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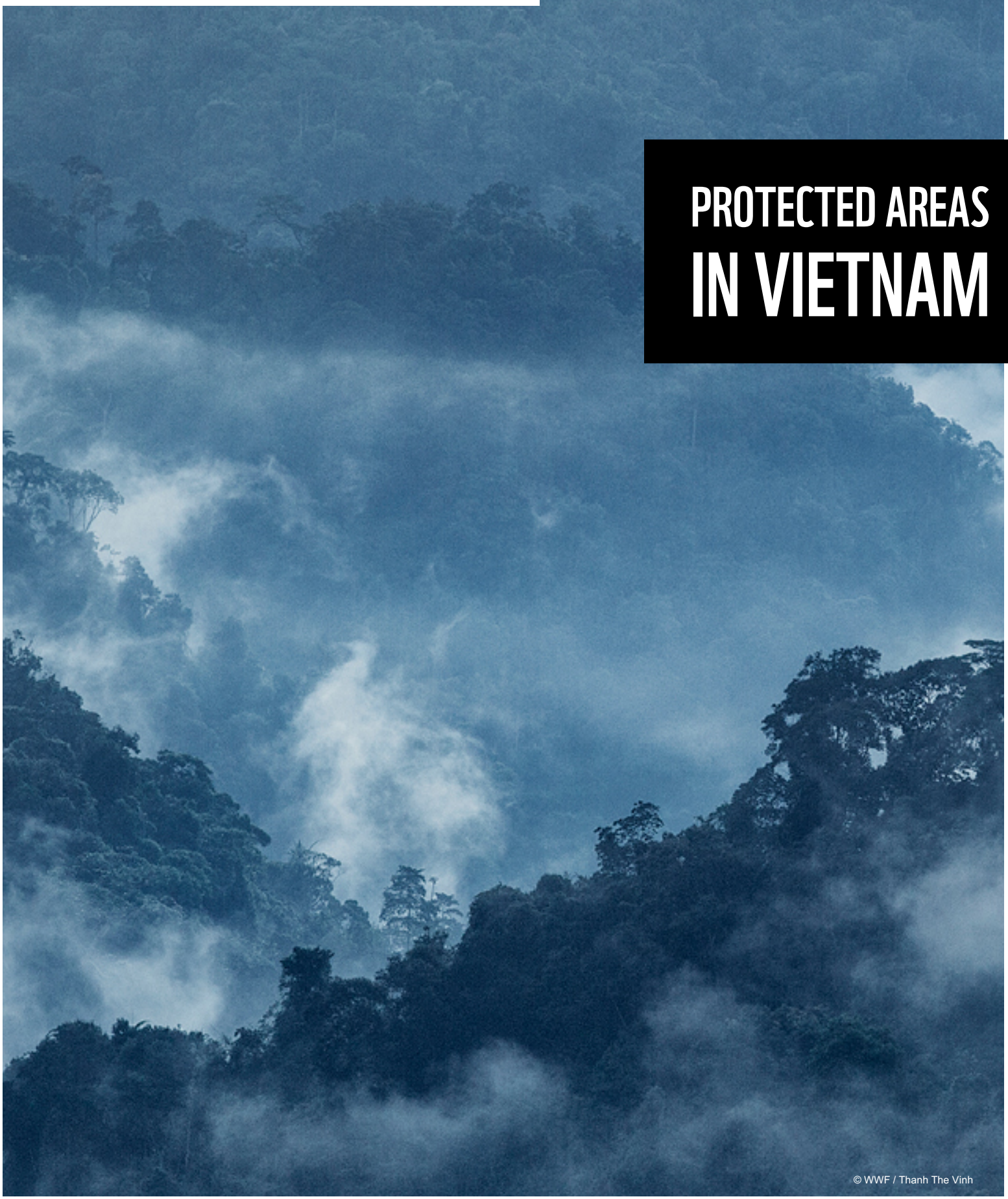
PROTECTED AREAS IN VIETNAM



INFORMING A NATIONAL TARGET FOR PROTECTED AREAS IN VIETNAM UNDER THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

INTRODUCTION

In order to safeguard ecosystems diversity, reduce the rate and risk of species extinctions, improve species populations abundance and maintain and enhance ecosystem services and nature's contributions to people (NCP) in Vietnam, protected areas (PA) and 'other effective area-based conservation measures' (OECM) needs to be expanded with appropriate prioritisation (i.e. coverage of key areas, ecological representativeness, and connectivity) and management improved, in line with the Goals proposed in the first draft of the Convention of Biological Diversity post-2020 Global Biodiversity Framework (CBD post-2020 GBF).

Global target 3[1] of the first draft of the post-2020 GBF states "*Ensure that **at least 30 per cent globally** of land areas and of sea areas, especially areas of particular importance for biodiversity and its contributions to people, 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"*.

Ensuring that 30% of land and sea areas globally, especially areas of particular importance for biodiversity and its contributions to people, are conserved through PA and other effective OECM, should be a collective, global effort. Parties to the CBD such as Vietnam must identify representative targets that effectively protect biodiversity and that can be implemented at national level. Collectively these efforts must add up to 30% in the right places on earth, and national efforts may translate into different levels of ambition depending on the individual contributions towards achieving the global target.

In order to commit to the level of ambition required in Vietnam to contribute to the achievement of the post-2020 GBF target on area-based conservation, here we provide a detailed technical and legal assessment on the current state of the PA network in Vietnam. The main goal of this work is to develop a spatial assessment of PA to position the country in the international landscape in terms of its contribution to achieve global targets, and to argue why a national target of 30% coverage of PA is not too ambitious for the country.

This report provides a global assessment of the current coverage of Vietnam's PA network of important biodiversity and NCP features, using both national (where available and accessible) and global data, and it discusses how a further spatial prioritization framework can support the implementation of the biodiversity and climate conventions.

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[1]This target is not final, it will be subject to agreement as part of the negotiations at the Convention on Biological Diversity Conference of the Parties in Kunming, China, 11-15 October 2021 and 25 April-8 May 2022.

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Suggested citation

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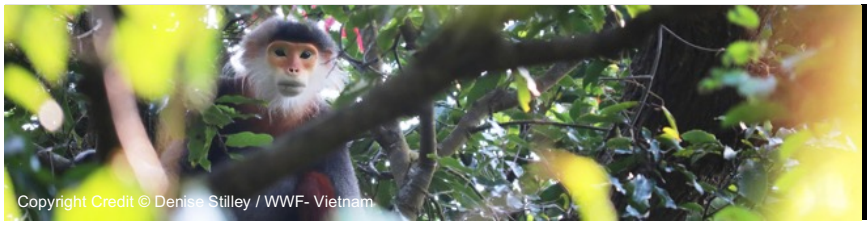

1. National status/baseline, key challenges and opportunities

1.1. Analysing data on PA in Vietnam

Global target 3 proposed under the first draft of the CBD post-2020 GBF underlines six main elements on relation to PA and other OECMs measures: i) national coverage (as percentage of national land covered), ii) coverage of areas of particular importance for biodiversity and its derived contributions to people, iii) ecological representativeness, iv) effectiveness and equitability in management, v) connectivity and vi) integration. This section focuses on a baseline assessment for these different elements.

1.1.1. National coverage of PA

According to the Vietnamese legal framework on PA (i.e. Forestry Law 2017, Fisheries Law 2017, Biodiversity Law 2008 and Environmental Protection Law 2020), PA in Vietnam can be broadly classified into four key categories which can be assigned to equivalent IUCN categories (in brackets) as follow (Dudley, 2008):

i) Category I. National Parks: designated for ecosystem protection, research, environment education and recreation (equivalent to IUCN Category II – National Park).

ii) Category II. Nature Reserves: designated for ecosystem or species protection, research, monitoring, recreation and environmental education (no direct equivalent to an IUCN category, more equivalent to IUCN Category II – National Park).

iii) Category III. Habitat and Species Conservation Areas (designated and managed mainly for environment and biodiversity conservation through management interventions (with increased provisions for co-management of resources) (equivalent to IUCN Category IV – Habitat/species management areas).

iv) Category IV. Protected Landscapes/Seascapes: designated and managed mainly for landscape or seascape conservation and recreation (equivalent to IUCN Category V – Protected landscape or seascape).

These four PA categories are adopted across Vietnam's three national systems of PA recognised on its legislation (Table 1) and they comprise both national and internationally recognised PA categories (RAMSAR, Biosphere Reserve, and so on).

"To improve the quality and increase the area of protected ecosystems, ensuring that the area of terrestrial protected areas accounts for 9% of the total territorial area; marine protected areas account for 0.24% of the sea area; forest coverage reaches 45%; primary forest remains at 0.57 million hectares, coupled with effective protection plans; that mangrove forests, seagrass beds, and coral reefs are maintained at the current levels; that 15% of degraded critical ecosystems are restored; and the number of internationally-recognized protected areas is increased to 10 Ramsar wetlands, 10 biosphere reserves, and 10 ASEAN heritage parks."

Specific Target 1. Section 2.4. Vietnam National Biodiversity Strategy to 2020, vision 2030. Ministry of Natural resources and the Environment (MONRE, 2011).

Vietnam currently has 171 PAs across its territory, which cover 8% of the terrestrial area and 0.5% of Vietnam's Exclusive Economic Zone (EEZ).

Table 1. PA system in Vietnam and relevant legislation.

Legislation	Description	Implementing agency
Decision 1976/QD-TTg	National system of 167 Special Use Forest (SUFs)	MARD
Decision 742/QD-TTg[2]	National system of 16 MPAs	MARD
Decision 1479/QD-TTg[3]	National system of 45 Inland Water Protected Areas (IWPAs)	MARD
Decision 45/QD-TTg[4]	National system of 219 Protected Areas containing terrestrial PAs, MPAs and Wetland PAs. ***Article 2*** states that: • This plan supersedes the planning of MPAs under the **Decision 742/QD-TTg**. • The planning of Wetland Protected Areas shall supersede the planning of IWPAs of the same location, geographical name under **Decision 1479/QD-TTg.**	MONRE
Decision 218/QD-TTg[5]	Management Strategy for national SUF, MPA, IWPA systems towards 2020. ***Article 1***, point 4 highlights the continuation of completing • National system of Special Use Forest (SUFs) according to Decree 117/2010/ND-CP (later detailed in **Decision 1976/QD-TTg**). • National system of 16 MPAs according to **Decision 742/QD-TTg.** • National system of 45 IWPAs according to **Decision 1479/QD-TTg.**	MARD

The responsibilities for managing PA are shared between the Ministry of Natural Resources and the Environment (MONRE) and the Ministry of Agriculture and Rural Development (MARD), with the former playing a more relevant role compare to other central-level agencies such as the Ministry of Science and Technology (MOSTE) or the Ministry of Culture, Sports and Tourism (MOCST). The sectorial and siloed approach to the management of PA and natural resources in Vietnam is clearly reflected by conflicts between Decision 45/QD-TTg and Decision 218/QD-TTg approved by the Central Government in the same year as shown in Table 1. Decision 218/QD-TTg highlights the role of MARD under the framework of the Law on Fishery and Law on Fisheries. Meanwhile, MONRE follows its plan on Vietnam's PA as stipulated in Decision 45/QD-TTg under the Law on Biodiversity 2008. However, the institutional framework for PA governance and management emphasized the mandate of MARD, since SUF and MPA management authorities are institutionalized under the vertical technical line of MARD. Our analyses show many inconsistencies among these two overlapping national plans (see Annex 1). This sectoral approach and its consequences on both jurisdictional gaps and overlap in PA management jeopardises sound and coordinated decision-making. Also, and crucially, there is a clear lack of a standardized database and spatial data for PA in Vietnam, which makes it challenging any assessments on the status and trends on PA in Vietnam.

Given this context, we based our analysis on the PA dataset from the World Database on Protected Areas (WDPA) with the removal of UNESCO-MAB Biosphere Reserves and sites where STATUS = Proposed or Not Reported, as per the usual methods for calculating area coverage with the WDPA (UNEP-WCMC, 2021). These sites were supplemented by sites in the PA layer created by WWF-Viet Nam (WWF-Viet Nam, 2021a, 2021b) that did not overlap with any sites in the WDPA were then selected and merged with the WDPA data. There were two sites (Sân Chim Đàm Dơi and Vườn chim Bạc Liêu) that were in both the WDPA and the layer created by WWF-Viet Nam but did not overlap spatially, therefore we retained the WDPA versions of these sites. This final layer was then dissolved to produce a flat layer for calculating area coverage (Further technical information could be provided under explicit request). Figure 1 represents the most updated PA spatial data for Vietnam and it shows the location of its **171 PA** across the country. These cover 8% of the terrestrial area of Vietnam and 0.5% of Vietnam's Exclusive Economic Zone (EEZ).

[2] Decision No.742/QD-TTg adopted by the Prime Minister on *'Approving the master plan for Vietnam's national MPA network towards 2020'* on 26 May 2010.
[3] Decision No. 1479/QG-TTg adopted by the Prime Minister on 'Approving the master plan of national inland water protected areas *towards 2020 with a vision to 2030'* on 13 October 2008.
[4] Decision No.45/QD-TTg adopted by the Prime Minister on 'Approving the master plan of national biodiversity conservation *towards 2020 with a vision to 2030*' on 4 Jan 2014.
[5] Decision No.218/QD-TTg adopted by the Prime Minister on 'Approving strategy for management of special-use forests, marine protected areas and inland water protected areas in Vietnam towards 2020 and vision to 2030 on 07 Feb 2014.

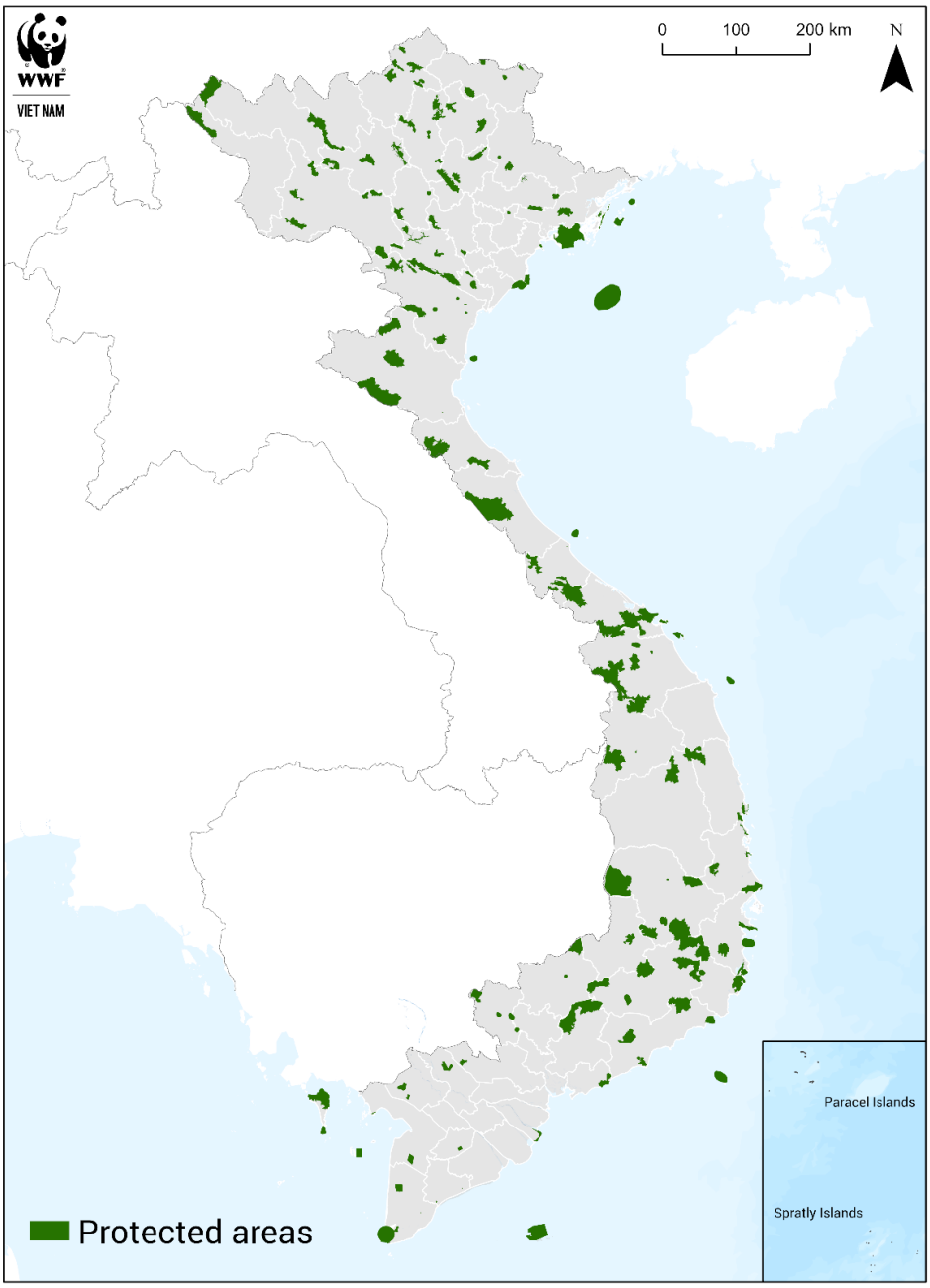

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Figure 1. Protected Areas in Vietnam (source: WWF-Viet Nam, 2021).

1.1.2. Areas of particular importance for biodiversity

Biodiversity is unequally distributed around the world, and Vietnam is precisely one of the world's sixteen most biologically diverse countries on Earth with over 50,000 species identified and high levels of species richness and endemicity (UNDP, 2021). Hence, Vietnam is considered to possess a uniquely high level of biodiversity and supports the highest endemism in the Southeast Asian continent. It is essential therefore to ensure that PA are appropriately placed and cover locations that represent the most important areas for biodiversity in the country. Here, we focus our analysis on Key Biodiversity Areas (KBAs), high-quality and primary forests, areas covering hotspots of endemic species and other areas with a high density of threatened species according to the IUCN Red List, as well as critical coastal habitats.

Key Biodiversity Areas (KBA)

The KBA dataset for Vietnam was extracted from the World Database of Key Biodiversity Areas (KBAs) (Birdlife International, 2021) which represent the most comprehensive global dataset on sites of significance for the global persistence of biodiversity (IUCN, 2016). Currently, Vietnam has **143 KBA** among which only 89 KBA overlap to some extent with PA. The KBA area in Vietnam cover 3.63M ha, only 44% of which is covered by PA (Figure 2).

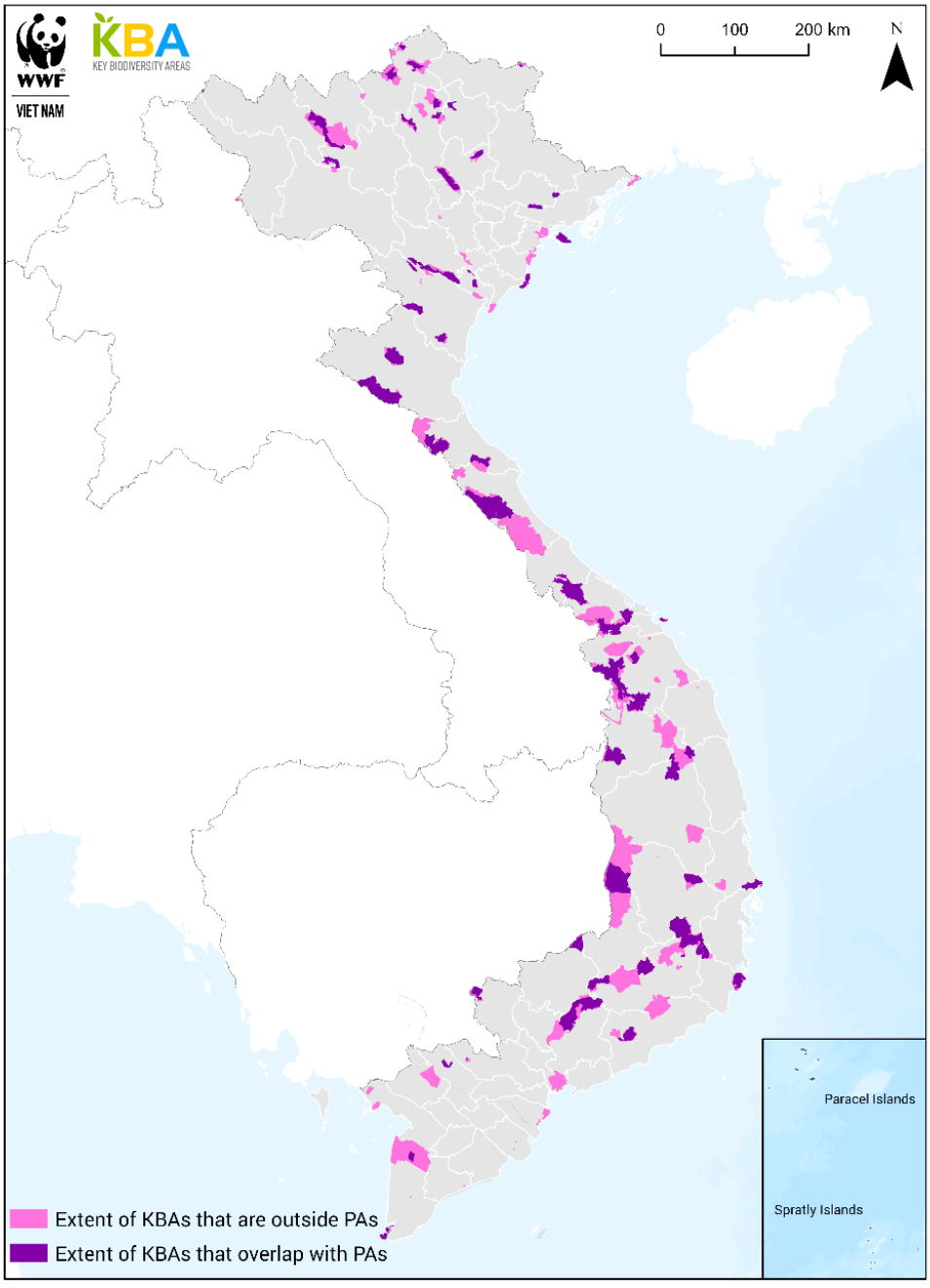

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Figure 2. Currently identified KBA in Vietnam shown by their extent inside and outside PA (source: WWF-Viet Nam, 2021).

Most of the unprotected 56% unprotected KBA area is located in the central and south Vietnam provinces of Quang Binh, Thua Thien Hue and Quang Nam, Kon Tum, Dak Lak, Dak Nong, Lam Dong, and Dong Nai (Figure 2). This finding is consistent with a recent national study on Vietnam's biodiversity conservation planning which highlights that many areas of important biodiversity in Central and South provinces of Dak Lak, Khanh Hoa, Phu Yen, Gia Lai and Lam Dong are currently unprotected (Diep, 2021).

Additionally, a preliminary scoping analysis undertaken in collaboration with the KBA Secretariat using the newly developed KBA Scoping Tool, suggests there are also potentially new KBA areas in Vietnam currently unidentified within high-quality forest that contain sufficient representation of biodiversity features that may potentially qualify the location as a KBA. Our results show that the border area between Dak Lak and Lam Dong is an important area of high rarity-weighted richness (endemicity) (Further technical information could be provided under explicit request) as well as having a high proportion of 'rich forest' according to our results derived from the national forest inventory the VNFOREST FORMIS database (VNFOREST, 2021) (see below).

Nationally important forests in Vietnam

We identified important forested areas for Vietnam using national data on *high-quality forest* derived from the VNFOREST FORMIS Forestry Data Sharing System (VNFOREST, 2021). We focused on *rich forest* and *medium forest* categories and we excluded plantations (Figure 3A). *Rich forests* are defined as those with the standing stock of greater than 200 m^3/h and *medium forests* are defined as forests with the standing stock ranging from greater than 100 to 200 m^3/ha (Circular33/2018/TT-BNNPTNT[6]).

According to our results, there are 27,771 km² of high-quality forest in Viet Nam, 7,676 km² of which is rich forest and the remaining 20,095 km² medium forest. Together, 34% of high-quality forest is within protected areas, with 49% of rich forest and 29% of medium forest inside PAs (Figure 3A).

We also used FORMIS data to measure irreplaceability, a measure of how close a location is to being essential to meet predefined conservation targets (Pressey et al., 1994, Baisero et al*.,* 2021). Systematic conservation planning software, such as Marxan (Marxan, 2020), are sometimes wrongly used as a surrogate for measuring irreplaceability (Baisero et al., 2021). However, they are designed to identify efficient solutions for meeting targets, not for identifying irreplaceable locations. The methods used in this analysis, outlined in Baisero et al. (2021), are designed to identify potentially irreplaceable locations. We collaborated with the KBA Secretariat to use the KBA Scoping Tool in order to identify which areas of high-quality forest (based on national FORMIS data) in Vietnam may be irreplaceable. According to our results, there are potentially 108 locations of *high-quality forest* in Vietnam which are potentially irreplaceable (Figure 3B). These potentially irreplaceable locations cover an area of 16,339 km², of which 43% is covered by PAs. Nevertheless, this is a preliminary scoping exercise which requires field surveys and more detailed analysis to confirm the presence on-the-ground of the species used in the analysis.

Arguably, whilst the definition of *high-quality forest* used by MARD, which is based on forestry and timber exploitation potential, can be used as a proxy indicator for *primary forests*, it is not a perfect indicator of *natural ecosystems* as defined by the CBD post-2020 GBF (i.e. those whose species composition is predominantly native and determined by the climatic and geophysical environment). The definition of *primary forest* or *natural ecosystem* is not a standardised set of monitoring indicators used in MARD's annual forest monitoring and inventory protocols (MONRE, 2019) to identify the area of undisturbed forest inside and outside PA. Hence, we used two additional global datasets as additional indicators to assess the remaining extent of primary forests in Vietnam: The Intact Forest Landscapes (IFLs) (Potapov et al., 2017) and the Global Forest Management dataset (Lesiv et al. 2021). According to our results with the IFL, which help identify the last remaining large (≥ 500 km^2) with no remotely detected signs of human activity in Vietnam, there are 2,989 km² of ILAs remaining in the country, with 67% of this area currently covered by PA (Figure 4A). Based on data from Lesiv et al. 2021, our analysis indicates that there is 44,850 km² of undisturbed forest in Vietnam, with only 28% of this currently covered by PA (Figure 4B).

[6] Circular 33/2018/TT-BNNPTNT adopted by the Ministry of Agriculture and Rural Development (MARD) on *"Guidelines on forest survey, inventory and monitoring of forest condition"* on 16 November 2018.

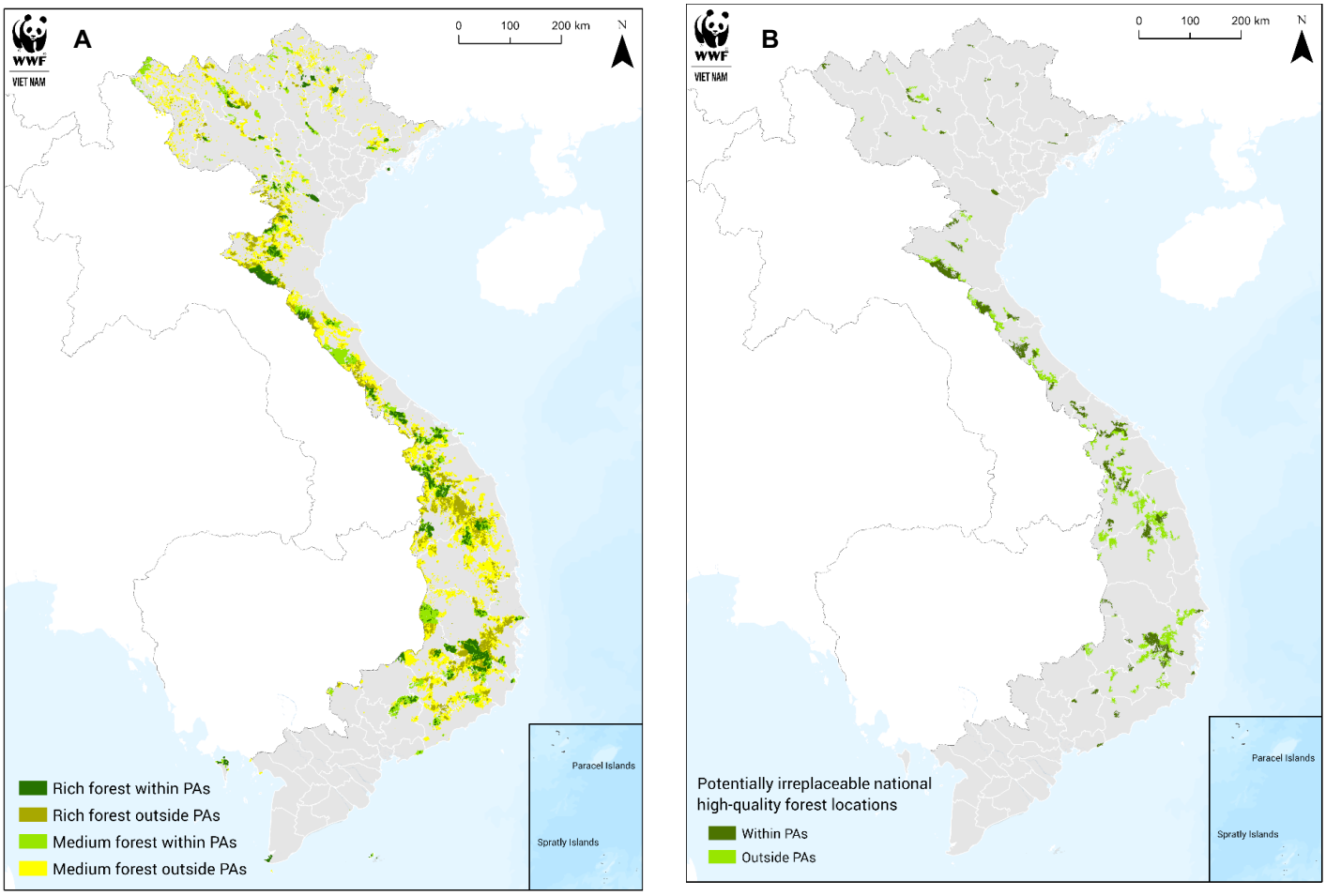

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Figure 3. A) National high-quality forest within and outside PA shown by rich- and medium-quality forest; B) Potentially irreplaceable locations within national high-quality forest in Vietnam based on a preliminary scoping exercise with the KBA Scoping Tool. Potentially irreplaceable locations are identified by the 'proximity to irreplaceability' metric (Baisero et al., 2021) within national high-quality forest in Vietnam based on forest data from FORMIS Forestry Data Sharing System (2021). (Source: WWF-Viet Nam, 2021).

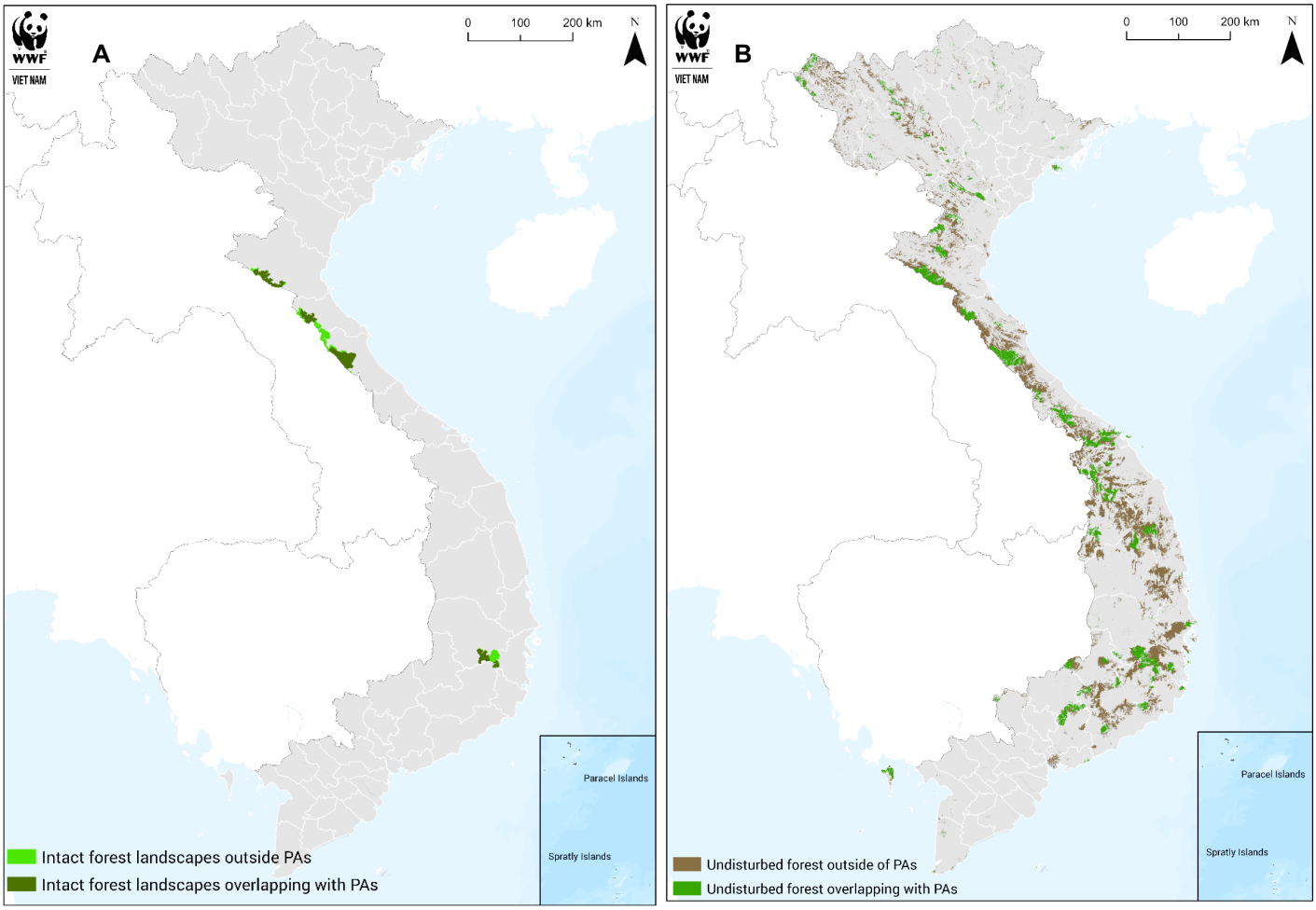

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Figure 4. A) Intact Forest Landscapes in Vietnam inside and outside PA, and B) Undisturbed forest inside and outside PA in Viet Nam based on Lesiv et al. 2021. (Source: WWF-Viet Nam, 2021).

Species richness and rarity-weighted richness

We also identified important areas for biodiversity in Vietnam based on species richness (UNEP-WCMC, 2020a) and rarity-weighted richness (UNEP-WCMC, 2020b). Species richness illustrates how important an area is for biodiversity, but does not consider small ranged/endemic species which are more likely to be threatened by human impacts. Rarity-weighted richness is a measure that combines endemism and species richness. Our analysis includes amphibians, birds, mammals, reptiles and a representative set of plant taxa which are used as a proxy to represent terrestrial biodiversity. Hence, there is a taxonomic bias. Figure 5 shows the PA coverage in Vietnam of areas of species richness and rarity-weighted richness. Our results show that important areas of high species richness and rarity-weighted richness also exist outside of PAs. Since this analysis was based on global species ranges, there might be different areas of high species richness and rarity-weighted richness using national datasets. Therefore, Figure 4 is only useful to highlight areas of global importance on a coarse scale but it does not remove the need for field surveys and more detailed analysis based on national data.

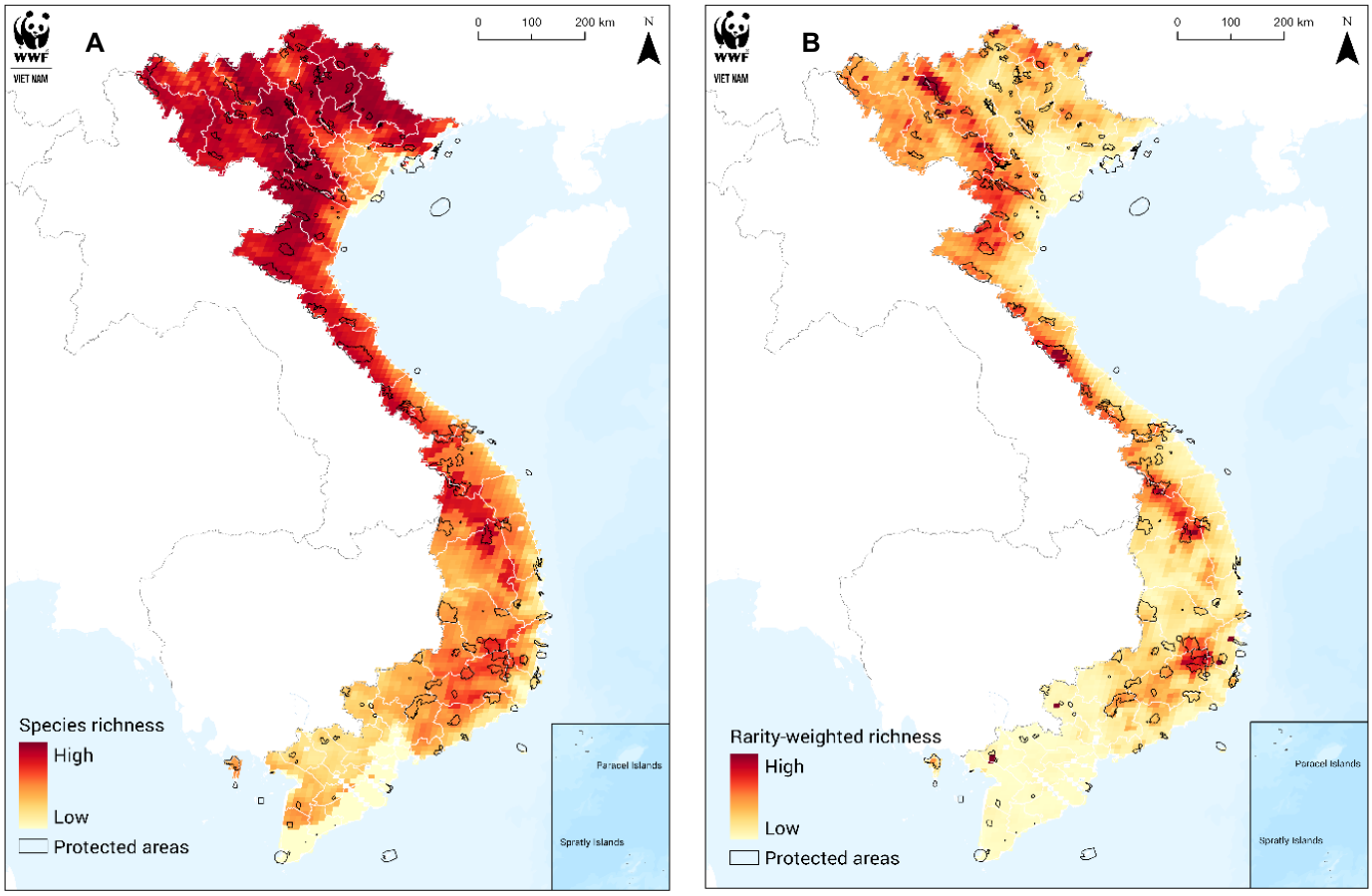

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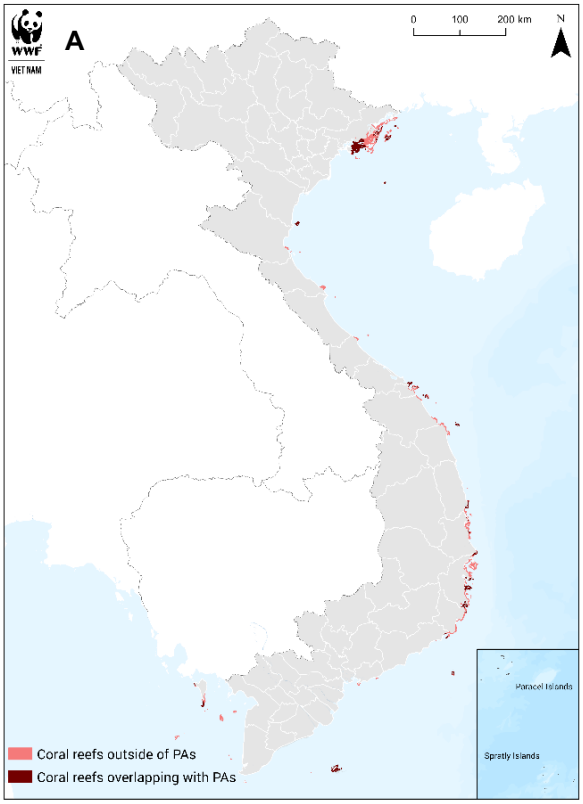
Figure 5. A) Species richness and B) rarity-weighted richness (proxy for endemicity) in Vietnam using global species range data from UNEP WCMC (2020 a,b). (Source: WWF-Viet Nam, 2021).

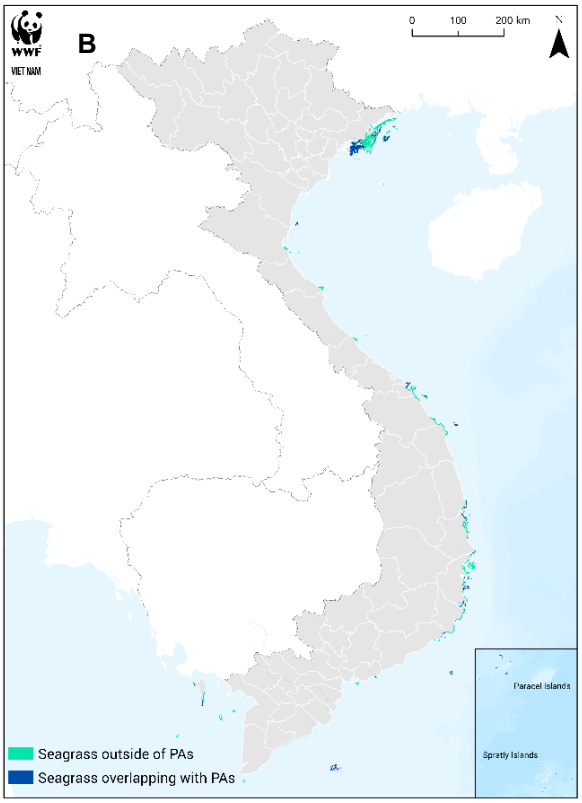
Coastal Habitats

We used the global datasets from Allen Coral Atlas (2020) and Bunting et al. (2018), to assess the current extent of Vietnam's critical marine ecosystems. According to our results, and given the lack of national data, Vietnam currently shows an extent of 622 km² of coral reefs, 115 km² of seagrass meadows and 1,581 km² of mangroves. Of this, only 34% of the coral reef area, 28% of seagrass meadows and 13% of mangrove forest are covered by PA (Table 2 and Figure 6).

Table 2. Protected area coverage of coastal habitats in Vietnam.

Coastal Habitat	Area outside PA (km²)	% area outside PA	Area inside PA (km²)	% area inside PA	Total area (km²)
Coral reefs	411	66%	211	34%	622
Seagrass	83	72%	32	28%	115
Mangroves	1372	87%	209	13%	1581





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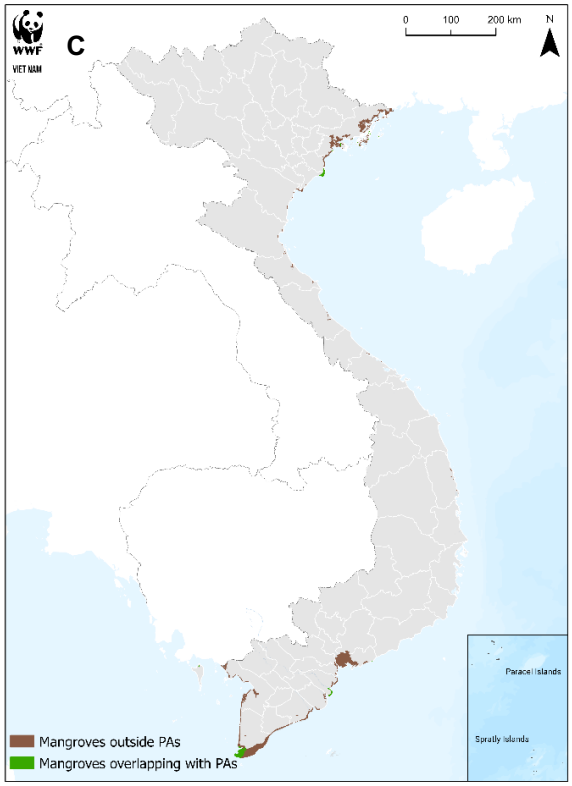

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Figure 6. A) Coral reefs, B) seagrass meadows and C) mangrove forests in Vietnam inside and outside PA. Coral and seagrass data from Allen Coral Atlas (2020) and mangrove data from Bunting et al. (2018). (Source: WWF-Viet Nam, 2021).

Our results show that large areas of coral reefs and seagrass meadows are outside PA in Northern Vietnam along the coastline of Quang Nhinh, and in South Vietnam along the coastlines of Khanh Hoa, Phu Yen and Ninh Thuan provinces. Similarly, most of the mangrove forests in the Southern delta (zone IV) (Hong and San, 1993), which has nearly 80% of the total mangrove area in Vietnam (MARD, 2014) (mostly in the coastlines of the Ba Ria-Vung Tau, Ho Chi Minh, Bac Lieu, Ca Mau and Kien Giang provinces) are largely unprotected.

1.1.3. Ecological representativeness

PA systems will not deliver global biodiversity outcomes effectively if they do not include sufficient representation of the world's ecosystems and species (UNEP-WCMC and IUCN, 2021). Hence, in order to achieve Goal A of the post-2020 GBF, PA networks must be *ecologically representative*. The CBD advises to assess and monitor ecological representativeness by using the Protected Area Representativeness Index (PARC-Representativeness) and the proportion of ecoregions covered by PA (CBD, 2021b). We obtained the PARC-Representativeness index developed by CSIRO (Australia's national science agency) for Vietnam from the Biodiversity Indicators Partnership (BIP Dashboard, 2021a) of which PA-related indicator data are based on upon PA coverage data from the World Database on Protected Areas (WDPA). This indicator ranges from 0-1, with values closer to 1 indicating fully protected biodiversity and values closer to 0 representing no biodiversity protection. The latest value of the PARC-index for Vietnam was 0.098 (data from 2016), which demonstrates an extremely low degree of biodiversity protection despite a low tendency to improvement with an annual rate of change of 3.37% between 2000-2016 (BIP Dashboard, 2021b).

Additionally, as recommended by the CBD we also analysed the spatial coverage of ecoregions in Vietnam. According to our results using the global ecoregions layer (Dinerstein et al., 2017) for Vietnam, 14 terrestrial ecoregions are found within Vietnam's territory, and all but two overlap with PA to some extent (Table 3, Figure 7). Three ecoregions meet or exceed the current Aichi Target 11 of 17% coverage (Cardamom Mountains rain forests, Northern Annamites rain forests and Southern Annamites montane rain forests) with the rest falling far short of this target. The new global target 3 of the first draft of the post-2020 GBF states that 30% of global lands should be conserved in ecologically representative protected areas systems, which means an increased level of ambition from the current Aichi Target 11. Currently none of the ecoregions in Vietnam meet the 30% PA coverage.

Table 3. PA coverage of the extent of ecoregions found within Vietnam.

Ecoregion	Area outside PA (km^2)	% area outside PA	Area inside PA (km^2)	% area inside PA	Total area (km^2)
Cardamom Mountains rain forests	250	44%	319	56%	569
Northern Annamites rain forests	8873	75%	2932	25%	11804
Southern Annamites montane rain forests	25380	81%	5889	19%	31269
Central Indochina dry forests	5875	86%	939	14%	6814
Northern Indochina subtropical forests	72391	93%	5612	7%	78003
Southeast Indochina dry evergreen forests	46824	93%	3533	7%	50357
Southern Vietnam lowland dry forests	32716	93%	2292	7%	35008
Northern Vietnam lowland rain forests	21179	94%	1327	6%	22506
South China-Vietnam subtropical evergreen forests	35818	95%	2053	5%	37871
Tonle Sap-Mekong peat swamp forests	14064	97%	462	3%	14526
Indochina mangroves	16977	98%	331	2%	17307
Red River freshwater swamp forests	10623	99%	95	1%	10719
Luang Prabang montane rain forests	1348	100%	0	0%	1348
Tonle Sap freshwater swamp forests	10256	100%	0	0%	10256

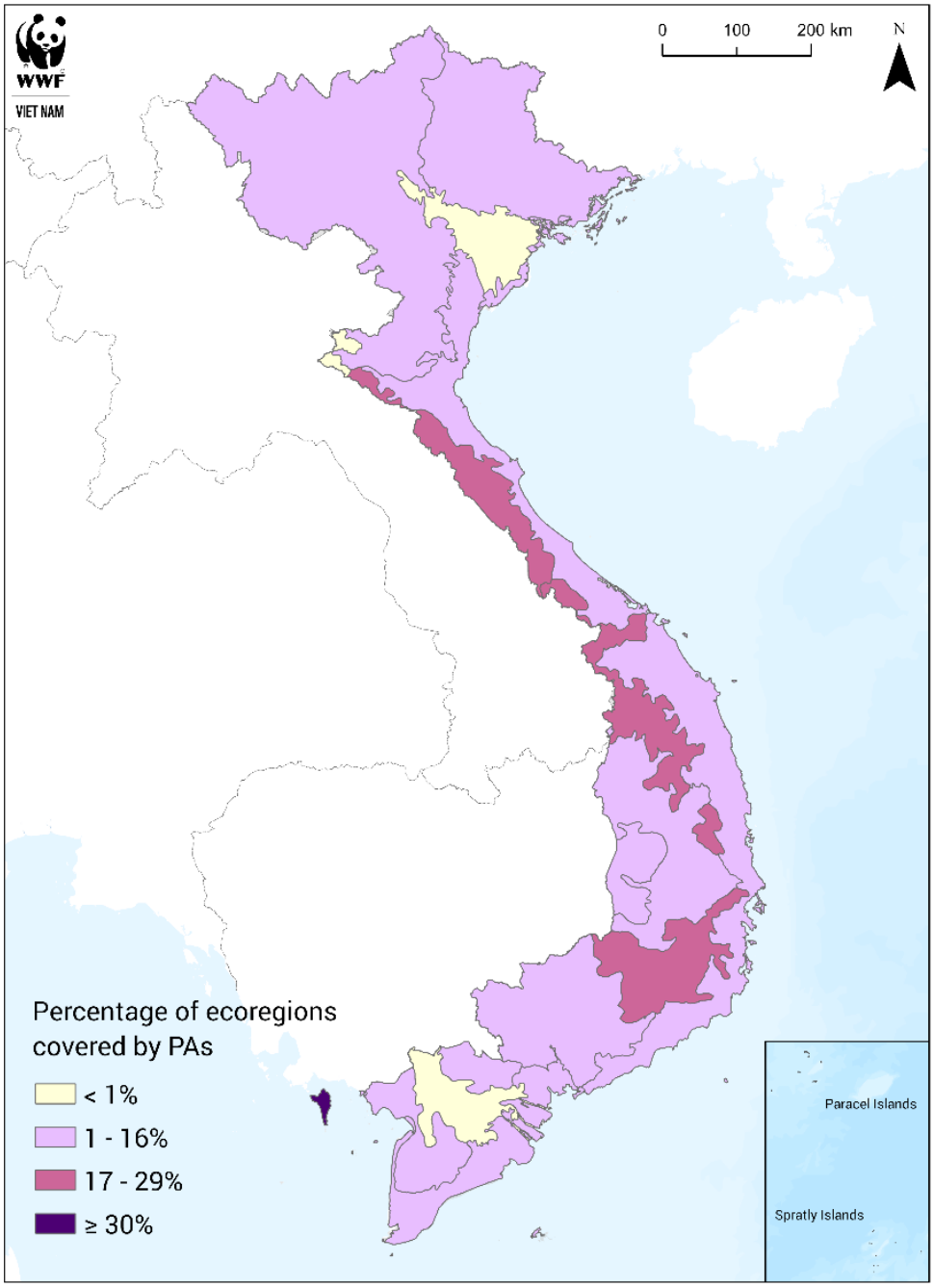

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Figure 7. Ecoregions in Vietnam, colored by the percentage of PA coverage. (Source: WWF-Viet Nam, 2021).

We also show in Box 1 results on the identification of important areas for biodiversity for conservation planning from colleagues at the Southern Institute of Ecology (SIE) of the Vietnam Academy of Science and Technology (VAST) on the project "*Application of remote sensing technology and database in research and planning of biodiversity conservation in the Central highlands and South-Central Vietnam*" during the 2018-2021 period. This project focused in 5 provinces of the Central highlands (Kon Tum, Gia Lai, DAk Lak, Dak Nong and Lam Dong) and 8 provinces in South Central Vietnam (Binh Thuan, Khanh Haa, Phu Yen, Binh Dinh, Quang Ngai, Quang Nam, and Da Nang) and it combined remote sensing with field observations across 509 sites.

Box 1. Biodiversity values in the Central highlands and South-Central Vietnam

Langbiang highland areas and the mountainous areas from Gia Lai - KonTum to Quang Nam (especially Langbiang) have been shown as areas of particularly high richness of rare species in the Central and South-Central areas of Vietnam (Figure 1). In Langbiang, the number of rare species found was over 70 species within a study area of 4 km^2, whilst the mountainous area from Gia Lai – Kon Tum showed over 65 rare species in the study area. These results confirmed that the National Parks of Bidoup-Nui Ba, Kon Ka Kinh and Phuoc Binh, as well as the Nature Reserves of Ngoc Linh, Kon Cha Rang and An Toan exhibit particularly high levels of species richness. It also showed important areas of high biodiversity values (i.e., with over 50 rare species recorded) outside the current PA network, including Deo Ca-Vong Phu bordering with Dak Lak, Khanh Hoa and Phu Yen.

This project also identified areas of high biodiversity value outside the Vietnam's SUF system but within KBA and areas of ecological landscapes prioritised for conservation in the Lower Mekong Basin. Selection criteria included minimum area of 5,000 ha and a coverage of natural vegetation types over 70%. The study identified 43 biodiversity hotspot areas (Figure 2) in Kon Plong (Kon Tum), Chu Mu (Dak Lak), Nam Phu Yen (Phu Yen), North Khanh Hoa (Khanh Hoa), Northeast Lam Dong (Lam Dong), Mount Braian (Nui San Pass - Lam Dong), and Northwest Ninh Thuan.

This project proposed the designation of 24 new potential PA covering an area of 704.771 ha (Figure 3), 4 of which have already been planned under Decision 45/QD-TTg or provincial planning (A Pun Ya, Hon Heo, Son Thai-Giang Ly and Tay Ba To) with some modifications in proposed area coverage. The total area of natural forests proposed is around 643.802 ha, which accounts for 91.3% of natural area of the proposed PAs, and the area of Protection Forests proposed is around 428,953 ha, which accounts for 60.9% of the total proposed PA area. The proposed PA would increase the coverage of Vietnam PAs from 7.2% to 9.2%, reaching the 9% target of the current Vietnam NBSAP. Within this proposed plan, the PA coverage of 4 ecoregions would also increase from 8.52% to 16.64% and some of the extent of the 24 KBA (out of 36 KBA identified in the study) would also be covered in the proposed plan. This project also proposed 14 biological corridors with a total area of 331,399 ha to increase PA connectivity.

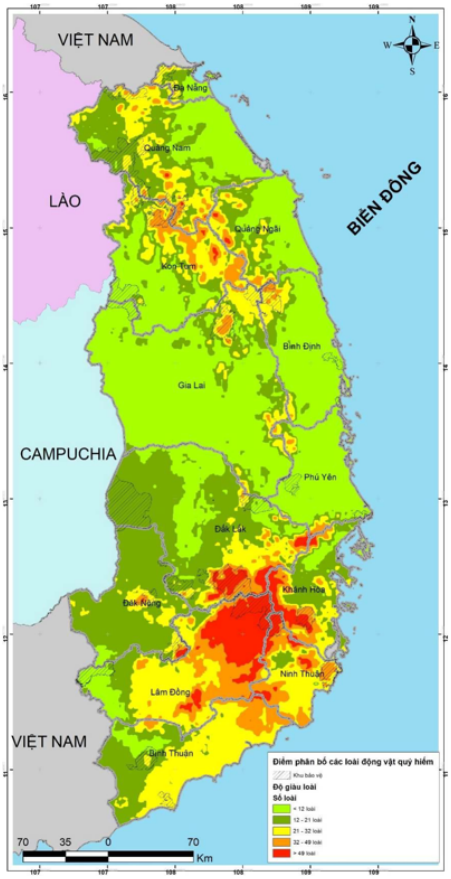

Figure 1. Distribution of Species Richness in the study area (2X2 km grid). Source: Southern Institute of Ecology (SIE, 2021).

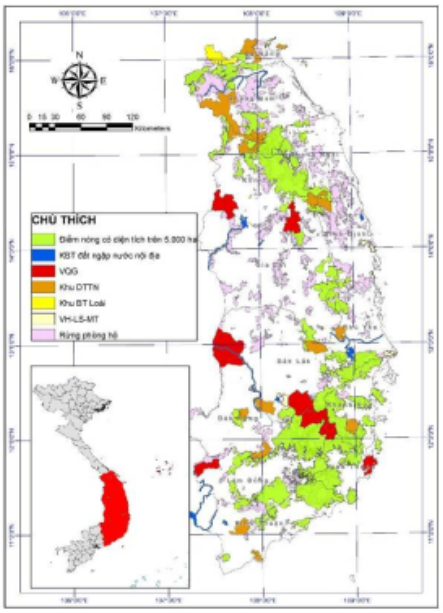

Figure 2. Biodiversity Hotspots in the study area. Source: Southern Institute of Ecology (SIE, 2021).

BOX 1. BIODIVERSITY VALUES IN THE CENTRAL HIGHLANDS AND SOUTH-CENTRAL VIETNAM

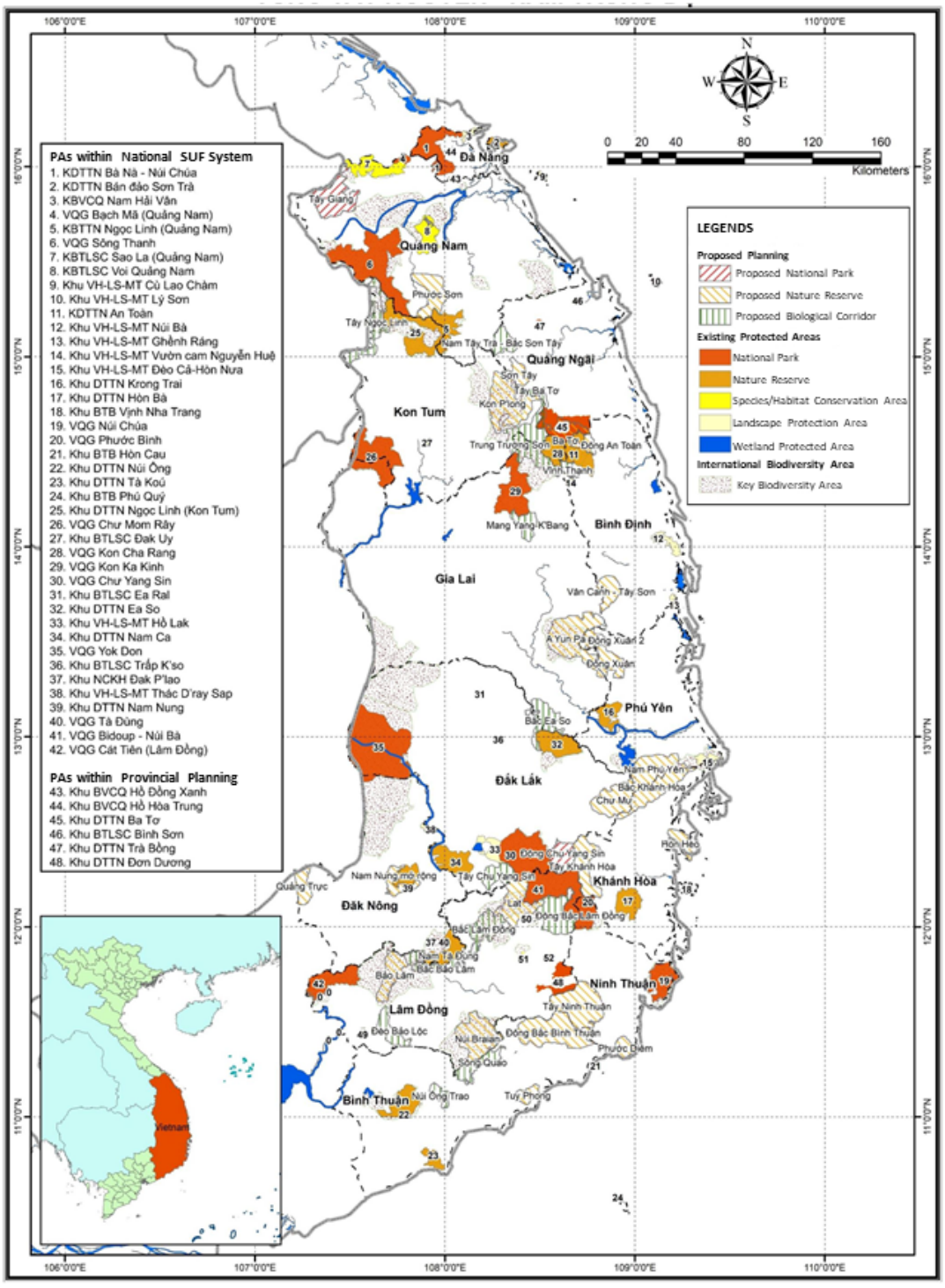

Figure 3. Proposed PA in Central highlands and South-Central Vietnam towards 2030. Source: Southern Institute of Ecology (SIE, 2021).

1.1.4. Effectiveness management and equitable governance of PAs

To achieve the CBD 2050 Vision and safeguard ecosystems diversity and NCP in alignment with the proposed Goal A of the first draft of the post-2020 GBF, an increase in PA coverage will not be sufficient (CBD, 2021a, Geldmann et al., 2019; Wolf et al., 2021; Acreman et al, 2020). PA should achieve the objectives for which they were established to be effective. Hence, the CBD post-2020 GBF highlights the importance of focusing on biodiversity outcomes rather than solely on spatial coverage. Whilst it is important to expand PA coverage to protect important areas for biodiversity and NCP in Vietnam that lie outside current PA boundaries, designating any new protected area will have minimal impact on biodiversity conservation in Viet Nam without adequate resources dedicated to threat management. Particularly, in the South-east Asia context (including Cambodia, Indonesia, Thailand and Vietnam), adequate financial and human resourcing as well as government transparency have been demonstrated to be key drivers to achieve biodiversity outcomes in PA (Graham et al., 2021).

We analysed the management effectiveness of the current Vietnam PA network using both the global METT (Management Effectiveness Tracking Tool) database held by UNEP-WCMC (UN Environment Programme World Conservation Monitoring Centre) and national METT assessments conducted shared by national stakeholders (WWF-Viet Nam and FFI) during the 2010-2021 period. METT is a widely used and recognized framework to monitor progress towards improving management effectiveness, and it can help managers track progress in implementing PA commitments under both the CBD and the Ramsar Convention. The scoring system used in METT is useful for tracking progress over time in individual sites and can be used to identify trends and patterns in management of PA across a number of sites as a basic indicator to monitor management effectiveness (Adams et al., 2021).

According to our results, only 29 PA in Vietnam have undertaken METT assessments (Further technical information could be provided under explicit request). Among these 29 PA, National Parks tend to have higher scores. Only eight PA undertook repeat assessments (over 3 times), which is a very low rate for Vietnam. The average METT score for 76 sites was 57.5, which is within *the moderately satisfactory* range.

Our results also show that the key weaknesses in PA management in Vietnam (criteria scoring lower) are generally related to PA fees, commercial tourism operators, local communities, monitoring evaluation, strategic plans for land and water use, and lack of capacity for enforcement. Visitor fees have been considered as a sustainable source of funding for PA management. However, the degree to which various sources of PA funding contribute to the achievement of ecological and socio-economic outcomes is not yet addressed in most PAME assessments.

The process of METT assessment in Vietnam does not often involve a diverse range of stakeholders while the METT proves to be more effective when a diversity of stakeholder/rights-holder groups are involved (Cook et al., 2014). The involvement of these actors in PAME assessment and PA governance could enhance local participation and support for PA designation and management, which is an important aspect for both Target 3, and also for Target 20 of the post-2020 GBF, which highlights the role of indigenous peoples and local communities in biodiversity conservation.

We acknowledge that there might exist PA effectiveness evaluations using different tools that we did not include in this analysis. Hence, there is a need to standardize and collect all results on management effectiveness evaluations of PA in Vietnam using a centralized system in order to monitor and report on this element of target 3 to the CBD.

Nevertheless, it is important to consider that whilst METT is a cost-effective option that does not make unreasonable demands on staff time, it is also open to deliberately distorting the results and, much more commonly, to poor application (e.g. not reviewing the METT to assess training/adaptation requirements before starting implementation, not completing the narrative sections so reducing its ability to drive adaptive management or not including a range of staff and stakeholders in the process) that reduces accuracy. Given the qualitative approach and the reliance on individual judgement, the METT method may be best at comparing performance in one site over time than at comparing between different sites, although it can also provide useful information about the general status of management effectiveness of PA. However, the ability for data from simple PAME systems like the METT, which focus on the practice of management, to indicate or correlate with overall biodiversity outcomes is limited and using the overall METT score to infer conservation outcomes is likely misleading, considering only one of the questions actually address conservation outcomes (Zimsky et

al., 2010, Carranza et al.,2013). Hence, there is also a need to consider other PAME tools to assess protected area effectiveness in Vietnam. The IUCN Green List framework (IUCN, 2021) focuses on four components including good governance, sound design and planning, effective management and conservation outcomes. It has been widely recommended as a new and holistic approach to address the weaknesses associated with governance and social equity in most PAME tools. However, achieving Green List recognition requires sufficient financial and human resources, which are precisely some of the current key weaknesses in PA management in Vietnam. The Green List Standard also requires systems-level considerations, including landscape and seascape connectivity. Nevertheless, one protected area in Vietnam has already achieved Green List status and others are listed (Box 2). Hence, there is an opportunity for Vietnam under the new NBSAP to increase its level of ambition and voluntarily adopt the IUCN Green List of Protected and Conserved Areas as standard to encourage protected area management effectiveness. The four pillars of the Green List framework (i.e. good governance, sound design and planning, effective management and successful conservation outcomes) provide a basis for developing headline indicators for the effective and equity components of Target 3 for each PA in the national PA network (Geldmann et al., 2020).

BOX 2. IUCN GREEN LIST IN VIETNAM

Box 2. Van Long Nature Reserve – First IUCN Green Listed reserve in Vietnam

VLNR is an important PA that supports high and unique biodiversity and NCP values. In 2020, the IUCN Green List Committee approved the nomination of Van Long Wetland Nature Reserve as Vietnam's and Southeast Asia's, first Green List site. The IUCN Green List assessment concluded that since its establishment, in the last 20 years the site has achieved important conservation outcomes (for example the population of Delacour langurs has nearly quadrupled), for both natural and social values. The site has been governed and managed effectively to ensure the long-term integrity of its values, and the site conducted extensive site and governance assessments with IUCN support to prepare their nomination. In terms of good governance, the site has demonstrated inclusive governance and well-demonstrated stakeholders' inclusion and satisfaction, and local authorities and communities actively engage in the conservation of the site. In terms of community benefits, local communities benefit from participation in the ecotourism of the site, the well-protected wetlands provide ideal conditions for recovering fishery stocks that are an important source of income and protein for local people, and the site helps regulating and reserving fresh water that is important for agricultural activities around the PA.

Hence, whilst the site failed to submit verifiable evidence for a PA definition against the indicator 2.1.1 of the IUCN Green assessment (i.e. *The site meets the IUCN definition of a Protected Area and/or is recognised as a 'Conserved Area'*) overall it provided meaningful evidence against all Green List indicators. Currently Vietnam has another 3 PA listed as candidates to the IUCN Green list, which include Con Dao National Park, Pu Mat National Park and Cat Tien National Park.

VLNR preserves the largest remaining natural inland wetland in the Northern Plain, and support the world largest population of the globally critically endangered Delacour langur, an endemic species to Vietnam.

Eco-tourism guide in Van Long Nature Reserve, Vietnam.

Karst-limestone and wetland ecosystems in Van Long Nature Reserve, Vietnam.

Delacour's langur (*Trachyphitecus delacouri*) in karst-limestone landscape in Van Long Nature Reserve, Vietnam.

1.1.5. PA connectivity in Vietnam

Another important element highlighted by the CBD as essential to reach the 2050 Vision, is a significant net increase in not only both area and integrity of natural ecosystems, but also connectivity (CBD, 2021a). Connectivity between PA is essential to ensure the long-term and persistence of biodiversity and the delivery of ecosystem services (Saura et al., 2019). A connectivity analysis should be conducted to provide an evidence-assessment of the level of connectivity between PA in Vietnam. Nevertheless, due to time constraints we only focus on two PA connectivity indices for Vietnam: The Protected Area Connectedness and the Protected Connected (Protconn) index.

We used the Protected Area Connectedness Index (PARC-Connectedness) developed by CSIRO for Vietnam from the BIP (BIP Dashboard, 2021c). The PARC-Connectedness Index for Vietnam was 0.401 in 2019, with an annual rate of increase of 0.9865% (BIP Dashboard, 2021d). This indicator ranges from 0-1, with values closer to 1 indicating that land is well-connected to other PA and areas of intact native vegetation, while values closer to 0 indicate low connectivity between PA. A value 0.401 implies a low level of connectivity between Vietnams' terrestrial PA.

We also assessed connectivity between PA in Vietnam by using the Protected Connected (Protconn) index (Saura et al., 2018) which was designed to measure the percentage of each nation that is covered by lands that are both protected and connected. The indicator considers the spatial arrangement, size and coverage of PA and accounts for both the land area that can be reached within PAs and that which is reachable through the connections between different PAs. The analysis includes all designated PA in the WDPA, and is conducted for a range of median dispersal distances (1 to 100 km) observed for most terrestrial vertebrates. In the current CBD Strategic Plan 2011-2020, the connectivity element of Aichi Target 11 was assumed to be met if the ProtConn Index≥17%. The Protconn Index for Vietnam is currently 1.656% (DOPA Explorer, 2021). Vietnam has lag behind other neighboring countries in terms of PA connectivity and it has been identified for designation of new PAs as a crucial measure to increase connectivity (Saura et al., 2018), which is consistent with its identification among the top global priority countries for PA network expansion to protect vertebrate species ranges and ecoregions (Pouzols et al., 2014).

2. PA drivers in Vietnam

The current Vietnam NBSAP highlights that major threats to wildlife in Vietnam, and which are also indicative of the major direct or indirect drivers causing negative impacts in the PA network in Vietnam, currently include: illegal and over-exploitation of wildlife, illegal wildlife trade, habitat loss and disturbance, pollution, and climate change. Main threats to Vietnam's KBA based on the IUCN – CMP (Conservation Measures Partnership) Unified Classification of Direct (IUCN and CMP, 2012), include 9 types of threats among which the most intense threats are biological resource use (about 50 KBA are under this threat), closely followed by agriculture and aquaculture (more than 40 KBA), transportation (20 KBA) and human disturbance (nearly 20 KBA) (WWF-Viet Nam BioDev2030, 2021). Our analyses on MEET assessments also shown that biological resource use was the highest ranked threat to Vietnam's PA (Further technical information could be provided under explicit request). For example, according to a report by the Forest Protection Department, forest rangers nationwide detected and processed over 174,000 cases of violations of the law on forest management, development, and forest products (of which 4,305 cases related to wildlife) during the period 2010-2016 (MONRE, 2019). Popular wildlife trade products included: pangolins, pangolin scales, turtles, bear hands, rhinoceros' horn, medicinal plants (MONRE, 2019).

Nevertheless, there are still many drawbacks that impede a comprehensive assessment of main drivers or threats to PA in Vietnam. Those include: i) threats are often referred to as the name of the PA without the detail of the location of the threat, ii) there is no data on the magnitude of threats, and iii) the available information on threats is unsystematic and does not reveal all kinds of threats (WWF-Viet Nam BioDev2030, 2021). Hence, there is a gap on threats data for PA in Vietnam so additional methods to acquire this information (e.g. from databases of the government agencies and indirect information of threats from land use cover change maps) need to be developed for a better understanding of threats. Globally, land-use change (primarily driven by agriculture, forestry and urbanisation) is the direct driver with the largest

relative impact on terrestrial and freshwater ecosystems, while direct exploitation of fish and seafood has the largest relative impact in the oceans (IPBES, 2019). A spatial analysis of land cover changes in Vietnam during 2000-2018 showed that forested areas are the most impacted areas by land use changes in Vietnam (WWF-Viet Nam BioDev2030 project, 2021). Particularly, PA in Vietnam has demonstrated their lack of effectiveness to protect flooded forests as 68% of Vietnam's flooded forests have disappeared between 2000-2018, with a higher magnitude of loss in PA than at country level (-32% of mixed forest at the country level, compared to -38 % at the PA level, while flooded forests decreased by 68% at the national level and 75% at the PA level). Agriculture and Forestry are the two main economic sectors with the most significant impacts on forested areas in Vietnam. These trends were similar for KBA that are mostly covered by forests (Birdlife International, 2021). Our analysis on IFLs (the last remaining intact large forests ≥ 500 km2 with no remotely detected signs of human activity) showed that only 68% of this area is currently covered by PA. We also examined datasets on areas of low human impact (Venter et al., 2016, Kennedy et al., 2019) and we found that no areas of low human footprint are present in Vietnam. It is likely that the high human population in Vietnam is the reason why these datasets are not displaying low human impact areas in the country

3. Progress towards Specific Target 1 of the Vietnam NBSAP to 2020, vision 2030

Here we assess the changes and trends in the PA network in Vietnam since the current Vietnam NBSAP 2010-2020 was adopted in 2011, with a particular emphasis on the changes that took place since the 6th National Report to the CBD in 2018 in relation to element i) national coverage (as percentage of national land covered) of the Post-2020 GBF's Target 3.

The specific Target 1 (section 2.4 of the Vietnam National Biodiversity Strategy to 2020, Vision to 2030) for Vietnam states: *To improve the quality and increase the area of protected ecosystems, ensuring that the area of terrestrial protected areas accounts for 9% of the total territorial area, marine protected areas account for 0.24% of the sea area, forest coverage reaches 45%, primary forest remains at 0.57 million hectares, coupled with effective protection plans; that mangrove forests, seagrass beds, and coral reefs are maintained at the current levels; that 15% of degraded critical ecosystems are restored; and the number of internationally recognized protected areas are increased to 10 Ramsar wetlands, 10 biosphere reserves, and 10 ASEAN heritage parks.*

Table 4 shows an assessment on the progress towards the target reported in the 6th Voluntary National Report to the CBD, the current status based on our results shown in the previous sections and their linkages with the current elements stated in the global target 3 of the first draft of the post-2020 GBF.

Based in our assessment, the national target on terrestrial PA coverage showed a positive trend by 2018 but it was still not achieved by 2021, according to our results. In terms of MPA coverage, the national target showed a positive trend by 2017 and it is already achieved by 2021. Nevertheless, both targets show a very low level of ambition in comparison with the global target 3 proposed in the first draft of the post-2020 GBF. In terms of forest cover, the national target of 45% coverage was not achieved by 2020. Nevertheless, according to our results based on VNForest FORMIS data, only approximately 8.38% of Vietnam's land area is classified as high-quality forest (27,771 km²), out of which only 34% is covered by PAs (see section 1.1.2). In terms of mangrove forests, seagrass meadows and coral reefs, there was a negative trend for mangrove forest and seagrasses meadows (not only the national target were not achieved but the national coverage of these critical habitats was reduced from the 2013 baseline. Vietnam also set national targets around the designation of new Ramsar sites, biosphere reserves and ASEAN Heritage Parks, the three of which showed a positive trend by 2021. (although the targets have not been achieved yet). There were also national targets around the conservation of primary forests and restoration of degraded ecosystems, but neither of them had a baseline reference neither a monitoring system nor indicators in place so progress could not be assessed. Last but not least, the current Vietnam NBSAP did not set any national target linked to the specific elements of the global target 3 of the post-2020 GBF on ecological representativeness, effective management and equitable governance and PA and OECM connectivity.

Table 4. Assessment of Vietnam's progress towards achieving Aichi Target 11 and related national target in current Vietnam NBSAP to 2020, Vision to 2030.

Post-2020 GBF Global Target 3 element	Related Target in current Viet Nam NBSAP	Summary of progress		Assessment of Progress
		Vietnam's Sixth National Report to the CBD (2019)	Current status based on our analysis (WWF-Viet Nam, 2021)	
3.1. *[Ensure that at least 30 per cent globally of land areas and of sea areas...are conserved…* (PA coverage)	Area of terrestrial PA to reach 9% of the total territorial area	By 2018, the area of terrestrial PA was 2,269,426 ha accounting for 6.84% of territorial area. It was proposed that SUFs could be increased to 2.4 million ha based on Decision No. 1976/QD-TTg. The target was perceived as too ambitious as the targeted SUF area reduced to 2,358,870 ha by 2020 in accordance by amended land use planning by the National Assembly's Resolution 134/2016/QH13.	Vietnam has 171 PAs that cover 8% of its terrestrial area and 0.5% of Vietnam's EEZ.	Vietnam has made some progress in increasing the number and area coverage of terrestrial and marine PA. Whilst the current national targets have been partially achieved (terrestrial) or completely achieved (marine), the current level of ambition of these national targets is not well aligned with the level of ambition proposed in Target 3 of the post-2020 GBF.
	Area of Marine Protected Areas (MPA) to reach 0.24% of the sea area	Between 2014 and 2017, the number of MPAs increased from 9 to 10. In 2017, there were 10 MPA in the planned MPA network covering a total area of 187,810 ha, which is 0.19% of Vietnam's sea area. The total area of MPA could possibly be 270,271 ha based on Decision 742/QD-TTg. However, the remaining 6 MPA were not designated due to a lack of technical support and financial resources.		
	Forest cover to reach 45% of the total territorial area	Forest cover increased from 40.43% to 41.45% during the 2014-2017 period. In 2017, forested land was 14,415,381 ha (10,236,415 ha of natural forest and 4,178,966 ha of plantation forest) of which 13.7 million ha was recorded for national forest cover[7]. Forest cover was expected to increase to area to 14.4 million ha 42% coverage) by 2020 based on Decision 886/QD-TTg. However, the target was assessed as too ambitious as the coverage target was reduced from 45% to 42% by the National Assembly at Resolution No. 134/2016/QH13.	By December 2020, forested area was 13,919,557 ha – 42.01%.[8]. Only 20% in these forested areas was classified as high-quality forests (rich and medium forests) and only 34% of high-quality forests is inside PA.	There has been progress towards the target but at an insufficient rate to meet 45% coverage by 2020.

[7] Decision 1187/QD-BNN-TCLN on "Announcement on the state of national forests 2017) adopted by VNFOREST of MARD on 03 April 2021.
[8] Decision 1558/QD-BNN-TCLN on "Announcement on the state of national Forests 2020" adopted by VNFOREST of MARD on 13 April 2021.

…especially areas of particular importance for biodiversity and its contributions to people… (Areas of particular importance for biodiversity)	Primary forest to be maintained at 0.57 million ha and have an effective protection plan	Baseline data was not available for 2014. As of 2018, there was not official baseline data on primary forests in Vietnam so there was no official target associated with primary forests in the legislation. The underlying reasons were attributed to a lack of implementing programme for the target, and that primary forest is not legally set as an indicator of yearly forest monitoring by MARD.	Our analysis shows that there is 44,850 km² of undisturbed forest in Vietnam, with 28% of this occurring within PA. Due to the high importance of primary forest (or rich natural forest), it is suggested that the future NBSAP should adopt a clear definition for this critical habitat.	Since the baseline was unknown, the progress is unknown.
	Area of mangroves to be maintained at current levels (190,000 ha)	The area of mangrove forest reduced to 166,502 ha in 2014 and increased to 213,142 ha in 2017 including a possibility of expansion through the development of a new plantation of 29,500 ha of mangroves by 2020 as per Decision No.120/QD-TTg. This increasing trend was explained by successful programmes on afforestation of coastal mangrove forests and effective local efforts on managing the expansion of aquaculture, particularly in the Mekong Delta.	The area of mangrove forests is about 158,100 ha of which only 13% is within PA.	The reduction in mangrove forest areas compared to the 2013 baseline shows a negative trend for Vietnam in this target.
	Seagrass area to be maintained at current levels (12,380 ha)	There was no data reference to assess progress but it was reported that progress towards target was achieved. Reasons for this lack of evidence included insufficient monitoring data, lack of implementing programmes and financial resources.	The area of seagrass meadows is about 11,500 ha of which only 28% is within PA.	Our baseline assessment shows a negative trend in this target.
	Coral reefs to be maintained at current levels (14,131 ha)	There was no data reference for 2017, so the progress was said as being made but an insufficient rate due to insufficient support from local institutions, inter-agency collaboration for managing and protecting coral reefs and no priority given to coral reefs in either environmental agenda or socio-economic activities.	The area of coral reefs is about 62,200 ha of which only 34% is within PA (21,100 ha). Our analysis shows a much bigger area of coral reefs in Vietnam compared to the NBSAP's baseline. This potentially indicates a lack of attention to coral reef monitoring and areas of importance for marine biodiversity outside MPAs.	The progress cannot be assessed due to significant difference between our analysis and the NBSAP's baseline.

	15% of degraded critical ecosystems are restored	There was no baseline data, monitoring system, or a clear definition of "critical ecosystem areas". Therefore, the extent to which these areas have been restored was unknown.		The progress is unknown since there was no baseline data neither a monitoring system in place.
	10 Ramsar wetlands	The number of Ramsar sites increased from 5 to 9 during the 2014-2017 period. Hence, the 6th NR reported that Vietnam was on track to meet the target.	There are 9 RAMSAR sites with an area of 120,549 ha (Ramsar, 2021).	Progress has been made since 2014. However, targets have not been achieved.
	10 biosphere reserves	The number of Biosphere Reserves increased from 8 to 9 sites with an area of 4,1M ha. Vietnam was on track to meet the target.	There are 9 Biosphere Reserves (UNESCO, 2021)	
	10 ASEAN Heritage Parks	The number of AHP increased from 4 to 6 sites during the 2014-2017 period. Vietnam was on track to meet the target.	There are 6 AHPs with an area of 83,676 ha (AHP, 2021).	
…ecologically representative…	There was no specific target aligned with this element	There were 172 PA reported, with a total area of 2,493,844 ha, located in various geographic/ecoregions and in four seas. Based on climate, topography, geology, and soil on the continental part of Viet Nam, it is divided into eight forest ecoregions, with 47 sub-regions.	There are 14 terrestrial ecoregions in Vietnam, and all but 2 overlap with PA to some extent. 3 ecoregions meet or exceed Aichi Target 11 of 17% coverage with the rest falling far short of this target.	There was no national target on the extent of ecoregions under PA, the progress towards Aichi Target 11 is hence unknown. Our results here show that currently none of the ecoregions in Vietnam meet Target 3 on 30% PA coverage.
…through effectively and equitably managed… (Effective management and equitable governance)	There was no specific target aligned with this element	6th NR report stated that 80% of special-use forests have established their own management boards (MARD, 2016). Nevertheless, special-use forest management is decentralized and forest owners are diverse. Mostly donors and NGOs undertook assessment of PA management effectiveness.	29 PA have METT assessments (17% of 171 PA in Vietnam, with only 8 of those have repeat assessments. One PA was Green Listed in 2020 (IUCN, 2021).	Our analysis shows the number of METT assessments undertaken per year has reduced during the 2013-2021 period. Hence, arguably progress is moving away from the target.

…well-connected systems of protected areas and other effective area-based conservation measures…] (PA and OECM connectivity)	There was no specific target aligned with this element	Task 1a of the current Vietnam NBSAP aimed to establish biological corridors to connect natural habitats of threatened species and PA, and to establish 3 transboundary tiger conservation areas with Laos and Cambodia. This remains in piloting phase.	Progress to target is unknown given there was no information on connectivity status.

4. Vietnam legislation on PA

Protected Areas in Vietnam have been designated, managed and influenced by key legislation and sectoral policies summarized in Table 5.

Table 5. Vietnam main legislation, policies, processes and milestones related to the designation and management of PA.

Year	Legislation
1962	Designation of Cuc Phuong Prohibited Forest as the first protected area of the Democratic Republic of Vietnam.[9]
1977	After the reunification of SRV in 1975, the Government established 10 more Prohibited Forests with a total area of 44,300 ha.[10]
1986	- Announcement of *Doi Moi* Policy to transform Vietnam into a socialist market-oriented country - 73 protected forests were designated covering an area of 769,500 ha.[11] - Protected Forests were categorised into three types based on use purposes. These include Protection Forests, Special Use Forest (SUFs), and Production Forests.
1987	Ratification of World Heritage Convention
1989	Ratification of Ramsar Convention
1991	- Enactment of Law on Forest Protection and Development, updated in 2004 and replaced by Law on Forestry (2017). - First National Plan for Environment and Sustainable Development (NPSED) of 1991-2000.[12]
1993	- Enactment of Law on Environmental Protection[13], updated in 2005[14], 2014[15],
1994	Ratification of CBD and CITES Conventions.
1995	Release of first National Biodiversity Action Plan (BAP).[16]
2001	Establishment of Nha Trang Bay MPA as Vietnam's first MPA.
2003	Enactment of the first Law on Fisheries[17], updated in 2017[18] Release of the first National Strategy on Environmental Protection (NSEP) to 2010 and a vision to 2020.
2008	Enactment of Law on Biodiversity[19]
2010	Enactment of Decision No.742 on National Strategy on Establishment of Vietnam's MPA network.[20]
2013	Release of National Biodiversity Action Plan towards 2020 with vision to 2030.[21]
2014	- Enactment of Decision 45/QD-TTg on Master plan of national biodiversity conservation by 2020, with a vision to 2030. [22] - Enactment of Decision 218/QD-TTg on approving strategy for management of special-use forests, marine protected areas and inland water protected areas in Vietnam towards 2020 and vision to 2030.[23] - Enactment of Decision 1976/QD-TTg on Approving strategic planning for SUF system across Vietnam 2020 and vision to 2030.
2017	- Update the Law on Fisheries 2017 to replace Law on Fisheries 2003 - Update the Law on Forestry 2017 to replace Law on Forest Protection and Development - Enactment National Action Plan for the implementation of the 2030 Agenda for Sustainable Development.[24]
2018	Enactment of Resolution No. 36-NQ/TW on "Strategy for Sustainable Development of Viet Nam's marine economy by 2030[25]
2020	Enactment of Law on Environmental Protection 2020[26] to replace Law on Environmental Protection 2014

[9] Decision No.72-TTg adopted by the Prime Minister of the Democratic Republic of Vietnam on *'Cuc Phuong Forest'* on 07 July 1962.
[10] Decision No.41/TTg adopted by the Prime Minister on *'The regulations of Prohibited Forests'* on 24 January 1977.
[11] Decision No.194/CT adopted by the Chairman of the Council of Ministers on 09 August 1986.
[12] Decision No.187-CT adopted by the Chairman of the Council of Ministers on *'The implementation of the National Plan of Environment and Sustainable Development'* on 12 June 1991.
[13] Law No. 29-L/CTN on *'Environmental Protection'* adopted on 27 December 1993 by the National Assembly.
[14] Law No.52/2005/QH10 on *'Environmental Protection'* adopted on 29 November 2005 in the 8th meeting of the National Assembly, session X.
[15] Law No.55/2014/QH13 on *'Environmental Protection'* adopted on 23 June 2014 in the 7th meeting of the National Assembly, session XII.
[16] Decision No.845/TTg adopted by the Prime Minister on *'Approving the National Biodiversity Action Plan of Vietnam'* on 22 December 1995.
[17] Law No.17/2003/QH11 on *'Fisheries'* adopted on 26 November 2003 in the 4th meeting of the National Assembly, session XI.
[18] Law No.18/2017/QH14 on *'Fisheries'* adopted on 21 November 2017 in the 4th meeting of the National Assembly, session XIV.
[19] Law No.20/2008/QH12 on 'Biodiversity' adopted on 13 November 2008 in the 4th meeting of National Assembly, session XII.
[20] Decision No.742/QD-TTg adopted by the Prime Minister on *'Approving the master plan for Vietnam's national MPA network towards 2020'* on 26 May 2010.
[21] Decision No. 1250/QD-TTg adopted by the Prime Minister on *'Approving the National Biodiversity towards 2020 with a vision to 2030'* on 31 July 2013.
[22] Decision No.45/QD-TTg adopted by the Prime Minister on 'Approving the master plan of national biodiversity conservation *towards 2020 with a vision to 2030*' on 04 Jan 2014
[23] Decision No.218/QD-TTg adopted by the Prime Minister on 'Approving strategy for management of special-use forests, marine protected areas and inland water protected areas in Vietnam towards 2020 and vision to 2030 on 07 Feb 2014.
[24] Decision No.662/QD-TTg on *'Promulgation of National Action Plan for the Implementation of the 2020 Agenda for Sustainable Development'* adopted by the Prime Minister on 10 May 2017.
[25] Resolution No.36-NQ/TW on "Strategy for sustainable development of marine economy by 2030, with a vision to 2045" adopted at the 8th plenum of the 12th Party Central Committee.
[26] Law No.72/2020/QH14 on *'Environmental Protection'* adopted on 17 November 2020 in the 10th meeting of the National Assembly, session XIV.

2021	-	Enactment of the National Forestry Development Strategy for the 2021-2030 period, with a vision to 2050[27]
	-	Enactment of the Strategy for the development of Vietnam's fisheries by 2030 with a vision to 2045[28]

5. Discussion

Protected areas are key to any national effort to contain biodiversity loss. Their role in doing so will be deliberated at the CBD COP-15 in 2021, where countries will be encouraged to set aside more land and marine areas for conservation. Nevertheless, Vietnam, as most countries in the world, will face the challenge of addressing economic losses as a result of the COVID-19 pandemic and promoting recovery through actions which simultaneously support biodiversity conservation. The World Bank spotlighted that to recover from the economic fall-out of the Covid-19 pandemic, promote economic growth and conserve biodiversity requires a system-wide approach, which encompasses protecting natural assets, growing diversifying tourism businesses, as well as sharing benefits with local communities (World Bank, 2021b).

International agendas, such as the CBD and UN SDGs highlight the essence of evidence-based decision-making underpinned by robust science (Lubchenco et al., 2015). Effectively formulating and implementing the post-2020 GBF's target 3 requires the co-production of scientific knowledge and collaboration at the science-policy interface to ensure national solutions are adaptable to the national and local contexts in Vietnam considering political realities where policies and management actions occur. Therefore, the implementation of a national target on protected and conserved areas in Vietnam brings important opportunities for inter-disciplinary research in the forthcoming years post-Kunming.

Our study addresses the current state of the PA network in Vietnam and set out recommendations to inform the development of a national target 3 on PA and OECM for the period 2021-2030. It provides insights into how to respond to these escalating crises, recover from the economic fallout of the pandemic, address longstanding development challenges, and conserve biodiversity through PA.

The results of this work highlight that, although progress has been made in developing the national PA network, significant gaps in the current Vietnam PA system still remain and Vietnam is severely impeded on its achievements on PA targets. The current PA network in Vietnam shows considerable gaps in the protection of important areas for biodiversity, is not effectively managed and show low levels of ecological representativeness and connectivity. With only 8% of terrestrial and 0.5% of marine areas within national jurisdiction being covered by PA by 2021, the coverage element of 17% and 10% respectively stated by Aichi Target 11 has been largely underachieved. Vietnam set PA targets in the current NSAP 2011-2020 that showed a considerably low level of ambition in comparison with Aichi target 11. Nevertheless, even this low level of ambition targets that characterized the current Vietnam NBSAP have not been achieved by 2021 (sse section 3).

In terms of important areas for biodiversity, 56% of current KBA are not within PA. Most of the unprotected KBA area is located in the central and south Viet Nam provinces of Quang Binh, Thua Thien Hue, Quang Nam, Kon Tum, Dak Lak, Dak Nong, Lam Dong, and Dong Nai. Also, a preliminary scoping analysis undertaken in collaboration with the KBA Secretariat suggests there are also potentially new KBA areas currently unidentified within high-quality forest. This work also highlights the border area between Dak Lak and Lam Dong as an important area of endemicity and a high proportion of 'rich forest' according to the

[27] Decision No. 523/QD-TTg adopted by the Prime Minister on "Approving Vietnam's forestry development strategy for the 2021 - 2030 period, with a vision to 2050" on 01 April 2021.
[28] Decision No.339/QD-TTg adopted by the Prime Minister on "Approving the strategy for development of Vietnam's fisheries by 2030 with vision towards 2045" on 11 March 2021.

national forest inventory. Nevertheless, the current forest inventory process only focuses on collecting information on timber and non-timber forest products so the assessment mechanism's design should be updated to include parameters for forest carbon stocks and coverage of natural undisturbed forests (primary native forests).
According to global datasets, Vietnam maintains three important Intact Forest Landscapes patches in the border areas with Lao PDR in the Central Annamites forests of Nghe Anh, Ha Tinh and Quang Binh provinces, with only 67% of this area currently found within PAs. Most of the unprotected intact forest according to this data are found outside PA located in the provincial border between Ha Tinh and Quang Binh. Preserving these remnant intact forests is not only a priority to contribute to the achievement of global biodiversity targets, but conserving these vital resources can also help in the fight against climate change and reach the Paris Agreement on reduce emissions and increase global sinks.

In terms of the ecological representation (ecoregions) of the PA network, our results suggest that there are important gaps in the current PA system. 97% of ecological representative elements (ecoregions) are outside the PA network in Vietnam (mostly the Red River freshwater swamp forests, Indochina mangroves and Tonle Sap-Mekong peat swamp forests). The freshwater swamp forest ecoregion along the lower Red River in northern Vietnam has been almost totally cleared of its original habitat, little freshwater swamp forest remains and there are no PA in this ecoregion, which provides a good background for potential restoration targets. Additionally, Northern and Southern Vietnam lowland rain forests are highly unprotected, with over 90% of their extent outside of PA. Our results suggest that none of the ecoregions in Vietnam currently cover the proposed coverage target in the post-2020 GBF of 30%.

The results of this study also show that the current PA network in Vietnam only cover 34% of its coral reef area, 28% of its seagrass meadows and 13% of its mangrove forests. Large areas of coral reefs and seagrass meadows are outside PA in Northern Viet Nam along the coastline of Quang Ninh, and in South Viet Nam along the coastlines of Khanh Hoa, Phu Yen and Ninh Tuan provinces. Similarly, most of the mangrove forests in the Southern delta, which has nearly 80% of the total mangrove area in Vietnam (mostly in the coastlines of the Ba Ria-Vung Tau, Ho Chi Minh, Bac Lieu, Ca Mau and Kien Giang provinces) are largely unprotected.

The Indochina mangroves are among the most diverse and extensive mangrove ecosystems in the world, and it provides important habitat for some of the world's rarest waterbirds. Whilst there has been significant mangrove reforestation and restoration activity in Vietnam (c. 200,000 ha) and government investment over the last three decades, only approximately 21% of the existing mangrove forests in Vietnam are natural forests with the remaining area replanted (McNally et al. 2011). Additionally, although PA have been created to conserve Vietnam's remnant mangroves, most of the area is still outside of PA. Similar to other countries in Southeast Asia, Vietnam's mangroves are experiencing rapid and large-scale conversion to agriculture and aquaculture so there is an urgent need for a more robust approach for the restoration of mangroves in Vietnam (including the adoption of monitoring and reporting procedures that consider both areal success and ecosystem function). Preserving and restoring mangroves, as well as seagrasses and coral reefs, is not only fundamental to achieve target 3 of the post-2020 GBF, but it is also essential for achieving targets 9, 10 and 11 of the frameworks on Meeting people's needs through sustainable use and benefit-sharing as a key element of the 2050 Vision for Biodiversity. The protection and restoration of such ecosystems to address societal needs would be an essential component of actions needed in Vietnam based on "ecosystem-based approaches", "nature-based solutions" or "green infrastructure".

Vietnam is one of the world's sixteen most biologically diverse countries, with over 50,000 species identified (UNDP, 2021) and has high levels of species richness and endemicity. Also, to set Vietnams in perspective in the global conservation scenario, we have identified that Vietnam holds 0.4% of the most valuable global areas for conserving biodiversity (based on data from Jung et al., 2021). This recent global study is based on a joint optimization that minimizes the number of threatened species, maximizes carbon retention and water quality regulation, and ranks terrestrial conservation priorities globally to provide a global assessment of where land could be optimally managed for conservation, and support both the implementation of the biodiversity and climate conventions.

Hence, according to our work, while a 30% PA coverage target as proposed in the first draft of the post-2020 GBF might have been viewed as too ambitious, Vietnam's potential contribution to the persistence of global and national biodiversity provide a strong argument for the GoV to take this unique opportunity to step up and raise its level of ambition to put its biological wealth under appropriate and effective protection before it is too late. The GoV must take urgent and ambitious actions to leverage the transformative change required to halt and start to reverse the loss of biodiversity and nature's contributions to people in the country. This will be essential not only for biodiversity conservation but to set to Vietnam on a path to a more sustainable future over the next decade.

5.1. Key messages and Opportunities

Here, we present key messages as a result of our assessment of the current status of the PA network in Vietnam. These include:

i) Vietnam should commit to bolder and more ambitious conservation efforts over the next decade to increase the extent and improve the management of its PA system. Given Vietnam's high percentage of territory that qualifies as most globally important for biodiversity and ecosystem services, the GoV should step up its level of ambition in line with the post-2020 GBF and set a target to achieve 30% protection of the land and ocean through PA and community conserved areas (such as communal conservancies) in Vietnam by 2030. This includes protecting the most critical 30% areas for biodiversity, sustainably manage the rest that are not conserved or protected, and restore degraded ecosystems. Achieving this level of ambition would only be possible with the inclusion of the lands and territories that are sustained, protected and restored by IPLCs in Vietnam, which requires that their rights and governance receive full recognition through specific policies and that they receive appropriate support to equitably and effectively manage these areas.

ii) The GoV should increase not only the quantity of PA in Vietnam, but also the quality of the existing PA. To achieve this, it is fundamental adequate financial and human resourcing of PA, as well as governance transparency to increase effectiveness in achieving good biodiversity outcomes. Effective management not only requires adequate resources and tools, but also clear management objectives. Equitable governance requires a functional, representative, inclusive, participatory and gender sensitive process of decision-making, as well as operational and well-resourced PA Management Boards and local institutions that guarantee overall good governance at the provincial levels in Vietnam. Also, assessments of PA effectiveness (such as MEET) should be integrated as a fundamental tool part of annual planning on PA management, and the Green List framework should be adopted and implemented in the long-term as the standard for achieving the effective and equity components of Target 3 for each PA in the national PA network.

iii) OECMs should be legally recognised by the Vietnamese legislation, including the designation of 'ecological corridors' within the key categories in the current PA legislation system in Vietnam. This would provide a unique opportunity for cross-jurisdictional coordination between MONRE and MARD in the

achievement of Target 3 following an ecosystem-based and integrative approach to biodiversity conservation and sustainable resource management.

iv) In the terrestrial realm, there is a need to considerably increase coverage and effectiveness of protection through systematic and centralized monitoring schemes of important areas for biodiversity in Vietnam, and to ensure zero loss of undisturbed and natural habitats remaining in the country, whilst sustainably manage those that are not conserved or protected. This work highlights some of the key opportunities to further explore on particular areas across Vietnam to increase PA coverage.

In terms of forest management, there are still overlapping legal frameworks featured by an inconsistent sectoral approach. Hence, the management of terrestrial PAs and forested lands in Vietnam is critically challenged by a lack of cross-sectoral coordination. From an economic perspective, Vietnam's Payment for Forest Ecosystem Services (PFES) scheme is referred to as a success story in raising forest finance and diversifying funding for forest management. The PFES mechanism has annually generated approximately US$125 Million in 41 Provinces (GIZ & UNIQUE, 2020). Nevertheless, the PFES scheme in Vietnam does not incentivize effective conservation or investments in restoration, so there is a need to increase financing to incentivise activities that enhance the provision of ecosystem services. From a bottom-up perspective, Vietnam's participation in UN-REDD, the World Bank's Forest Carbon Partnership Facility, and other REDD+ projects show the country's effort in sustainable forest management. However, the implementation of REDD+ and other community-based models often led to the continuation of existing governance frameworks, and insignificant socio-economic benefits are perceived by local communities and the forest degradation trend continues in Vietnam (Bayrak and Marafa, 2020). There is a crucial opportunity though through the recently developed Vietnam's Forestry Development Strategy for the period 2021-2030[29]. **MARD and MONRE must ensure that biodiversity targets developed under the new Vietnam NBSAP 2021-2030, with a vision to 2050 are aligned with the Vietnam Forestry Development Strategy** as it provides a unique opportunity to reconcile the various efforts and policies the GoV has taken for biodiversity conservation, forest restoration and management of natural production forests, as well as climate change.

v) In the marine realm, there is also a need to increase the coverage of essential marine ecosystems (according to our results currently only 34% of coral reef areas, 28% of seagrass meadows and 13% of mangrove forests is covered by PA). Additionally, the effectiveness of existing MPAs is hindered by funding shortcomings and lack of management capacity (Bui Thi Thu Hien et al., 2014), and it is still understudied whether or not MPA conservation efforts have contributed to positive ecological outcomes.

Whilst significant technical and financial inputs from international donors and NGOs in the past two decades have provided a stronger scientific basis for strengthening sustainable fisheries management and developing the Vietnam's MPA network (Khuu et al., 2021a), intense pressures from small-scale nearshore and offshore fisheries and negative state subsidies for increasing the number of offshore fishing boats of which mobility and yields are mostly untracked (Khuu et al., 2021b), are still among the key drivers of marine biodiversity loss in Vietnam's EEZ. The impacts of fisheries on marine ecosystems are largely unknown due to a lack of effective data collection, monitoring and management measures (Khuu et al., 2021b).

The Yellow Card handed to Vietnam by the European Commission in 2017 lead to a decrease of 12% in seafood exports to the EU during 2017-2019 (World Bank, 2021a). The new Strategy for development of Vietnam's fisheries by 2030 ascertains the role of MPAs and Vietnams commitment to sustainable fisheries[30], which must be considered as a crucial opportunity to develop an ecologically representative

[29] Decision No. 523/QD-TTg adopted by the Prime Minister on "Approving Vietnam's forestry development strategy for the 2021 - 2030 period, with a vision to 2050" on 01 April 2021.
[30] Decision No.339/QD-TTg adopted by the Prime Minister on "Approving the strategy for development of Vietnam's fisheries by 2030 with vision towards 2045" on 11 March 2021.

MPA network with effective governance to produce fisheries outcomes while preserving critical marine habitats in the country.

Also, the signature of the EU-Vietnam Free Trade Agreement (EVFTA) in 2019 brought opportunities to Vietnam to export its agricultural and fisheries products from more sustainable practices, including conservation and sustainable management of biodiversity (European Commission, 2021). If Vietnam makes efforts to remove the IUU yellow card via enhancing sustainable fisheries and marine conservation practices over the coming years, the industry could bounce back with an estimated export value to EU of $1.2-1.4B. EVFTA also provides Vietnam with opportunities to reform its current legal framework related to sustainable development and biodiversity conservation in response it its commitments to International Agendas.

vi) Vietnam must also ensure ecological representativeness and connectivity among its national network of PA, which must include scaling-up restoration efforts. This is essential not only for the persistence of biodiversity, but also to secure biocultural heritage and the ecosystem services on which all Vietnamese depend – such as sufficient supply of clean water, pollination services, soil health and so on.

vii) Last but not least, and **central to all efforts, is the need to fund and manage PA well, promote tourism and diversify its offerings, and share benefits with local communities fairly**. Taken together, these three factors can enhance development outcomes, secure biodiversity assets and support economic recovery from the pandemic.

PA sustainable financing will be essential to achieve biodiversity outcomes and PA tourism is a mechanism an effective Green Economic Recovery Initiative beneficial for both development and conservation (World Bank, 2021b). Promoting sustainable and inclusive tourism in PA through key actions (see below) should be an integrated element in economic development plans and economic recovery strategies in Vietnam. These actions should include:

- **Increase Public Investment in PA Management in Vietnam** through the use of financial instruments such as public budgets, and innovative mechanisms to tap private sector resources such as conservation trust funds or collaborative public-private management partnerships.
- **Build Capacity to train qualified PA managers** who understand the skills for wildlife management, but also protected area laws and policies, and the business needs of tourism operators and commercial entities.
- **Grow and diversity tourism offerings in Vietnam PA sustainably, and monitor visitors and impacts.** In order to dilute negative impacts, it is crucial to expand the network of PA for phased tourism development based on desirability and feasibility criteria through which sites can be ranked to identify optimal opportunities for private sector participation and benefits to local communities. Also, to make the case for public spending and to aid planning, the Government should regularly assess the impacts of PA tourism, and use surveys to capture visitor numbers, tourist spending, and seasonal changes. This information is essential to shape policies, improve tourist services, assist local communities, refine tourism business models, and demonstrate the economic returns of investing in PA in Vietnam.
- **Develop concessions policies and similar approaches to outsource tourism development** as another mean to promote tourism in PA in Vietnam. Such mechanisms should stipulate though key terms and conditions for business operation, such as duration, type of operation, environmental conditions, and fees for access, and concessions programs should include strong protected area laws and regulations, public support for proposed commercial activities, demonstrated economic benefits, stakeholder input into concession operations, and legal frameworks to support implementing agencies.

- **Formalize benefit sharing with local communities and distribute benefits fairly** by including the poor and disadvantaged with policies in place that enable this. Benefit sharing approaches include direct and indirect employment, revenue sharing by PA authorities, revenue sharing schemes from tourism businesses and partnerships, sustainable use of plants and animals, and shared decision making and capacity building. The Government should also assist households to participate in the tourism economy through entrepreneurship training, skills development, credit services, and local procurement to strengthen linkages in local economies.

5. Proposed Vietnam national target on PA, Priority actions and Indicators

Based in our assessment, we propose an overall target 3 for protected areas and OECM in Vietnam, with 3 sub-targets on area-based protected areas, two sub-targets on sustainable, effective and equitable managed protected areas, one sub-target on Indigenous Peoples and Local Communities rights on protected areas, 18 key actions for implementation as well as an indicator and monitoring framework to track progress.

Targets and Actions	Lead organization(s)	Partner organization(s)	Budget (Low, Medium, High)[31]
3. By 2030, 30% of Vietnam's terrestrial, freshwater and marine areas covering important areas for biodiversity across all biomes, are protected or community-conserved through effectively and equitably managed, ecologically representative and well-connected protected areas and other effective area-based conservation measures, and there is full recognition of land and resource access rights, resulting in measurable improvement in biodiversity outcomes, management and equitable benefit-sharing with local communities.			
3.1. Sub-targets			
i) Sub-targets on area-based protected areas *3.1.1. To increase the area of terrestrial and freshwater protected areas and designate OECM (including Community Conserved Areas) to at least 20% of the national territory by 2030.* *3.1.2. To increase the area of marine protected areas and designate OECM (including Locally managed Marine Areas) to at least 10% of the Vietnam Economic Exclusive Zone by 2030.* *3.1.3. To ensure zero loss of natural and undisturbed forests with a 2021 baseline, and to restore at least 30% of the total area of degraded terrestrial, freshwater and marine ecosystems, with special attention to increasing connectivity and restoring areas of particular importance for biodiversity and ecosystem services by 2030.*			
3.2. Key Actions			
Action 3.2.1. Implement gap analyses and systematic conservation planning to identify new potential protected areas in terrestrial, freshwater and marine ecosystems. New protected areas designation must be ecologically representative of ecosystems in Vietnam, capture the areas with highest biodiversity value (both at the level of species and ecosystems) and ecosystem services potential (using criteria such as Key Biodiversity Areas, national data on species, ecologically or biologically significant marine areas (EBSAs), and Nature's Contributions to People (following IPBES criteria)), as well as be equitable in relation to its impacts and benefits to local communities.	MARD, MONRE	Province/District governments, relevant provincial technical departments, PA management authorities, research institutes, NGOs, local communities, dive instructors (marine biodiversity monitoring)	Low

[31] *budget: Low: < US $5 million; Medium: US $5 million- US $10 million; High: > US$10 million.

Action 3.2.2. Implement detailed feasibility studies and biodiversity surveys on the ground to determine suitability for PA status, identify potential boundaries, and assess management requirements (including co-management mechanisms and local benefit sharing). These assessments will include not only ecological appraisals, but also socio-economic and NCP assessments, as well as the organization of local and provincial consultations.	MARD	MONRE, National and international research organisations in consultation with government departments, local and provincial governments, PA management authorities, local communities, civil society and private sector	Medium
Action 3.2.3. Develop a tentative list of candidate terrestrial, freshwater and marine protected areas and submit it to consultations with government at all levels, civil society and the private sector to identify priority sites.	MARD, MONRE	Province/district governments, relevant provincial technical departments, NGOs, local communities, civil society and private sector	Low
Action 3.2.4: Submit recommendations for new protected areas to Parliament. Develop a list of high priority sites for designation as terrestrial, freshwater and marine protected areas once the feasibility studies and consultations have been completed and submit to Parliament for consideration.	MARD, MONRE	NGOs, research institutes	Low
Action 3.2.5. develop and adopt a collective and clear definition for primary native forest, develop indicators for primary native forest, integrate those indicators in the monitoring system as integrative part of the annual forest inventory operations, and include annual results in the Forestry Data Sharing System.	VNFOREST and FPD (MARD)	Forest Planning Province/district governments, Department of Agriculture and Rural Development (DARD), PA management authorities, Forest rangers	Medium
Action 3.2.6. Implement systematic conservation planning to identify the most appropriate places for the restoration of endemic ecosystems within working landscapes of agricultural and other managed ecosystems.	MONRE	MARD, NGOs, research institutes, local communities	Low
Action 3.2.7. Implement ecosystem-based interventions to restore the most cost-effective and priority areas with a particular focus on targeted restoration of wetlands and mangroves and in increasing connectivity through ecological corridors between terrestrial protected areas. This action should also include feasibility assessments, resource mobilisation for adequate financing, and implementing a whole systems approach to community restoration including community-driven projects.	MARD, MONRE	Province/district governments, relevant provincial technical departments, research institutes, NGOs, local communities, civil society and private sector	High
Action 3.2.8. Enact policy regulations to legally recognise OECM in the legislation and to ensure they are operational by 2025. This action includes commissioning a legal review to advice amendments of the Protected Areas Law with an additional focus to particularly incorporate in the legal framework Community Conserved Areas (CCA), Locally Managed Marine Areas (LMMA) and co-management mechanisms. This could be operationalised through review team of national and international legal experts informed by multi-stakeholder consultations at local, provincial and national levels.	MONRE	MARD, IUCN Environmental Law Centre and the ASEAN Centre for Biodiversity Conservation, Province/district governments, relevant provincial technical departments, research institutes, NGOs, local communities, civil society and private sector	Medium
Action 3.2.9. Prepare a bill for submission to Parliament with recommendations for amendments on the current Protected Areas legal framework.	MARD	MONRE	Low

ii) Sub-targets on Sustainable, effective and equitable managed protected areas 3.1.4. To ensure effective and equitable management of at least 70% of protected areas and to achieve designation of at least 10 Green Listed protected areas by 2030, with threats and biodiversity outcomes monitored through systematic and standardised monitoring schemes, and assessments of management effectiveness (such as MEET) integrated in annual planning of protected areas management. 3.1.5. To ensure effective resourcing of protected areas, promote sustainable tourism and diversify its offerings, and share benefits with local communities fairly.			
Action. 3.2.10. Identify priority areas of high biodiversity and important ecosystem services located outside current protected areas and the list of new candidate terrestrial, freshwater and marine protected areas (using criteria such as Key Biodiversity Areas, national data on species, ecologically or biologically significant marine areas (EBSAs), and Nature's Contributions to People assessments (following IPBES criteria) to implement sustainable use management plans.	MARD, MONRE	Province/district governments, Government line departments, PA management authorities, research institutes, NGOs, local communities, civil society, private sector	High
Action 3.2.11. Develop a standardised biodiversity monitoring scheme and national database system for protected areas to monitor threats and biodiversity outcomes as part of the core functions of protected areas, and ensure adequate resourcing. Reporting of threats and populations trends (including migratory species) to the central government must also be imbedded in annual protected area management plans as essential key performance indicators.	MARD, MONRE	Province/district governments, Government line departments, PA management authorities, research institutes, NGOs	Medium
Action 3.2.12. Adopt a standardized protected area management effectiveness evaluation framework for periodical assessments (METT, RAPPAM, IUCN Green List) of national terrestrial, freshwater and marine protected areas. The framework will be an integrative part of the annual protected area management plans for each protected area, with status and assessment of management effectiveness reported to the central government.	MARD, MONRE	Province/district governments, Government line departments; PA management authorities	Low
Action 3.2.13. Ensure an adequate level of investment required for protected areas management and build capacity of protected area managers. This action must include the design and adoption of sustainable financing mechanisms for protected area management that ensures various sources of funding, including an increase in public investment from public budgets from the GoV, NGO funding and conservation trust funds, private sector (including collaborative public-private management partnerships) and income generated from tourism revenues to ensure adequate levels of resource allocation.	Ministry of Finance, MARD, MONRE	Province/district governments, Government line departments; PA management authorities, research institutes, NGOs and CSOs	High
Action 3.2.14. Enact policy regulations and the necessary legal framework to enable decentralisation of decision-making authority to protected area management boards. This action should include at least authority to make arrest and impose sanctions to protected area management boards and establish clear regulations for the participation of local communities in protected areas management activities and knowledge sharing (such as for example via peer enforcement and recruitment as protected areas wardens) in alignment with cost/benefit-sharing mechanisms.	MARD, MONRE	Ministry of Public Security, Ministry of Border Defence, Province/district governments, Government line departments; PA management authorities, forest rangers, MPA wardens	Low

Action 3.2.15. Grow and diversity tourism offerings in protected areas sustainably, and monitor visitors and impacts. This action must include the development of comprehensive assessments of benefits of protected area tourism and phased tourism development based on desirability and feasibility criteria through which sites can be ranked to identify optimal opportunities for private sector participation and benefits to local communities. Tourism monitoring (visitor numbers, tourist spending, and seasonal changes) as well as impact monitoring of protected areas tourism must be imbedded in annual protected area management plans and adequate resourcing ensured. This monitoring will be essential to shape policies, improve tourist services, assist local communities, refine tourism business models, and demonstrate the economic return over investment on tourism development in protected areas.	MARD	Ministry of Culture, Sports and Tourism, Province/district governments, Government line departments, research institutes, PA management authorities, NGOs, local communities, private sector	Medium
Action 3.2.16. Develop concessions policies to outsource tourism development in protected areas. This action must include the development of mechanisms to stipulate key terms and conditions for business operations, such as duration, type of operation, environmental conditions, and fees for access, and concessions programs should include strong protected areas laws and regulations, public support for proposed commercial activities, demonstrated economic benefits, stakeholder input into concession operations, and legal frameworks to support implementing agencies.	MARD	Ministry of Culture, Sports and Tourism, Province/district governments, Government line departments, research institutes, PA management authorities, NGOs, local communities, private sector	Low
Action 3.2.17. Develop and adopt effective communication strategies and plans to raise awareness on the potential benefits of protected areas and conservation features, the need for protection and its contribution to people and local economies, as well as the role of local communities for effective governance of protected areas.	MARD, MONRE	Ho Chi Minh Communist Youth Union, VTV, newspaper, PA management authorities, NGOs, CSOs	Low
iii) Sub-target on Indigenous Peoples and Local Communities rights on protected areas *3.6. To appropriately recognize and secure 100% of the rights to the lands and waters traditionally and collectively governed by Indigenous Peoples and local communities for the conservation and the sustainable use of biodiversity by 2030.*			
Action 3.2.18. Formalize benefit-sharing with local communities and ensure a fair distribution of benefits by including the poor and disadvantaged with policies in place that enable this. This action must include the development of socio-economic assessments of local communities living in and adjacent to protected areas boundaries with active participation from local communities, user groups and CSOs to identify cost/benefit sharing mechanisms and viable sustainable local livelihoods alternatives. Benefit sharing approaches must include direct and indirect employment, revenue sharing by protected areas authorities, revenue sharing schemes from tourism businesses and partnerships, sustainable use of plants and animals, and shared decision making and capacity building. The GoV should also assist households to participate in the tourism economy through entrepreneurship training, skills development, credit services, and local procurement to strengthen linkages in local economies.	MARD, MONRE	Province/district/commune governments, Government line departments, research institutes, PA management authorities, NGOs, CSOs, local communities, private sector	High
3.3. Indicators and monitoring framework Based on the CBD's proposed indicators for target 3 in the draft post-2020 GBF (CBD, 2021a), we suggest the following indicator framework to measure the progress and achievement of the proposed targets and priority actions.			

Indicator 3.1.1: Percentage of Viet Nam's land and coastal/marine territory within the formal protected area system that is being ecologically representative and connected.

- Percentage of terrestrial areas covered by PAs
- Percentage of inland water areas covered by PAs
- Percentage of marine/coastal areas covered by PAs
- Percentage of forested areas
- Protected Area Coverage of Key Biodiversity Areas
- Proportion of important sites for terrestrial and freshwater biodiversity that are covered by PAs, by ecosystem type.
- Number and coverage of PAs under international designation (AHP, BR, …)
- PA coverage of terrestrial/marine ecoregions
- Coverage of Biological corridors
- Number and coverage of transboundary PAs

Indicator 3.1.2: Percentage of Viet Nam's land and coastal/marine territory within OECMs.

- OECM Coverage
- Proportion of important sites for terrestrial and freshwater biodiversity that are covered by OCEMs.
- Area of Forest under sustainable management: total FSC certification
- Progress towards sustainable forest management

Indicator 3.2.1: Presence or absence of a revised PA law that recognizes multiple IUCN PA management categories and OECMs.

- Coverage of PA/OECM by IUCN categories

Indicator 3.3.1: Percentage of PAs/OECMs that are effectively and equitably managed

- Percentage of PAs/OECMs having PAME assessments (Green List, METT)
- Number of PAs that completed site-level assessment of management effectiveness
- Percentage of PAs/OECMs by area meeting their ecological objectives
- Remote sensing of change in state of biodiversity due to PA/OECMs
- Percentage of PAs/OECMs by area which have implemented management (comprehensive/partial/don't know)
- Remote sensing of change in human pressure due to PAs/OECMs (Geldmann et al., 2021)
- Percentage of PAs/OECMs actively implementing effective measures to recognise and respect the knowledge and rights of indigenous and local communities

CBD's proposed indicators:
Coverage of Protected areas and OECMS (by effectiveness)
Proposed disaggregation (By ecosystem type; By key biodiversity area; By effectiveness category (PAME); By mountains)
Existing national reporting/validation process (SDG (14.2.1, 15.1.2 and 15.4.1))
Global dataset for national disaggregation (Existing, PA data from pre-1970 to present, OECM data under compilation)
Methodological basis: SDG: Protected Planet: https://www.protectedplanet.net/en

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Annex 1. National Statistics of PA number and coverage

INCONSISTENCIES IN STATISTICS AMONG DIFFERENT PA SYSTEMS

Our analysis on the legal framework governing PAs in Viet Nam shows that PAs are under two overlapping national plans laid out in Decision 45/QD-TTg and Decision 218/QD-TTg. These two systems comprise of internationally Recognised Protected Areas and National Protected Areas that are broadly classified into four categories, including National Parks, Nature Reserves, Species/Habitat Conservation Areas, and Landscape Protection Sites. The statistics on the number and coverage of PAs in these two strategies are summarised in Tables 1 and 2.

Table 1. Number and Areas (ha) of PA by biome types according to the master plan of PA network under Decision 218/QD-TTg adopted on 07 February 2014[32]. Since there is no defined area of IWPAs and classification of MPAs, the estimated number of PAs under this planning is 228 PAs covering about 2,722,025.17 ha.

Vietnam category	Equivalent IUCN Category	Special Use Forest (SUF) Decision 1976/QD-TTg		Inland Water PAs Decision 1479/QD-TTg		MPAs Decision 742/QD-TTg	
		N	Area (ha)	N	Area (ha)	N	Area (ha)
National Park	II - National Park	34	1,166,462.43			6*	136,547
Nature Reserve	III- Natural Monument or Feature	58	1,108,635.00			2*	55,700
Species & habitat conservation area	IV- Species/Habitat Management Area	14	81,126.21	45	No determination of area	7*	59,044
Landscape protection site	V- Protected Landscape/ Seascape	61	95,530.53			1**	18,980
Total		167	2,451,754.17	45	N/A	16	270,271

*Classified based on RIMF under MARD[33]; ** Not yet classified

Table 2. PA in Vietnam according to the three national systems approved in Decision No.45/QD-TTg adopted on 08 January 2014, that aims to designate 219 PA with a total area of about 3,067,000 ha by 2020.

Viet Nam category	Equivalent IUCN Category	Terrestrial		Wetland or Inland Water		Marine	
		N	Area (ha)	N	Area (ha)	N	Area (ha)
National Park	II - National Park	30	1,080,517.23	1	7,100	1	7,850
Nature Reserve	III- Natural Monument or Feature	66	1,303,912.21	25	177,071.30	8	139,005
Species & habitat conservation area	IV- Habitat/Species Management Area	18	112,402.04	12	110,438	1	2,881.47
Landscape protection site	V- Protected Landscape/ Seascape	45	70,081.19	9	52,218.30	3	19,165.00
Total		159	2,566,912.67	47	336,827.60	13	168,901.47

[32] Decision No.218/QD-TTg adopted by the Prime Minister on 'Approving strategy for management of special-use forests, marine protected areas and inland water protected areas in Vietnam towards 2020 and vision to 2030 on 07 Feb 2014.

[33] http://www.rimf.org.vn/baibaocn/chitiet/tinid-2087

Our analyses of individual protected areas under two national plans presented in Tables 1 and 2 highlight inconsistencies in Protected Area's coverage statistics. Particularly:

1) National Parks (NPs): According to the plan under Decision 45/QD-TTg there was a plan to establish 32 NPs by 2020 with a total area of 1,095,467.23 ha, which only includes one MPA (Co To MPA). Nevertheless, according to Table A1 (under Decision 218/QD-TTg), there was a plan to designate have 37 NPs, including 34 SUFs and 3 MPAs (other 3 MPAs being categorised as NPs are within SUF designations) with an estimated area of 1,264,296.43 ha and by 2020.

2) MPAs: According to Decision 45/QD-TTg, Hon Cau (Binh Thuan) was designated as an MPA with a toal area of 12,500 ha under the Nature Reserve category. Nevertheless, in Decision 742/QD-TTg it was planned as an MPA under Species and Habitat Protection Area category. Hon Cau island has a land area of about 150 ha surrounded by marine waters, but under Decision 45/QD-TTg, Hon Cau island is protected by a 12,500-ha terrestrial PA - I.e. over 80 times available land area for land use planning. In this case, although PA coverage is consistent between the two Decisions, inconsistencies still exist in the PA categorisation and type of realm/biome.

3) Species and Habitat conservation sites: Table 3 below exemplifies some inconsistencies in PA coverage data between the two PA plans.

Table 3. Inconsistencies in PA coverage data among legal texts.

PA	Province	Decision 45/QD-TTg		Decision 1976/QD-TTg	
		Area (ha)	Category	Area (ha)	Category
Sân Chim đầm Dơi	Cà Mau	130	Species and Habitat conservation site	128.15	Species and Habitat conservation site
Vườn Chim Bạc Liêu	Bạc Liêu	385	Species and Habitat conservation site	126.70	Species and Habitat conservation site

TERRESTRIAL PROTECTED AREAS

Decision No. 1976/QD-TTg dated 30.10.2014 on the planning for SUF across Vietnam towards 2020, vision to 2030 shows the following plan for SUFs to be achieved by 2020. To achieve the national target of 9% PA coverage by 2020, the 6th NR proposed an increase of the area of terrestrial PAs as SUFs to 2.4 million ha by 2020 based on Decision 1976/QD-TTg. As per December 2020, the SUFs only reached 2,173,230 ha of which 91,805 ha are plantations (Table 4). On the marine realm, only 12 MPAs have been designated with 8 MPAs between 2001-2011 out of the 16 MPAs by 2020 stated in the 6th NR.

Table 4. Planned SUF system until 2020 with a vision to 2030, categorized by type of Protected Areas (Decision 1976/QD-TTg).

VN Category	Equivalent IUCN Category	N	Area (ha)
National Park	II - National Park	34	1,166,462.43
Nature Reserve	III- Natural Monument or Feature	58	1,108,635.00
Species & habitat conservation site	IV- Habitat/Species Management Area	14	81,126.21
Landscape conservation site	V- Protected Landscape/ Seascape	61	95,530.53
Total Protected Area (SUF)		167	2,451,754.17

Table 5. Forest inventory by December 2020 as in Decision No. 1558/QD-BNN-TCLN on "Announcement on the state of the state of national forest" dated 13 April 2021 by MARD (FPD, 2021).

Type of Use	Nature	Plantation	Total Area (ha)
Special Use Forest (SUF)	2,081,425	91,805	2,173,230
Protection Forest	4,070,519	614,985	4,685,504
Production Forest	4,127,240	3,691,240	7,818,480
Total	10,279,184	4,398,030	14,677,214

The 6th NR stated that the 9% target was too ambitious and the area of SUFs also altered, targeting 2,358,870 ha 2020 in accordance to land use adjustment decided by the National Assembly at Resolution 134/2016/QH13, 2016. While this resolution said that the planned land area assigned to SUFs increased from 2,271,190 (Resolution 17/2011/QH13) to 2,358,870 ha. However, by 2020, the area of SUFs only reached 2,173,230 ha – so SUFs has not used up land inventory.

WETLAND PROTECTED AREAS

In Vietnam, wetlands are broadly classified as inland wetlands and coastal wetlands (Thinh, 2003). Based on IUCN-IGET, wetlands are equivalent to freshwater, marine and their transition zones with terrestrial ecosystems. Mangrove forests and mudflats are concentrated mainly in the deltas, estuaries and tidal areas, while lagoons mainly along the coastline of the central (Thua Thien - Hue to Ninh Thuan Provinces) and coral reefs and seagrass beds are in the south-central coastal (IUCN, 2005).

The country has 11,847,975 ha of wetlands, accounting for 37% of the country's total area (cited in MONRE, 2019). This figure did not include the area of freshwater ecosystems e.g., rivers and streams (that are seasonally flooded), springs, spots of hot water, and mineral water. *Total SUF area on Wetlands* are 38,504 ha (own estimate). According to the Decision No. 45/QD-TTg, the Government planned to have 45 wetland-protected area with a total of 0.33 M ha by 2020.

MARINE PROTECTED AREAS

The Prime Minister's Decision No. 742/QD-TTg in 2010 on approving the plan on the system of Vietnam's MPA network by 2020, set out the plan to achieve at least 0.24% of Vietnam's marine areas covered by MPAs by 2015 through the establishment of national MPA network containing 16 MPAs – which was expected to scale up by 2020.However, by July 2021, only 12 out of 16 planned marine protected areas (Table 6) have been established with a total 213,400 ha (i.e., 0.185% of the sea areas under protection) (D-Fish, 2021). (According to the Decision No. 45/QD-TTg, dated January 08, 2014 on approval of biodiversity conservation planning by 2020 with a vision to 2030, the Government planned to have 13 marine protected areas with a total of 0.22 M ha by 2020. In Decision No. 742/QD-TTG, the no. of marine protected areas planned was 16).

Table 6. List of planned marine protected areas (Decision No. 742/QD-TTg, was updated by Decision No.218/QD-TTg dated 07 February 2014[34] and updates on designation.

No.	Name of marine conservation zone/province	Total areas (ha)	Sea area (ha)	Status on establishment (by July 2021)
1	Tran island/Quang Ninh	4,200	3,900	Detailed planning in 2020 under the name Co To - Dao Tran with and area of 18,414.92 ha
2	Co To/Quang Ninh	7,850	4,000	
3	Bach Long Vi/Hai Phong	20,700	10,900	Established (2013)
4	Cat Ba/Hai Phong	20,700	10,900	Established (1986)
5	Hon Me/Thanh Hoa	6,700	6,200	Planning
6	Con Co/Quang Tri	2,490	2,140	Established (2009)
7	Hai Van - Son Cha/Thua Thien - Hue - Da Nang	17,039	7,626	Planning
8	Cu Lao Cham/Quang Nam	8,265	6,716	Established (2005)
9	Ly Son/Quang Ngai	7,925	7,113	Established (2016)
10	Nam Yet/Khanh Hoa	35,000	20,000	Planning
11	Nha Trang Bay/Khanh Hoa	15,000	12,000	Established (2001)
12	Nui Chua/Ninh Thuan	29,865	7,352	Established (2003)
13	Phu Quy/Binh Thuan	18,980	16,680	Planning
14	Hon Cau/Binh Thuan	12,500	12,390	Established (2010)
15	Con Dao/Ba Ria - Vung Tau	29,400	23,000	Established (1993)
16	Phu Quoc/Kien Giang	33,657	18,700	Established (2007)

[34] Decision No.218/QD-TTg adopted by the Prime Minister on *'Approving the strategy on management of SUF, MPA, inland water PA networks towards 2020 with a vision to 2030'* on 07 February 2014.

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NATIONAL TARGET 3 OF THE POST-2020 GBF

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