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Call for Action: Integrating Seaweeds into Global Biodiversity Frameworks

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Why Seaweeds Matter

Seaweeds are species of red (*Rhodophyta*), green (*Chlorophyta*) and brown (*Phaeophyceae*) marine macroalgae that are extremely numerous and diverse. They form some of the most productive, extensive, and ecologically important marine habitats on Earth (Figure 1), including kelp forests, fucoid forests, rhodolith beds, crustose coralline algae, tropical seaweed beds, and *Halimeda* meadows.

These habitats are valuable contributors to the health of coastal ecosystems, providing key ecosystem services that include food provision and security, coastal protection, fish nurseries, nutrient-cycling and carbon storage. Through their cultivation, they also retain great socio-cultural importance for coastal communities, directly supporting the livelihoods of more than six million small-scale farmers, across 56 countries who participate in commercial aquaculture activities[1,2].

Globally, seaweed habitats are, however, exposed to an increasing number of stressors including marine heatwaves, pest and disease incidence, coastal pollution, overfishing and overharvesting, with each having damaging ecological and socio-economic impacts. The cumulative effects of these stressors are contributing to the loss of seaweed habitats[3], which is negatively harming the resilience of coastal ecosystems, the biodiversity they support, and is creating livelihood instability for the coastal communities dependent upon them.

Highlights

Seaweed ecosystems have high ecological and socio-economic value but are continually overlooked in global biodiversity and conservation frameworks.

The poor integration of seaweeds arises from four key obstacles: weak institutional cooperation, inconsistent use of seaweed terminologies, limited explicit mention of seaweeds within biodiversity targets, and a reliance on non-binding agreements that cannot be enforced.

Integrating seaweed habitats into biodiversity frameworks can strengthen marine resilience, livelihoods, food security, and delivery of SDGs 1, 2, and 14.

Dedicated investment is needed to support seaweed habitat protection, monitoring, restoration, and genuine implementation of conservation commitments.

Recommendations to resolve these gaps focus on improving institutional coordination, establishing a unified seaweed terminology, generating explicit seaweed-focused biodiversity targets, expanding existing Marine Protected Areas to include seaweeds, and incorporating enforcement mechanisms into conservation agreements to compel target delivery.

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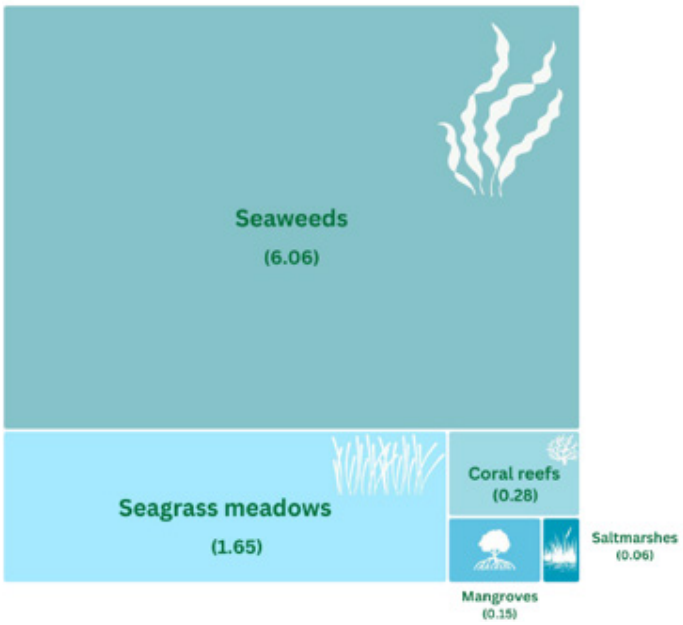

Figure 1: Global extent estimates of major marine vegetated biomes (million km2). Source: Corrigan et al., 2025

Global Biodiversity Frameworks and Seaweeds - the Missing Link

Despite their great ecological and socio-economic value, seaweeds have often been overlooked as important living ecosystems, and as such have historically received minimal attention in international biodiversity frameworks seeking to halt biodiversity loss. Global priorities for marine biodiversity have typically focused on coral reefs, mangroves, seagrass meadows, and saltmarshes[4], while seaweeds have more often been treated primarily as commercial commodities as opposed to ecosystems in need of protection.

The evidence base of this policy brief is subsequently based on an analysis by Beattie (et al., 2025) that assessed 18 international biodiversity frameworks for their inclusion of seaweeds[5]. It identifies how seaweeds are recognised, where they are overlooked, and pinpoints several barriers that are preventing their stronger integration into international biodiversity management (Table 1).

Barrier 1: Weak institutional cooperation and coordination

The institutions that govern biodiversity through their creation of international biodiversity frameworks suffer from fragmented coordination. Often, scientific advice and policymaking are handled by separate entities that interact infrequently despite their overlapping mandates and interests. The conservation of seaweeds intersects with the priorities of many sectors including aquaculture, fisheries, and coastal and food management, yet at present, there is a lack of clear ownership, accountability, and responsibility for their governance not just globally, but also nationally and locally. These gaps are leaving their conservation unaccounted for.

Barrier 2: Seaweeds are not easily identifiable within framework texts due to inconsistent terminology usage

Seaweeds are typically depicted or addressed through broader aquaculture-related discussion that seeks to cover all marine fauna and flora. When seaweeds are directly mentioned, various seaweed-related terms are used interchangeably including ‘aquatic plants’ vs. ‘algae’, vs. ‘macroalgae’, vs. ‘seaweeds’, vs. ‘kelp’. This can create confusion for non-seaweed experts on what should qualify as seaweed, and their perceived importance for biodiversity. This unintentionally creates gaps in policy implementation that weakens their visibility and heightens interpretative ambiguity of whether or not frameworks are designed with all seaweed habitats in mind.

Barrier 3: Global biodiversity targets lack seaweed specificity

Seaweeds are rarely explicitly mentioned within biodiversity targets seeking to conserve, protect, and sustainably manage marine spaces. Current biodiversity goals set ambitions to broadly cover aquaculture or marine food production systems as a whole, which may provide some indirect protective benefits to seaweeds, however, it leaves them without designated protection and creates gaps in their conservation enforcement.

The institutions assessed, that are governing international biodiversity, through their biodiveristy-related frameworks: the United Nations Convention on Biological Diversity (CBD), the Food and Agriculture Organization (FAO), the Intergovernmental Science- Policy Platform on Biodiversity and Ecosystem Services (IPBES), the International Plant Protection Convention (IPPC), the International Seabed Authority (ISA), the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme (UNEP), Ramsar Convention on Wetlands, and the United Nations (UN).

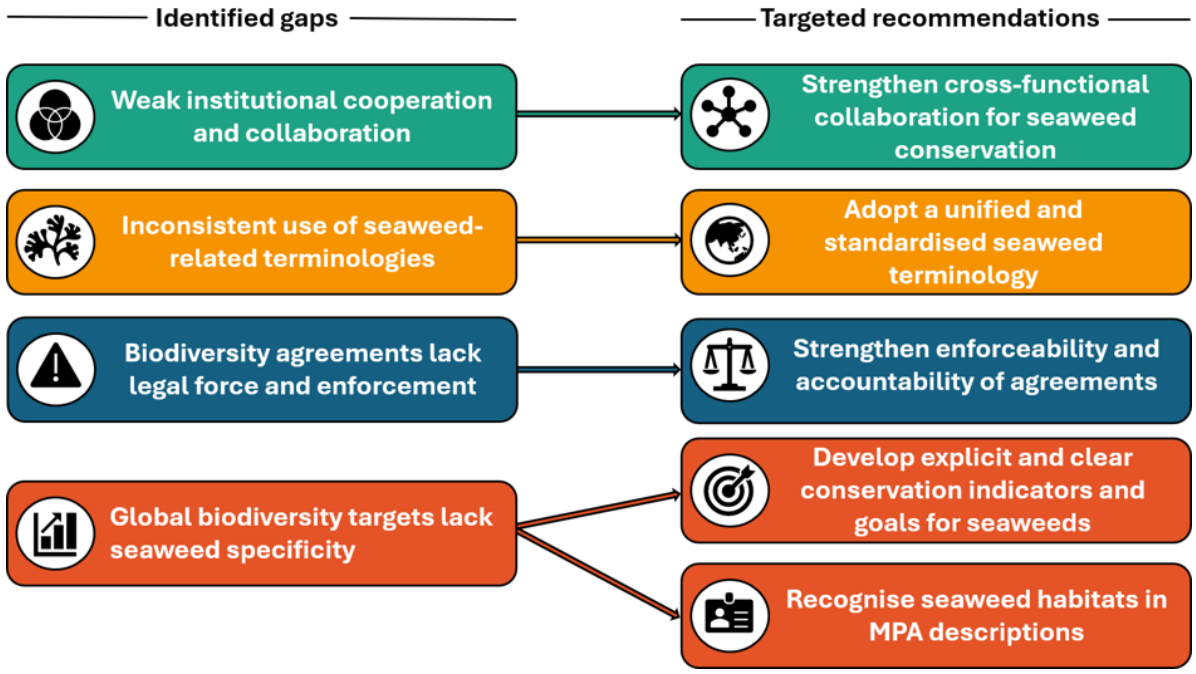

Figure 2. The major governance gaps and the actions needed to successfully integrate and recognise seaweeds as important marine ecosystems in international biodiversity frameworks.

Barrier 4: Biodiversity agreements lack legal force and enforcement

Many biodiversity frameworks focus on voluntary contributions of participating nations to encourage conservation action. However, the use of robust, binding agreements that can enforce compliance with biodiversity conservation is underutilised. For instance, a lack of enforcement has significantly impacted the sustainability and resilience of seaweed industries in many countries, such as Tanzania and the Philippines[6,7].

Closing the Gap – Making Seaweeds Visible in Global Biodiversity Governance

Seaweeds are ecologically critical in supporting ocean and human health; however, without clear and explicit recognition in biodiversity governance, they will remain politically invisible and without meaningful protection. If not urgently brought into political oversight, they risk being further excluded from important biodiversity- and conservation-related planning, monitoring, and reporting efforts designed to safeguard our marine environment.

To close these gaps, we propose that the institutions creating biodiversity-related frameworks and legislation should seek to strengthen the integration and representation of seaweeds.

Outlined are a set of five recommendations to support the improved integration of seaweeds into biodiversity and conservation governance.

1. **Strengthening institutional cooperation and collaboration** – that can support a realignment of biodiversity-related governance to focus more strongly on seaweed conservation efforts.
2. **Establishing and using a clear, unified, and consistent seaweed terminology** – one that recognises the ecological value of all seaweeds, and their associated habitats across all biodiversity agreements.
3. **Increasing the explicit inclusion of seaweeds in international biodiversity goals** – to make it clear that conservation indicators and goals have been designed with seaweeds in mind.
4. **Amending the description of Marine Protected Areas to better incorporate seaweed communities** – to improve seaweed habitat protection without reclassification.
5. **Incorporating enforcement mechanisms into conservation agreements** – by enlisting enforcers, coordinating their activity, and setting enforcement expectations, the long-term success of marine biodiversity efforts and the effective conservation of seaweeds can begin to be achieved.

A Clear 'Call for Action' for Seaweed Conservation Across Global Ocean and Coastal Governance

Seaweed ecosystems are overlooked in marine conservation governance despite contributing immensely to biodiversity, climate resilience, coastal protection, and food security for millions of vulnerable coastal communities worldwide. This is no longer a marginal oversight, but a critical failure of global marine management given their substantial importance for ocean and human health.

To rectify this, governments and multilateral institutions must urgently act to integrate seaweeds into biodiversity frameworks, as well as championing their importance in climate adaption and blue economy strategies. The research community must also continue to strengthen the evidence base that justifies the urgent need for seaweed conservation in biodiversity-related decision-making. Critically, the integration of seaweeds must be matched by dedicated investment that commits to the protection, monitoring, and restoration of seaweed habitats. Targeted investment could be achieved by incorporating seaweeds into existing climate funds, blue bond financing mechanisms, or biodiversity credit schemes. However, without targeted funding and allocated resources for their conservation, any declaration announcing support for seaweed habitats will continue to lack capacity for genuine and tangible protection.

Seaweeds must no longer be seen as peripheral marine resources. Global biodiversity and conservation governance must now seek to treat them as a key component of a resilient ocean.

Actor	Action	Enables	Significance
National Governments	Integrate seaweeds into biodiversity frameworks	Clearer and explicit seaweed recognition	Improves seaweed visibility in biodiveristy governance
Multilateral institutions	Include seaweeds in climate, ocean, and blue economy strategies	Access to dedicated seaweed finance	Seaweeds can be funded as nature-based infrastructure
Research community	Strengthen the evidence base for seaweed conservation	Robust biodiversity indicators and monitoring for seaweeds	Employs science-based best practice in decision-making

Table 1: Turning evidence into action. The major stakeholders who must act to urgently improve the integration of seaweeds into global biodiversity governance and management.

Acknowledgements

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Further Reading

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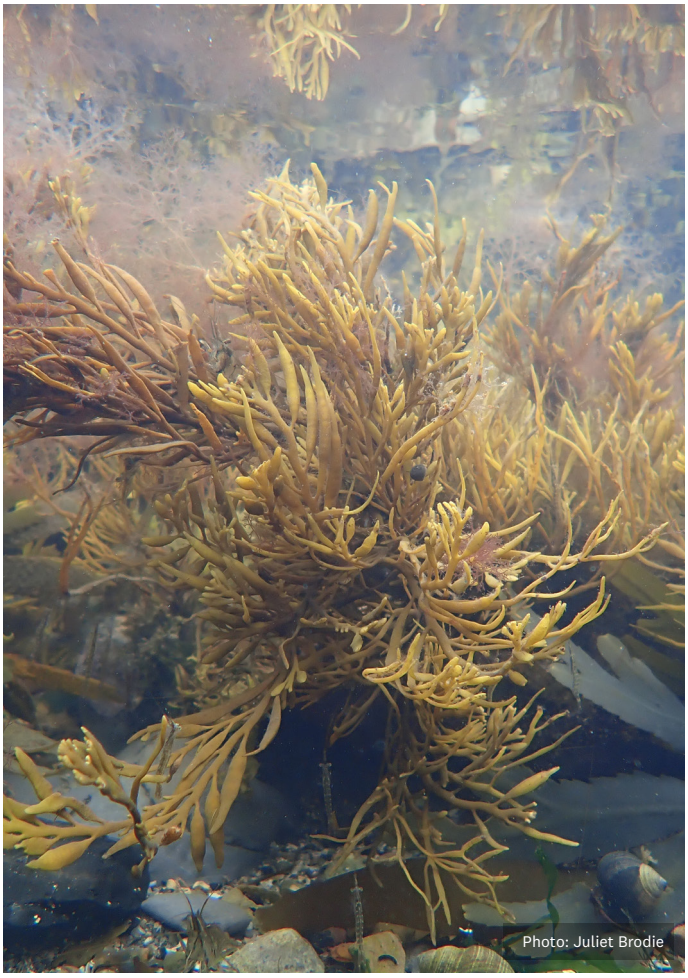
Photo: Juliet Brodie


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