

Recommendations to IUCN to Improve Marine Protected Area

Classification and Reporting

February 6th 2018

Submitted by: The Pew Bertarelli Ocean Legacy Project

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Summary

The term Marine Protected Area (MPA) is used to reflect a spectrum of management objectives from delivering sustainable exploitation to protecting biodiversity or sites of scientific and/or cultural interest. MPAs are often classified according to the International Union for the Conservation of Nature's (IUCN) Protected Area Categories. However, due to broad definitions of what constitutes an MPA and the lack of nuance within progress reports, it is difficult to determine exact levels of protection and likely biological benefits. Fully protected areas generate the greatest ecological gains. However multiple-use areas are often prioritised by policy makers. Here, we evaluate global targets and MPA definitions, reflect on progress and highlight key recommendations for improving the application of IUCN Categories and strengthening the existing framework. We argue that this, together with improved reporting standards, is an essential step towards accurate understanding, evaluation and effective communication of the true ecological benefits of MPAs.

Introduction

Human activities are having a detrimental impact on the world's oceans, including decreases in biodiversity and fish-stocks. Arresting the decline of the ocean ecosystem requires a holistic approach, incorporating the sustainable management of fisheries, the prevention of marine pollution and the conservation of species and habitats. Marine Protected Areas (MPAs) are one of the oldest forms of fisheries management (Johannes 1978) and have been shown to be effective at protecting habitat, species, and areas critical to marine life (e.g. spawning grounds) in a variety of contexts (Hamilton et al. 2011; Edgar et al. 2014; Giakoumi et al. 2017). MPAs can safeguard ocean areas from destructive and/or extractive activities such as unsustainable fishing and mining, and yield significant benefits to marine ecosystems (Edgar et al. 2014; Lester et al. 2009) and the people that depend on them (Di Franco et al. 2016; Terraube et al. 2017). MPAs can also help mitigate the effects of climate change through enhanced and maintained carbon sequestration and storage, and promote biological processes that build resilience against changing environmental conditions (Roberts et al. 2017; Soler et al. 2015).

The term *Marine Protected Area* has become a ‘catch-all’ for many forms of spatial management (Mora and Sale 2011; Lubchenco and Grorud-Colvert 2015), and institutions such as the Convention on Biological Diversity (CBD), the Food and Agriculture Organization of the United Nations (FAO), and the International Union for Conservation of Nature (IUCN), each offer a different definition (Table 1) and categorisation (Table 2) of protected areas. As a result, levels of biodiversity protection within these areas vary widely, ranging from 100% fully protected (zero resource extraction permitted) to multiple-use areas (which may include commercial fisheries and mining). Such a wide variety of MPA definitions makes it difficult to evaluate the conservation gains of protection through percentage coverage figures alone. The same situation can also be applied to terrestrial protected areas.

MPA effectiveness in protecting biodiversity varies substantially and intense research effort is devoted to understanding characteristics required to ensure improvements against baseline conditions (e.g. Lester et al. 2009; Edgar et al. 2014; Sciberras et al. 2015; Di Franco et al. 2016; Ban et al. 2017; Giakoumi et al. 2017; Sala and Giakoumi 2017). Common characteristics that emerge of MPAs that carry strong conservation benefits are high level of protection and enforcement, the importance of long-term protection and clearly defined boundaries, stakeholder engagement and community involvement, resource (staff and budget) capacity, and large size. Although required characteristics are context dependent, the level of ecological benefits observed following protection is directly linked to the level of protection, with well-managed fully protected MPAs consistently showing much greater benefits than multiple use MPAs (e.g. Edgar et al. 2014; Sciberras et al. 2015; Giakoumi et al. 2017; Sala and Giakoumi 2017).

Targets for implementing MPAs have been set at global levels (Table 3) and there is a strong political drive to achieve these targets while minimising social and economic impacts (De Santo 2013). To advance progress towards global targets, there has been a focus by policy makers on large-scale marine protected areas (LSMPAs) as well as their smaller counterparts. Defined as areas equal to or larger than 100,000 km², designated LSMPAs now account for around two-thirds of worldwide MPA coverage (O’Leary et al. unpubl.). Considering their significant contribution to meeting global conservation targets, ensuring their effectiveness is key. Already characterised by large size and clearly defined boundaries, their efficacy will likely be driven by the level of protection they afford marine life and the degree to which they are managed and enforced.

Most terrestrial and marine protected areas are classified according to the IUCN Protected Area Categories based on management objectives. However, there is growing concern within the scientific, NGO, and policy community that the broad scope of these categories (and their misapplication) is leading to a misrepresentation of national and global levels of biological protection (Spalding et al. 2016; Horta e Costa et al. 2016, 2017; Malta Declaration 2017). While we agree with Dudley et al. (2017) that a global system of protected area categorisation that unifies terrestrial and marine conservation efforts is important, and that the IUCN classification should not be casually abandoned, we highlight key recommendations for improving application of IUCN categories and strengthening the existing framework.

Global Targets for Marine Protection

International institutions have been setting global marine protection goals for the last two decades (Wood et al. 2008). The 2002 Plan of Implementation of the World Summit on Sustainable Development committed to establishing a representative global network of marine protected areas by 2012. The 5th IUCN World Parks Congress in 2003 recommended to “greatly increase the marine and coastal area managed in marine protected areas by 2012; these networks should include strictly protected areas that amount to at least 20-30% of each (habitat).” The Eighth Ordinary Conference of the Parties to the CBD in 2006 set a target for “at least 10% of each of the world’s ecological regions [including marine and coastal be] effectively conserved [by 2010].” Each of these goals have either expired or been updated. Current global goals are the United Nations Sustainable Development Goal 14 (SDG14) and the CBD’s Aichi Target 11 (CBD 2011), both of which seek to effectively protect at least 10% of the ocean by 2020 (Table 3). The most recent global recommendation to expand marine protection was approved at the IUCN World Conservation Congress in 2016 which urges world leaders to protect 30% of the oceans by 2030 (Table 3).

Both SDG14 and the CBD use the percent coverage of spatial protection as an index for reporting progress towards meeting marine protected area targets based on protected area designations reported to the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and IUCN World Commission on Protected Areas. However, neither goal stipulates the minimum level of protection that MPAs should have. Countries can, therefore, theoretically meet these targets with measures that offer little protection from extractive or damaging activities, and there are concerns that some MPAs offer little actual protection and are designated in areas of least value for commercial activities rather than in areas most in need of protection or of greatest value to biodiversity (Costello and Ballantine 2015).

The IUCN defines a protected area as ‘a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values’ (Day et al. 2012). It uses a six category management classification scheme for MPAs to document their varying conservation values (one with a sub-division - Table 2).

Only category Ia allows no resource extraction whatsoever (equivalent to *fully* protected areas). Categories Ib and II allow “sustainable resource use by indigenous people to conserve their traditional spiritual and cultural values, provided this is done in accordance with cultural tradition” (equivalent to *strongly* protected areas). Categories IV to VI permit commercial fishing to take place. Categories V and VI could allow commercial fishing, deep sea mining and oil and gas exploration to occur within a designated protected area (Day et al. 2012). These categories present challenges in application and in determining the conservation benefits of protection. For example, there is some evidence that ecosystem-level conservation benefits have not been demonstrated beyond categories I and II (Lester and Halpern 2008).

The Guidelines for Applying IUCN Protected Area Management Categories to Marine Protected Areas (Day et al. 2012) state that recreational and commercial fishing practices may be unsustainable and incompatible with the objectives of a protected area. “Fisheries that are adequately managed to provide sustainable long-term exploitation of a target species do not necessarily comply with ecological standards for nature conservation, in that, for example, they may have indirect trophic impacts”. The guidelines further state that, for an area that allows fishing to be considered a marine protected area it must meet the definition of a protected area and thus be primarily managed for nature conservation, not fisheries management.

Progress

The World Database on Protected Areas (WDPA) is the global authority on reported protected area coverage. The WDPA is a joint project of United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and the IUCN World Commission on Protected Areas, working with governments and collaborating NGOs. As of November 2017, there were 15,271 marine protected areas across the globe representing ocean coverage of 6.35%. The 10 largest sites cover over 50% of the area covered by marine protected areas (UNEP-WCMC and IUCN 2017).

The Atlas of Marine Protection (MPAtlas), a project of the Marine Conservation Institute, was launched in 2012 to provide a more nuanced picture of global marine protection. MPAtlas uses WDPA data as a starting point and examines certain regions in depth, replacing WDPA records with national or regional databases that are more up-to-date or provide greater detail. The project’s aim is to present a more accurate depiction of protection levels. As of November 2017, MPAtlas reports that substantially less (3.08%) of the ocean is within marine protected areas than the WDPA database, and that only 1.47% of the ocean is protected in fully protected MPAs.

Crucially, the WDPA stores IUCN Protected Area Management Categories as reported by the data provider (governments) although the use of the IUCN Protected Area Management Categories system is voluntary. UNEP-WCMC encourages the adoption of the IUCN standards but does not assign or evaluate the application of the categories by countries. This information would permit more nuanced reporting against global targets. Due to the clear link between level of protection and ecological benefits, coverage of fully and strongly protected marine protected areas offers a more direct indicator for measuring contributions to protection than overall MPA coverage. However, for an accurate estimate, this information would require verification against metrics for management, enforcement, and compliance to ensure effectiveness of the fully protected MPAs.

Discussion

There is risk that some data supplied by national governments to the World Database on Protected Areas (WDPA) and used for reporting to the CBD on progress towards reaching Aichi Target 11 and to measure progress against SDG14, either does not specify, or inaccurately defines, the conservation value of designations. This may be because: A) the use of the IUCN Protected Area Management Categories system is voluntary (in 2014, 65% of the number of

MPAs in the WDPA has an IUCN category – WDPA 2015); B) any IUCN categorisation which is provided by a country is not reviewed for accuracy by the United Nations Environment Programme World Conservation Monitoring Centre, or C) sufficient data are not available about a specific area to determine an accurate category determination. Such inaccuracies in categorisation can be a consequence of how jurisdictions choose to apply the system rather than an indication that the IUCN system itself is ineffective (Dudley et al 2017).

Discrepancies between data presented by the WDPA and MPAtlas may be the result of the fact that what counts as an MPA varies from organisation to organisation, or because the IUCN guidelines are being inaccurately represented by those submitting data to the WDPA. As an example of the variations between the two datasets, the WCMC lists the Marae Moana MPA (Cook islands) as being 1,976,000 km², whereas, the same MPA is listed as 324,000 km² on MPAtlas. Similarly, the WCMC list the Réserve Naturelle Nationale des Terres australes françaises as being 1,655,001 km², whereas the MPA is listed as being 673,000 km² according to the criteria of MPAtlas.

There are several examples of the inaccurate application of IUCN MPA Categories and of the submission of a national MPA designation to the WDPA which results in debatable conservation benefits. For example, in Canada, some form of commercial fishing is allowed in 160 of 161 marine protected areas designated as IUCN categories Ia, Ib and II (Robb 2011). In New Zealand, the OECD Environmental Performance Review of New Zealand stated that 30% of the country's total marine environment is protected within *national marine protected areas* (OECD 2017). In reality, this 30% consists of predominantly Benthic Protected Areas (BPAs), established under a fisheries regulation to prohibit bottom trawling and submitted for IUCN Category VI classification. The BPA designation allows all other forms of commercial fishing, deep sea mining, and oil and gas exploration, and offers no protection to pelagic habitats (Ministry of Primary Industries 2015).

In the United States, the Trench Unit and the Volcanic Unit of the Mariana Trench Marine National Monument does not include the water column above the substrate at the bottom of the ocean, and is identified as a Category V marine protected area (UNEP-WCMC and IUCN 2017). Considering the French territories, in March 2017 the government declared that 32.5% of its maritime space is under protection within approximately 450 marine protected areas (Ministry of Ecological and Solidarity Transition 2017). However, under the Environmental Code (Article L334-1), France applies eight categories of marine protected areas and only 1.3% of the French EEZ is highly protected, whereby any industrial or commercial extraction is prohibited (The Pew Charitable Trusts 2017). The WCMC states that 30.69% of French waters sit within MPAs (UNEP-WCMC and IUCN 2017).

It has also been argued that issues with the IUCN system itself have caused uncertainty when evaluating global MPAs conservation effectiveness (Horta e Costa et al. 2016). These include that: IUCN categorisation is based on management objectives detailed in MPA management plans, which can have a significant mismatch to regulations restricting permitted activities; and; many

protected areas are multiple-use or contain a mixture of highly protected and multiple use zoning, but this is not being effectively differentiated by the current IUCN system.

As a result of all of the above, stated progress against global MPA targets gives an inaccurate sense of conservation gains, as the total global area protected includes substantial areas with little protection from extractive or damaging activities.

It is becoming increasingly apparent that governments must accurately apply credible global standards for marine protection classification, so that the information that they feed into UNEP-WCMC is robust and consistent. Governments and UNEP-WCMC should clearly distinguish between fully/strongly protected and partially protected areas that are established as fisheries management regulations or legislation (i.e. do not have marine biodiversity protection as their driving purpose). The development of separate data sets (between full/strongly and partial) needs to be a priority, especially if the global IUCN, CBD, and SDG targets are to be judged in terms of marine biodiversity protection. By presenting more nuanced reporting, this system would produce a more transparent link between policy intent, and the tools by which that is delivered. Based on stated ambitions to protect marine biodiversity under the Convention of Biological Diversity and Sustainable Development Goal 14, such a link may lead to the prioritisation of highly and strongly protected marine areas, in places where it is appropriate, as the most effective means of achieving global conservation targets for the greatest ecological benefit.

Recommendations

1. Accurate application and compliance assurance of the IUCN marine protected area classification system

- Governments and states designating protected areas should only call a spatial management measure a marine protected area if it is compliant with the IUCN definition.
- Governments and states should ensure the correct IUCN categorisation is given to a marine area and that this information is submitted to UNEP-WCMC.
- Where vertical zoning is in place, the protected area should be classified as the management category with the lowest level of protection for reporting purposes.
- There should be a system wherein IUCN experts and member associations assess the designation of submitted marine protected areas to UNEP-WCMC, to ensure compliance with the IUCN definition and, where non-compliant or a lack of information for assessment is submitted, ask the government designating them for further information.

2. Clarifying and strengthening the current IUCN classification system

IUCN State and Government Agency members should seek to improve clarity within the current IUCN protected areas classification system to maintain reporting credibility and accurate assessment of MPA effectiveness and ecological representativity. The following recommendations could be implemented to help move towards this goal:

- A clear definition of the concept of “fully protected MPA” should be established. For example, the concept should only be used for no-take protected areas (IUCN category Ia). The definition ‘strongly protected MPA’ should be applied to Ib and II.
- The classification system should assess policy-makers' goals when designing and implementing marine protection measures and should evaluate the biological impacts of uses allowed inside the protected areas, based on existing regulations and implementation of new regulations for those uses.
- The classification system should recognise and report the distinction between multiple-use marine protected areas, minimal/single factor protection, and other types of spatially managed areas that do not meet the qualifications of IUCN marine protected area. Where appropriate, these should instead be classified as other effective conservation measures.
- UNEP-WCMC should develop separate data sets between full/strong and partial marine protection. Where a protected area has multiple-use zones, only the fully protected area should be listed as an IUCN category Ia MPA.
- The IUCN should conduct a review and hold a consultation into the relationship between IUCN categories and marine conservation
- The concept of “low-level non-industrial natural resource use” should be clarified by IUCN; this text remains rather vague and allows multiple interpretations.
- A clear definition of “industrial fishing” is needed – a suggestion is that industrial fishing be considered as any commercial fishing that is not deemed as “artisanal fishing”. Artisanal fishing (or traditional/subsistence fishing) should be considered as small-scale, low-technology, low-capital, low intensity, fishing practices undertaken by individual fishing households (Cochrane and Garcia 2009). A detailed definition is key, as artisanal fishing can be highly destructive when intensive, or when modern technology is used (e.g. monofilament long-lines versus hand lines) (Hawkins and Roberts 2004; Mangi and Roberts 2006). Clarifying the concept of industrial and artisanal fishing would help classify what can or cannot be called a marine protected area, and what category they belong to, according to the IUCN definition.
- A clear definition of allowable “indigenous fishing” is needed. “Indigenous fishing” is a culturally-based definition, rather than one defined by fishing technology and scale of fishing. While some indigenous fishing is low technology and low impact, there are several examples of indigenous owners or co-owners of industrial fishing companies.
- Management, monitoring, and enforcement plans should be submitted by governments alongside MPA designations and made publicly available by the IUCN to promote effectiveness.

Conclusions

For the greatest biological benefits, where socially and economically feasible, policy makers should prioritise highly and strongly protected MPAs as the most effective means of achieving global conservation targets set by the international community. MPA coverage represents one aspect of the protection of marine resources (sustainable management of fisheries another significant component), but percentage increases do not necessarily translate into the full spectrum of ecological benefits if the level of protection is inadequate. This could lead to

unrealistic expectations for the benefits such protection can offer for marine biodiversity, create a false sense of security that marine resources are protected, whilst at the same time masking the threats facing our oceans (Plumeridge and Roberts 2017). It is therefore crucial that effective governance structures are in place to achieve specific conservation objectives, which are underpinned by properly resourced surveillance and enforcement of regulations protocols.

Biodiversity is responsible for a plethora of ecosystem functions and services (Gamfeldt et al. 2015) critical for human health and wellbeing (Diaz et al. 2006). While well-managed and particularly fully or strongly protected MPAs will contribute to safeguarding biodiversity, supporting coastal communities and providing the space for marine life to adapt to changing environmental conditions, the oceans are an interconnected and dynamic system. Activities that take place beyond the boundaries of MPAs, in the vast majority of the ocean, will carry the most significant consequences for the marine life and people that depend on a healthy ocean. To ensure global goals for conservation and sustainable use are achieved and meaningful, well-managed MPAs need to be combined with the effective management of all ocean areas and uses. Strengthening the IUCN Protected Areas Categories and improving reporting standards is an essential step towards being able to accurately evaluate global progress towards conservation goals and ensure effective communication about expected benefits from MPAs.

Table 1: Marine Protected Area Definitions

Marine Protected Area Definitions	
United States NOAA	“Marine protected area means any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.” (NOAA 2000)
Convention on Biological Diversity 7 (Decision VII/5)	"Marine and coastal protected area' means any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings. Areas within the marine environment include permanent shallow marine waters; sea bays; straits; lagoons; estuaries; subtidal aquatic beds (kelp beds, seagrass beds; tropical marine meadows); coral reefs; intertidal muds; sand or salt flats and marshes; deep-water coral reefs; deep-water vents; and open ocean habitats." (CBD 2004)
Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)	“CCAMLR recognises that the term Marine Protected Area (MPA) does not have a single definition, but in general terms, an MPA is a marine area that provides protection for all or part of the natural resources it contains. Within an MPA certain activities are limited, or entirely prohibited, to meet specific conservation, habitat protection, ecosystem monitoring or fisheries management objectives. MPAs do not necessarily exclude fishing, research or other human activities; in fact, many MPAs are multi-purpose areas. MPAs in which no fishing is allowed are often referred to as 'no-take areas'. Other uses may still be permitted”. (CCAMLR 2016)
European Commission	“Marine protected areas are a measure used across Europe’s seas for protecting vulnerable species and habitats. More precisely, they are: - geographically defined marine areas; - whose primary and clearly stated objective is nature conservation; and which are regulated and managed through legal or other effective means to achieve this objective.” (EU 2015)
Food and Agriculture Organization of the United Nations (FAO)	“There are several definitions of marine protected areas. In fisheries management, MPAs are generally considered temporally and geographically defined areas that afford natural resources greater protection than is afforded in the rest of an area as defined in relation to fisheries management (e.g. the fishery, ecosystem or zone constituting the management unit),

	i.e. a no-take area to protect spawning of a certain fish species targeted by a fishery or an area with specific gear prohibitions.” (FAO 2009)
OSPAR	“Within OSPAR, MPAs are understood as areas for which protective, conservation, restorative or precautionary measures have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment” (OSPAR 2003)

Table 2: IUCN World Commission on Protected Areas (WCPA) Protected Area Categories

IUCN WCPA Protected Areas Management Categories		
Categories	Definitions	Examples of Accepted Marine Activities (Day et al. 2012)
Ia. Strict nature reserve	Strictly protected for biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values	Non-extractive research, Non-extractive traditional use, restoration or enhancement for conservation
Ib. Wilderness area	Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition	Sustainable resource use by indigenous people to conserve their traditional spiritual and cultural values
II. National park	Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities	Traditional fishing in accordance with cultural tradition and use, large scale low intensity tourism, shipping, problem wildlife management
III. Natural monument or feature	Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove	Traditional fishing in accordance with cultural tradition and use, large scale low intensity tourism, shipping, problem wildlife management
IV. Habitat/species management area	Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or	Recreational and sustainable local fishing, aquaculture, works such as dredging

	habitats, but this is not a requirement of the category	(all the above permitted if compatible with MPA objectives)
V. Protected landscape or seascape	Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values	Untreated waste discharge, seafloor mining, long term and sustainable fishing practices, aquaculture
VI. Protected areas with sustainable use of natural resources	Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims	Seabed mining, commercial fishing (e.g. dredge trawling)

Table 3: Global MPA targets

Global Marine Protected Area Targets			
	Target	Deadline	Applicable protection
<p>Convention on Biological Diversity AICHI Target 11</p> <p>During the 10th CBD Conference of the Parties held in Japan in 2010, the 193 signatory countries adopted a revised and updated Strategic Plan for Biodiversity, including the Aichi Biodiversity Targets</p>	>10%	2020	“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 landscape and seascape”
<p>Sustainable Development Goal 14</p> <p>In 2015 member states of the United Nations adopted a series of 17 Sustainable Development Goals which came into force in 2016. The Goal of SDG 14 is to “Conserve and sustainably use the oceans, seas and marine resources for</p>	>10%	2020	Target 14.5: “By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.”

sustainable development.”			
IUCN World Conservation Congress 2016	>30%	2030	“A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”

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13

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Acknowledgements

With thanks to the Pew Charitable Trusts and the Bertarelli Foundation. Special thanks to Matt Rand, Simon Reddy, Tom Hickey, Katie Gray, Jim Palardy, Tom Dillon, Kerri-Ann Jones, Seth Horstmeyer, and the Great British Oceans Campaign.

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