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Annual Review of Environment and Resources

Other Effective Area-Based Conservation Measures (OECMs) in Global Area-Based Conservation

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Global Biodiversity Framework, GBF, 30 by 30 target, equitable conservation, conservation governance, biodiversity conservation

Abstract

Other Effective Area-Based Conservation Measures (OECMs) are an emerging area-based conservation mechanism aspiring to achieve long-term and effective in situ biodiversity conservation outside traditional protected areas. Contributing toward several global biodiversity targets, they combine protection with sustainable land use and human development. This review analyzes spatial and temporal trends in OECM site designation (2010–2024), exploring governance frameworks, management, and ecological effectiveness in reducing biodiversity loss, addressing environmental change, and promoting sustainable development. Emphasis is placed on inclusivity of OECMs, particularly engagement of local communities and Indigenous Peoples in stewardship and decision-making, thereby enhancing social

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equity and cultural relevance. Academic and policy attention has centered on two areas: (*a*) refining the OECM framework, its definition, characteristics, and alignment with international goals (Section 3), and (*b*) evaluating governance, effectiveness, and national/subnational implementation (Section 4). While OECMs offer potential to expand global conservation, issues around governance and site-level outcomes remain underexplored and warrant attention (Section 5).

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1. INTRODUCTION

> Area is easy to measure, but effectiveness is what matters for biodiversity.
>
> —Adapted from Antonelli (1) and Hagerman et al. (2)

Area-based conservation has long been a cornerstone of global efforts to safeguard biodiversity. In the nineteenth and early twentieth centuries, protected areas (PAs) were established to preserve natural beauty and resources. Over time, the scope and diversity of these areas have expanded. The International Union for Conservation of Nature (IUCN) categorizes PAs based on their primary management objectives, ranging from strict no-take zones to multiple-use landscapes and seascapes (3).

The adoption of the *Strategic Plan for Biodiversity 2011–2020* at the tenth Conference of the Parties (COP10) to the Convention on Biological Diversity (CBD) in Nagoya, Japan, marked a pivotal moment in global conservation. This framework introduced 20 Aichi Biodiversity Targets to guide conservation efforts through 2020. Aichi Target 11 called explicitly for the expansion of "effectively and equitably managed, ecologically representative and well-connected systems of PAs and other effective area-based conservation measures" (4, p. 1, para. 2). For the United Nation's 2018 definition of OECMs, see the sidebar titled Defining OECMs.

DEFINING OECMs

While definitions and criteria for PAs were already well established, the term "other effective area-based conservation measures" lacked clarity when first introduced in 2010 as part of the Aichi Biodiversity Targets. This gap was addressed in November 2018 at COP14, where Parties to the CBD adopted Decision 14/8 (5), which formally defined OECMs and outlined guiding principles, characteristics, and criteria for their identification. The agreed upon definition provides a clear basis for recognizing and reporting areas that contribute to biodiversity conservation outside formally designated PAs:

> A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services, and where applicable, cultural, spiritual, socio-economic, and other locally relevant values.
>
> —Convention on Biological Diversity, 2018, Decision 14/8 (5, para. 2)

Unlike PAs, which must have conservation as a primary objective, Other Effective Area-Based Conservation Measure (OECM) sites may pursue various management goals. Conservation may be a primary aim, a secondary benefit, or even an unintended but sustained outcome of other long-term land or resource use strategies. What is essential is that these areas deliver demonstrable and enduring in situ conservation outcomes. OECMs are not substitutes for PAs, which remain central to national conservation strategies and are indispensable for meeting international targets. OECMs provide a complementary mechanism that broadens the conservation landscape by recognizing areas where long-term biodiversity outcomes occur alongside diverse land and resource uses. A comprehensive and equitable conservation framework requires both PAs and OECMs, each contributing in different ways to safeguarding ecosystems, cultural values, and human livelihoods.

Given the occasional conflation of these mechanisms in the wider literature, and to support conceptual clarity throughout this review, we present **Table 1**, which summarizes the key differences between PAs and OECMs. This comparison highlights distinctions in objectives, governance structures, legal requirements, and contexts in which either approach may be more appropriate.

The formal recognition of OECMs, as a form of area-based conservation, adds an important layer to global conservation by acknowledging the role of diverse governance systems—such as those led by Indigenous Peoples, local communities, private actors, or sectoral authorities—in achieving conservation outcomes outside of formally designated PAs. As such, they serve as a complementary, flexible tool for achieving global biodiversity targets and ensuring the representation and resilience of ecosystems worldwide.

A key distinction between PAs and OECMs lies in their objectives and governance structures (6, 7). PAs are explicitly designated for the long-term conservation of nature, with management practices that prioritize biodiversity protection and eliminate activities harmful to this goal. OECM sites are typically established where biodiversity conservation is not the primary management objective, formal legal designation is not necessarily required, and governance arrangements are diverse, often encompassing Indigenous stewardship, community-based management, private initiatives, or sectoral governance.

The full potential of OECMs, as a form of area-based conservation, has yet to be realized in practice, although academics have explored opportunities and challenges since their introduction (8, 9). Unlike PAs, which typically rely on legal or formal mechanisms to secure conservation outcomes (10), OECM sites operate in more diverse contexts where such mechanisms may be absent or underdeveloped. Instead, OECMs are governed and managed in areas that deliver important ecosystem services and hold cultural, spiritual, and socioeconomic significance. Whether

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Table 1 Summary of conceptual and operational differences between PAs and OECMs

Dimension	PAs	OECMs
Primary objective	Explicit, legally recognized long-term conservation of nature as the primary management goal.	Biodiversity conservation is achieved as a primary, secondary, or unintended long-term outcome of established land/resource use; conservation is not always an explicit objective.
Governance	Often state-led, although shared, private, or Indigenous governance models exist.	Highly diverse governance, frequently led by Indigenous Peoples, local communities, private actors, or sectoral agencies; formal state designation is not required.
Legal status	Usually legally designated with enforceable protection mechanisms.	Legal designation not required; governance legitimacy may derive from customary law, community norms, or long-standing practices.
Management approach	Focused on regulating or excluding activities incompatible with conservation.	Allows continued sustainable use where compatible with maintaining long-term biodiversity outcomes.
Monitoring and reporting	Established global reporting systems (e.g., WDPA, PAME tools).	The World Database on OECMs updates site information monthly; reporting pathways are still being developed but should incorporate community-driven or nonstate contributions.
When most appropriate	When strict protection is needed; when biodiversity objectives must be primary and legally enforceable.	When conservation outcomes arise within multifunctional landscapes, cultural sites, productive systems, or areas where formal designation is not feasible or desired.
Role in 30 by 30	Foundational for achieving national conservation targets.	Expands recognition of effective conservation beyond formal sites, particularly in human-dominated or customary land/sea areas.

Abbreviations: OECMs, other effective area-based conservation measures; PAs, protected areas; PAME, Protected Areas Management Effectiveness; WDPA, World Database on Protected Areas.

conservation is an explicit management objective or an unintended outcome, these areas can achieve effective in situ biodiversity conservation through sustained practices and local stewardship (2, 11, 12).

Supplemental Material >

A review of more than 384 peer-reviewed articles published between 2010 and the end of 2023 (see search strategy in **Supplemental Materials**) reveals a dynamic and evolving discourse on OECMs—an observation similarly noted in another review up to 2022 (13). While earlier studies focused primarily on identifying opportunities and challenges associated with OECMs (6, 8, 14–16), the discourse has evolved significantly since 2019. Academic and policy attention has increasingly shifted toward refining the definition and core characteristics of OECMs, alongside a deeper examination of their governance structures, conservation effectiveness, and integration into national and international policy frameworks. Contributions from both scholars and practitioners have advanced this growing body of work (7, 11, 12, 17–24), highlighting the increasing importance of OECMs within global biodiversity governance.

Recent efforts have focused on refining the operational distinctions between PAs and OECMs to ensure policy implementation and reporting clarity. These efforts go beyond fundamental definitional differences to consider how each area type functions in practice, examining factors such as the intent behind management, the role of local actors, and the durability of conservation outcomes (7, 11, 25). Rather than viewing PAs and OECMs as mutually exclusive, emerging guidance encourages a complementary approach that recognizes the distinct, yet often overlapping, contributions each can make to global biodiversity targets (18, 26).

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Other critical questions—such as how OECMs align with management objectives, deliver measurable biodiversity outcomes, and contribute to global biodiversity and sustainability targets [e.g., the United Nations CBD and Sustainable Development Goals (SDGs)]—have also been explored in the recent literature (27, 28). The inclusion of data on OECM sites in the World Database on Protected Areas (WDPA) and their formal recognition within the CBD's Kunming–Montreal Global Biodiversity Framework (GBF), in 2020, marked a significant shift. This development reflects growing acceptance of OECMs as a legitimate, inclusive, diversified approach to area-based conservation that complements traditional PAs.

A framework proposed by researchers (17) and adapted in **Figure 1** to a theory of change provides a holistic overview of the enabling conditions, progress, outcomes, and barriers associated with implementation of OECMs across diverse social and ecological contexts. The theory of change framework helps conceptualize how OECMs evolve—from initial recognition and funding to achieving long-term conservation and social outcomes. It highlights the transformative potential of OECMs to deliver biodiversity benefits while recognizing and integrating the needs, rights, and values of local communities, Indigenous Peoples, and other stakeholders. **Figure 1** underscores that OECMs are not simply spatial designations but represent dynamic, context-specific governance arrangements embedded within lived landscapes. It also draws attention to critical challenges, including policy ambiguity, funding gaps, and the risk of imposing top-down models, all of which must be addressed to realize the inclusive and equitable promise of OECMs fully.

This perspective reinforces the need to examine how OECM sites are conceived, negotiated, and governed in practice. Doing so requires careful attention to the sociopolitical and cultural dimensions that influence what constitutes effective conservation in different settings. It also calls for participatory approaches that acknowledge diverse worldviews, land uses, and institutional arrangements, especially where formal conservation models may not be appropriate or accepted. Understanding these nuances is essential for developing robust national frameworks that can identify, support, and report on the success of OECMs in equitable and ecologically meaningful ways.

2. BACKGROUND AND HISTORICAL CONTEXT OF OECMs

2.1. Shifting Paradigms: How OECMs Emerged as a Policy Tool

OECMs have emerged from the realization that, while vital, conventional PAs alone are insufficient to reverse or halt the accelerating loss of global biodiversity. Many ecosystems and species of conservation concern exist outside formally designated PAs, in landscapes and seascapes where people live, work, and depend on natural resources. This reality has driven the need for more inclusive, adaptive, and context-specific conservation approaches that can operate alongside traditional PAs. The OECM framework represents a practical response to this need by enabling the recognition of areas where biodiversity is conserved through various governance types, including Indigenous, community-led, private, and sectoral arrangements.

The growing momentum behind the global institutionalization of the OECM framework is increasingly reflected in national-level responses, with countries such as Canada and Colombia among the first to formally designate these areas. However, Canada's initial approach drew criticism for its limited attention to inclusivity and the inadequate recognition of Indigenous Peoples' rights and roles in the designation process (29–31). These early experiences underscored the importance of ensuring that OECM site identification and management are grounded in ecological effectiveness and principles of social equity and legitimate governance. In this context, complementary approaches that integrate biodiversity protection with sustainable human use are both ecologically necessary and socially and politically imperative (21, 32). By expanding the

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a

Inputs

- Area recognized as an OECM
- Incorporated into the conservation agenda
- Funded

Activities

Enabling actions:

- Site selection guided by IUCN and experts
- Global South leveraging existing frameworks
- Development of clear policies and reduction of category confusion
- Create tailored, finer-scale conservation frameworks

Governance and management:

- Integrate customary management
- Strengthen community governance
- Embrace diverse governance types
- Build local knowledge into monitoring

Early outcomes

- Management maintained
- Diverse management and governance systems
- Monitored
- Held accountable

Long-term outcomes/impacts

- Effectiveness assured
- Long-term conservation
- Conservation decentralized
- Diverse systems maintained
- Nature and social systems recoupled

Barriers

- Unclear policies and category confusion
- Need for tailored, finer-scale conservation frameworks
- Ecological bias over sociocultural goals
- Funding gaps persist
- Insecure land tenure weakens authority
- Site recognition often state-controlled
- No clear conflict resolution pathway
- Top-down, uniform models risk being imposed
- Limited resources and management capacity
- Without scrutiny, governments may use designations for political gains
- Limited data and evaluation mechanisms
- Governments may resist shared responsibility
- Legal systems may block decentralization
- Inflexible design of OECMs may risk ineffectiveness under changing climatic conditions

Key assumptions

- OECMs embraced by 15 countries with 6,404 sites, 1.2% land, 0.1% ocean (UNEP-WCMC & IUCN 2024) with growth likely to continue
- Recognition leads to increased management and conservation effectiveness
- Diverse governance models effectively incorporated
- Community empowerment improves conservation outcomes
- Integration of traditional and scientific knowledge strengthens management
- Technology and local knowledge continues to be harnessed to facilitate understanding of positive outcomes for people and planet
- Full integration of equity for Indigenous Peoples, local communities, and marginalized groups
- Adequate funding and resources sustained

b



(*Caption for* ***Figure 1*** *appears on following page*)

Figure 1 (*Figure appears on preceding page*)

Theory of change for OECMs. Adapted from Alves-Pinto et al. (17). (*a*) Inputs, activities, and early and long-term outcomes associated with OECMs are summarized. Significant barriers to progress such as unclear national policies, funding and data gaps, and sociocultural marginalization are noted, all of which can limit the realization of OECMs' full potential. Key assumptions are also highlighted including the full integration of equity for Indigenous peoples, local communities, and marginalized groups. (*b*) OECMs are an integral part of the international conservation agenda. Contributing to the UN Convention on Biological Diversity GBF Target 3, the "30 by 30" goal, they also support other GBF targets and the UN SDGs by serving as direct enablers, providing policy-enabling conditions, and delivering co-benefits and system linkages. Abbreviations: GBF, the Kunming–Montreal Global Biodiversity Framework; IUCN, the International Union for Conservation of Nature; OECMs, Other Effective Area-Based Conservation Measures; SDGs, Sustainable Development Goals; UN, United Nations; WD OECM, World Database on Other Effective Area-Based Conservation Measures. SDG icons reproduced from the United Nations Sustainable Development Goals (**https://www.un.org/sustainabledevelopment**). GBF icons reproduced from the Kunming–Montreal Global Biodiversity Framework (**https://www.cbd.int/gbf**).

conservation toolkit beyond state-led models, OECMs offer a pathway to more equitable, inclusive, and representative area-based conservation that reflects diverse worldviews and supports shared stewardship of nature.

Building on these lessons, the establishment of a permanent body at COP16 (2024) to support Indigenous participation in CBD processes marked a key step toward embedding Indigenous leadership within global conservation governance. This development reflects a broader shift toward more inclusive, participatory, and culturally grounded approaches to biodiversity conservation and reinforces the need to elevate diverse governance systems in the implementation of the OECM framework.

The increasing recognition of OECM sites nationally and internationally is also evident in their integration into global reporting systems. In 2020, the WDPA began including data on OECMs in its monthly reporting, enabling near real-time progress tracking through the Protected Planet platform (33). The pace of designation has since accelerated (see sidebar titled Global Spatial Coverage and Distribution of OECMs). As of March 2024, 10 countries had established or nominated 855 OECMs, and by December 2024, this number had grown to 6,464 sites across 15 countries. This rapid increase reflects a strong and growing commitment by national governments to acknowledge and integrate OECMs as a vital and complementary component of area-based conservation strategies.

GLOBAL SPATIAL COVERAGE AND DISTRIBUTION OF OECMs

The combined spatial extent of PAs and OECMs in March 2024 was 7.52 million km^2, covering 22% of terrestrial and inland waters (4.02 million km^2) and 17% of marine and coastal zones (3.5 million km^2) (33). The Global South shows a faster adoption rate. Since 2020, Morocco and the Philippines alone account for 47% of new designations. Morocco leads globally with 338 OECMs, followed by Canada with 311, representing 31% and 28% of the total area covered, respectively (together spanning more than 540,000 km^2).

Despite their growing number, OECM sites represent a modest share of global conservation coverage. Currently, 6,464 OECMs cover only 1.2% of land (1,589,491 km^2) and 0.1% of oceans (403,604.6 km^2), or 0.3% of exclusive economic zones (EEZs).

The Global North hosts more sites than the Global South (5,849 versus 615, respectively), but the latter accounts for more than 94% of terrestrial OECM site area—approximately 1.5 million km^2 compared to only 92,500 km^2 in the Global North. Conversely, marine OECM coverage is dominated by the Global North (318,000 km^2), largely due to Canada.

This trend underscores the role of Global South countries in meeting biodiversity targets, despite facing systemic challenges in governance, funding, and institutional capacity.

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Japan's interest in networks of OECM sites extends to urban and peri-urban contexts; however, identifying appropriate sites requires rigorous empirical assessment, particularly through the application of environmental economic methodologies, as exemplified by a case study of Satoyama redevelopment in Kobe (34). Their Nationally Certified Sustainably Managed Natural Sites scheme aims to provide a foundation for sites to become eligible for registration as OECMs, provided they do not overlap with existing PAs. OECM site designations in Japan began to expand in 2024, with records in the World Database on OECMs (WD-OECM). Mexico is expected to follow suit in 2025, especially given the potential to protect its marine ecosystems (35). These expansion efforts, along with classification initiatives to align existing conservation areas with OECM criteria, reflect an evolving global conservation landscape. Here, literature plays a dual role: shaping conceptual definitions and providing practical guidance for national implementation. Yet, concerns persist about the risk of misclassification or overestimation of OECM sites in recent discussions (18), a point addressed in later sections. A 2025 study that screened 81 potential OECM sites found that none of them met OECM criteria entirely. Key insights demonstrate where sites typically meet or fail criteria and what support is needed (36).

Canada's early OECM site designations, such as the Canadian Forces Base Shilo, coincided with the development of international guidelines. Researchers demonstrated how the Canadian Council on Ecological Areas screening tool could align with IUCN guidance, stressing the value of country-specific approaches tailored to national contexts (37). In Colombia, collaboration with IUCN helped align Complementary Conservation Strategies with OECM criteria, underlining the importance of secure land tenure and long-term management (38). South Africa's rapid progress in OECM designation reflects a favorable policy environment. Its preexisting categorization of PAs, conservation areas, and partnership areas facilitated the integration of OECMs. Researchers found that many of these areas already fulfilled key OECM criteria under diverse governance types—including private, communal, and traditional authorities (39). However, they also identified constraints such as legal ambiguities, weak reporting mechanisms, limited institutional capacity, and lack of incentives. Despite these challenges, considerable opportunities were identified, such as enhancing representativity, recognizing community and private sector efforts, and strengthening inclusive conservation across landscapes.

Broader geopolitical insights into OECM framework implementation have been discussed, with some focus on the Global North–Global South divide—with researchers arguing that the Global North often lacks a "critical territorial perspective," limiting its ability to adopt pluralistic conservation approaches (40, p. 16). Latin American models informed by Buen Vivir philosophies challenge anthropocentric conservation and extractivism, viewing environmental degradation as a form of violence. These frameworks legitimize diverse local, private, and community-led conservation efforts that are often excluded from mainstream conservation narratives.

Spatial trends and ecological value of OECM sites have been explored (41). The ambiguity in classifying multifunctional sites such as United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites, Man and Biosphere Reserves, and Global Geoparks echoed by researchers elsewhere (24, 42) was addressed by examining OECM site overlap with key biodiversity areas (KBAs), ecologically or biologically significant areas, and ecoregions. The findings, 50% overlap with KBAs in six of nine countries and broader representation across ecoregions and pelagic provinces, suggest that OECM sites contribute significantly to ecological connectivity and representativeness. However, they highlight that, without consistent effectiveness measures, the true conservation value of these areas remains uncertain.

A wide range of ecosystems and governance types have been associated with OECM sites, including alpine refugia, airspace corridors, subterranean habitats, sacred sites, marine parks, surf breaks, and deep-sea thermal vents (34, 43–51). A review of conservation practices being

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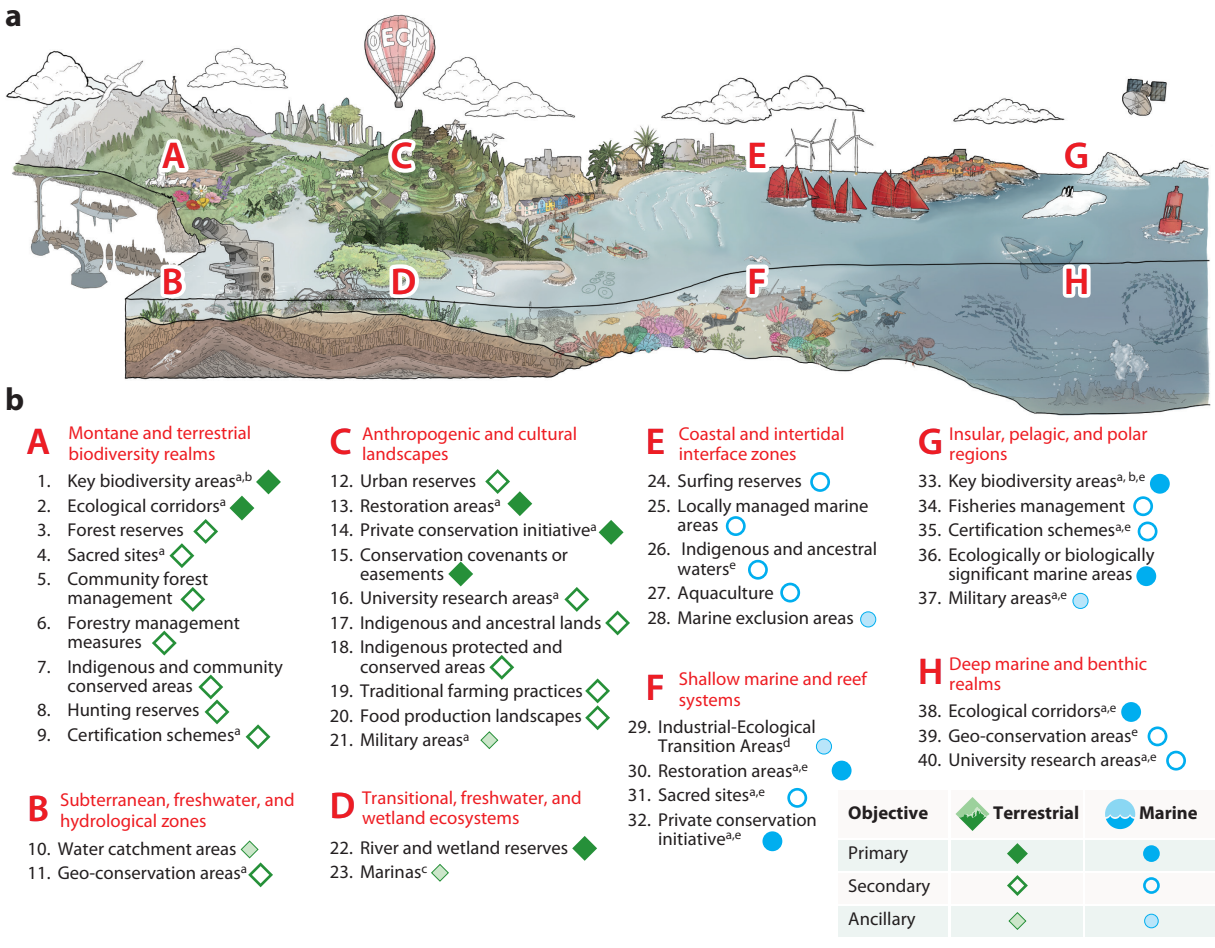


Figure 2

(*a*) Other Effective Area-Based Conservation Measures (OECMs) at the nexus of biodiversity conservation and human sustainable development. A schematic diagram illustrating the diversity of "other effective area-based conservation measures"; a key component of global efforts in area-based conservation, specifically part of the United Nations Convention on Biological Diversity Global Biodiversity Framework Target 3. Illustration by Sam Griffin and Catherine Wensink. (*b*) OECM site classification adapted from Cook (52) and extended through the inclusion of additional potential site types (53, 54). Primary (*solid symbols*), secondary (*outlined symbols*), and ancillary (*shaded symbols*) conservation objectives are shown by type of OECM updated from Cook (52). A–H denotes terrestrial, freshwater, transitional, coastal, and marine systems from montane landscapes to deep-sea environments. [a]denotes that measure could appear in multiple areas on the figure; [b]denotes that when the key biodiversity area is a cultural site, the objective is secondary; [c]denotes Reference 53; [d]denotes Reference 54; [e]denotes that this is an update of Cook's categories (52)—for example, Cook refers to Indigenous and ancestral lands, but not Indigenous and ancestral waters.

realized in OECMs (52) is updated in a schematic diagram (**Figure 2**) and continues to evolve. Case studies explored in depth in China, Indonesia, Nepal, Mexico, Spain, and Sulawesi propose expanding conservation networks, including through OECM sites, despite inconsistencies in national methodologies (35, 55–59). These include agroforestry systems, community-managed forests, and culturally significant landscapes that offer both biodiversity and livelihood benefits (24, 58, 60). The studies highlight the need for adaptable yet standardized frameworks to assess ecosystem services and ecological processes. Classification systems in WD-OECM, informed by

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researchers (52), could help clarify the roles and benefits that different OECM site types provide for the conservation and preservation of ecosystem services, enabling greater recognition and policy support.

Clearer differentiation between PAs and OECMs in global reviews would enable more accurate recognition of the unique contributions each makes to area-based conservation. The use of the combined term "protected and conserved areas" (PCAs) in frameworks such as the GBF Target 3 blurs the important distinctions in scope, objectives, and governance (35, 61–64). In response, efforts have been made to refine terminology, including a typology of area-based terms (65) and the development of a standardized lexicon (26), which proposes referring to OECMs as alternative conservation areas. As definitions become more established and distinctions clarified, the full diversity and value of OECMs could be recognized and integrated into global conservation.

2.2. Political Landscapes: How Geopolitics Shape OECM Adoption and Recognition

Geopolitics is defined as the struggle over control of geographical entities with international or global relevance and the strategic use of such spaces for political advantage (66). This perspective significantly influences how OECMs, as a form of area-based conservation, are perceived and implemented, particularly in transboundary areas and in parts of the ocean that lie outside the legal control of any single country and where ecological boundaries often cross political ones [e.g., areas beyond national jurisdiction (ABNJs)]. These settings involve complex governance arrangements, highlighting the need for standardized approaches and international cooperation to ensure effective biodiversity protection.

Conservation beyond national borders, where ecosystems span multiple jurisdictions, has been an important part of area-based conservation discussions (67, 68). The Salas y Gómez and Nazca Ridges, a 150,000 km^2 biodiversity hotspot in the Pacific Ocean, straddle the exclusive economic zones (EEZs) of Chile and Peru and extend into the high seas. With high endemism and critical migratory corridors, more than 73% of marine ridges lie in ABNJs and are vulnerable to unregulated exploitation. Governance barriers and recommendations have been identified for expanding marine protection within national EEZs, such as World Heritage status under the OECM framework or leveraging the UN High Seas Treaty, adopted in June 2023 (69), which could potentially address regulatory gaps (70).

The Food and Agriculture Organization (FAO) of the United Nations, primarily because of its mandate to support sustainable fisheries and marine resource management, notes that countries can report only OECM sites within their jurisdiction (71). However, OECMs may offer adaptive, inclusive conservation tools in ABNJs, enabling collaboration across governments, communities, industries, and international organizations. Researchers suggest that such approaches could enhance connectivity across regions such as the Salas y Gómez and Nazca Ridges by recognizing voluntary or customary stewardship practices (72). As the FAO continues to consider OECMs, such agreements within the marine environment may become important mechanisms for advancing adaptive transboundary conservation and supporting the implementation of area-based measures beyond national jurisdiction.

Successful examples in which transboundary conservation can facilitate regional cooperation and resource sharing for biodiversity protection on land include the Turtle Islands Heritage Protected Area and the Red Sea Marine Peace Park (73, 74). Yet, cases with geopolitical tensions and uneven capacities, like in the waters of Gibraltar and the Mammellone Bank in the Strait of Sicily, obstruct progress (75). Negotiation, mediation, and joint governance have been demonstrated to overcome such barriers and align national interests with shared ecological goals (76).

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Power dynamics also shape the implementation of the OECM framework. The Global North often drives conservation agendas due to its greater resources and institutional influence (77), while the Global South—home to many biodiversity hotspots—may struggle to assert its priorities (78). Colonial legacies further complicate this imbalance (79). Still, geopolitics can foster innovation: OECM sites in ABNJs and transboundary areas could empower diverse stakeholders, including Indigenous Peoples, local communities, and nonstate actors, and shift power dynamics to promote more equitable governance (80).

In the broader context of international conservation, OECMs serve as a bridge among global, national, and regional governance systems. Mechanisms such as the Ramsar Convention, UNESCO designations, and Regional Fisheries Management Organizations support coordination among countries, while newer agreements like the BBNJ provide additional tools to address gaps in high seas governance. In such settings, OECMs have the potential to advance biodiversity goals while fostering inclusive and cooperative conservation. National biodiversity strategies increasingly recognize that achieving the GBF Target 3 (30 by 30) requires both PAs and OECMs, each contributing uniquely within a comprehensive and connected conservation network.

In the following sections, we analyze the evolving definitions, site-level applications, and policy frameworks surrounding OECMs to assess their capacity to complement existing PA networks while integrating the economic and social dimensions of resource management.

3. INTEGRATING SOCIOECONOMIC, CULTURAL, AND GOVERNANCE DIMENSIONS INTO OECMs

The practical implications of OECMs, particularly socioeconomic, cultural, and governance aspects, constitute a large part of the discourse on OECMs. Their success hinges on integrating conservation objectives with existing land and resource use. OECM sites focus on the positive impact that communities can have on area-based conservation. The impact of communities on rates of deforestation and degradation can be profound. One study on tropical PAs, Indigenous lands (ILs), and protected Indigenous areas found that ILs significantly reduce deforestation and degradation compared to non-PAs and, in Africa, even exceed the performance of PAs (81).

3.1. Socioeconomic and Cultural Values of OECMs

OECMs offer a distinct opportunity to integrate biodiversity conservation with local communities' socioeconomic and cultural values. By supporting sustainable livelihoods, preserving cultural practices, and enabling equitable benefit-sharing from natural resources, they can enhance both ecological integrity and community well-being. Several studies have demonstrated how OECMs can be effectively embedded within local economies, ensuring that conservation is pursued not at the expense of people but in partnership with them.

Crop wild relatives (CWRs) play a critical role in sustaining agricultural biodiversity by contributing traits such as drought tolerance, pest resistance, and nutritional quality to cultivated crops. These genetic resources are essential for ensuring food system resilience in the face of climate change. Despite their importance, the in situ conservation of CWRs—within their natural habitats and often under traditional land management—has received limited attention and remains significantly underrepresented in current conservation strategies (82).

Integrating CWR-rich landscapes into OECM site planning could help protect wild genetic diversity and the traditional knowledge systems supporting it. Potential OECM sites have been proposed in biodiversity-rich regions such as the Mediterranean basin, the Irano-Anatolian region, the Caucasus, and the Tropical Andes, where traditional cultivation practices preserve cultural knowledge and genetic resources (83). Transient land-use systems, such as pastoralism, contribute

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to ecosystem health through seed dispersal and low-intensity grazing. Migration routes and grazing areas used by pastoralists in Spain have been identified as strong candidate OECM sites (84, 85).

Fisheries represent a critical intersection between ecological sustainability and human livelihoods, especially for coastal communities. Healthy marine ecosystems are essential to support fish populations, making biodiversity conservation a prerequisite for long-term fisheries productivity. OECMs offer a valuable pathway for recognizing and strengthening locally grounded marine stewardship practices. In Indonesia, territorial use rights in fisheries have empowered small-scale fishers to sustainably manage traditional fishing areas sustainably, often alongside ecotourism and other livelihood strategies (86). These community-led systems reflect deep ecological knowledge and local governance, showing how marine OECM sites can protect biodiversity while enhancing socioeconomic resilience (19). Integrating such approaches into national marine protection strategies could significantly expand conservation coverage in effective and equitable ways.

Indigenous ecological knowledge and sustainable resource use are essential components of successful OECM site planning. In Cameroon, traditional beliefs among forest communities, including egalitarianism, sharing, and human–nature conviviality, have reinforced biodiversity protection (87). However, exclusionary conservation policies, such as strictly enforced PAs that deny Indigenous Peoples access to ancestral forests, can erode cultural identity and intergenerational knowledge. By contrast, OECM sites grounded in human rights–based approaches could offer safer, more inclusive alternatives.

A more holistic approach that incorporates spiritual and cultural dimensions can enhance the relevance of OECMs as forms of area-based conservation. In East African pastoral lands, ethnographic research has shown how cultural values shape conservation-compatible land use (88). In Tibetan Buddhist communities, reverence for nature fosters environmentally responsible behaviors, including abstaining from killing, cultivating compassion, and protecting sacred landscapes (85). Such belief systems reflect deeper social values that align with transformational conservation goals (89), demonstrating how OECMs can support ethical stewardship alongside ecological outcomes.

OECM site designation could also provide a platform to address historical injustices experienced by Indigenous communities. Rather than imposing top-down conservation models, such a mechanism could help restore Indigenous stewardship over ancestral lands. In Canada, the potential for OECM sites to recognize and reestablish Indigenous leadership in conservation has been highlighted as a key benefit (90). Similar evidence from Australia, Brazil, and Canada shows that Indigenous-managed lands deliver strong biodiversity outcomes when governance is grounded in traditional knowledge and collaborative partnerships (91). These findings reinforce the need to elevate Indigenous leadership and avoid exclusionary conservation practices of the past.

The long-term success of OECMs, as a form of area-based conservation, requires financial models that align ecological outcomes with social and economic equity across diverse governance systems. A more business-oriented approach to conservation financing has been proposed to improve transparency and appeal to the financial sector (92). This includes consistent reporting on income, return on investment, annual performance, and resource use, alongside clear tracking of beneficiaries and management costs. Aligning with GBF Target 19, this approach could support better planning and more effective resource mobilization for OECMs.

In parallel, alternative financing mechanisms offer transformative possibilities. Conservation-compatible livelihoods aim to provide economic opportunities that align with environmental goals (93). A more radical proposition—conservation basic incomes (CBIs)—seeks to redistribute wealth to relieve the financial pressures that often drive environmental degradation. Estimated at US$5.50 per person per day, CBIs would cost roughly US$478 billion annually. While this exceeds

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the US$133 billion in global conservation spending recorded in 2020, it remains modest relative to the US$44 trillion in economic output tied to a healthy natural environment (94). Supporters of CBIs argue for community-centered, post-profit economic models that prioritize equity and sustainability (95).

Integrating ecological priorities with local communities' social and economic realities allows OECMs to redefine effective conservation. Examples such as supporting pastoralist practices in Spain, preserving crop diversity in the Mediterranean and the Andes, and empowering small-scale fishers in Indonesia all demonstrate that biodiversity protection and human well-being can be mutually reinforcing. However, this depends on rights-based approaches, inclusive governance, and sustainable financial systems. When these foundations are in place, OECMs offer a pathway toward conservation that respects cultural heritage, supports livelihoods, and rectifies longstanding inequalities.

A recent global niche modeling analysis of PA distribution provides further insight into the strategic value of OECMs. The study found that strict PAs are disproportionately located in highly developed regions with strong nongovernmental organization (NGO) presence and institutional capacity (96). This suggests that OECMs may be especially important in areas lacking enabling conditions. In these contexts, achieving positive socioeconomic outcomes through inclusive area-based conservation may be desirable and essential for long-term success.

3.2. Power, Participation, and Protection: Governing and Managing OECMs Fairly

Effective governance and management are fundamental to the success of OECMs. Recognizing and supporting diverse governance models—including Indigenous, community-based, private, and shared arrangements—enhances the legitimacy and inclusivity of OECM site designation and implementation. Although platforms such as the World Database on Protected Areas Management Effectiveness (WD-PAME) have documented an array of governance approaches, many remain underreported or poorly understood. This is an opportunity for management effectiveness in OECMs.

Evidence consistently shows that governance rooted in local empowerment, equity, and long-term support delivers more durable conservation outcomes. A global systematic review identified key success factors, including the devolution of rights to local actors and the inclusion of diverse perspectives through fair and inclusive processes. It sustained external support from institutions such as governments or NGOs. In contrast, limited participation or short-term consultation alone showed little impact (97). These findings are especially relevant to the OECM framework, where governance often exists outside formal state-led structures and depends heavily on the engagement of nonstate actors.

Efforts to systematically document diverse governance types are gaining momentum. A review of 60 years of data from the World Database on Protected Areas emphasized the importance of formally recognizing nongovernmental and community-led governance systems (98), a message reinforced more recently in the context of OECM site reporting (41). Early foundational work in Canada helped shape today's OECM framework standards, concluding that long-term management—measured in decades—is essential to effectiveness. Conservation objectives should remain central, and expansion of conserved areas must be grounded in demonstrable biodiversity value (99, 100). These principles informed the development of the OECM guidelines and screening tools developed by the IUCN (101, 102).

Indigenous Peoples and local communities (IPLCs) manage extensive areas that often overlap with ecologically valuable landscapes (103). Territories reported through Indigenous and

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community conserved areas, for example, frequently coincide with intact forest landscapes, supporting biodiversity conservation and ecosystem services such as carbon storage (104). Such overlaps strengthen the case for recognizing these areas as OECM sites.

Alternative governance frameworks rooted in community values and traditions also offer powerful models. In Crăciunel, Romania, commons-based systems—featuring local laws, annual assemblies, and detailed resource-use plans—demonstrate how conservation can be a continuous, democratic negotiation rather than a fixed, time-bound intervention (95). However, such systems often clash with externally imposed frameworks, such as Natura 2000 designations that lack adequate management or funding. Similar dynamics have been observed in Italy, where common pool resources reflect locally embedded conservation through negotiated, flexible practices (105).

Inclusive, ecosystem-wide governance approaches have been demonstrated. In Brazil's Babitonga Bay, a complex multidimensional governance assessment involved more than 700,000 people across several municipalities, integrating marine spatial planning, ecosystem services, and habitat protection. Although resource-intensive, this approach allowed conflicts to surface and be addressed constructively while ensuring that human needs were considered in conservation trade-offs (106).

Expanding Indigenous participation in decision-making is essential. In Canada, researchers recommend several pathways to strengthen IPLC involvement: integrating Indigenous voices into climate and biodiversity agendas, acknowledging ecological grief, recognizing the authority of IPLCs to declare PAs (including OECM sites), upholding land rights, and improving access to adaptation finance through less bureaucratic processes (107).

Despite existing reporting frameworks (3), nonstate and community-led governance types remain significantly underrepresented (61). Addressing this gap in OECMs will require the development of a standardized yet flexible methodology for documenting governance systems that reflect local diversity.

Tensions around ultimate authority and legitimacy surface across contexts and could represent a central challenge in realizing the full potential of OECMs. Prior to the adoption of the Kunming–Montreal GBF, the International Indigenous Forum on Biodiversity called for Indigenous territories and waters to be recognized as distinct from both PAs and OECMs. This hints at a need for globally agreed upon mechanisms to equitably integrate all forms of area-based conservation and hints that we are not quite there yet.

There are, however, encouraging signs of progress. The creation of a UN Subsidiary Body for IPLCs at COP16 (2024) represents a significant step toward embedding traditional knowledge systems into global conservation policy. Studies have demonstrated that OECM sites can accommodate a range of governance types while supporting ecological and cultural objectives. Indigenous-led initiatives have resulted in robust conservation outcomes alongside cultural resilience (108). Research from multiple ecological contexts affirms the adaptability and effectiveness of community-based governance (109), while integrated approaches have been shown to improve equity and environmental performance (110). These findings highlight the potential of OECM sites to serve as inclusive, locally meaningful frameworks for conservation success.

3.3. Integrating OECMs into Global Conservation and Development Framework Targets

As the global conservation agenda increasingly seeks to integrate biodiversity goals with broader sustainable development objectives, OECMs have emerged as a strategic tool that bridges ecological and human well-being priorities. Their integration into international frameworks—such

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as the UN's 2030 SDGs—has been recognized (6, 7, 111). A comprehensive analysis of area-based conservation's contributions to SDGs, including explicit reference to OECMs across both terrestrial (SDG 15) and marine (SDG 14) domains, outlines how these sites can support sustainable, peaceful, and resilient societies (27).

Multiple studies illustrate OECMs' potential to support food security, ecosystem resilience, and cultural heritage. For instance, marine biodiversity integration into SDG strategies in Mozambican fishing communities highlights the role of OECMs in securing livelihoods and nutrition (112). Similar contributions are seen in West Africa, where OECMs in Benin align with food sovereignty efforts (113), and in Japan's *satoyama* systems—transitional areas between village and forest—where agro-biodiversity, culture, and community cohesion intersect (34, 114).

Despite this momentum, consensus on reconciling overlapping area-based conservation approaches remains elusive. The lack of alignment between frameworks may hinder efficiency and transparency. Establishing OECM sites as an overarching designation under which terrestrial and marine area–based tools can be nested could help harmonize reporting and support more coherent planning. Calls for this type of streamlining have been echoed in reviews of marine area–based management tools, which recommend developing sector-specific guidance that accommodates regional contexts and more effectively evaluates effectiveness (115).

In fisheries, spatial management tools already provide significant conservation benefits, even if they are not always labeled as OECMs. A global review of area-based fisheries management measures (ABFMs) catalogued various spatial and temporal tools contributing to biodiversity outcomes—often as ancillary benefits—highlighting their alignment with OECM framework criteria (23).

Managing marine systems adds additional complexity, as highlighted by the work of Claudet et al. (18) and García et al. (116), who emphasize the importance of governance and outcome-oriented assessment. These studies advocate for recognizing fisheries tools, such as ABFMs, as OECMs, provided they deliver demonstrable biodiversity benefits. A 5-year evidence-gathering period is suggested to assess outcomes before formal recognition. Moreover, allowing nonstate actors to submit monitoring data—distinct from state-led reporting—could encourage more inclusive participation. In some cases, sites could remain in a national inventory as candidate OECMs until benefits are confirmed, offering a flexible pathway to inclusion.

Another key issue is clarity around international classifications and reporting. Categories such as "designated," "proposed," or "established" (used in the WD-OECM) may be inconsistently applied across countries. Strengthening the consistency and transparency of these classifications could enhance credibility and comparability.

OECMs also have the potential to fill gaps in global reporting frameworks by offering flexible and locally appropriate conservation designations that complement more rigid formal protections. However, integration with existing international conventions—such as Ramsar or UNESCO World Heritage Sites—must not dilute their original mandates. Rather, OECMs could strengthen institutional and operational strategies, particularly in complex or historically entrenched governance contexts, as seen in the Serengeti-Ngorongoro Biosphere Reserve (42).

Scholars have argued that all 727 UNESCO Biosphere Reserves should be formally recognized within the PA or OECM systems (117). This gains further support from evidence in Tanzania, where forested areas with overlapping designations demonstrate higher forest biomass densities than single-designation areas (118). While such dual recognition appears ecologically beneficial, reconciliation within international reporting frameworks remains a challenge that must be addressed to ensure clarity and accountability.

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Table 2 Measuring what matters—from OECM framework to site effectiveness

Dimension	Description	Key consideration(s)
Area coverage	Total size of land/sea under OECM designation	A straightforward but insufficient way to measure effectiveness.
Ecological effectiveness	Extent to which site successfully maintains biodiversity, ecosystem functions, and natural processes in the long-term	Are species and habitats being maintained or restored? Does the site provide integrity and resilience?
Governance quality	Legitimacy, transparency, inclusiveness, and accountability of the decision-making processes guiding management of the site	Are governance arrangements inclusive, legitimate, and long-term?
Socioeconomic impact	Effects a site or conservation measure has on the well-being, livelihoods, cultural values, and social structures of local communities and stakeholders	Do OECMs support livelihoods, equity, and cultural values?
Monitoring and evaluation	Systematic tracking and assessment of conservation outcomes to inform adaptive decision-making and improve performance over time	Is there a system in place using credible, context-specific indicators?
Alignment with international targets	The site's conservation objectives and outcomes contribute to global agreements and frameworks, such as the CBD and SDGs	Do OECMs contribute meaningfully to national biodiversity targets under the Kunming–Montreal Global Biodiversity Framework and other international targets for sustainable development (i.e., SDGs)?

Abbreviations: CBD, Convention on Biological Diversity; OECMs, Other Effective Area-Based Conservation Measures; SDGs, Sustainable Development Goals.

4. FROM RECOGNITION TO RESULTS: EVOLVING OECMs

The rapid expansion of OECM sites has prompted renewed dialogue on how they are designed, implemented, and evaluated for long-term impact. As countries scale up area-based conservation efforts to meet the 30 by 30 GBF Target 3, the ability to track not only spatial coverage but also ecological effectiveness becomes ever more essential. While quantifiable targets, such as total area conserved, are relatively straightforward to measure, their correlation with meaningful biodiversity outcomes is far less certain (2). Without robust monitoring frameworks, there is a risk that conservation progress may be overstated or misrepresented.

Effective biodiversity conservation depends on the extent of conserved areas and how well these areas function ecologically, socially, and institutionally. This includes maintaining species populations, habitat integrity, and ecosystem services as well as adaptive governance over time. Tracking real progress requires moving beyond surface-level metrics toward performance-based evaluation (1). As has been argued from very early on, achieving conservation goals hinges on the quality, representativeness, and connectivity of PAs and conserved areas—not simply their size (16). **Table 2** provides a summary of measuring what matters based on this.

These challenges are relevant for OECMs, which are diverse by nature and often embedded in dynamic socio-ecological contexts. Integrating adaptive management, climate resilience, and locally defined indicators into OECM evaluation frameworks will ensure their expansion contributes to biodiversity outcomes and broader sustainability goals.

4.1. Design and Effective Management Challenges

Fewer than one-third of areas recognized as science policy priorities for biodiversity are under protection (119). Therefore, a central challenge is ensuring that OECM sites are designed with biodiversity value in mind and that benefits are demonstrable. As has been observed with

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APPLYING WATSON ET AL.'s (63) 2023 FRAMEWORK TO OECMs UNDER GLOBAL BIODIVERSITY FRAMEWORK TARGET 3

To support the effective implementation of Global Biodiversity Framework Target 3, six guiding principles have been proposed to help ensure OECMs deliver meaningful biodiversity outcomes while upholding transparency, equity, and ecological integrity (63).

1. **Biodiversity significance:** OECMs must deliver sustained biodiversity outcomes, even if conservation was not the original intent (120).
2. **Transparent representation:** Clear reporting on governance, location, and outcomes is essential for credibility and accountability.
3. **Ecological connectivity:** OECMs help build coherent ecological networks, linking fragmented habitats and supporting climate resilience.
4. **Ecosystem services rationale:** Recognizing contributions to climate regulation, water provision, and food systems can strengthen local support.
5. **Spatial planning tools:** Data-driven planning ensures OECMs complement existing PAs and address key biodiversity gaps.
6. **Equitable and inclusive governance:** Emphasizing the rights and roles of IPLCs ensures socially just conservation.

Together, these principles guide strategic, inclusive, and outcome-oriented conservation—placing OECMs as vital in achieving global biodiversity goals.

some PAs, there is a risk that designations may prioritize ease of establishment over ecological significance. Considerations include dual benefits for biodiversity and people, connectivity, and shifting environmental conditions that may alter the suitability of specific areas for long-term conservation.

Integrating OECMs into national conservation strategies requires more than merely recognizing area coverage; it demands clear guidance on how these areas contribute meaningfully to biodiversity goals. A practical approach to area-based conservation that includes PA and OCEM sites, sometimes referred to as PCAs, has been developed to support the implementation of Target 3 of the GBF (63). It sets out six principles to ensure that all PCAs are effectively sited, managed, and governed. Although OECM sites may not be established with conservation as their primary aim, they must deliver sustained biodiversity outcomes to qualify (6, 120). The principles, as outlined in the sidebar titled Applying Watson et al.'s (63) 2023 Framework to OECMs Under Global Biodiversity Framework Target 3, provide a pathway for integrating OECMs into equitable and ecologically effective conservation networks.

Measuring the success of OECM sites requires moving beyond binary classifications of conservation outcomes. A novel framework called Green Shoots, inspired by the IPCC's burning embers approach, has been proposed to visually represent varying levels of effectiveness in PCAs (121). This method allows for a more nuanced interpretation of progress by illustrating a continuum of success, rather than a pass/fail outcome. Importantly, Green Shoots also encourages the inclusion of areas managed for anthropocentric purposes—such as carbon sinks or marginal agricultural lands—within the OECM framework, if they deliver demonstrable and sustained biodiversity benefits (121).

Understanding management effectiveness in existing area-based conservation tools reveals important lessons for OECMs. An analysis of WD-PAME found that only 23% of terrestrial PAs had adequate budgets and staffing (122). In addition, just 4–9% of global vertebrate populations

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(amphibians, birds, and mammals) were represented in these areas. These limitations suggest that conventional management effectiveness tools may underestimate the contributions of OECM sites, especially where conservation outcomes stem from informal or under-resourced governance arrangements. Some under-represented metrics, such as social cohesion, biocultural indicators, human health and well-being, and in-kind volunteer efforts, where applicable, are rarely captured in standardized tools.

Further comparative analysis shows that OECM sites may outperform PAs in several respects. Many OECMs are under national or federal governance—though a few large designations influence this (41). Roughly two-thirds of OECMs report biodiversity conservation as a primary or secondary objective, but the lack of clearly stated management goals in others raises valid concerns. The authors emphasize the need to recognize non-biodiversity values better and to strengthen accountability, especially in sites governed through customary, community, or private systems. The Common International Classification for Ecosystem Services (CICES V5.1) provides a structured framework for valuing ecosystem services by classifying them in relation to the ecological processes that generate them (123). As a tool for integrating ecosystem function into environmental assessment and policy design, this is especially relevant to OECMs.

Effective spatial design is critical. OECM sites have the potential to enhance landscape connectivity and link KBAs across fragmented ecosystems. In China, OECMs are predicted to act as ecological corridors that connect habitats and increase resilience (124). A similar approach has been implemented in the Hindu Kush Himalaya Region, where OECMs support connectivity between PAs while respecting the cultural and livelihood needs of mountain communities (125). These examples highlight the flexibility of OECMs in bridging gaps within formal PA networks.

Recognition of this role is growing. Dudley et al. (27, p. 147) analyzed the ability of area-based conservation to meet SDGs as a foundation for conservation, well-being, sustainability, and prosperous societies. They include OECMs as part of "critical complementary area-based approaches that are often outside the network of protected and conserved areas include key biodiversity areas, ecological corridors and climate refugia." When OECM sites are designed and evaluated with connectivity, inclusivity, and long-term management in mind, they can play a central role in achieving both biodiversity and sustainable development targets.

4.2. Monitoring and Evaluation

To determine whether area-based conservation sites are effectively protecting biodiversity and contributing to socioeconomic goals, monitoring and evaluation are essential for transparency and for demonstrating success and legitimacy. These processes could take many forms, but as highlighted in the literature on PAME, are not without challenges. OECMs could utilize some of the approaches outlined below.

4.2.1. Advancing monitoring and adaptive management for OECMs. Achieving positive biodiversity outcomes through OECM sites requires robust monitoring and adaptive management (17). Innovations in technology—such as citizen science, automation, and advanced data analytics—offer promising solutions to overcome long-standing data gaps and resource constraints. The importance of spatial scale, particularly in small islands or fragmented contexts, cannot be overstated. As OECM sites expand globally, there is a clear opportunity to integrate these tools more systematically into broader conservation strategies.

4.2.2. The role of innovation in monitoring. While traditional biodiversity monitoring and evaluation approaches remain foundational, they have been significantly enhanced by recent technological advancements. Tools such as environmental DNA (eDNA), drones, automated camera traps, and machine learning are reshaping how conservation outcomes are measured. Maxwell

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and colleagues (21) highlight the need for conservation evaluations to become outcome-oriented, incorporating diverse tools and standardized reporting frameworks. However, this shift should also be a space to address potential risks, particularly those associated with the use of artificial intelligence in conservation (126).

A comprehensive review of emerging technologies in biodiversity monitoring is provided in a conceptual framework (127). Big data, citizen science, remote sensing, automation, and eDNA can be integrated to enhance spatial and temporal resolution, accuracy, and scalability of biodiversity assessments, offering a transformative opportunity for OECM implementation and evaluation.

4.2.3. Participation, equity, and capacity. Ensuring inclusive participation is equally critical. Integrating participatory biodiversity monitoring findings into global systems like the Global Biodiversity Information Facility (GBIF) offers a cost-effective and scalable approach. Citizen science has proven highly valuable in contexts with limited formal research capacity. The benefits of combining continuous local monitoring efforts with expert periodic assessments have been emphasized (128). eDNA sampling can be made cost-effective by involving trained nontechnical personnel (129). Building on this, there may be opportunities to leverage existing infrastructure, such as the PCR testing facilities that became widespread during the COVID-19 pandemic.

Disparities in access to technology and expertise could risk reinforcing global inequalities. Kusters et al. (130) underline the role of NGOs in upskilling local partners and building capacity among conservation professionals. For OECMs to deliver on their promise, investment in local training and institutional support is vital and entirely possible.

4.2.4. Data platforms and governance challenges. Data repositories play a key role in global monitoring efforts. The WD-OECM will likely remain the primary platform for OECM reporting. However, complementary platforms like Restor can support decentralized monitoring and site-level management. Restor now includes data from more than 200,000 sites in 140 countries to support global restoration efforts and tracks biodiversity indicators, carbon stocks, hydrology, land cover, soil characteristics, and disturbance events (131). This makes it a valuable tool for visualizing change and guiding local action.

Concerns have been raised about data-sharing platforms, particularly around data ownership, equity, and privacy. The need for trust-building mechanisms and data governance protocols that protect confidentiality, particularly for private landowners and Indigenous or community-managed sites, has been stressed (132). These safeguards are especially relevant to OECM site evaluations, where recognition and reporting may rely on voluntary data sharing.

4.2.5. Global reporting and strategic integration. To ease reporting burdens on countries with limited capacity, a global sampling framework has been proposed (133). The model, applied to 25 countries ranging from polar to tropical ecosystems, demonstrates how representative sampling can offer timely and meaningful insights into global conservation progress. The authors also advocate for weighted metrics to ensure fair representation of countries with fewer resources for area-based conservation, which was echoed by recent public opinion research focused on PA targets but with relevance to OECMs (134).

A diverse body of research continues to enrich the OECM monitoring toolkit. Several studies have contributed open data sets and spatial analyses to inform site identification, design, and performance evaluation (63, 133, 135, 136). Others have produced indices and user-friendly toolkits tailored to the practical needs of site managers and community partners (62, 137–141).

For these tools to be truly effective, they must be not only technically robust but also accessible and adaptable. Success depends on ensuring they are usable in real-world conditions—particularly in data-poor regions where OECMs are often most urgently needed and most likely to be community-led.

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5. TOWARD CREDIBLE AND EQUITABLE OECMs: A CALL FOR DELIBERATE ADVANCEMENT

Looking toward 2030, OECMs are positioned to transform global conservation efforts. Their future success will depend not only on biodiversity outcomes but also on how well they integrate interdisciplinary collaboration, adapt to environmental change, embrace rights-based approaches, and harness the leadership of nonstate actors. These dimensions are increasingly important in achieving long-term, inclusive, resilient conservation strategies.

OECMs offer an entry point for integrating multiple disciplines—such as agroecology, fisheries, forestry, public health, sustainability science, and maritime heritage—into conservation planning. Restoration ecology, for instance, can align with the OECM framework's goals by identifying restoration hotspots where ecological recovery delivers direct and measurable benefits to nature and people. Conservation corridors and landscape-scale regeneration projects can enhance ecological connectivity and provide ecosystem services such as water supply and carbon storage, but it takes time for benefits to be realized. Maritime archaeology contributes further by highlighting co-benefits from shipwrecks and submerged heritage sites, which serve as refugia for marine biodiversity and as focal points for sustainable tourism and fisheries co-management.

While PAs have traditionally operated within static boundaries, a rapidly changing environment requires more dynamic approaches. OECM sites, by design, can be more flexible. Climate change, species migration, and shifting ecological baselines demand adaptable site boundaries and management plans. For instance, projected thermal stress in marine areas may undermine the effectiveness of existing conservation zones, affecting species including those of high commercial value (142). Meanwhile, current OECM site networks may not align with climate refugia, emphasizing the need for regular reassessment and adaptive redesign. Joint initiatives between climate and conservation researchers could help OECM sites respond more effectively to future scenarios while supporting global climate goals through mechanisms like blue carbon and carbon credit markets.

Incorporating rights-based approaches into OECM frameworks is critical for equity and legitimacy. True inclusion requires attention to gender dynamics, intergenerational equity, and the rights of IPLCs. Research on community forestry reveals persistent challenges, including exclusion of women and youth from decision-making, deviation from agreed upon plans, and the influence of commercial interests. Addressing these challenges requires more than procedural fixes; it demands structural reforms that acknowledge social and political histories. Equitable conservation recognizes communities as stakeholders, rightsholders, and contributors with longstanding governance systems and knowledge.

Non-state actors, particularly NGOs, have been central to promoting community-driven conservation. They provide vital support through advocacy, local capacity building, and amplifying marginalized voices and representing nonhuman interests. Despite progress, many NGOs continue to face funding limitations, competition, and coordination challenges. Forming coalitions or super-NGOs could streamline efforts, reduce duplication, and improve outcomes, particularly in small island communities (143). Lessons from Indonesia show that even when legal authority shifts to local governments, limited technical and financial capacity can hinder implementation, gaps that community organizations and/or NGOs are often best equipped to fill (144).

Improving the legitimacy and effectiveness of OECMs also means addressing institutional bottlenecks. For example, data submitted to the WD-OECM are currently limited to state actors, creating asymmetries in representation. Establishing formal arbitration mechanisms—modelled after those used in the World Heritage Sites and Important Bird and Biodiversity Areas frameworks—could provide a fair process for conflict resolution and standard setting. Conversely,

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positive recognition could be advanced through tools like the IUCN Green List, showcasing exceptional achievements in OECM governance and biodiversity outcomes.

Financing and resourcing remain one of the most pressing—and least addressed—challenges facing OECM site management. Managing expanded stewardship networks requires sustainable, diversified funding and resourcing. Blended finance models offer a promising avenue. In South Africa, innovative financing mechanisms have attracted private and public investors (145). These authors discuss how communal land tenure and unclear ownership structures often discourage investment. Proposals that offer a development dividend or use financial instruments like insurance and guarantees are suggested as ways to mitigate risk and build investor confidence. Globally, a conservation-focused funding mechanism modelled on the UN Framework Convention on Climate Change's Green Climate Fund suggested by Stark et al. (146) could address equity issues by aligning contributions with countries' economic capacities.

OECMs are not without flaws. However, their uptake, broad applicability, and growing support suggest they have a critical role in reimagining conservation for the future. As OECM designations increase, a critical question emerges: When an area meets most or all PA criteria, is opting for OECM status a more appropriate or inclusive alternative—or simply a more convenient one? While OECMs offer flexibility, especially in recognizing diverse governance types, their lack of formal legal protection can create the perception that they are an easier option. This raises important concerns about the implications for conservation integrity, equity, and long-term accountability. We argue that they are complementary and part of an area-based conservation toolkit. Embedding interdisciplinary thinking, equity, and environmental adaptability into OECM site design and governance can help ensure these areas deliver lasting benefits for biodiversity, climate resilience, and community well-being. As countries move toward the 2030 GBF targets and SDGs, OECMs will be most effective when driven by inclusive, collaborative, and forward-looking strategies.

SUMMARY POINTS

1. Other Effective Area-Based Conservation Measures (OECMs), formally recognized in 2010, represent a complementary mechanism to protected areas (PAs) for achieving in situ biodiversity conservation.
2. OECMs can deliver long-term conservation outcomes in landscapes and seascapes where biodiversity protection may not be the primary objective, including areas of active human use.
3. These sites provide important co-benefits, such as ecosystem services, climate resilience, and livelihood support, particularly when grounded in inclusive governance systems.
4. By integrating conservation and sustainable use, OECMs contribute to multiple international commitments, including the Kunming–Montreal Global Biodiversity Framework and the Sustainable Development Goals (SDGs).
5. The pace of OECM designation has accelerated between 2020 and 2024, with observable differences in implementation strategies between the Global North and Global South.
6. If Parties to the Convention on Biological Diversity fully support their implementation and reporting, OECMs offer opportunities to address persistent challenges in PA management, such as equity, monitoring gaps, and underrepresentation.

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FUTURE ISSUES

1. Develop clear and flexible criteria to assess OECM effectiveness, building on Protected Areas Management Effectiveness (PAME) tools but adapted through real-world case studies.
2. Broaden site types and include underrepresented ecosystems like freshwater, groundwater, and small islands as well as incidental areas such as military zones and decontaminated lands.
3. Strengthen legal frameworks and ensure recognition of OECMs under customary law.
4. Establish systems to monitor risks of downgrading, like Protected Area Downgrading, Downsizing, and Degazettement (PADDD) in PAs.
5. Design OECMs to support ecological connectivity and adapt to environmental change, using climate and land-use modeling to anticipate future shifts.
6. Expand innovative, accessible monitoring methods—such as environmental DNA, drones, and citizen science—and promote long-term data collection.
7. Ensure transparent governance and reporting through arbitration mechanisms, document designation pathways over time, and clarify overlaps with other conservation systems.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

AUTHOR CONTRIBUTIONS

C.M.W. and J.E.F. conceived and designed the project, contributed to the acquisition, analysis, and interpretation of data, wrote and revised the article, and reviewed the article critically for important intellectual content. D.J.I., A.D., and N.W. contributed to the acquisition, analysis, and interpretation of data and reviewed the article critically for important intellectual content.

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