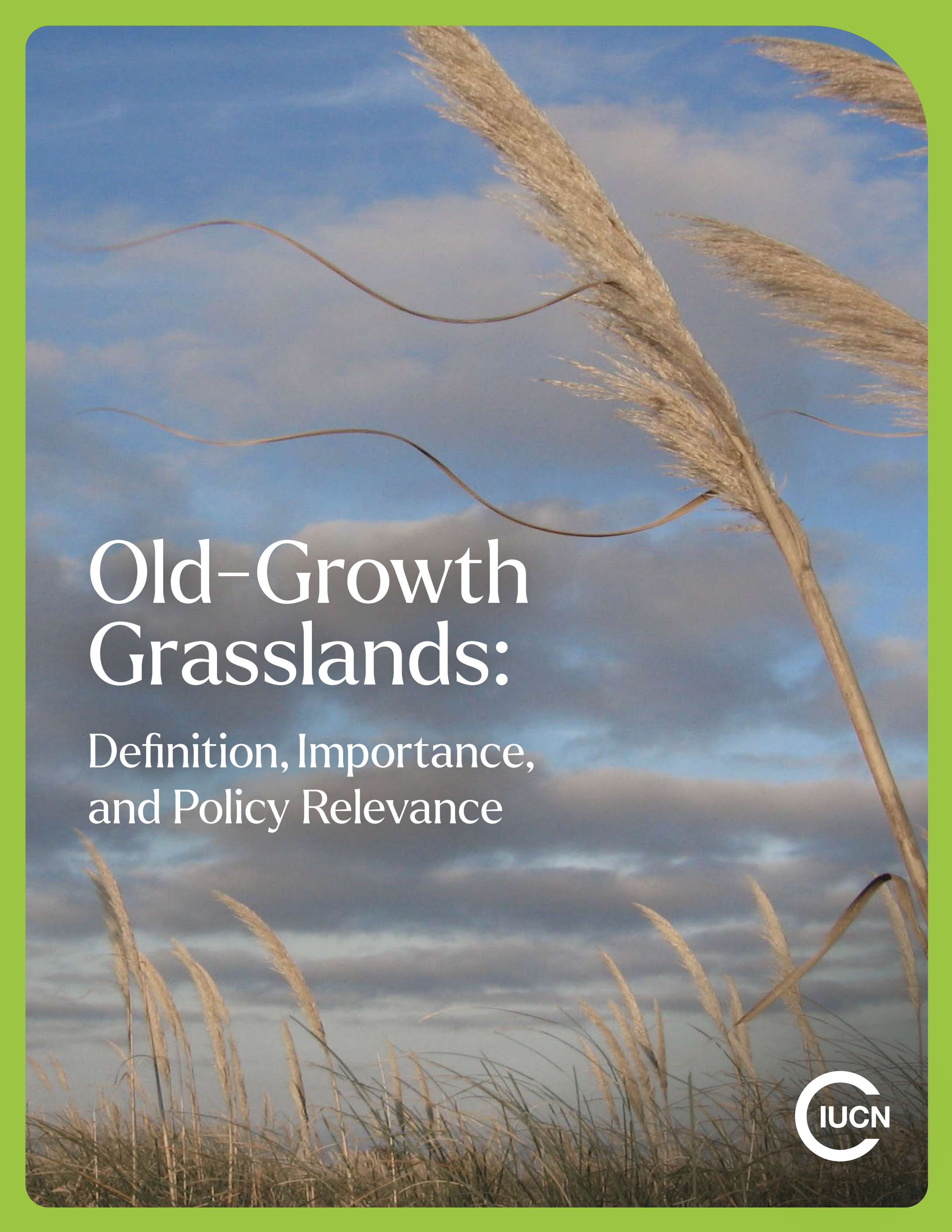




Old-Growth Grasslands:

Definition, Importance,
and Policy Relevance



Key messages:

Old-growth grasslands are ancient, biodiverse and have persisted over millennia as grassy ecosystems, shaped and stabilised by long-term interactions with fire, herbivory, climate variability and soil processes

Characterised by exceptionally high levels of biodiversity, they host globally significant lineages of grasses, forbs, and pollinators, as well as specialised and often threatened fauna

Despite their ecological importance, old-growth grasslands are routinely misclassified as “degraded forests,” “wastelands,” or “unused lands,” leading to neglect in policy frameworks

Conservation crucial for protection of Old-growth grasslands as restoration driven recovery of characteristic long-lived perennial species can require centuries to millennia

The global recognition of primary forests demonstrates the power of scientific evidence and policy framing to mobilise conservation action, highlighting the urgent need for comparable recognition and monitoring of old-growth grasslands.



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Grasslands are a standalone ecosystem

Old-growth grasslands (Veldman et al. 2015) are ancient, biodiverse, and functionally complete grassy ecosystems that have persisted for centuries to millennia without ever having been forests. Far from being “degraded” or “awaiting trees,” they represent primary ecosystems, shaped and stabilised by long-term interactions among fire, herbivory, climate variability, and soil processes.

Old-growth grasslands are defined by long ecological continuity, often stretching back to the Pleistocene. Their species assemblages have evolved under recurrent disturbance regimes and are not remnants of deforestation or agricultural abandonment (Bond, 2016; Parr et al., 2014). Critical features include dominance of perennial C_4 grasses, extraordinarily diverse herbaceous communities (forbs, sedges, geophytes), and complex faunal assemblages adapted to open habitats. These communities are tightly coupled with ecosystem processes: frequent, low-intensity fire, grazing by wild or domestic herbivores, and high interannual variability in rainfall, all of which maintain open structure and prevent woody encroachment (Bond & Parr, 2010; Lehmann et al., 2014).

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Old-growth grasslands are rich in biodiversity

Biodiversity levels in old-growth grasslands are exceptionally high. Many tropical and temperate grasslands support higher vascular plant richness per square meter than neighbouring forests (Overbeck et al., 2007; Veldman et al., 2015). Much of this diversity is concentrated in the herbaceous layer, which hosts globally significant lineages of grasses, forbs, and pollinators, as well as specialised and often threatened fauna such as grassland birds, small mammals, reptiles, and large grazers. Crucially, these biodiversity assemblages depend on structural openness, making them highly sensitive to afforestation, bush encroachment, or fire suppression (Parr et al., 2014; Veldman et al., 2015).

Belowground carbon storage in Old-growth grasslands is important for climate mitigation

A hallmark of old-growth grasslands is their belowground carbon dominance. Deep-rooted perennial grasses and stable soil organic carbon (SOC) pools constitute the majority of carbon stocks in these systems, often exceeding aboveground woody biomass in adjacent forests (Grace et al., 2006; Veldman et al., 2015; Jackson et al., 2002). SOC pools may take centuries to accumulate and are resilient to natural fire regimes. As a result, efforts to convert grasslands to forests—through tree planting, carbon offset programmes, or land-use reclassification—often lead to net carbon losses, destabilisation of soils, and disruption of water balances (Bond, 2016; Veldman et al., 2015).

See our detailed policy brief on grassland carbon [here](#).

Conservation of intact, Old-growth grasslands is critical

Studies show that once old-growth grasslands are destroyed, passive restoration alone is insufficient to fully recover species richness or composition. Many of the characteristic old growth species — native perennial grasses or forbs, species with underground storage organs, fire adapted, clonal, stress tolerant but poor colonizers — are frequently absent from secondary grasslands, even after long periods. These grasslands, even decades after disturbance, typically retain only about 63% of the plant species richness found in old-growth grasslands, and recovery of characteristic long-lived perennial species can require centuries to millennia (Nerlekar & Veldman, 2020). Early successional secondary grasslands are dominated by fast-growing, weedy species, and even as species richness gradually increases, the unique composition and functional traits of old-growth communities remain largely absent.

Conservation of extant old-growth grasslands is critical for maintaining the irreplaceable reservoirs of biodiversity, ecological processes, and evolutionary history.



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Old-growth grasslands are threatened by misclassification, driving conversion and degradation

Despite their ecological importance, old-growth grasslands are routinely misclassified as “degraded forests,” “wastelands,” or “unused lands,” especially in South Asia, Africa, and South America. This misclassification underpins widespread afforestation, plantation forestry, and land conversion programmes that erase ancient ecosystems and undermine pastoralist and Indigenous livelihoods (Nerlekar & Veldman, 2020; Lahiri & Reddy, 2025). Protecting old-growth grasslands is therefore essential for achieving the objectives of the Convention on Biological Diversity, UNFCCC, and UNCCD, particularly regarding ecosystem integrity, nature-based solutions, and land degradation neutrality.

Parallels with the Primary Forest Concept: What Policy and Global Momentum Reveal

Primary forests are widely recognised as ecosystems of exceptional ecological and cultural importance, supporting irreplaceable biodiversity, globally significant carbon stocks (Gibson et al. 2011; Dellasala et al. 2020; Mackey et al. 2020), and longstanding relationships with Indigenous peoples and traditional land stewardship. Growing scientific evidence demonstrating the rapid decline of primary forests, largely driven by deforestation (Goldman et al. 2025), has catalysed increasing attention from policymakers, donors, and conservation practitioners. In response, major initiatives and collaborative efforts have emerged to map the extent and condition of primary forests and to strengthen their recognition within national policies and global environmental frameworks.

The growing recognition of primary forests demonstrates how scientific evidence, mapping efforts, and clear policy framing can mobilise global conservation action. Comparable efforts are urgently needed for old-growth grasslands, where baseline ecological data are often fragmented, outdated, or entirely absent. In contrast to forests, many grassland ecosystems still lack consistent inventories, global datasets, and agreed indicators of ecological integrity, leaving large areas misclassified, poorly understood, or effectively invisible within national reporting systems and global conservation priorities. Strengthening the scientific recognition and monitoring of these ecosystems is therefore a critical step toward elevating grasslands within biodiversity, restoration, and climate agendas.

Old-growth grasslands may also play an important symbolic and communicative role for grassland conservation more broadly. Much as primary forests have become emblematic of irreplaceable ecosystems, recognising old-growth grasslands could help build greater public and political awareness of grassland biodiversity, ecological integrity, and cultural value, helping address the longstanding lack of attention and “charisma” afforded to grassland ecosystems globally.

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Cover image: Fernando Miñarro



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