Convention on Biological Diversity

UNDP

Aichi Biodiversity Target 11 Country Dossier: PAPUA NEW GUINEA

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TABLE OF CONTENTS

GLOSSARY **3**

EXECUTIVE SUMMARY **5**

Aichi Biodiversity Target 11 Elements: Current status and opportunities for action *5*

INTRODUCTION **8**

SECTION I: CURRENT STATUS **10**

COVERAGE - TERRESTRIAL & MARINE *11*

ECOLOGICAL REPRESENTATIVENESS – TERRESTRIAL & MARINE *14*

AREAS IMPORTANT FOR BIODIVERSITY *19*

AREAS IMPORTANT FOR ECOSYSTEM SERVICES *26*

CONNECTIVITY & INTEGRATION *28*

GOVERNANCE DIVERSITY *29*

PROTECTED AREA MANAGEMENT EFFECTIVENESS *32*

SECTION II: EXISTING PROTECTED AREA AND OECM COMMITMENTS **34**

PRIORITY ACTIONS FROM 2015-2016 REGIONAL WORKSHOPS *34*

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLANS (NBSAPs) *38*

APPROVED GEF-5 & GEF-6 PROTECTED AREA PROJECTS *40*

UN OCEAN CONFERENCE VOLUNTARY COMMITMENTS *41*

OTHER ACTIONS/COMMITMENTS *42*

ANNEX I **44**

FULL LIST OF TERRESTRIAL ECOREGIONS *44*

ANNEX II **46**

ADDITIONAL DETAILS ON PPAs *46*

REFERENCES **47**

GLOSSARY

AZEs	Alliance for Zero Extinction sites
CEPF	Critical Ecosystem Partnership Fund
EBSA	Ecologically or Biologically Significant Marine Area
EEZ	Exclusive Economic Zone
GCF	Green Climate Fund
GD-PAME	Global Database on Protected Area Management Effectiveness
GEF	Global Environment Facility
IBA	Important Bird and Biodiversity Area
ICCAs	Indigenous and Community Conserved Area Area (may also be referred to as territories and areas conserved by Indigenous peoples and local communities or "territories of life")
IPLC	Indigenous Peoples and Local Communities
KBA	Key Biodiversity Area
MEOW	Marine Ecosystems of the World
MPA	Marine Protected Area
NBSAP	National Biodiversity Strategy and Action Plan
OECM	Other Effective Area-Based Conservation Measures
PA	Protected Area
PAME	Protected Area Management Effectiveness
PPA	Privately Protected Area
PPOW	Pelagic Provinces of the World
ProtConn	Protected Connected land indicator
SOC	Soil Organic Carbon
TEOW	Terrestrial Ecosystems of the World
WDPA	World Database on Protected Areas
WD-OECM	World Database on Other Effective Area-Based Conservation Measures

Disclaimer

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This country dossier is compiled by the UNDP and SCBD from publicly available information. It is prepared, within the overall work of the Global Partnership on Aichi Biodiversity Target 11, for the purpose of attracting the attention of the Party concerned and other national stakeholders to facilitate the verification, correcting, and updating of country data. The statistics might differ from those reported officially by the country due to differences in methodologies and datasets used to assess protected area coverage and differences in the base maps used to measure terrestrial and marine area of a country or territory. Furthermore, the suggestions from the UNDP and SCBD are based on analyses of global datasets, which may not necessarily be representative of national policy or criteria used at the national level. The analyses are also subject to the limits inherent in global indicators (precision, reliability, underlying assumptions, etc.). Therefore, they provide useful information but cannot replace analyses at a national level nor constitute a future benchmark for national policy or decision-making.

The preparation of this dossier was generously supported by: the Government of the Federal Republic of Germany, *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GMbH*; the European Commission; the Government of the United Kingdom of Great Britain and Northern Ireland; and the Government of Japan (Japan Biodiversity Fund). The dossier does not necessarily reflect their views.

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EXECUTIVE SUMMARY

This document provides information on the coverage of protected areas (PAs) and other effective area-based conservation measures (OECMs), as currently reported in global databases (the World Database on Protected Areas (WDPA) and World Database on Other Effective Area-Based Conservation Measures (WD-OECM)). It also includes details on the status of the other qualifying elements of Aichi Biodiversity Target 11 based on this data. These statistics might differ from those reported officially by countries due to difference in methodologies and datasets used to assess protected area coverage, differences in the base maps used to measure terrestrial and marine area of a country or territory, or if global datasets differ from the criteria and indicators used at the national level. This dossier also provides a summary of commitments made under Aichi Biodiversity Target 11, and a summary of potential opportunities regarding elements of the target for future planning.

The dossier has been developed in consultation with the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), which manages the WDPA, WD-OECM and Global Database on Protected Area Management Effectiveness (GD-PAME). Parties to the CBD are requested to contact protectedareas@unep-wcmc.org with any updates to the information in these databases.

Aichi Biodiversity Target 11 Elements: Current status and opportunities for action

Coverage - Terrestrial & Marine

- **Status:** as of May 2021, terrestrial coverage in Papua New Guinea is 17,247.6 km^2 (3.7%) and marine coverage is 3,343.5 km^2 (0.1%).
- **Opportunities for action:** opportunities for the near-term include updating the WDPA with any unreported PAs, and the recognizing and reporting OECMs to the WD-OECM. In the future, focus on relatively intact areas, while addressing the elements in the following sections, could be considered when planning new PAs or OECMs.

Ecological Representativeness– Terrestrial & Marine

- **Status:** Papua New Guinea contains 18 terrestrial ecoregions, 9 marine ecoregions, and 1 pelagic province: the mean coverage by reported PAs and OECMs is 3.7% (terrestrial), 0.9% (marine), and 0.0% (pelagic); 5 terrestrial ecoregions, 4 marine ecoregions, and 1 pelagic province have no coverage by reported PAs and OECMs.
- **Opportunities for action:** there is opportunity for Papua New Guinea to increase protection in terrestrial and marine ecoregions and pelagic provinces that have lower levels of coverage by PAs or OECMs. Ecoregions which currently have no coverage by PAs or OECMs are key areas for action.

Areas Important for Biodiversity

- **Status:** Papua New Guinea has 129 Key Biodiversity Areas (KBAs): the mean protected coverage of KBAs by reported PAs and OECMs is 7.1%, while 106 KBAs have no coverage by reported PAs and OECMs.

- **Opportunities for action:** there is opportunity for Papua New Guinea to increase protection of KBAs that have lower levels of coverage by PAs and OECMs; priority could be given to those with no current coverage.

Areas Important for Ecosystem Services

- **Status:** coverage of areas important for ecosystem services: In Papua New Guinea, 3.3% of aboveground biomass carbon, 3.3% of belowground biomass carbon, 3.2% of soil organic carbon, 0.2% of carbon stored in marine sediments is covered by PAs and OECMs.

- **Opportunities for action:** for carbon, there is opportunity for Papua New Guinea to increase PA and OECM coverage in both marine and terrestrial areas with high carbon stocks. Protecting areas with high carbon stocks secures the benefits of carbon sequestration in the area.

- For water, there is opportunity to increase the area of the water catchment under protection by PAs and OECMs, or in cases where there is high levels of protection, focus on effective management for these areas. Protecting the current area of forested land and potentially reforesting would have benefits for improving water security.

Connectivity and Integration

- **Status:** coverage of protected-connected lands is 1.9%.

- **Opportunities for action:** there is opportunity for a general increase of PAs or OECMs and to focus on PA and OECM management for enhancing and maintaining connectivity. Improving connectivity increases the effectiveness of PAs and OECMs and reduces the impacts of fragmentation.

- As well, a range of suggested steps for enhancing and supporting integration are included in the voluntary guidance on the integration of PAs and OECMs into the wider land- and seascapes and mainstreaming across sectors to contribute, inter alia, to the SDGs (Annex I of COP Decision 14/8)

Governance Diversity

- **Status:** the most common governance type(s) for reported PAs in Papua New Guinea is: 93.0% under IPLCs (82.5% local communities; 10.5% Indigenous Peoples).

- **Opportunities for action:** explore opportunities for governance types that have lower representation, for Papua New Guinea this could relate to shared governance.

- There is also opportunity for Papua New Guinea to complete governance and equity assessments, to establish baselines and identify relevant actions for improvement. As well, a range of suggested actions are included in the voluntary guidance on effective governance models for management of protected areas, including equity (Annex II of COP Decision 14/8).

Protected Area Management Effectiveness

- **Status:** 75.9% of terrestrial PAs and 90.6% of marine PAs have completed Protected Area Management Effectiveness (PAME) assessments reported.
- **Opportunities for action:** the 60% target for completed management effectiveness assessments (per COP Decision X/31) **has** been met for terrestrial PAs and **has** been met for marine PAs. Further increasing this percentage would be beneficial overall for understanding how well protected areas are being managed.
- There is also opportunity to implement the results of completed PAME evaluations, to improve the quality of management for existing PAs and OECMs (e.g. through adaptive management and information sharing, increasing the number of sites reporting 'sound management') and to increase reporting of biodiversity outcomes in PAs and OECMs.

INTRODUCTION

The Strategic Plan for Biodiversity 2011-2020 was adopted at the tenth meeting of the Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) held in Nagoya, Aichi Prefecture, Japan from 18-29 October 2010. The vision of the Strategic Plan is one of "Living in harmony with nature" where *"By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people"* (CBD, 2010). In addition to this vision, the Strategic Plan is composed of 20 targets, under five strategic goals. Aichi Biodiversity Target 11 states that *"By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes."*

With the conclusion of the Aichi Biodiversity Targets in 2020, Target 11 on area-based conservation has seen success in the expansion of the global network of protected areas (PA) and other effective area-based conservation measures (OECMs). The negotiation of the post-2020 Global Biodiversity Framework (GBF) and its future targets provide an essential opportunity to further improve the coverage of PAs and OECMs, to improve other aspects of area-based conservation, to accelerate progress on biodiversity conservation more broadly, while also addressing climate change, and the Sustainable Development Goals. This next set of global biodiversity targets are to be adopted at the fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity. These new targets must aim to build upon lessons learned from the last decade of progress to deliver transformative change for the benefit of nature and people, to realize the 2050 Vision for biodiversity.

The United Nations Development Programme (UNDP) and the Secretariat of the Convention on Biological Diversity have developed the Aichi Biodiversity Target 11 Country Dossiers, which provide countries with an overview of the status of Target 11 elements, opportunities for action, and a summary of commitments made by Parties over the last decade. Each dossier can support countries in assessing their progress on key elements of Aichi Biodiversity Target 11 and identifying opportunities to prioritize new protected areas and OECMs.

This dossier provides an overview of area-based conservation in Papua New Guinea. Section I of the dossier presents data on the current status of Papua New Guinea's PAs and OECMs. The data presented in Section I relates to each element of Target 11. Section I also presents the PA and OECM coverage for two critical ecosystem services: water security and carbon stocks. In addition, the dossier presents opportunities for action for Papua New Guinea, in relation to each Target 11 element. The analyses present options for improving Papua New Guinea's area-based conservation network to achieve enhanced protection and benefits for livelihoods and climate change. Section II presents details on Papua New Guinea's existing PA and OECM commitments as a summary of existing efforts towards achieving Target 11. This gives focus not only to national policy and actions but also

voluntary commitments to the UN. Furthermore, where data is available, this dossier provides information on potential OECMs, Indigenous and Community Conserved Areas (ICCAs; also, often referred to as territories and areas conserved by Indigenous peoples and local communities or "territories of life") and Privately Protected Areas (PPAs) and the potential contribution they will have in achieving the post-2020 targets.

The information on PAs and OECMs presented here is derived from the World Database on Protected Areas (WDPA) and World Database on Other Effective Area-Based Conservation Measures (WD-OECM). These databases are joint products of UNEP and IUCN, managed by UNEP-WCMC, and can be viewed and downloaded at www.protectedplanet.net. Parties are encouraged to provide data on their PAs and OECMs to UNEP-WCMC for incorporation into the databases (see e.g., Decisions 10/31 and 14/8). The significant efforts of Parties in updating their data in the build up to the publication of the Protected Planet Report 2020 (UNEP-WCMC and IUCN, 2021) were greatly appreciated. UNEP-WCMC welcomes further updates, following the data standards described here (www.wcmc.io/WDPA_Manual), and these should be directed to protectedareas@unep-wcmc.org. The statistics presented in this dossier are derived from the May 2021 WDPA and WD-OECM releases, unless explicitly stated otherwise. Readers should consult www.protectedplanet.net for the latest coverage statistics (updated monthly).

Some data from the WDPA and WD-OECM are not made publicly available at the request of the data-provider. This affects some statistics, maps, and figures presented in this dossier. Statistics provided by UNEP-WCMC (terrestrial and marine coverage) are based upon the full dataset, including restricted data. All other statistics, maps, and figures are based upon the subset of the data that is publicly available.

Where data is less readily available, such as for potential OECMs, ICCAs and PPAs, data has also been compiled from published reports and scientific literature to provide greater awareness of these less commonly recorded aspects. These data are provided to highlight the need for comprehensive reporting on these areas to the WDPA and/or WD-OECM. Parties are invited to work with indigenous peoples, local communities and private actors to submit data under the governance of these actors, with their consent, to the WDPA and/or WD-OECM.

Overall, PAs and OECMs are essential instruments for biodiversity conservation and to sustain essential ecosystem services that support human well-being and sustainable development, including food, medicine, and water security, as well as climate change mitigation and adaptation and disaster risk reduction. The data in this dossier, therefore, aims to celebrate the current contributions of PAs and OECMs, whilst the gaps presented hope to encourage greater progress, not just for the benefit of biodiversity and the post-2020 GBF, but also to recognize the essential role of PAs and OECMs to the Sustainable Development Goals and for addressing the climate crisis.

SECTION I: CURRENT STATUS

Aichi Biodiversity Target 11 refers to both protected areas (PAs) and other effective area-based conservation measures (OECMs). This section provides the current status for all elements of Aichi Biodiversity Target 11 where indicators with global data are available. Statistics for all elements are presented using data on both PAs and OECMs (where this data is available and reported in global databases like the WDPA and WD-OECM). It is recognized that statistics reported in the WPDA and WD-OECM might differ from those reported officially by countries due to differences in methodologies and datasets used to assess protected area coverage and differences in the base maps used to measure terrestrial and marine area of a country or territory. Details on UNEP-WCMC's methods for calculating PA and OECM coverage area available here. The global indicators adopted here for presenting the status of other elements of Target 11 may also differ from those in use nationally.

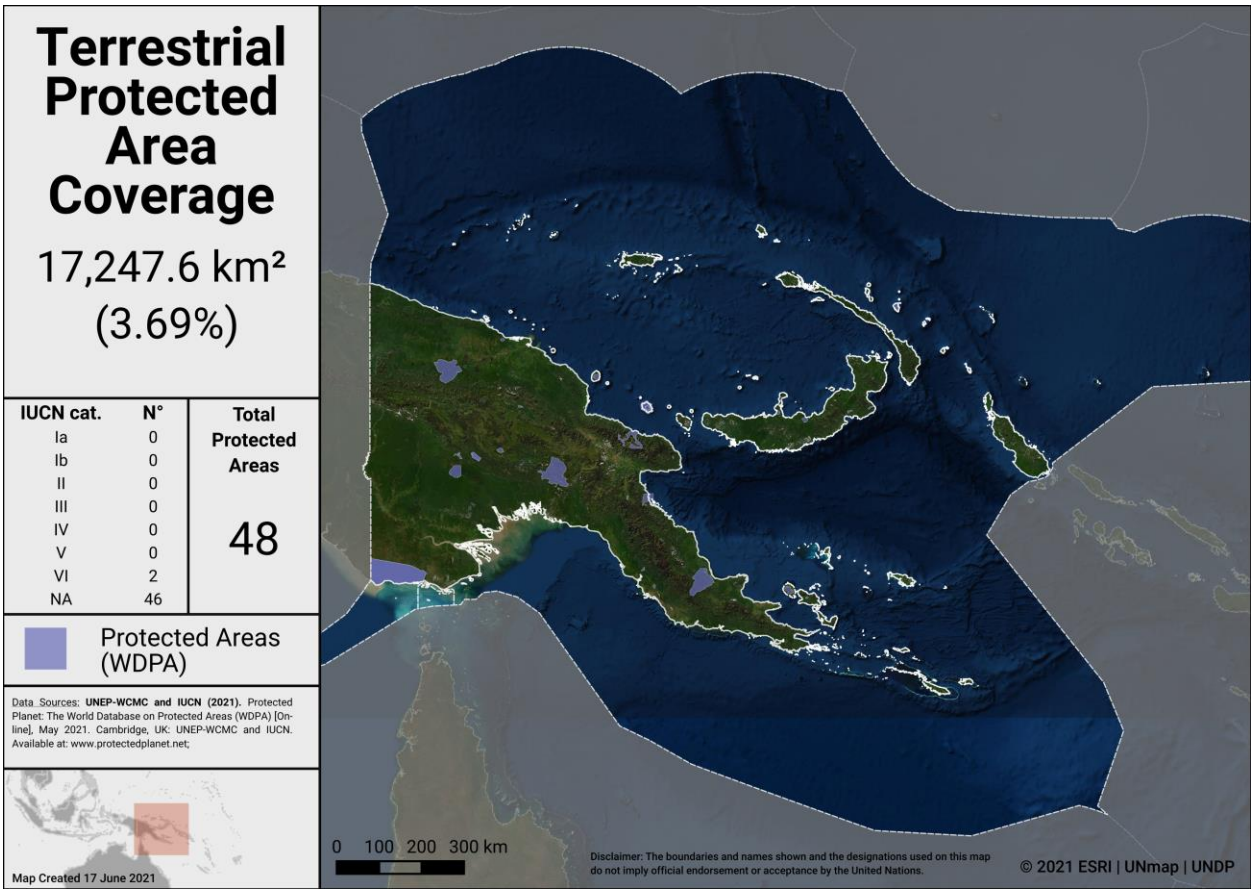
COVERAGE - TERRESTRIAL & MARINE

As of May 2021, Papua New Guinea has **57** protected areas reported in the World Database on Protected Areas (WDPA). 2 proposed PAs are not included in the following statistics (see details on UNWP-WCMC's methods for calculating PA and OECM coverage **here**).

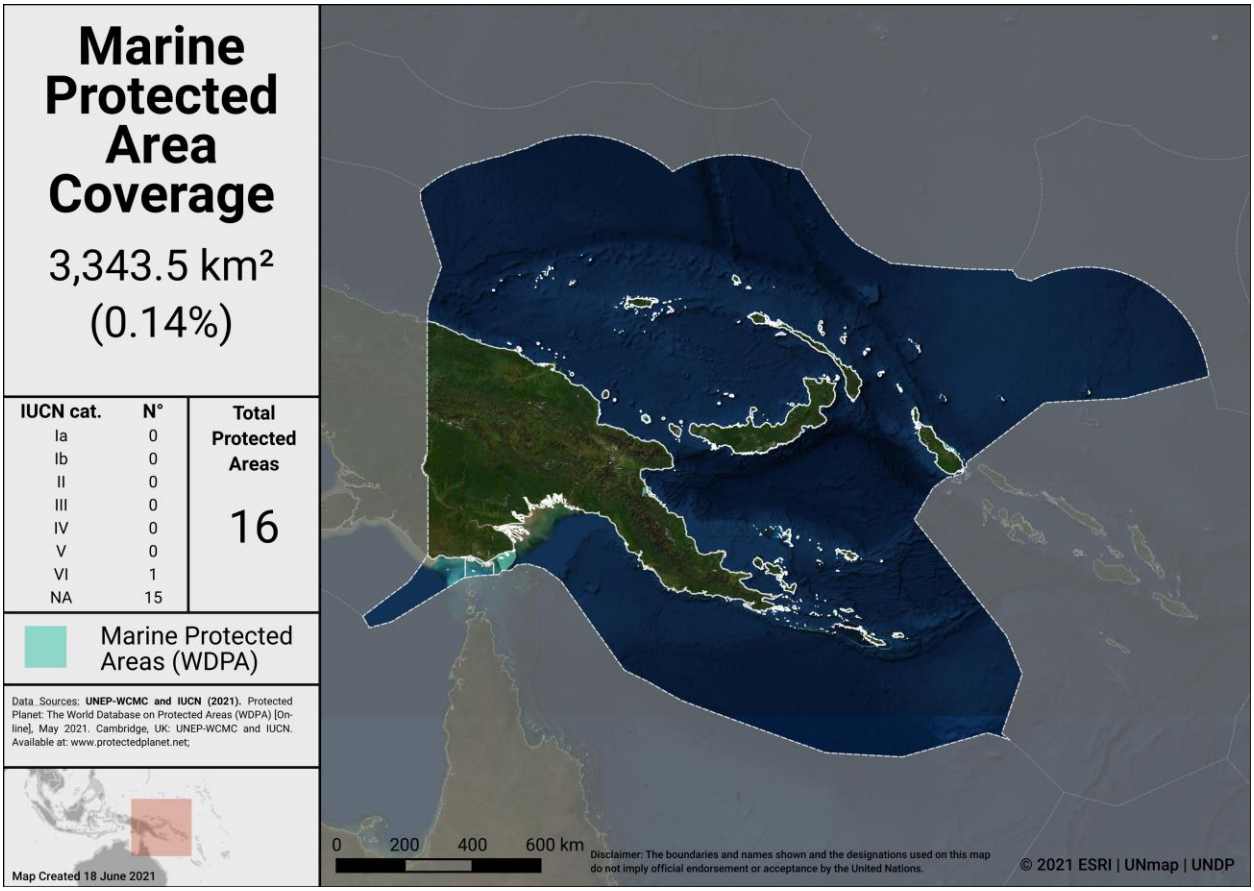
As of May 2021, Papua New Guinea has **0** OECMs reported in the world database on OECMs (WD-OECM).

Current coverage for Papua New Guinea:

- 3.7% terrestrial (48 protected areas, 17,247.6 km^2)
- 0.1% marine (16 protected areas, 3,343.5 km^2)



Terrestrial Protected Areas in Papua New Guinea



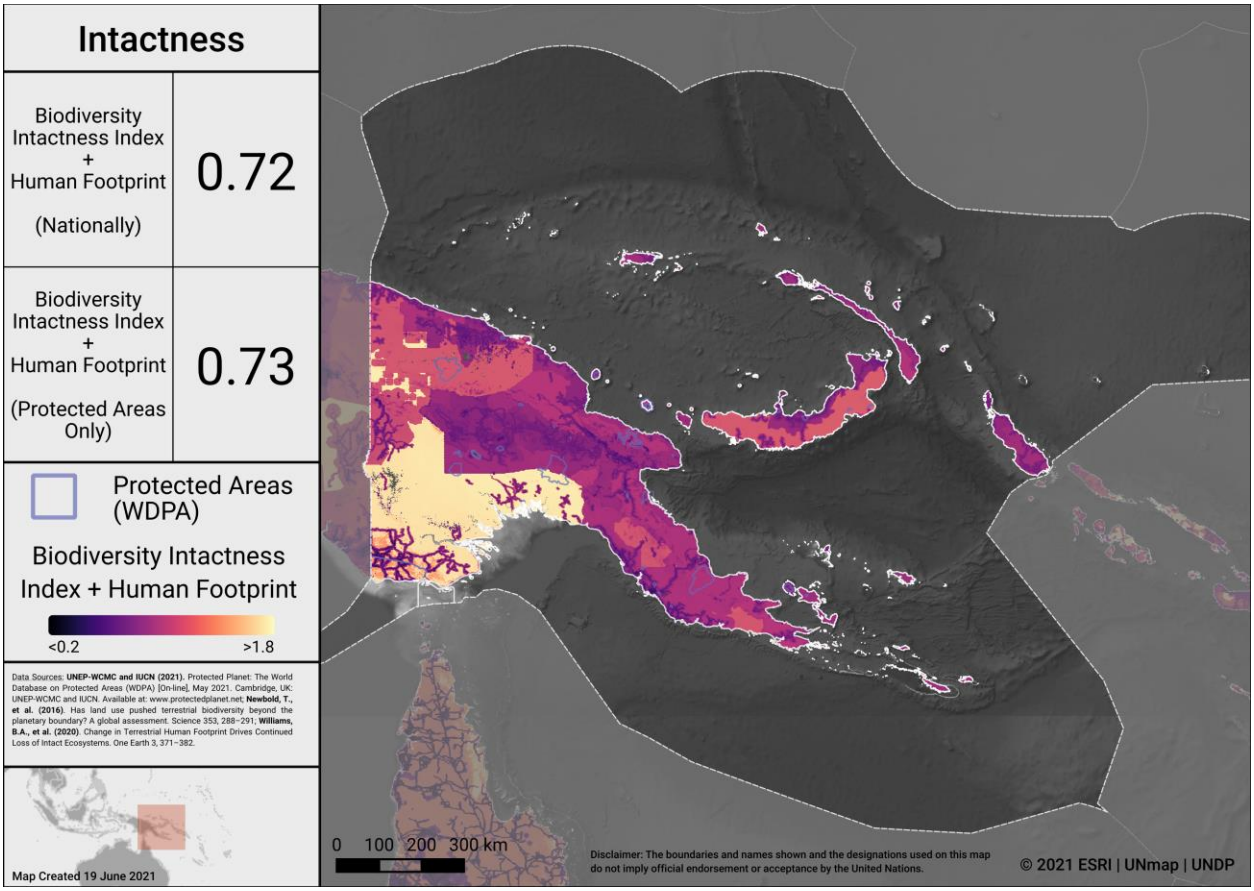
Marine Protected Areas in Papua New Guinea

Potential OECMs

There are no currently potential OECM examples for Papua New Guinea.

Opportunities for action

Opportunities for the near-term include updating the WDPA with any unreported PAs, and the recognizing and reporting OECMs to the WD-OECM. In the future, as Papua New Guinea considers where to add new PAs and OECMs, the map below identifies areas in Papua New Guinea where intact terrestrial areas are not currently protected. Focus on relatively intact areas, while addressing the elements in the following sections, could be considered when planning new PAs or OECMs.



Intactness in Papua New Guinea

To explore more on intactness visit the UN Biodiversity Lab: map.unbiodiversitylab.org.

ECOLOGICAL REPRESENTATIVENESS – TERRESTRIAL & MARINE

Ecological representativeness is assessed based on the PAs and OECMs coverage of broad-scale biogeographic units. Globally, ecoregions have been described for terrestrial areas (Dinerstein et al., 2017), marine coastal and shelf ecosystems (to a depth of 200m; Spalding et al., 2007) and surface pelagic waters (Spalding et al., 2012).

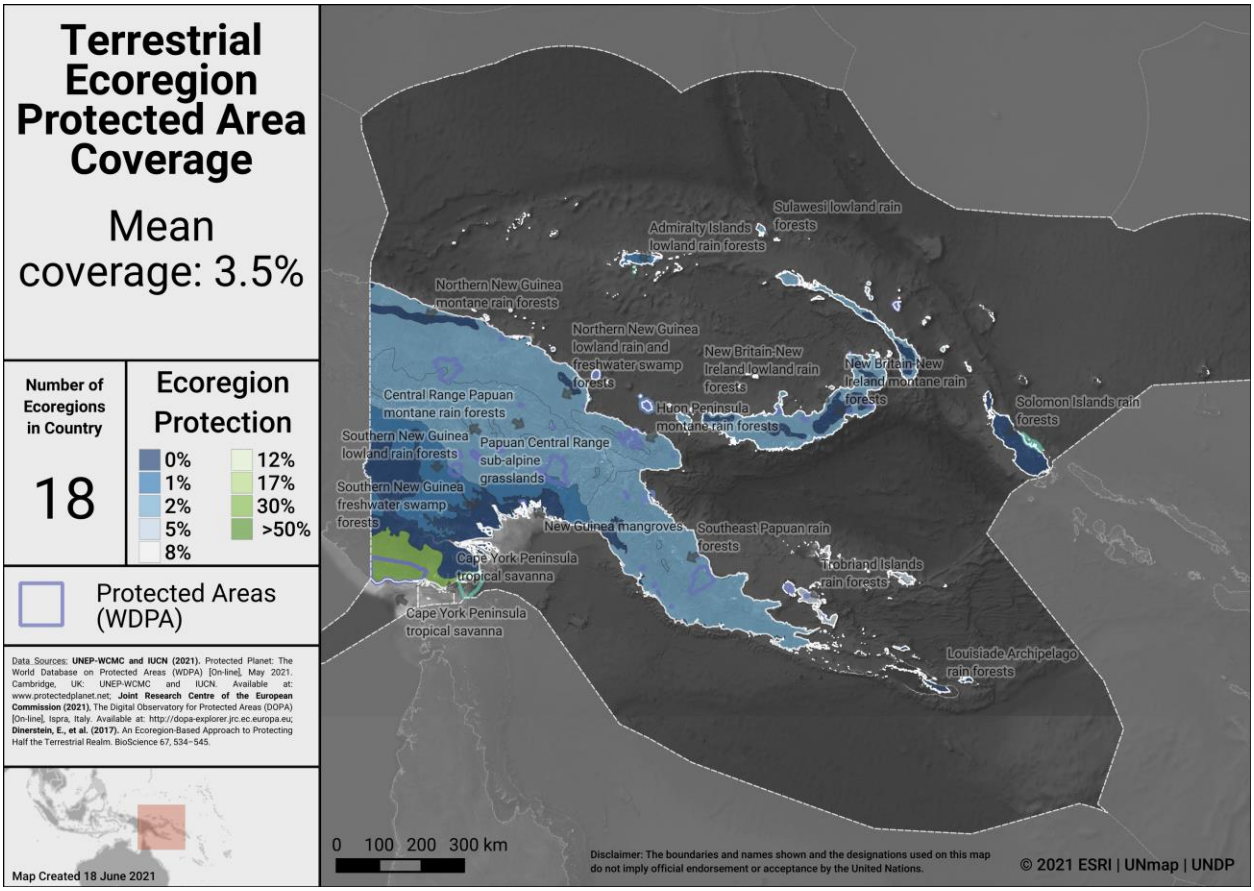
Papua New Guinea has 18 **terrestrial** ecoregions. Out of these:

- 13 ecoregions have at least some coverage from PAs and OECMs.
- 1 ecoregion has at least 17% protected within the country.
- The average terrestrial coverage of ecoregions is 3.7%.

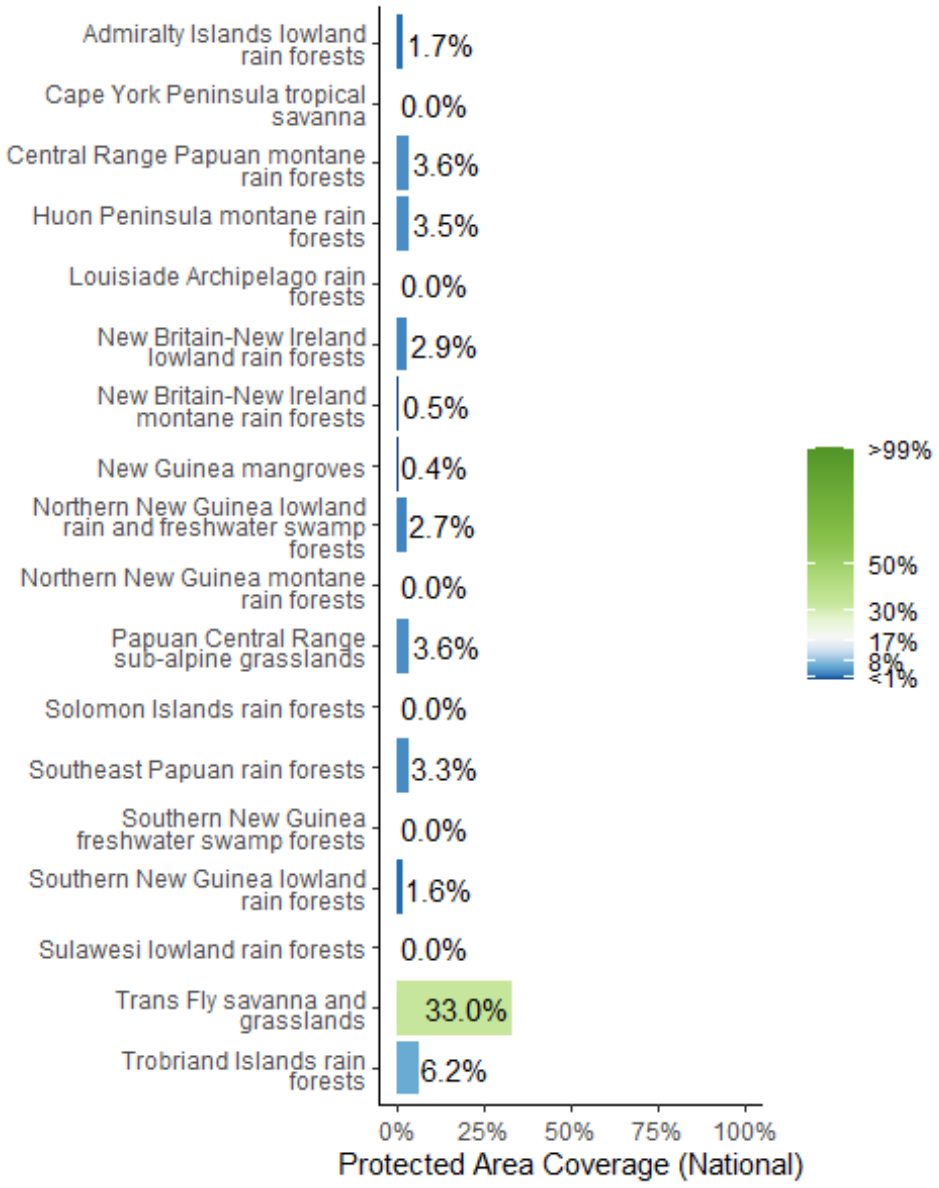
Papua New Guinea has 9 **marine** ecoregions and 1 **pelagic province**. Out of these:

- 5 marine ecoregions and 0 pelagic provinces have at least some coverage from reported PAs and OECMs.
- 0 marine ecoregions and 0 pelagic provinces have at least 10% protected within Papua New Guinea's exclusive economic zone (EEZ).
- The average protected area coverage of marine ecoregions is 0.9% and the average protected area coverage of Pelagic Provinces is 0.0%.

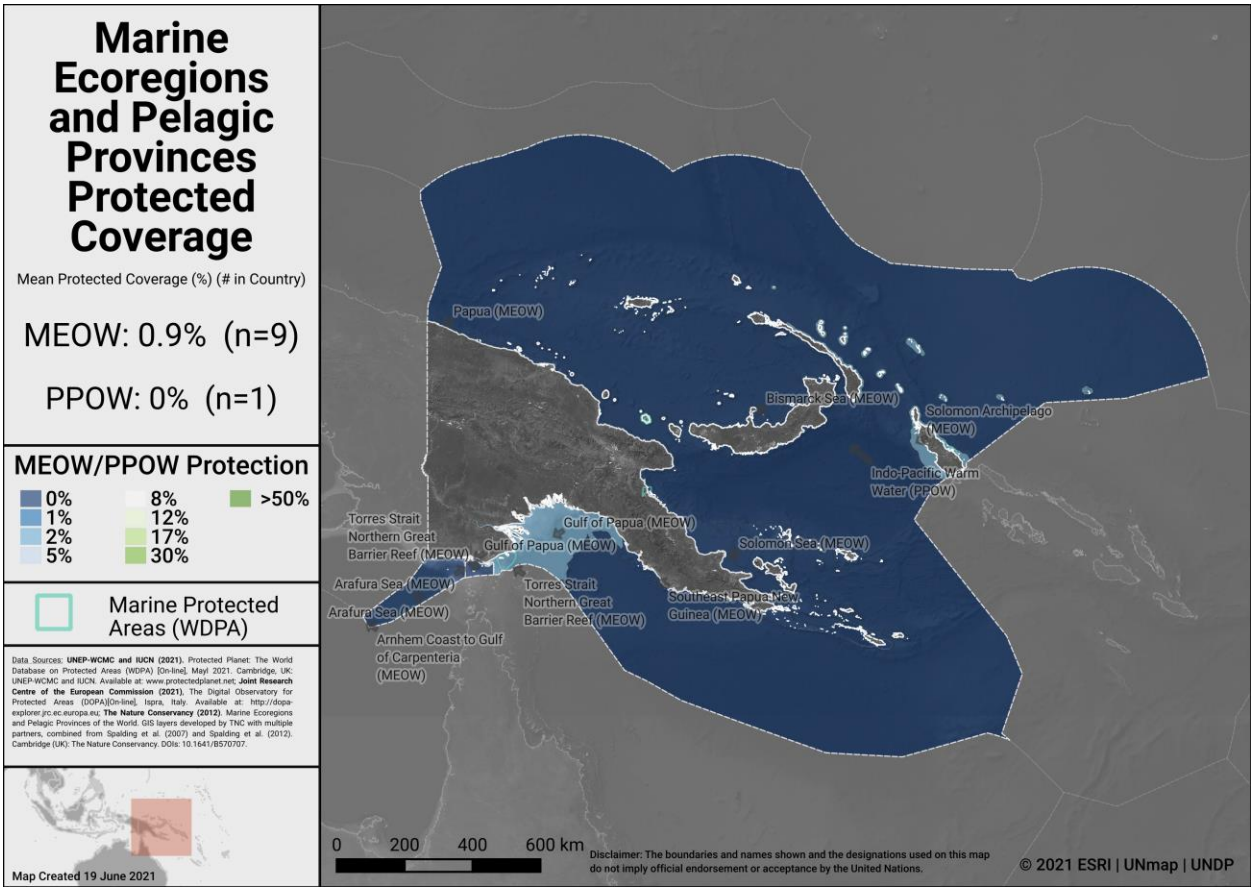
A full list of terrestrial ecoregions in Papua New Guinea is available in Annex I.



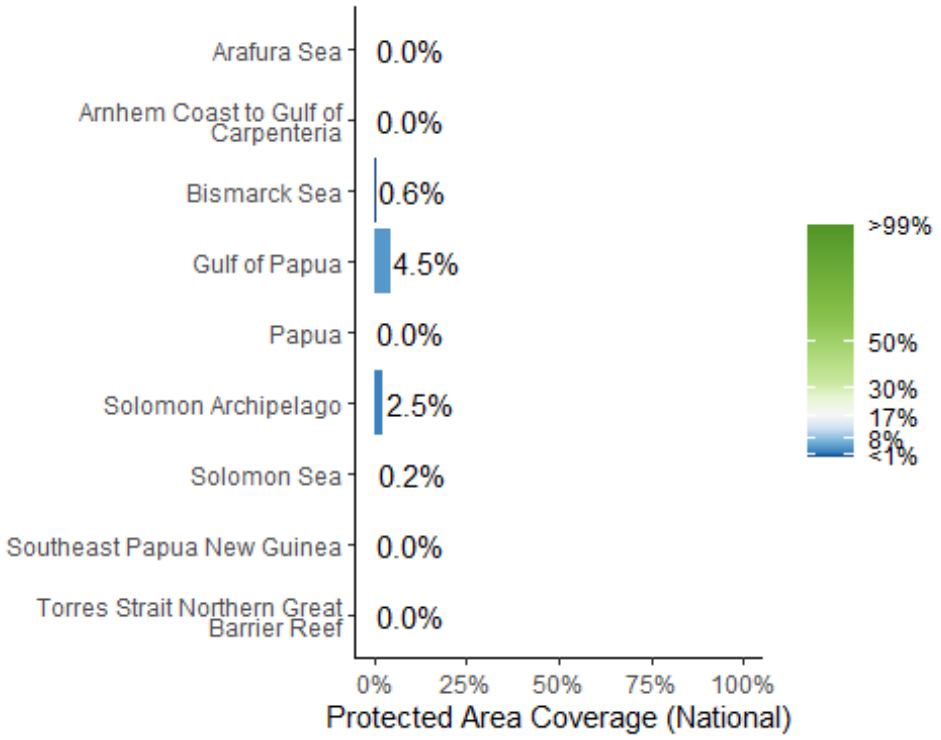
Terrestrial ecoregions in Papua New Guinea



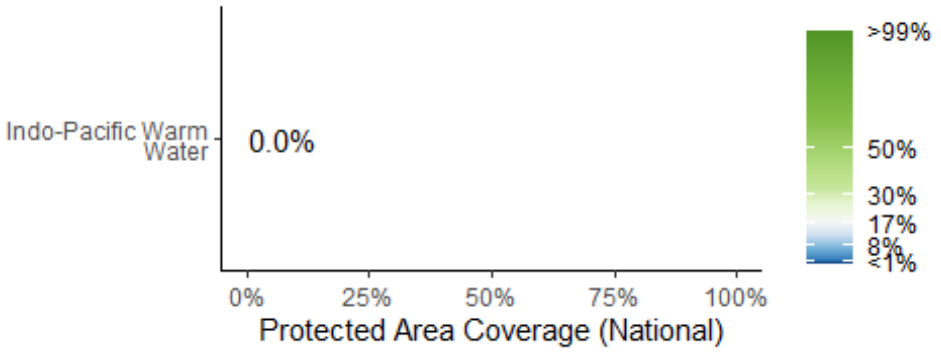
Terrestrial ecoregions of the World (TEOW) in Papua New Guinea



Marine ecoregions and pelagic provinces



Marine Ecoregions of the World (MEOW) in Papua New Guinea



Pelagic Provinces of the World (PPOW) in Papua New Guinea

Opportunities for action

There is opportunity for Papua New Guinea to increase protection in terrestrial and marine ecoregions and pelagic provinces that have lower levels of coverage by PAs or OECMs. Ecoregions which currently have no coverage by PAs or OECMs are key areas for action.

AREAS IMPORTANT FOR BIODIVERSITY

Key Biodiversity Areas (KBAs)

Protected area and OECM coverage of Key Biodiversity Areas (KBAs) provide one proxy for assessing the conservation of areas important for biodiversity at national, regional and global scales. KBAs are sites that make significant contributions to the global persistence of biodiversity (IUCN, 2016). The KBA concept builds on four decades of efforts to identify important sites for biodiversity, including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and KBAs identified through Hotspot ecosystem profiles supported by the Critical Ecosystem Partnership Fund. Incorporating these sites, the dataset of internationally significant KBAs includes Global KBAs (sites shown to meet one or more of 11 criteria in the Global Standard for the Identification of KBAs, clustered into five categories: threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and irreplaceability), Regional KBAs (sites identified using pre-existing criteria and thresholds, that do not meet the Global KBA criteria based on existing information), and KBAs whose Global/Regional status is Not yet determined, but which will be assessed against the global KBA criteria within 8-12 years. Regional KBAs are often of critical international policy relevance (e.g., in EU legislation and under the Ramsar Convention on Wetlands), and many are likely to qualify as Global KBAs in future once assessed for their biodiversity importance for other taxonomic groups and ecosystems. To date, nearly 16,000 KBAs have identified globally, and information on each of these is presented in the World Database of Key Biodiversity Areas: www.keybiodiversityareas.org.

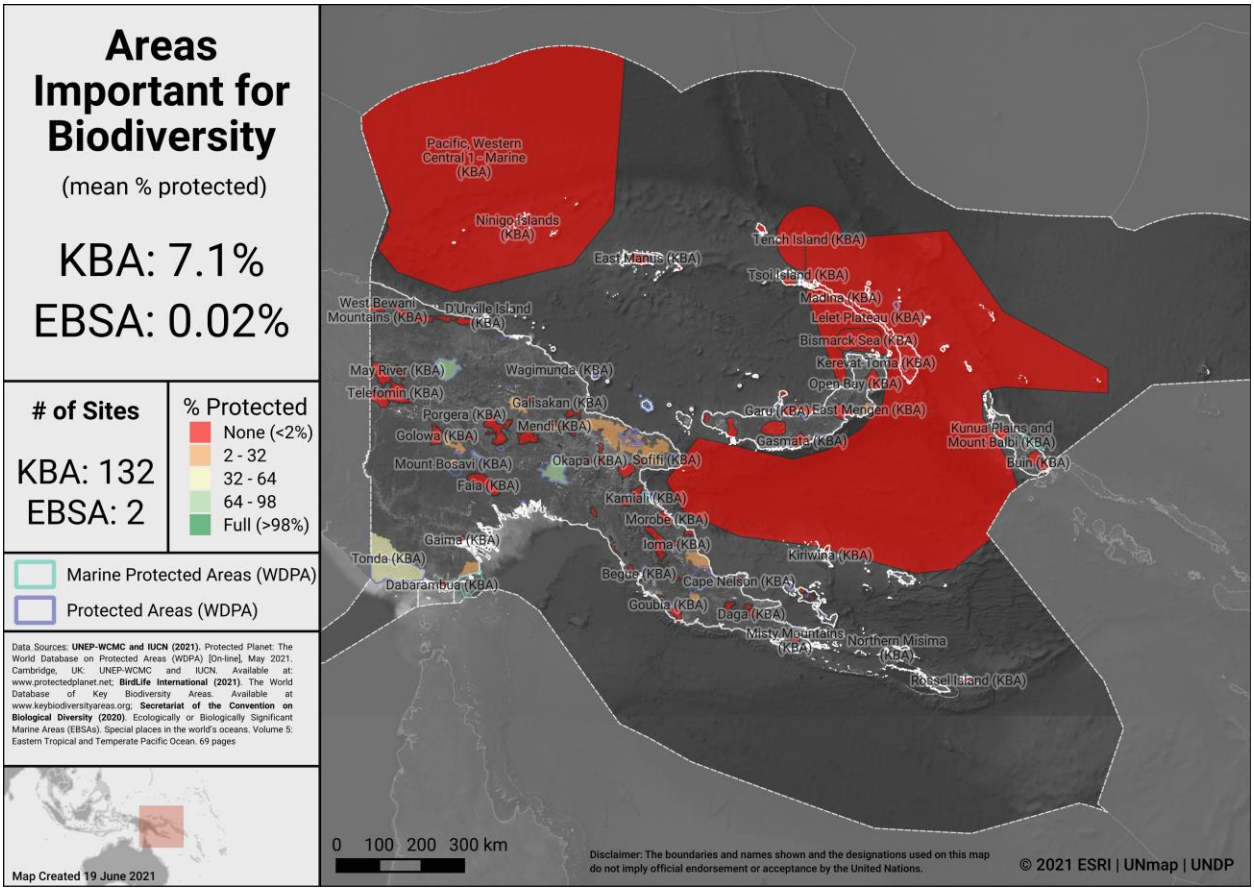
Papua New Guinea has 132 Key Biodiversity Areas (KBAs) [**129** included in the analysis]

- Mean percent coverage of all KBAs by PAs and OECMs in Papua New Guinea is **7.1%**.
- **0** KBAs have full (>98%) coverage by PAs and OECMs.
- **23** KBAs have partial coverage by PAs and OECMs.
- **106** KBAs have no (<2%) coverage by PAs and OECMs.
- *3 KBAs lack spatial data to allow PA coverage to be determined*

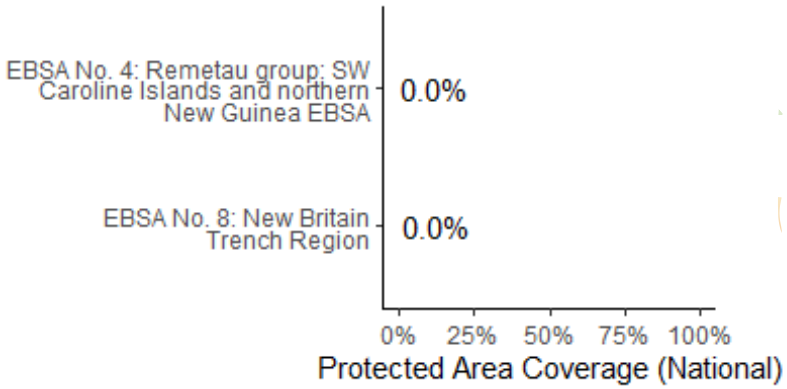
Ecologically or Biologically Significant Marine Areas (EBSAs)

Other important areas for biodiversity may also include Ecologically or Biologically Significant Marine Areas (EBSAs), which were identified following the scientific criteria adopted at COP-9 (Decision IX/20; see more at: https://www.cbd.int/ebsa/). Sites that meet the EBSA criteria may require enhanced conservation and management measures; this could be achieved through means including MPAs, OECMs, marine spatial planning, and impact assessment.

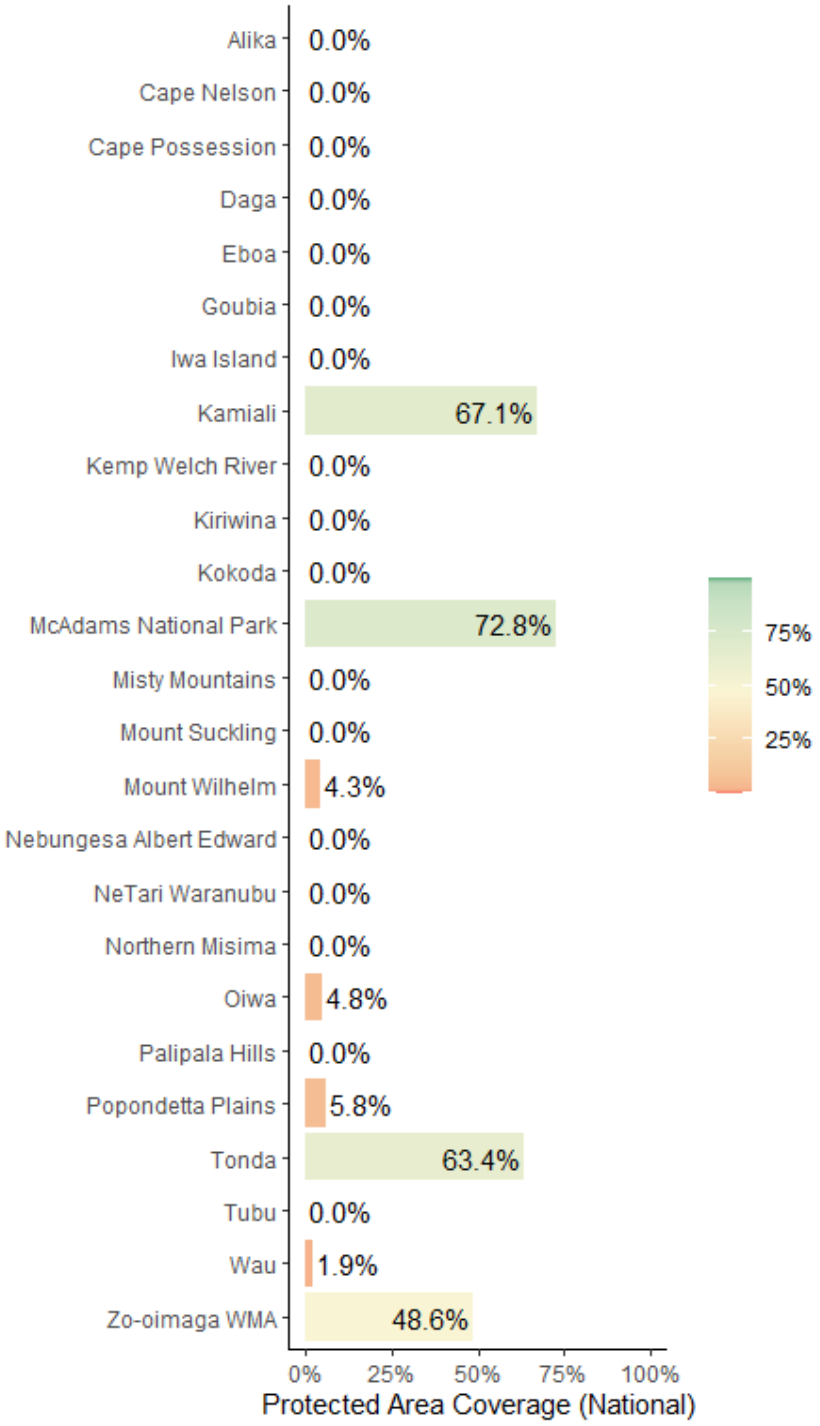
There are 2 EBSAs with some portion of their extent within Papua New Guinea's EEZ, both of which have no coverage from PAs or OECMs.



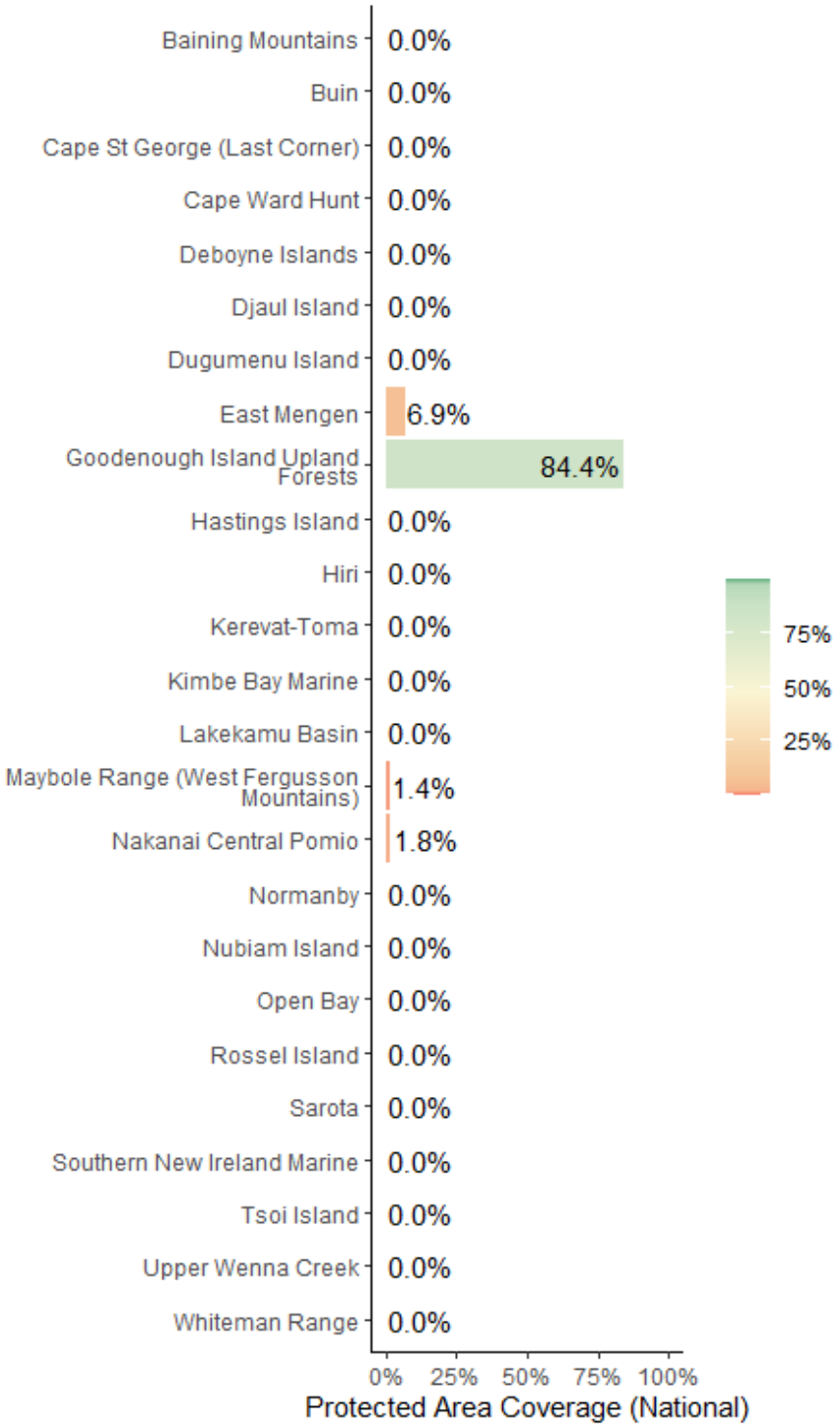
Areas Important for Biodiversity in Papua New Guinea



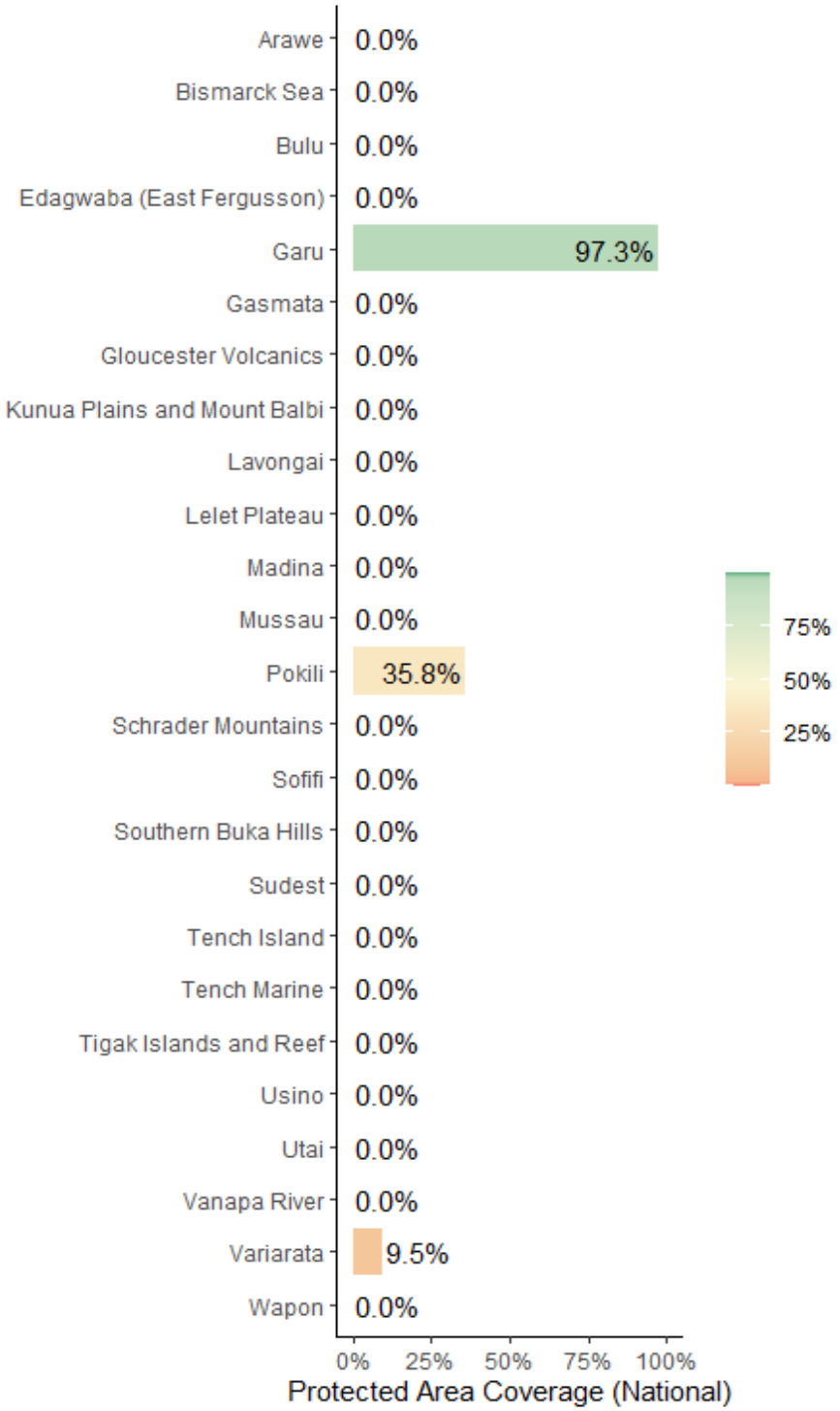
Ecologically or Biologically Significant Marine Areas (EBSAs) in Papua New Guinea



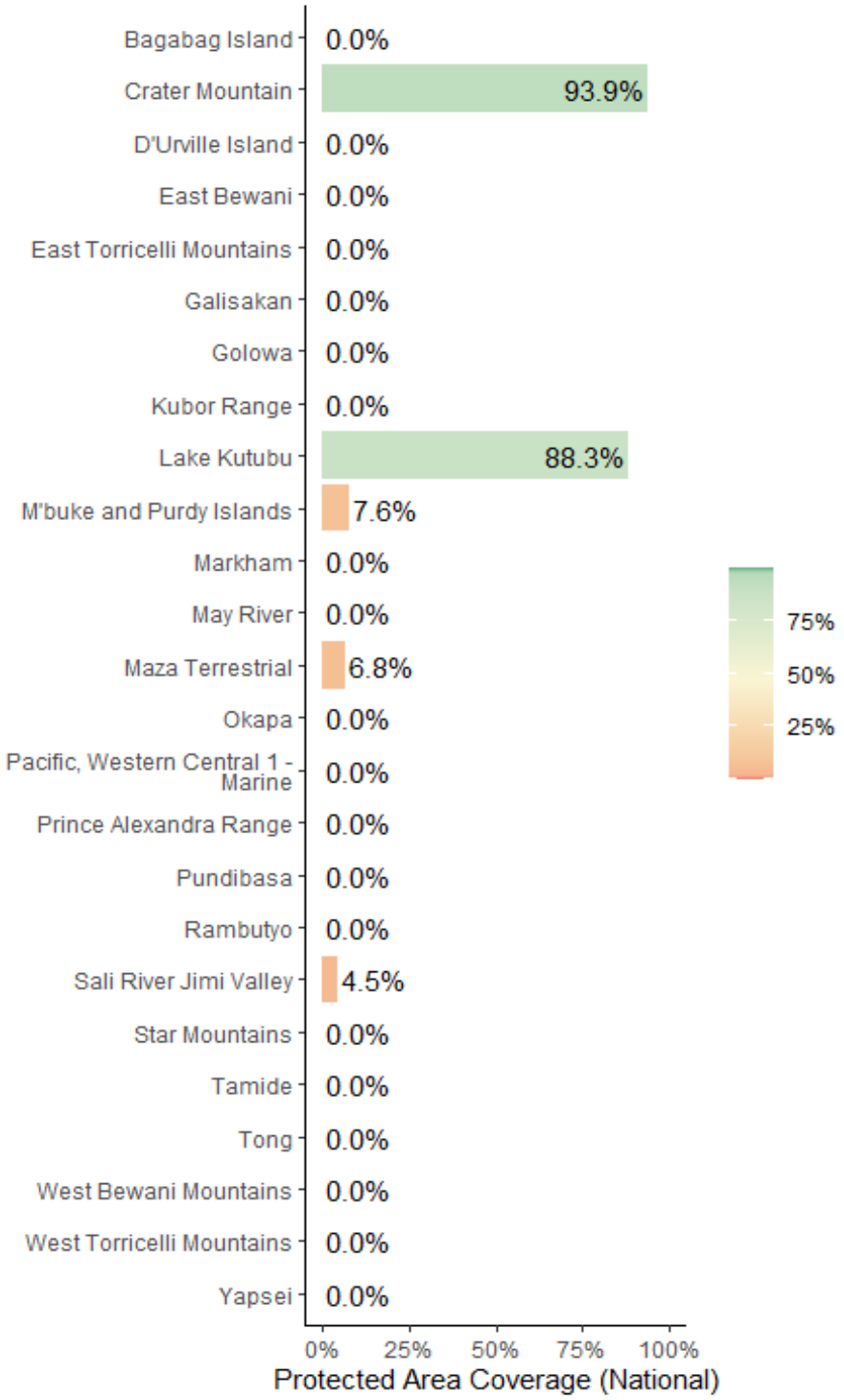
Key Biodiversity Area Coverage (KBA) in Papua New Guinea



Key Biodiversity Area Coverage (KBA) in Papua New Guinea



Key Biodiversity Area Coverage (KBA) in Papua New Guinea



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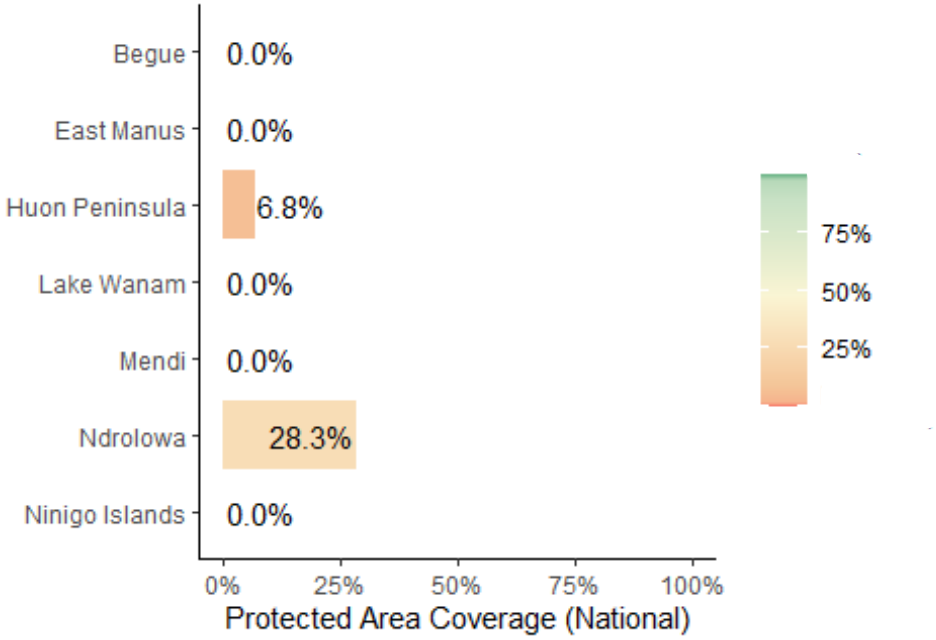


Key Biodiversity Area Coverage (KBA) in Papua New Guinea

Opportunities for action

There is opportunity for Papua New Guinea to increase protection of KBAs that have lower levels of coverage by PAs and OECMs; priority could be given to those with no current coverage

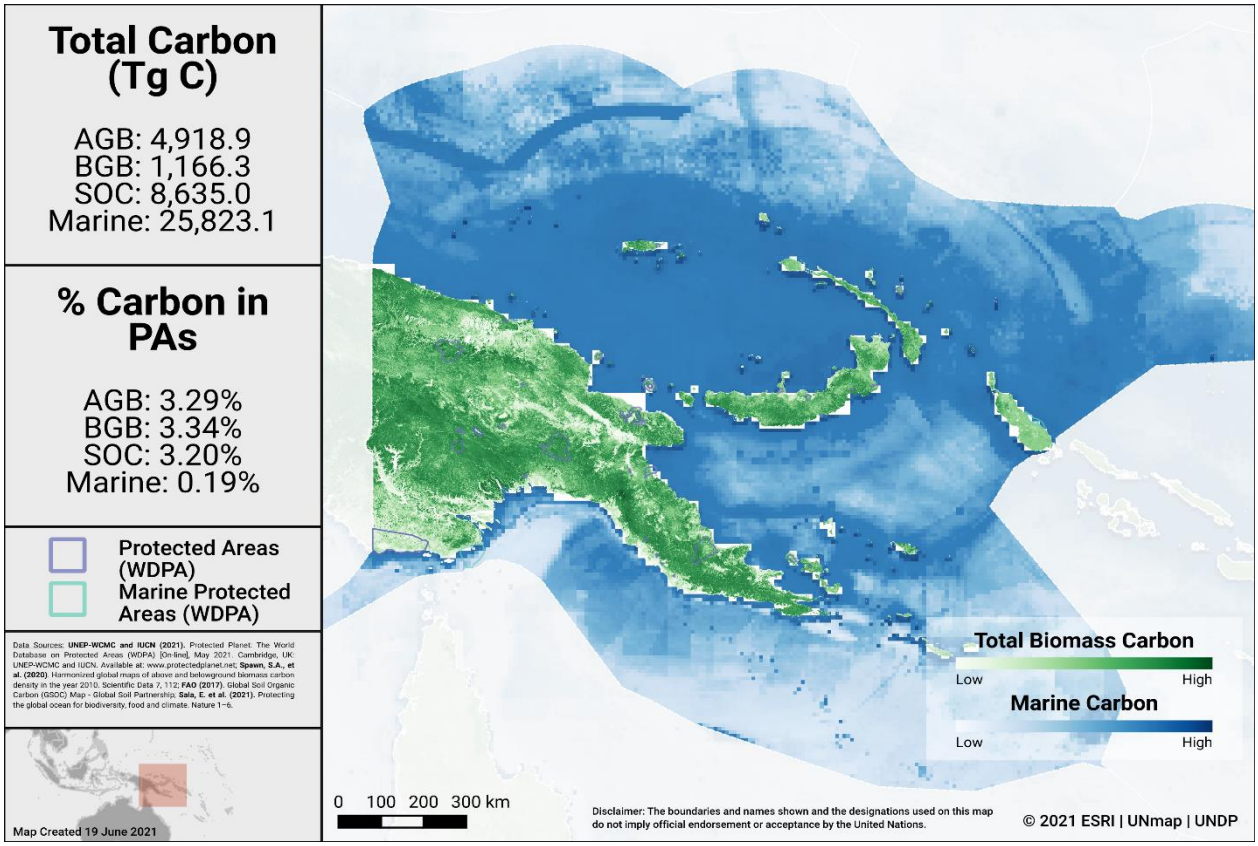
AREAS IMPORTANT FOR ECOSYSTEM SERVICES

There is no single indicator identified for assessing the conservation of areas important for ecosystem services. For simplicity, two services with available global datasets are assessed here (carbon and water). In future, other critical ecosystem services could be explored.

Carbon

Data for biomass carbon comes from temporally consistent and harmonized global maps of aboveground biomass and belowground biomass carbon density (at a 300-m spatial resolution); the maps integrate land-cover specific, remotely sensed data, and land-cover specific empirical models (see Spawn et al., 2020 for details on methodology). The Global Soil Organic Carbon Map present an estimation of SOC stock from 0 to 30 cm (see FAO, 2017). Data is also presented from global maps of marine sedimentary carbon stocks, standardized to a 1-meter depth (see Sala et al., 2021, and Atwood et al., 2020).

The map below presents the total carbon stocks in Papua New Guinea and the percent of carbon in protected areas. The total carbon stocks is 4,918.9 Tg C from aboveground biomass (AGB), with 3.3% in protected areas; 1,166.3 Tg C from below ground biomass (BGB), with 3.3% in protected areas; 8,635.0 Tg C from soil organic carbon (SOC), with 3.2% in protected areas; and 25,823.1 Tg C from marine sediment carbon, with 0.2% in protected areas.



Carbon Stocks in Papua New Guinea

Water

Forests and intact ecosystems support stormwater management and clean water availability, especially for large urban populations. Research that has examined the role of forests for city drinking water supplies shows that of the world's 105 largest cities, more than 30% (33 cities) rely heavily on the local protected forests, which provide ecosystem services that underpin local drinking water availability and quality (Dudley & Stolton, 2003).

Drinking water supplies for cities in Papua New Guinea may similarly depend on protected forest areas within and around water catchments. Intact catchments can support more consistent water supply and improved water quality.

Opportunities for action

For carbon, there is opportunity for Papua New Guinea to increase PAs and OECMs coverage in both marine and terrestrial areas with high carbon stocks, as identified in the map above. Protecting areas with high carbon stocks secures the benefits of carbon sequestration in the area.

For water, there is opportunity to increase the area of the water catchment under protection by PAs and OECMs, or in cases where there is high levels of protection, focus on effective management for these areas. Protecting the current area of forested land and potentially reforesting would have benefits for improving water security.

CONNECTIVITY & INTEGRATION

Two global indicators, the Protected Connected land indicator (ProtConn; EC-JRC, 2021; Saura et al., 2018) and the PARC-Connectedness indicator (CSIRO, 2019), have been proposed for assessing the terrestrial connectivity of PA and OECM networks. To date there is no global indicator for assessing marine connectivity, though some recent developments include proposed guidance for the treatment of connectivity in the planning and management of MPAs (see Lausche et al., 2021).

Protected Connected Land Indicator (Prot-Conn)

As of January 2021, as reported in the Joint Research Centre of the European Commission's Digital Observatory for Protected Areas (DOPA) (JRC, 2021), the coverage of protected-connected lands (a measure of the connectivity of terrestrial protected area networks, assessed using the ProtConn indicator) in Papua New Guinea was 1.9%.

PARC-Connectedness Index

In 2019, as assessed using the PARC-Connectedness Index (values ranging from 0-1, indicating low to high connectivity), connectivity in Papua New Guinea is 0.42. This represents no significant change since 2010.

Corridor case studies

There are currently no corridor case studies available for Papua New Guinea (but see general details on conserving connectivity through ecological networks and corridors in Hilty et al 2020).

Opportunities for action

There is opportunity for a general increase of PAs or OECMs and to focus on PA and OECM management for enhancing and maintaining connectivity. Improving connectivity increases the effectiveness of PAs and OECMs and reduces the impacts of fragmentation.

As well, a range of suggested steps for enhancing and supporting integration are included in the voluntary guidance on the integration of PAs and OECMs into the wider land- and seascapes and mainstreaming across sectors to contribute, inter alia, to the SDGs (Annex I of COP Decision 14/8).

GOVERNANCE DIVERSITY

There is a lack of comprehensive global data on governance quality and equity in PAs and OECMs. Here, we provide data on the diversity of governance types for reported PAs and OECMs.

As of May 2021, PAs in Papua New Guinea reported in the WDPA have the following governance types:

- 3.5% are governed by **governments** (by federal or national ministry or agency)
- 0.0% are under **shared** governance
- 0.0% are under **private** governance
- 93.0% are under **IPLC** governance
  - 10.5% by Indigenous Peoples
  - 82.5% by local communities
- 3.5% **do not** report a governance type
  - (All of which are international designations)

OECMs

As of May 2021, there are **0** OECMs in Papua New Guinea reported in the WD-OECM, therefore there is no data available on OECM governance types.

Privately Protected Areas (PPAs)

From Gloss et al. (2019), a UNDP study on PPAs, in Papua New Guinea:

- PPAs **are not** formally defined in current PA legislation (however, new legislation in development may allow for private persons to protect land they own through PPAs).
- PPAs **are not** directly identified in Papua New Guinea's recent NBSAP (however, it does call for strengthening "the capabilities of NGOs and community institutions to play an effective role in the conservation and management of biodiversity….").
- PPAs **are not** included as part of the current PA network.

See full details in Papua New Guinea's country profile, and a summary in Annex II.

Territories and areas conserved by Indigenous Peoples and local communities (ICCAs)

From Kothari et al. (2012) potential ICCAs (or similar designation) in Papua New Guinea include:

- **79** CCAs (no details on total area covered)
- **86** LMMAs (locally managed marine areas) covering **59 km²**
  - Currently the WDPA lists 6 reported LMMAs

Other Indigenous lands

There is currently no data available on the total area of lands managed and/or controlled by Indigenous Peoples in Papua New Guinea (see Garnett et al 2018 for details).

Opportunities for action

Explore opportunities for governance types that have lower representation, for Papua New Guinea this could relate to shared governance, etc. There is also opportunity for Papua New Guinea to complete governance and equity assessments, to establish baselines and identify relevant actions for improvement. Examples of existing tools and methodologies include: Governance Assessment for Protected and Conserved Areas (Franks & Brooker, 2018), Social Assessment of Protected Areas (Franks et al 2018), and Site-level assessment of governance and equity (IIED, 2020). As well, a range of suggested actions are included in the voluntary guidance on effective governance models for management of protected areas, including equity (Annex II of COP Decision 14/8).

Equator Prize Projects

The Equator Initiative brings together the United Nations, governments, civil society, businesses and grassroots organizations to recognize and advance local sustainable development solutions for people, nature and resilient communities.

The Equator Prize projects provide examples of unique and locally based governance of natural resources. Papua New Guinea has the following Equator Prize winners that showcase examples of local, sustainable community action:

Organization	Year	Project Description
Tree Kangaroo Conservation Program	2014	The Tree Kangaroo Conservation Program manages a community conservation area and locally-owned forest, the first of its kind in Papua New Guinea. The locally-driven initiative undertakes a range of activities to protect the watershed and provide the local population with sustainable livelihoods. The conservation area covers 78,729 hectares of habitat, protecting endemic and endangered wildlife species, including the Huon tree kangaroo. The organization has partnered with the private sector and the government on a conservation livelihoods program and a coffee harvesting project, which has brought in more than US$75,000 for local farmers and their families. Farmers use this additional income to pay for their children's school fees, family health expenses, and basic household necessities. The initiative represents a unique model of community mobilization and leadership, and is the first time that the diverse Indigenous communities involved in the initiative have come together to advance a shared conservation and sustainable livelihoods agenda.

Organization	Year	Project Description
Wanang Conservation Area	2015	Developed in response commercial logging pressures and a lack of public services, the Wanang Conservation Area is an alliance of ten Indigenous, rainforest-dwelling clans that together protect 10,000 hectares of forest for biodiversity research, carbon storage, and sustainable livelihoods. The initiative maintains a 'forest dynamics plot', where they have planted more than 280,000 trees to study their responses to changing climatic conditions. A research station, which is one of the largest in the country, serves as a capacity building hub and trains Wanang villagers and students are as para-ecologists and research technicians. The research station enhances communication between the local population and research scientists, provides a source of livelihoods, and supports environmental learning. The initiative has become a model for community-driven conservation and development in the country and is a powerful example of partnership between a self-governed community, local NGOs, government, and research institutes. It is also a model of resistance to commercial logging interests in a region being ravaged by deforestation. Forest conservation has become the cornerstone of the local economy, with partnerships creating greater access to health, education, and food security.

PROTECTED AREA MANAGEMENT EFFECTIVENESS

This section provides information on the coverage of PAs and OECMs with completed protected area management effectiveness (PAME) assessments as reported in the global database (GD-PAME). The proportion of terrestrial and marine PAs with completed PAME assessments is also calculated and compared with the 60% target agreed to in COP-10 Decision X/31. Information is also included regarding changes in forest cover nationally within PAs and OECMs.

Protected area management effectiveness (PAME) assessments

As of May 2021, Papua New Guinea has 57 PAs reported in the WDPA; of these PAs, 41 (71.9%) have management effectiveness evaluations reported in the global database on protected area management effectiveness (GD-PAME).

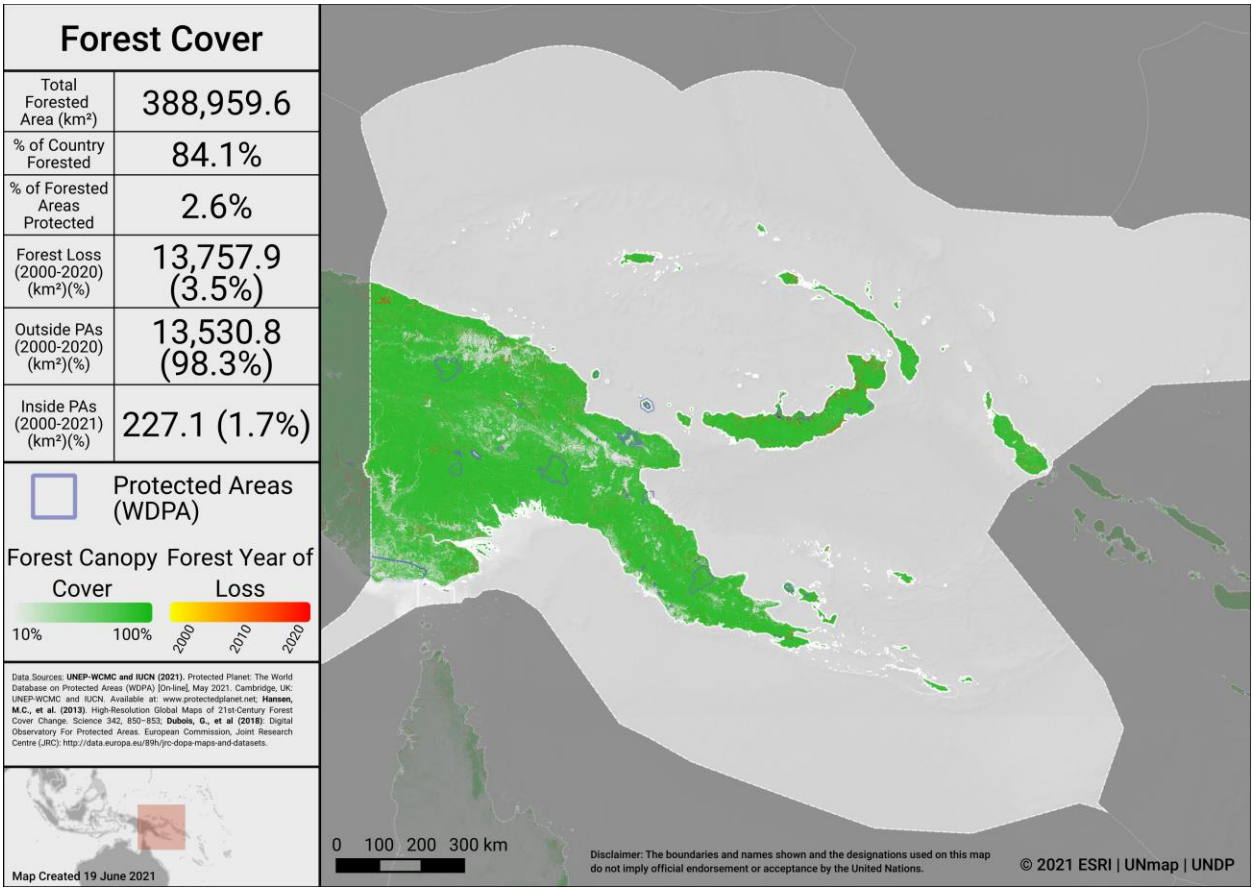
- 2.8% (13,094 km^2) of the terrestrial area of the country is covered by PAs with completed management effectiveness evaluations.
  - 75.9% of the area of terrestrial PAs have completed evaluations.
- 0.1% (3,030 km^2) of the marine area of the country is covered by PAs with completed management effectiveness evaluations.
  - 90.6% of the area of marine PAs have completed evaluations.

The 60% target for completed management effectiveness assessments (per COP Decision X/31) **has** been met for terrestrial PAs and **has** been met for marine PAs.

As of May 2021, there are 0 OECMs in Papua New Guinea reported in the WD-OECM and no information available on the management effectiveness of potential OECMs.

Changes in forest cover in protected areas and OECMs

Forested areas in Papua New Guinea cover approximately 84.1% of the country, an area of 388,959.6 km^2. Approximately 2.6% (9,940.8 km^2) of this is within the protected area estate of Papua New Guinea. Over the period 2000-2020 loss of forest cover amounted to over 13,757.9 km^2, or 3.0% of the country (3.5% of forest area), of which 227.1 km^2 (1.7% of forest loss) occurred within protected areas. The map below shows how forest cover has changed in Papua New Guinea from 2000-2020 both inside and outside of PAs. This can indicate how effective PAs are in reducing forest cover loss



Forest Cover and Forest Loss in Papua New Guinea

Opportunities for action

The 60% target for completed management effectiveness assessments (per COP Decision X/31) **has** been met for terrestrial PAs and **has** been met for marine PAs. Therefore, the 60% target for protected area management effectiveness has been met. Further increasing this percentage would be beneficial overall for understanding how well protected areas are being managed.

There is also opportunity to implement the results of completed PAME evaluations, to improve the quality of management for existing PAs and OECMs (e.g. through adaptive management and information sharing, increasing the number of sites reporting 'sound management') and to increase reporting of biodiversity outcomes in PAs and OECMs.

SECTION II: EXISTING PROTECTED AREA AND OECM COMMITMENTS

PRIORITY ACTIONS FROM 2015-2016 REGIONAL WORKSHOPS

National priority actions for Aichi Biodiversity Target 11 were provided by Parties following a series of regional workshops in 2015 and 2016. The Capacity-building workshop for Pacific on achieving Aichi Biodiversity Targets 11 and 12 took place 11 - 13 July 2016 in Nadi, Fiji. Progress towards the quantitative targets for marine and terrestrial coverage has been assessed based on data reported in the WDPA and WD-OECM as of 2021. For more information, see the workshop report at: https://www.cbd.int/meetings/

The following actions were identified during the workshops:

Terrestrial coverage:

1) Conduct review and assessment of current Protected area network based on the CARR principle (comprehensive, adequate, representative, replicated) and update the current PA database
2) Upgrade existing successfully managed Conservation Areas, e.g. YUS and Torricelli CA
3) Conduct educational awareness of protected areas in communities based on their priorities
4) Conduct consultations with the communities and other key stakeholders on recommendations for reclassification of PAs
5) Assess and report on the terrestrial and marine Ecoregions and the status of species and ecosystem and their protection in PNGs Protected Areas System..

Marine coverage: Recognize, register and gazette the existing WMAs and LMMAs that meet the IUCN criteria.

Ecological representation:

1) Government initiates further investigation by approaching other partners (Universities, NGOs or private industry) to support assessment, negotiations and management arrangements in identified sites of high priority
2) Formalization of community conservation areas with boundaries that takes into consideration the language and cultural groups
3) Develop public Private partnership arrangements for industries to support the establishment of a new protected area as an offset to a planned or existing development

4) Review of relevant legislations on land use and zoning

5) Assess and report on the terrestrial and marine Ecoregions and the status of species and ecosystem and their protection in PNGs Protected Areas System.

Areas Important for biodiversity and ecosystem services:

1) Develop and update inventory of land use /zone planning guidelines for terrestrial and marine protected areas

2) Identifying robust investments (including climate change refugia by conserving the geophysical stage and in enhancing connectivity for ecosystem services.

Connectivity:

1) Support and formalize the inclusion of Protected Areas owned and managed by customary landowners and communities, all levels of government, NGOs and private companies and will incorporate both marine and terrestrial areas

2) Identify and further develop the Existing Protected Areas such as YUS Conservation Areas and Torricelli Mountain Range Conservation Area are prime examples of successful PA in PAGE 6 PNG. Both are looking to expand the size of their respective Protected areas, provide solid guidelines and principles that need to be adapted by other Protected

3) Establish Long term agreement for management by communities and governments.

Management effectiveness:

1) Develop and apply policies for biodiversity management planning, monitoring and reporting, natural and cultural resource management, and law enforcement of the Protected Area

2) establishment of PA management standards and PA performance monitoring system for different categories of PAs

3) institutionalization of clear reporting structure and methods for all categories of PAs

4) establishment of law enforcement and habitat/biodiversity monitoring protocols

5) clear official guidelines for community involvement in the management of Conservation Areas

6) clear capacity development strategies and action plans for increasing management effectiveness of the PA system (National Parks, Wildlife Sanctuaries and Conservation Areas)

7) Incentive mechanisms for increasing motivation of technical staff

8) Establishment and institutionalization of PA data/information and knowledge management system enabling learning from and up-scaling of pilot/individual project activities

9) Evaluate biodiversity management effectiveness every three years to demonstrate the successes and challenges for each Protected Area in PNG

10) Evaluate and improve the effectiveness of the protected area management.

Governance and Equity:

1) Review, repeal and develop legislative framework to potentially integrate them to aid in determining the governance and management structure and administrative arrangements of each PA

2) Streamline and harmonize for each respective Protected Areas types' selection criteria, processes and procedure using local, national and international standard and examples into new PA classification system to suit PNG local context

3) Institutionalise and formalise the management and governance arrangements for the PA network so the links between policies and national framework for protected areas and implementation on the ground are established

4) Development of Protected Area Register managed by CEPA with information being routinely incorporated into forestry, mining and infrastructure development proposals, and for the information to be available for interested stakeholders

5) Zoning within the Protected Area, management plans, conservation agreements and the wishes of customary landowners and communities will also influence where and when activities take place, and set standards and conditions

6) Develop PA Management Plan and land use plan guidelines for various types of PA in the context of the national framework for protected areas

7) Develop contractual agreements/deeds/MoU with relevant private or landowners including neighbouring tribes and clans on management structure of protected area, shared responsibilities and fair benefit sharing

8) Develop administrative process and procedures requirements for listing of PA in the PA Network Register. 9) Support and build capacity for customary landowners in their initiatives to establish effective protected areas on their land

9) Identify the donors and partners for each specific PA types for sustainable technical and financial support

10) establish mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas.

Integration into the wider landscape and seascape:

1) Prevent and mitigate the negative impacts of key threats to protected areas
2) Develop and focus on PNG's landscape/seascapes and biological diversity as much as possible
3) Identify the importance of Mitigating the climate change effects through maintaining intact forests and thus storing carbon
4) support and help in adaptation, by providing a buffering effect from climatic extremes and reducing the impact of sea level rise along coastlines by maintain natural vegetation
5) Establish and strengthen Transboundary protected areas, and other forms of collaboration protected areas across national and regional boundaries to enhance the conservation and sustainable use of biological diversity
6) Integrate protected areas into broader land-and –seascapes and sectors so as to maintain ecological structure and function.

OECMs:

1) Subjected to the wishes of the customary landowners and communities, it is desirable that Ramsar Sites, world Heritage areas and Special management Areas are covered by national legislation
2) Provide solid guidelines and principles that need to be adapted by the different levels of government including the landowners and local communities
3) Upgrade existing successfully managed Conservation Areas, e.g. YUS and Torricelli CA.

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLANS (NBSAPs)

Papua New Guinea has submitted an NBSAP during the Strategic Plan for Biodiversity 2011-2020 (most recent NBSAP is available at: https://www.cbd.int/nbsap/search/).

This NBSAP **did** include a quantitative target for **terrestrial** PAs or OECMs (17%).

- As of May 2021 (based on the WDPA/WD-OECM) has the target been met: **NO (but post-2020 target)**
- Accounting for other projects, actions and commitments, if this target is met, coverage in the country will increase by **60,360 km²** by 2025.

This NBSAP **did** include a quantitative target for **marine** protected areas or OECMs (10%).

- As of May 2021 (based on the WDPA/WD-OECM) has the target been met: **No (but post-2020 target date)**
- Accounting for other projects, actions and commitments, if this target is met, coverage in the country will increase by **211,795 km²** by 2030

NATIONAL TARGET 11 Vulnerable Ecosystems

- PNG will continue to improve measures to manage and protect marine and coastal ecosystems to avoid significant adverse impacts vulnerable species
- Minimize and address the impacts of ocean acidification through enhanced cooperation at all levels
- By 2030, PNG will effectively regulate harvesting and overfishing, illegal, unreported and unregulated fishing and destructive fishing practices
- By 2030, PNG will have conserved over 10% of coastal and marine areas as protected areas through the Locally Managed Marine Areas (LMMAs)
- Empower local communities with capacity and resources to enhance conservation of vulnerable coastal and marine ecosystems
- By 2030, improved understanding of climate science will enable better prediction of PNG's future climate and identification of impacts of climate on natural resources
- Establish a sustainable development policy in agriculture, fisheries, forestry, mining and oceans
- A resilient, sustainable society through the protection and preservation of the natural environment
- By 2030, the management of vulnerable ecosystems and species will be increasingly considered in the face of climate change impacts
- By 2030, Papua New Guinea's understanding of the compounding pressures of climate change and other anthropogenic pressures on native biodiversity will have improved from current levels

NATIONAL TARGET 12 Protected Areas (A growing nationwide network of terrestrial and marine protected areas established and effectively managed)

- Papua New Guinea will continue to manage its 57 gazetted protected areas through improved management regimes
- By 2025, Papua New Guinea will have achieved 6.6% of the 17% representation and will reach or exceed the required 17% representation by 2022
- By 2025, Papua New Guinea will have developed a Marine Protected Area (MPA) Policy to guide the development of MPAs
- By 2025, Papua New Guinea will have MPAs representing 12% of the marine ecosystems, reaching or exceeding the 10% representation target
- Aligned with Vision 2050, establish at least one million hectares of marine protected areas Aligned with Vision 2050, establish a total of 20 national reserves, wilderness areas and national parks

APPROVED GEF-5 & GEF-6 PROTECTED AREA PROJECTS

Approved GEF-5 and GEF-6 PA-related biodiversity projects

This includes biodiversity projects from the fifth and sixth replenishment of the Global Environment Facility (GEF-5 and GEF-6) with a clear impact of the quantity or quality of PAs; also including some projects occurring within the wider landscapes/seascapes around PAs. Only those with a status of 'project approved' or 'concept approved' as of June 2019 were considered. The qualifying elements likely benefiting from each GEF project is assessed based on a keyword search of Project Identification Forms (PIF). Where spatial data for the proposed PAs was available, further details (based on an analysis by UNDP) regarding their impacts for ecological representation, coverage of KBAs, and coverage of areas important for carbon storage is included.

GEF ID	PA increase?	Area to be added (km^2)	Type of new protected area	Qualitative elements potentially benefitting (based on keyword search of PIFs)
5510	Yes	1,851	Terrestrial	All except Connectivity
9536	No	N/A	N/A	Effectively managed

Based on spatial data available for GEF project 3954 and 5510, benefits will arise for several elements of Target 11:

Coverage of Terrestrial and Marine Ecoregions:

- 4 Terrestrial Ecoregions will have improved coverage. These Ecoregions are: Huon Peninsula montane rain forests; Northern New Guinea lowland rain and freshwater swamp forests; Northern New Guinea montane rain forests; Papuan Central Range subalpine grasslands;.
  - The average increase in coverage of Terrestrial Ecoregions will be 1.51%.

Coverage of KBAs:

- Coverage will improve for 1 KBAs.

Ecosystem services:

- 0.75 % increase in the PA coverage of aboveground biomass.
- 1.1 % increase in the PA coverage of important aboveground biomass areas.
- 0.4 % increase in the PA coverage of soil organic carbon (SOC).
- 0.315 % increase in the PA coverage of areas important for SOC.

UN OCEAN CONFERENCE VOLUNTARY COMMITMENTS

Voluntary commitments for the UN Ocean Conference are initiatives voluntarily undertaken by governments, the UN system, non-governmental organizations, among other actors—individually or in partnership—that aim to contribute to the implementation of SDG 14 (here we focus in particular on SDG 14.5). The registry of commitments was opened in February 2017, in the lead up to the first UN Ocean Conference (5 to 9 June 2017).

Ocean Actions improving MPA or OECM coverage:

#OceanAction16178: Protecting 1 million sq kms through the $15 million WCS Marine Protected Area Fund, by Wildlife Conservation Society(Non-governmental organization).

- Area to be added: 25,600 km^2.
- Notes on area added: project aims to establish new MPAs, including zoning plans, with consensus from key stakeholders and strengthen the effectiveness of management within existing locally managed marine areas (LMMAs), see details in country profile for WCS MPA project: https://mpafund.wcs.org/.
- Progress report: Yes (2019), status=On Track.
- Further details available at: https://oceanconference.un.org/commitments/?id=16178.

Ocean Actions improving MPA or OECM coverage post-2020:

#OceanAction21432: Bootless Bay Managed Marine Area, by Conservation and Environment Protection Authority (Government).

- Area to be added: **no area given**.
  - Target date of 2030
- Progress report: No progress report submitted (as of March 2021).
- Further details available at: https://oceanconference.un.org/commitments/?id=21432.

#OceanAction21660: Morgado Square Marine Managed Area, by National Fisheries Authority (Government).

- Area to be added: **no area given** km^2.
  - Target date of 2030
- Progress report: No progress report submitted (as of March 2021).
- Further details available at: https://oceanconference.un.org/commitments/?id=21660.

OTHER ACTIONS/COMMITMENTS

Papua New Guinea's statement at the 2020 UN Biodiversity Summit mentions PAs, OECMs or corridors:

The government has developed actions to address protection and conservation of land and marine biodiversity through establishing marine and terrestrial protected areas.

Commitments for PAs and OECMs from Other National Policies

Policy document	Ecosystem	Policy text
Nationally Determined Contribution	Forest ecosystems	Avoided forest conversion: 21.48 Mt CO2e/yr
Nationally Determined Contribution	Forest ecosystems	Avoided woodfuel harvest: 0.32 Mt CO2e/yr
Nationally Determined Contribution	Wetland ecosystems	Avoided peat impacts: 24.5 Mt CO2e/yr
Nationally Determined Contribution	Coastal ecosystems	Avoided mangrove impacts: 1.22 Mt CO2e/yr
National Energy Policy	Forest ecosystems	Promote and update standards for efficient conversion and cleaner utilization of biomass including cleaner charcoal and wood burning stoves
National Energy Policy	Forest ecosystems	Promote the use of biomass briquettes as alternatives to wood fuel and kerosene in cooking, water heating and steam generation
National Energy Policy	Forest ecosystems	Promote the use of hybrid power generation systems involving wind and other energy sources
Medium Term Development Plan	Forest ecosystems	Increase supply of energy with sustainable energy source
Medium Term Development Plan	Forest ecosystems	Improve biodiversity conservation for tourism purposes and protection of PNG's diverse flora and fauna
Medium Term Development Plan	Forest ecosystems	Reduce primary forest depletion rate per year from 9% to 5% by 2022
Strategy for Responsible and Sustainable Development	Forest ecosystems	Protect the environment by shifting responsibility to polluters to internalise environmental cost through setting standards for penalties and fees

Policy document	Ecosystem	Policy text
National Energy Policy	Wetland ecosystems	Promote protection of the environment and catchment areas
Medium Term Development Plan	Wetland ecosystems	Improve biodiversity conservation for tourism purposes and protection of PNG's diverse flora and fauna
Medium Term Development Plan	Coastal ecosystems	Improve biodiversity conservation for tourism purposes and protection of PNG's diverse flora and fauna
Reducing emissions from deforestation and forest degradation	Forest ecosystems	Strengthened and Coordinated National Level Development and Land Use Planning through development of climate and REDD+ relevant development indicators (DNPM) within the national development framework and strengthening of development of national land use policy, planning and legislation (DLPP)
Reducing emissions from deforestation and forest degradation	Forest ecosystems	Integrated Subnational Planning through strengthening ward and LLG level planning and strategic development planning at provincial, and district level and the linkages between levels of planning (DPLGA and DNPM)
Reducing emissions from deforestation and forest degradation	Forest ecosystems	Strengthening climate change legislation, financing and management - (CCDA)
National Forest Programme	Forest ecosystems	Plantation for fuel wood and carbon trade options
Protected Area Plan	Wetland ecosystems	any priority identified terrestrial and wetland areas that are not subject to resource use by customary landowners to become National Parks (NP) by 2020, along with other high montane areas considered of value to the CARR system
Protected Area Plan	Coastal ecosystems	10% of offshore areas outside territorial waters but within the EEC will be included in national marine sanctuaries by 2025
National Forest Programme	Grasslands & Agricultural systems	Improve Silviculture techniques

ANNEX I

FULL LIST OF TERRESTRIAL ECOREGIONS

Ecoregion Name	Area (km^2)	% of Global Ecoregion in Country	% of Country in Ecoregion	Area Protected (km^2)	% Protected in Country
Admiralty Islands lowland rain forests	2,098.5	100.0	0.5	35.9	1.7
Cape York Peninsula tropical savanna	1.7	0.0	0.0	0.0	0.0
Central Range Papuan montane rain forests	96,727.2	56.5	20.9	3,457.5	3.6
Huon Peninsula montane rain forests	16,449.6	100.0	3.5	584.4	3.6
Louisiade Archipelago rain forests	1,607.6	100.0	0.3	0.0	0.0
New Britain-New Ireland lowland rain forests	34,915.6	100.0	7.5	1,006.1	2.9
New Britain-New Ireland montane rain forests	12,081.2	100.0	2.6	64.6	0.5
New Guinea mangroves	5,902.9	22.1	1.3	23.7	0.4
Northern New Guinea lowland rain and freshwater swamp forests	75,313.2	55.9	16.3	2,044.0	2.7
Northern New Guinea montane rain forests	6,600.2	28.5	1.4	0.0	0.0
Papuan Central Range sub-alpine grasslands	5,782.3	37.3	1.2	208.5	3.6

Ecoregion Name	Area (km^2)	% of Global Ecoregion in Country	% of Country in Ecoregion	Area Protected (km^2)	% Protected in Country
Solomon Islands rain forests	9,328.8	26.1	2.0	0.0	0.0
Southeast Papuan rain forests	77,034.3	100.0	16.6	2,532.9	3.3
Southern New Guinea freshwater swamp forests	49,032.9	49.3	10.6	0.9	0.0
Southern New Guinea lowland rain forests	46,931.9	38.4	10.1	744.5	1.6
Sulawesi lowland rain forests	7.9	0.0	0.0	0.0	0.0
Trans Fly savanna and grasslands	18,300.6	68.8	3.9	6,045.4	33.0
Trobriand Islands rain forests	4,179.6	100.0	0.9	258.0	6.2

ANNEX II

ADDITIONAL DETAILS ON PPAs

- In PNG, 97 percent of land is owned by customary landowners • Conservation programs in the Country increasingly depend on cooperation between customary landholders, government agencies, and NGOs
- Although PPAs are Not formally defined, new PNG PA legislation expected to go before the Parliament in late 2018 will allow for private persons to protect land they own through PPAs
- The draft Protected Areas Bill foresees the establishment of a Protected Areas Trust Fund, which could be used to support the establishment and maintenance of protected areas at both the national and provincial level through a range of mechanisms. This may include Privately Protected Areas.
- PPAs were not directly identified in the county's recent NBSAP; however, it does include a strategy to "Strengthen the capabilities of NGOs and community institutions to play an effective role in the conservation and management of biodiversity; in particular, initiate training programmes with 'umbrella NGOs' which have large networks of community-based organizations.".

Case studies/best practices:

- *YUS Conservation Area*: Located on the Huon Peninsula, covers, this 78,700 ha; project was spearheaded by the Tree Kangaroo Conservation Program (TKCP), an initiative of the Woodland Park Zoo, to conserve the Matschie's tree-kangaroo, but the program has expanded to include a broad landscape and components that enhance local community livelihoods. A partnership between TKCP, 50 local communities, the PNG government, Conservation International, and several international funders led to the site's gazettement. The Conservation Area continues to be entirely owned by local people, with management support from the government
- *Wanang Conservation Area*: effort to designate started in 2000, when 11 clans signed a conservation deed among themselves to protect 10,000 ha of forest from logging; to make this economically viable, communities approached the New Guinea Binatang Research Center (BRC) to explore hosting research on their land. Today, an innovative partnership with the Smithsonian Center for Tropical Forest Research and BRC provides local communities with income for protecting their forest. Scientific research is now core to the local economy. Local people have received scientific training to monitor forest health and work as field assistants. They have also received compensation.

See additional info in country profile.

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