



From Background to Foreground: Elevating Moss in Critical Plant Studies and Conservation Ethics

Andrea Natan Feltrin¹

Abstract:

Moss is commonplace, yet it is seldom treated as an object of sustained ethical attention, and I take that ordinary disappearance as a problem for conservation ethics: value still tends to follow size, mobility, charisma, visible expression, economic use, or forms of agency that can be compared readily with human and other animal capacities, while moss matters ecologically but falls outside this grammar of attention. I therefore use *mossy entanglement* to describe its surface-bound and moisture-dependent participation in shared worlds, for the agency at issue is infrastructural: through attachment, water retention, substrate change, carbon dynamics, microhabitat formation, and refuge making, moss alters the conditions under which other beings persist, and neither intention nor sovereign action is required for those effects to matter. The argument moves among bryophyte biology, philosophical analysis, and the Cape Horn Biosphere Reserve in Chile: biological research supplies the material basis of *mossy entanglement*, while critical plant studies, posthumanism, and multispecies justice establish the

¹ Independent Scholar,
Environmental Philosophy.

Email: natan.feltrin@live.it

E-ISSN: 3107-488X

© 2026 *Entanglements: Journal of Posthumanities*,

Received: 29 April 2026

Revised: 13 July 2026

Accepted: 15 July 2026

Published Online: 31 July 2026

Website: www.entanglements.in

conceptual dispute, and Cape Horn places that dispute under practical pressure because bryophytes there have changed biodiversity assessment, environmental education, ecotourism, and biocultural conservation. The case hence supports an ethics of habitability concerned not only with organisms, but also with substrates, microclimates, ecological relations, and the small shelters through which a shared world remains liveable.

Keywords: Moss; Bryophytes; Critical Plant Studies; Conservation Ethics; Biocultural Conservation; Plant Agency; Multispecies Justice; Cape Horn Biosphere Reserve.

Introduction

Moss is easy to see and difficult to notice: it grows on stones, walls, bark, roofs, peat, paths, and shaded soil, yet it seldom occupies the centre of ecological imagination, and biological insignificance cannot explain this marginality, for mosses and other bryophytes participate in water regulation, contribute to soil formation, shelter minute organisms, enter carbon and nutrient cycles, and respond sensitively to environmental disturbance (Vanderpoorten and Goffinet; Slate et al.). The difficulty, then, is conceptual as well as empirical, since moss does not fit the dominant grammar through which ecological value is perceived, and even fields that reject crude anthropocentrism can reproduce the problem: for instance, conservation ethics and critical plant studies often distribute attention according to visibility, charisma, cognition, and expressivity. Old-growth trees, flowering plants, crops, spectacular animals, and visibly responsive vegetal forms enter public and scholarly concern more readily, whereas moss usually arrives as texture, low to the ground, absorptive, surface-bound, and slow; the discrepancy has consequences,

for a living form may perform substantial ecological work and still remain peripheral to the concepts through which valuable life is recognised.

Attention to moss therefore entails a change of scale: the eye moves down towards damp stone, shaded bark, thin soil, and activity easily mistaken for background, and I call this ecological configuration *mossy entanglement*. The term names how moss shapes shared conditions of life and locates agency in infrastructure rather than command: a moss attaches to a surface, holds water, modifies a substrate, and helps form a microhabitat, and although no single process resembles autonomous movement or intentional rule, together they change what can live in a place and under which conditions. Biology comes first in this account, for mosses affect water relations, surfaces, microclimates, carbon dynamics, and habitats; the philosophical and ethical force of the concept follows from those material effects, which unsettle an account of agency tied to intention, sovereignty, or independent movement and raise a further conservation question: can an ethic value the conditions that sustain life when inconspicuous organisms make those conditions? Ecological description, philosophical interpretation, and normative argument remain distinguishable here, but each bears on the others.

Because “entanglement” has several theoretical histories, I use it within a deliberate boundary: DeLanda’s assemblages describe heterogeneous compositions whose elements acquire capacities through conjunction (DeLanda); for Barad, entities and their boundaries emerge through intra-action (Barad); and Morton’s mesh, meanwhile, names coexistence within an ecological field that has no outside position (Morton). My claim is narrower, for *mossy entanglement* identifies a biologically specific mode of vegetal participation organised through moisture retention, surface attachment, substrate modification, microhabitat formation, and ecological support; by following those activities, relational ontology acquires both an ecological scale and a normative object. The same boundary governs references to moss

“teaching” or “asking”: those verbs belong to philosophical interpretation, while the capacity to alter relations and sustain conditions belongs to moss. Its way of living may expose the limits of inherited concepts without converting the plant into a human subject, and the distinction matters in critical plant studies because human-like cognition can quietly reappear as the threshold of significance, even in work intended to resist anthropomorphism.

Marder, Coccia, Mancuso, Hall, Gagliano, Ryan, Vieira, Myers, and Nealon have all contested the treatment of plants as passive matter (Marder; Coccia; Mancuso; Mancuso and Viola; Hall; Gagliano, Ryan, and Vieira; Myers; Nealon), and their work makes vegetal agency thinkable, but moss poses a more particular problem: rather than ask whether plants display capacities already legible to humans, *mossy entanglement* asks how vegetal life configures the conditions of coexistence. Intelligence, communication, personhood, and symbolic grandeur are not prerequisites, for smallness, surface attachment, moisture dependence, and ecological support are precisely the features through which moss becomes significant.

My method follows the movement from material process to conceptual consequence: I begin with bryological and ecological research on the ways mosses and other bryophytes shape their surroundings, and then bring those processes into debates on human supremacy, plant agency, anthropomorphism, multispecies justice, and conservation value. Finally, the Cape Horn case tests what changes when attention to bryophytes enters a conservation setting, including what an assessment can register, what institutions protect, and how people learn to perceive ecological significance. The theoretical framework is thus built from moss ecology rather than attached to it afterwards, and Cape Horn matters because bryophytes have already altered conservation knowledge and practice there: when Rozzi and collaborators shifted the taxonomic and geographical lens towards mosses, liverworts, and other non-vascular

plants, a form of biodiversity missed by dominant assessments came into view (Rozzi et al., “Changing Lenses”). The shift operates across habitat, knowledge, and institutions, for bryophytes sustain ecological conditions; their inclusion changes what an assessment can see; and the resulting knowledge enters education, ecotourism, and biocultural conservation. Accordingly, the discussion proceeds in three movements: it first reconstructs the perceptual hierarchy that keeps moss at the margins, then tests a different account of agency against bryophyte biology and damaged environments, while Cape Horn supplies the practical case, after which the conclusion gathers these strands into an ethics of habitability.

Human Supremacy as a Perceptual Regime

I use “human supremacy” to describe more than a stated belief in human superiority, for it is also a regime of attention that, before any explicit ethical judgement is made, helps determine what can appear valuable. Crist describes it as a lived worldview in which Earth belongs to humans, other beings exist for human ends, and human superiority seems self-evident (Crist); such a worldview legitimates extraction, expansion, confinement, and ecological simplification, but at the same time it trains perception, allowing some beings to appear as lives while others recede into scenery, substrate, resource, or background. Conservation priorities are not exempt from this perceptual order: scientific, institutional, cultural, and affective filters shape them, and large, mobile, expressive, rare, useful, or symbolically powerful species are consequently more likely to become objects of concern, while organisms and relations that sustain life without attracting attention are easier to neglect. Moss belongs to the second group: it is rarely hated, but it is routinely passed over, and this quiet neglect shows how closely conservation value can remain tied to spectacle and recognisability.

The hierarchy has a long philosophical history: Western traditions repeatedly placed humans near the summit of life and assigned plants, soils, stones, and waters to passivity; the Great Chain of Being arranged living beings vertically, while Cartesian dualism later intensified the separation of thinking subject from extended matter. Merchant shows how early modern mechanism redescribed nature as passive and manipulable (Merchant), whereas Rachels argues that Darwinian continuity undermines fixed species hierarchies, although cultural exceptionalism can survive the scientific critique of human uniqueness (Rachels); these accounts differ in object and historical scale, but together they show how concepts of agency and value sustain ecological hierarchy. Nor has the category of the human ever been innocent or internally inclusive: Ferrando argues that humanism repeatedly defined full humanity by marginalising women, colonised peoples, racialised communities, disabled persons, and others (Ferrando). A critique of human supremacy must therefore avoid an undifferentiated “we,” for responsibility for ecological crisis is distributed unevenly across colonial, capitalist, racial, and economic histories; Moore’s account of capitalism as world-ecology is useful here because it traces how accumulation converts living relations into cheap resources, externalities, and opportunities for profit (Moore).

Yet capitalism and anthropocentrism do not by themselves explain why particular forms of life become perceptually negligible, for the IPBES Global Assessment and the World Scientists’ Warning to Humanity document accelerating biodiversity loss and intensifying pressure on ecosystems (Intergovernmental Science-Policy Platform; Ripple et al.), and although Dasgupta rightly insists that economies exist within nature rather than outside it, the language of natural capital remains limited whenever living relations are translated into economic value (Dasgupta). The ecological crisis is hence also a crisis of perception: it concerns both

what humans do to the living world and the learned habits by which parts of that world become disposable or vanish from view.

Posthumanist thought contests the autonomous human subject imagined to stand outside the world it acts upon: Marchesini understands human existence as constitutively hybrid and relational (Marchesini), while Morton similarly rejects the fantasy of a position outside “Nature” and emphasises implication in a dense mesh of coexistence (Morton). These frameworks open the argument, but moss makes its demand more exact, asking whether ecological ethics can value beings and processes that do not present themselves as speakers, companions, recognisable partners, or agents; at this point, multispecies justice becomes necessary. Celermajer and collaborators argue that justice cannot be confined to relations among humans because multispecies dependencies produce the worlds humans share (Celermajer et al.), and moss takes that argument towards one of its difficult limits: it is neither charismatic nor vocal, nor is it companionable or readily mourned, but it nevertheless participates in the conditions that enable many beings to live. It does not solicit concern through resemblance, and an account of multispecies justice unable to include moss would therefore remain too dependent on recognisability.

Moss is therefore a test case rather than a sentimental counter-image to human violence: human supremacy trains attention to follow power, size, utility, and expressive agency, whereas moss redirects it towards support, mediation, dependency, and the material conditions of persistence. Asking whether moss resembles a human, an animal, or an intentional subject will not disclose its value; the relevant question is what its way of living makes possible.

Critical Plant Studies and the Limits of Recognisable Agency

Critical plant studies has challenged the treatment of plants as passive scenery, resource, or metaphor, and I take Marder's *Plant-Thinking* as a foundational intervention because it treats vegetal life as a position from which thought itself can be reoriented: plants trouble metaphysical models centred on bounded individuality, interior consciousness, and sovereign action, for their lives unfold across roots, leaves, surfaces, atmospheres, seasons, and relations (Marder). Coccia presses the challenge at the level of ontology, for in *The Life of Plants* he describes how plants transform light, air, water, and matter and thereby help produce the breathable medium they inhabit (Coccia). His metaphysics of mixture rejects a familiar sequence in which discrete beings first exist and only later enter relations; life takes form through exchange from the beginning.

Moss brings this account to ground level: Coccia emphasises atmosphere, breath, leaves, and planetary mixture, while moss draws the eye to the thin zones where surface, substrate, moisture, and minute organisms meet. It lives through contact, absorbing across its surfaces, depending on films of water, and modifying its immediate surroundings, and this mode of mixture is low, lateral, absorptive, and infrastructural; moss therefore allows critical plant studies to think vegetal agency through surface and dependency rather than through height, flowering, rootedness, productivity, or expressive vitality. Broader theories of relationality mark the scope of the claim but do not replace its biological detail: assemblage theory attends to capacities acquired through heterogeneous composition (DeLanda); Barad locates the emergence of determinate entities within intra-action (Barad); and Morton's mesh refuses any external position from which coexistence might be surveyed (Morton). Yet *moosy entanglement* remains close to a particular organism and the conditions it modifies, for moisture retention, substrate change, microhabitat formation, and ecological support give relational ontology a material scale at which a conservation judgement can be made.

Plant intelligence remains relevant to this debate, although the term requires care: Mancuso and Viola challenge the assumption that intelligence needs a brain or nervous system by emphasising plant sensing, memory, communication, and problem solving (Mancuso and Viola; Mancuso), and their work has helped to make plants legible as active beings. But if ethical significance still depends on capacities recognisable as cognition, part of the older criterion of value remains in place, and here moss marks a limit: arguments for plant intelligence and communication disturb the image of vegetal passivity, yet they may preserve hierarchy when plants become ethically interesting only by appearing more cognitive, communicative, or animal-like. Moss redirects the discussion to support, mediation, retention, shelter, and environmental transformation, none of which requires intelligence in a familiar sense in order to be ecologically consequential.

Approaches organised around language and personhood encounter a similar difficulty: Hall's *Plants as Persons* and Gagliano, Ryan, and Vieira's *The Language of Plants* contest the inherited silence of vegetal life (Hall; Gagliano, Ryan, and Vieira), but *mossy entanglement* begins elsewhere, with a material question concerning how small vegetal forms configure the conditions through which shared life persists. Language and personhood retain their philosophical importance, yet the ethical force of agency need not wait until either category has been established. Nealon links vegetal life to biopower, value, and modernity in *Plant Theory* (Nealon), showing that plants are central to histories of food, labour, colonialism, biotechnology, energy, and capital, whereas moss occupies a less obvious place in this political ecology: it is seldom the primary object of cultivation, extraction, trade, or symbolic investment and more often appears as dampness, residue, excess, or unwanted growth. That marginality is politically informative, for it shows how scale, utility, and economic legibility organise ethical and institutional attention.

Myers opens a related question by asking how plants participate in making worlds liveable: her account of the Planthroposcene considers how vegetal life might reconfigure stories of planetary existence (Myers; Reid), and moss gives the proposal a particular, ground-level inflection, as it produces conditions for shared life through small mediations such as retaining water, softening surfaces, sheltering minute organisms, and creating thresholds where other lives can take hold. “Plant blindness” is useful here, though it does not capture the whole problem, for Wandersee and Schussler use the phrase for the tendency to overlook plants or rank them below animals (Wandersee and Schussler), while moss intensifies that tendency because it offers neither flowers and fruits nor height, dramatic seasonal display, or immediate human utility. It is perceived as texture before it is recognised as life, and Kimmerer’s *Gathering Moss* is indispensable for precisely this reason: it shows that moss asks for another practice of attention, one grounded in closeness, slowness, humility, and ecological intimacy (Kimmerer).

The literature thus leaves a problem of threshold: if cognition, personhood, speech, or resemblance decides when vegetal life becomes ethically legible, a familiar hierarchy survives inside the enlarged circle of concern, whereas *mossy entanglement* relocates the threshold in the production and modification of ecological conditions. That proposition, however, can stand only if bryophyte biology supplies its material ground.

Moss Biology and Infrastructural Agency

Mossy entanglement must remain a biological claim before it becomes a philosophical one; otherwise, moss would serve merely as a metaphor for relationality, and the material processes that trouble inherited models of value would disappear. Bryophytes comprise mosses, liverworts, and hornworts, and as non-vascular plants they lack the xylem and phloem

systems by which vascular plants transport water and nutrients internally, but to describe this difference simply as deficiency is to mistake a distinct organisation of life for incompleteness. They are evolutionarily successful organisms whose strategies depend on surface contact and close responsiveness to moisture, substrate, light, and air (Vanderpoorten and Goffinet), and mosses make these strategies particularly visible: they do not rely on deep roots or vascular transport in the manner of many terrestrial plants, for water and nutrients are instead absorbed across their surfaces. The body consequently remains open to surrounding conditions, while moisture is not only a resource but a medium of life, reproduction, and environmental relation. In many mosses, for example, sexual reproduction depends on sperm moving through a film of water, so an aquatic inheritance is carried into terrestrial life, not as an evolutionary remainder but as an ecological strategy (Kimmerer; Vanderpoorten and Goffinet).

Openness does not mean passivity, for mosses persist in forests, bogs, and tundra, as well as on rock faces, tree bark, disturbed soils, urban walls, and exposed substrates. Smallness lets them occupy microhabitats unavailable to larger plants, including cracks, shaded surfaces, thin soils, decaying wood, and boundary zones where moisture, minerals, organic matter, and atmospheric conditions meet, and their success turns on fine differences in humidity, light, shelter, and surface; spatial dominance is unnecessary. The scale is also methodological because it changes the observer: a moss mat calls for a lowered posture, slower looking, and attention to slight transitions, whether dampness on stone, rough bark, the shaded face of a wall, or the narrow difference between exposed dryness and retained moisture. This is not decorative description, for moss becomes ecologically legible only when perception adjusts to the scale at which it lives.

The functions performed at that scale are extensive, although they vary considerably among species, as mosses can absorb rainfall, retain

moisture, slow runoff, and buffer local humidity. By colonising bare surfaces, trapping particles, and accumulating organic matter, they contribute to soil formation and gradually turn exposed substrate into more complex habitat, while their mats may shelter bacteria, fungi, algae, protozoa, tardigrades, mites, springtails, insects, seedlings, and other small organisms. What looks like a surface from one distance may therefore be a multispecies architecture from another. Carbon dynamics provide a further example, especially in peatlands: bryophytes, and *Sphagnum* mosses in particular, contribute to carbon sequestration through photosynthesis and the accumulation of partially decomposed organic matter. Although peatlands occupy a relatively small proportion of Earth's surface, they store large quantities of carbon, and bryophytes are central to many of these systems; recent research confirms their substantial contributions to terrestrial water, carbon, and nitrogen cycles, but also warns that climate change may weaken or alter those contributions (Slate et al.).

The same openness that supports these relations can make mosses sensitive to disturbance, for many species absorb substances directly across their surfaces and therefore respond to changes in air quality, pollution, moisture, acidity, and temperature. This sensitivity makes them useful ecological indicators, but it also prevents any easy celebration of resilience: persistence is not invulnerability, since altered precipitation, pollution, habitat fragmentation, land-use change, and climate disruption threaten the conditions through which mosses sustain themselves and other organisms (Slate et al.; Vanderpoorten and Goffinet). Resilience and vulnerability therefore meet in moss, whose persistence is exposed rather than independent, relying on moisture, surface, light, and shelter while also modifying those conditions. A model of agency restricted to intentional action by a bounded subject sees passivity here, whereas a relational model can register participation, responsiveness, and the capacity to change a shared environment.

I use agency in this deliberately material sense: moss does not deliberate or act as a sovereign individual, yet it alters moisture regimes and substrates, shelters organisms, contributes to carbon storage, and helps generate microhabitats. *Mossy entanglement* names the world-shaping effects of this infrastructural activity without conflating them with animal decision making or human intention. Bar-On, Phillips, and Milo's account of Earth's biomass makes the larger point plain, for the distribution of human attention is a poor measure of biological importance (Bar-On, Phillips, and Milo), and much of what sustains the biosphere remains outside ordinary visibility. Once moss is understood to contribute to carbon storage, soil formation, water regulation, microhabitat construction, and shelter, its marginal position cannot be explained by ecological insignificance; we must instead examine the criteria through which significance becomes recognisable.

Moss, Refugia, and Damaged Worlds

Refugia expose what follows from this account of agency: a refugium is a place where species or communities persist while surrounding conditions become adverse, and climate, shade, moisture, altitude, disturbance history, and local ecological structure may all produce one. Some refugia extend across landscapes, while others are easy to miss; on stone, bark, soil, or decaying wood, a moss mat may hold enough water, buffer enough exposure, or offer enough cover for a small community to survive a difficult interval. Such small refugia complicate the usual conservation image, for large landscapes, emblematic species, and visibly intact habitats remain important, but they do not exhaust the material conditions of persistence. Moss directs attention to infrastructures of survival that may fit within a hand's breadth, such as retained moisture, a shaded crevice, a softened log, or a surface on which

spores, larvae, microbes, and seedlings find temporary shelter; their scale does not diminish them, for persistence is produced within them.

Tsing's *The Mushroom at the End of the World* helps frame the point through its account of life continuing in landscapes marked by disturbance, extraction, and capitalist ruin (Tsing, Mushroom). Matsutake and moss belong to different kingdoms and histories, so the comparison must remain limited, but both draw attention to life in altered places without turning restoration into a fantasy of simple return: moss can make an exposed surface more retentive and sheltering, yet the damage within which it works does not thereby disappear. *Feral Atlas* follows altered ecologies produced by human infrastructures, colonial histories, and industrial systems, attending to more-than-human relations that proliferate after disturbance (Tsing et al.). Moss belongs within this frame only with an important caution, for to present it as proof that life can adapt to anything would make resilience an alibi for further destruction. What moss reveals is more ambivalent: the inventiveness of persistence, but also the violence of conditions under which such inventiveness is increasingly required.

Van Dooren clarifies the stakes by treating extinction as the unravelling of ways of life, dependencies, and shared worlds rather than simply the disappearance of isolated species (van Dooren). Read in this way, the loss of moss is more than the loss of a small plant, for microhabitats, moisture regimes, sheltering surfaces, and relations that sustain other beings may also be diminished; a moss mat is, in this precise sense, a small world of dependencies. In *What Would Animals Say If We Asked the Right Questions?* Despret offers a methodological lesson of a different kind, showing that what other beings become within human knowledge partly depends on the questions addressed to them (Despret). The application to moss is exact, for if the inquiry asks whether moss acts like a human subject, a negative answer closes it almost immediately, but

if it asks how moss participates in refugia, moisture regimes, substrates, and multispecies shelters, another field of agency becomes visible.

A refuge is hence a relational achievement, composed through water, shade, stone, microbes, fungi, invertebrates, plants, and human practices of care or restraint, and moss contributes by holding together minor conditions of continuance; under some circumstances, that work is enough to turn an exposed surface into shared habitat. Yet nothing in this account makes moss a universal healer: its work is slow, partial, and conditional, and it cannot compensate for unrestrained extraction, climate disruption, deforestation, pollution, or hydrological collapse. To cite moss as evidence that life will always recover would repeat the techno-optimistic error Crist criticises, namely the refusal to confront expansion itself (Crist), for moss grants no permission for damage; on the contrary, it directs attention to the fragile processes through which a damaged world may continue to support life.

The ethical claim is consequently specific: conservation must attend to losses at the scale of species and ecosystems, but it must also recognise the minor conditions through which persistence remains possible. Shared worlds are sustained from below, through accumulations of moisture, shelter, contact, and time, and although these processes are not heroic, they are nevertheless indispensable. Thinking with moss means remaining with damaged worlds without surrendering them.

Cape Horn and the Practice of Biocultural Conservation

At Cape Horn, the argument leaves the level of conceptual possibility: bryophytes are central to regional biodiversity, and sustained attention to them has changed what conservation assessment can register, with effects that reach beyond inventories into environmental education, ecotourism, public communication, and the institutional practices

through which the reserve is understood. A taxonomic change in attention has thus had practical consequences. Conservation has long had preferred protagonists, for elephants, pandas, wolves, whales, big cats, and raptors readily become emblems of ecological concern; they are large, mobile, expressive, affectively immediate, and easy to narrate, and their images therefore circulate effectively through campaigns and policy. Their protection remains important, but the pattern discloses a hierarchy of attention: Prokop and collaborators found that charismatic animals received disproportionate visibility in major conservation journals as measured by the altmetric attention score (Prokop et al.). Concern is shaped not only by ecological need, but also by affect, familiarity, body size, recognisability, media circulation, and narrative ease.

Bryophytes approach conservation from almost the opposite position: small, dispersed, quiet, and difficult to monumentalise, they derive their importance less from symbolic immediacy than from ecological support. Thinking conservation from moss therefore does two things at once, enlarging the range of organisms eligible for protection while also calling into question the criteria by which protection is organised. Cape Horn makes the problem concrete because, as Rozzi and collaborators argue, every biodiversity assessment depends on the lenses through which biodiversity is studied. Frameworks that privilege vertebrates, vascular plants, and better-known Northern Hemisphere ecosystems leave other kinds of richness in the background, but their work in the sub-Antarctic Magellanic ecoregion shows that a shift in taxonomic and geographical lens produces a different conservation landscape (Rozzi et al., “Changing Lenses”).

The empirical contrast is striking: the sub-Antarctic Magellanic ecoregion contains more than five per cent of the world’s bryophyte species on less than 0.01 per cent of Earth’s land surface (Rozzi et al., “Changing Lenses”). Along Chile’s southwestern archipelagic margin, the researchers identify high moss and liverwort richness, including

endemic species, and they also find opposing latitudinal patterns, with vascular plant richness peaking farther north while non-vascular richness increases towards the sub-Antarctic south (Rozzi et al., “Changing Lenses”). Familiar indicators, therefore, cannot simply be assumed to represent biodiversity across unlike biomes. For this reason, “changing lenses” is a methodological intervention rather than a decorative metaphor: biodiversity never appears equally from every standpoint, and choices of taxa, scale, region, instrument, and institutional priority shape what becomes knowable. Once those choices changed at Cape Horn, mosses and other bryophytes ceased to be minor additions to a settled inventory; they became central to the account of the region’s ecological importance.

Field practice carries the same argument into the body: in Rozzi’s work, the observer changes posture, scale, and instrument, and what an established framework failed to register becomes visible through this recalibration; the change is not merely subjective, since new attention discloses organisms and relations that biodiversity knowledge must then accommodate. The creation of the Cape Horn Biosphere Reserve in 2005 is significant in this context, for scientific work on the region’s non-vascular flora helped support the reserve’s establishment, demonstrating that an inconspicuous taxonomic group could motivate whole-ecosystem conservation once its ecological and aesthetic value became legible to publics and policy makers (Rozzi et al., “Changing Lenses”; Rozzi et al., “Ecotourism”). Moss did not remain an item in a biological description, but began to reorganise conservation priorities and institutions.

Miniature Forests of Cape Horn, by Goffinet, Rozzi, Lewis, Buck, and Massardo, cultivates this reorientation through the figure of the “miniature forest” (Goffinet et al.). From a standing distance, a bryophyte community may look like a patch, carpet, stain, or texture, but through a hand lens it becomes a dense assemblage of mosses, liverworts, lichens, fungi, invertebrates, water, and substrate. The figure does not magnify

moss rhetorically; it trains the observer to enter the scale at which its importance already exists. “Tourism with a hand lens” turns this change of scale into a repeatable practice: participants slow down, kneel, and attend to small co-inhabitants rather than passing quickly across a spectacular landscape. Rozzi and collaborators organise Field Environmental Philosophy as a four-stage cycle comprising interdisciplinary research; the composition of metaphors and narratives; guided field activities with ecological and ethical orientation; and, finally, conservation actions or areas in which the learning acquires institutional form (Rozzi et al., “Ecotourism”); the hand lens belongs within that sequence, joining scientific observation to aesthetic experience and asking the body to lower itself before organisms that dominant attention passes over.

The practice is neither science communication added after research nor an ethical lesson detached from evidence, for its stages move back and forth among observation, art, the humanities, bodily experience, and conservation action. Rozzi and Tauro describe participants observing and drawing organisms, composing metaphors, and attending to the habitats and habits through which small beings live (Rozzi and Tauro), while Tauro and collaborators similarly present Field Environmental Philosophy as a biocultural methodology for education and ecotourism rather than as a one-way transfer of facts (Tauro et al.). The result is a practical question: are other-than-human beings merely objects of study and use, or co-inhabitants with whom humans share habitat, vulnerability, and responsibility? The 3Hs model makes the ethical architecture explicit by linking co-inhabitants, their habits, and their habitats (Rozzi and Tauro; Tauro et al.); these terms connect ways of living to the particular places that allow them, and in later work Rozzi applies the same biocultural structure to human-river-biosphere co-inhabitation, insisting that biophysical, cultural-linguistic, and institutional dimensions must be considered together (Rozzi, “Biocultural

Ethics"). At Cape Horn, this is why learning facts about mosses, liverworts, and lichens cannot be separated neatly from learning how to perceive them as co-inhabitants.

Descola's critique of the nature-culture divide clarifies what is at stake: biocultural conservation does not place nature in an external domain to be managed by culture, but follows the ecological and cultural relations through which a place is made (Descola). In Cape Horn, bryophytes move through field science, public communication, tourism, education, institutional protection, and ethical reorientation, and although the biological and cultural processes remain different, they are inseparable in practice. A direct policy implication follows, for global conservation indicators lose ecological accuracy when they flatten regional difference, which is why Rozzi and collaborators argue for indicator groups specific to ecoregions or biomes (Rozzi et al., "Changing Lenses"). An assessment centred on vascular plants will distort priorities in high-latitude ecosystems where non-vascular plants carry particular ecological weight, so the choice of indicator is both methodological and political: it helps decide what can become eligible for protection.

Situated assessment is not provincialism, for the global significance of Cape Horn's bryophyte richness becomes evident because the research attends carefully to a regional pattern that familiar proxies had obscured. The case suggests, somewhat paradoxically, that conservation gains global accuracy through attention to place rather than through repeated reliance on a narrow set of supposedly universal indicators. The same case gives multispecies justice a practical dimension: Celermajer and collaborators argue that such justice requires changes in the institutions and practices through which human communities live with other beings (Celermajer et al.), and *Field Environmental Philosophy* answers at the level of learned care. Through the hand lens, mosses and liverworts become perceptible as co-inhabitants rather than background matter.

Perceptual transformation is not a substitute for law, institutional commitment, funding, ecological research, or restraint, yet these structures remain vulnerable when they reproduce a hierarchy that favours the large, useful, and charismatic. Moss-centred conservation shows why ethical concern must be cultivated at the scale of attention if it is to endure at the scale of policy. Here *mossy entanglement* becomes testable: non-vascular plants prove central to regional biodiversity; their inclusion alters assessment and institutional priorities; and they become organisers of biocultural practice and ethical learning. Cape Horn does not merely illustrate the theory after the fact, but shows the relations named by the concept acquiring scientific, pedagogical, and institutional form.

A moss-centred conservation ethic would therefore protect species together with the conditions of their persistence: microhabitats, moisture regimes, substrates, shaded surfaces, decaying wood, peatlands, boundary zones, and the educational practices through which such places become meaningful. Cape Horn demonstrates the institutional consequence a small organism can have when conservation changes its lens.

Conclusion: From Recognition to Habitability

Bringing moss to the foreground does more than recover a neglected group: it changes the terms on which conservation value is distributed, directing attention to forms of life whose ecological importance exceeds their perceptibility and to processes of support, retention, mediation, and shelter that seldom look dramatic. Much of biodiversity endures through work of this kind, and *mossy entanglement* names the agency exercised through it: by retaining moisture, stabilising substrates, forming microhabitats, contributing to carbon storage, and changing the conditions available to other beings, moss acts

infrastructurally within the relations that permit life to continue, while intention, centralised cognition, and expressive movement are consequently poor measures of its activity.

Cape Horn demonstrates the practical force of the conceptual revision: when bryophytes entered the lens of biodiversity assessment, they also entered environmental education, ecotourism, and biocultural conservation, while the hand lens made a change of scale bodily and teachable, so that texture at a distance became a dense field of ecological relations at close range. Knowledge, value, and protection shifted together. Foregrounding moss, however, cannot mean installing a new protagonist at the centre of conservation, for replacing charismatic animals with moss would leave the hierarchy of attention intact. The harder task is to loosen the hierarchy itself: ecological significance and perceptual prominence often diverge, and some of the processes most important to a shared world are precisely those least able to command attention.

The movement I have traced is from recognition to habitability: conservation ethics must still ask which organisms deserve recognition as ethical subjects, but it must also ask what allows a multispecies community to endure. The second question brings substrate, moisture, microclimate, shelter, and ecological process into the ethical field, so concern can extend beyond the individual without making individual lives less important. Moss offers no solution to the ecological crises of the Anthropocene, and its persistence must not be romanticised as proof that damaged systems will recover, for habitability is fragile because the relations that make it can be broken by extraction, pollution, deforestation, and climate disruption. Moss renders this fragility visible at ground level, where continuance may turn on small differences in water, shade, surface, and time.

Mossy entanglement is one name for those relations: it asks conservation to perceive the work that supports life from below, including lives and processes that may never become charismatic, expressive, or easy to narrate, and whether shared worlds remain possible depends in part on whether that work can continue.

Works Cited

- Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Duke University Press, 2007.
- Bar-On, Yinon M., et al. "The Biomass Distribution on Earth." *Proceedings of the National Academy of Sciences*, vol. 115, no. 25, 2018, pp. 6506–11. <https://doi.org/10.1073/pnas.1711842115>.
- Celermajer, Danielle, et al. "Multispecies Justice: Theories, Challenges, and a Research Agenda for Environmental Politics." *Environmental Politics*, vol. 30, nos. 1–2, 2021, pp. 119–40. <https://doi.org/10.1080/09644016.2020.1827608>.
- Coccia, Emanuele. *The Life of Plants: A Metaphysics of Mixture*. Translated by Dylan J. Montanari, Polity Press, 2019.
- Crist, Eileen. "The Affliction of Human Supremacy." *The Ecological Citizen*, vol. 1, no. 1, 2017, pp. 61–64.
- Dasgupta, Partha. *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury, 2021.
- DeLanda, Manuel. *A New Philosophy of Society: Assemblage Theory and Social Complexity*. Continuum, 2006.
- Descola, Philippe. *Beyond Nature and Culture*. Translated by Janet Lloyd, University of Chicago Press, 2013.

Despret, Vinciane. *What Would Animals Say If We Asked the Right Questions?* Translated by Brett Buchanan, University of Minnesota Press, 2016.

Ferrando, Francesca. *Philosophical Posthumanism*. Bloomsbury Academic, 2019.

Gagliano, Monica, et al., editors. *The Language of Plants: Science, Philosophy, Literature*. University of Minnesota Press, 2017.

Goffinet, Bernard, et al. *Miniature Forests of Cape Horn: Ecotourism with a Hand Lens / Los Bosques en Miniatura del Cabo de Hornos: Ecoturismo con Lupa*. University of North Texas Press, 2012.

Hall, Matthew. *Plants as Persons: A Philosophical Botany*. State University of New York Press, 2011.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. *Global Assessment Report on Biodiversity and Ecosystem Services*. Edited by Eduardo S. Brondízio, Josef Settele, Sandra Díaz, and Hien T. Ngo, IPBES Secretariat, 2019.
<https://doi.org/10.5281/zenodo.3831673>.

Kimmerer, Robin Wall. *Gathering Moss: A Natural and Cultural History of Mosses*. Oregon State University Press, 2003.

Mancuso, Stefano. *The Revolutionary Genius of Plants: A New Understanding of Plant Intelligence and Behavior*. Atria Books, 2018.

Mancuso, Stefano, and Alessandra Viola. *Brilliant Green: The Surprising History and Science of Plant Intelligence*. Translated by Joan Benham, Island Press, 2015.

Marchesini, Roberto. *Posthumanist Manifesto: A Pluralistic Approach*. Lexington Books, 2023.

- Marder, Michael. *Plant-Thinking: A Philosophy of Vegetal Life*. Columbia University Press, 2013.
- Merchant, Carolyn. *The Death of Nature: Women, Ecology, and the Scientific Revolution*. HarperOne, 2019.
- Moore, Jason W. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. Verso, 2015.
- Morton, Timothy. *The Ecological Thought*. Harvard University Press, 2010.
- Myers, Natasha. "How to Grow Liveable Worlds: Ten Not-So-Easy Steps for Life in the Planthroposcene." *ABC Religion & Ethics*, 7 Jan. 2021, www.abc.net.au/religion/natasha-myers-how-to-grow-liveable-worlds%3A-ten-not-so-easy-step/11906548. Accessed 8 July 2026.
- Nealon, Jeffrey T. *Plant Theory: Biopower and Vegetable Life*. Stanford University Press, 2016.
- Prokop, Pavol, et al. "Prioritisation of Charismatic Animals in Major Conservation Journals Measured by the Altmetric Attention Score." *Sustainability*, vol. 14, no. 24, 2022, article 17029. <https://doi.org/10.3390/su142417029>.
- Rachels, James. *Created from Animals: The Moral Implications of Darwinism*. Oxford University Press, 1990.
- Reid, Georgina. "Welcome to the Planthroposcene: A Conversation with Natasha Myers." *Wonderground*, 29 Apr. 2022, wonderground.press/culture/welcome-to-the-planthroposcene-natasha-myers/. Accessed 8 July 2026.
- Ripple, William J., et al. "World Scientists' Warning to Humanity: A Second Notice." *BioScience*, vol. 67, no. 12, 2017, pp. 1026–28. <https://doi.org/10.1093/biosci/bix125>.

Rozzi, Ricardo, et al. "Changing Lenses to Assess Biodiversity: Patterns of Species Richness in Sub-Antarctic Plants and Implications for Global Conservation." *Frontiers in Ecology and the Environment*, vol. 6, no. 3, 2008, pp. 131–37. <https://doi.org/10.1890/070020>.

Rozzi, Ricardo. "Biocultural Ethics for Human–River–Biosphere Co-Inhabitation." *Philosophies*, vol. 11, no. 4, 2026, article 123. <https://doi.org/10.3390/philosophies11040123>.

Rozzi, Ricardo, et al. "Ecotourism with a Hand-Lens: A Field Environmental Philosophy Experience from the South of the World." *Philosophy for the Real World: An Introduction to Field Philosophy*, edited by Evelyn Brister and Robert Frodeman, Routledge, 2020, pp. 222–39.

Rozzi, Ricardo, and Alejandra Tauro. "The Multiple Lenses of Ecotourism with a Hand Lens: Fundamental Concepts and Practices." *Field Environmental Philosophy: Education for Biocultural Conservation*, edited by Ricardo Rozzi et al., Springer, 2023, pp. 27–51. https://doi.org/10.1007/978-3-031-23368-5_3.

Slate, Mandy L., et al. "Impact of Changing Climate on Bryophyte Contributions to Terrestrial Water, Carbon, and Nitrogen Cycles." *New Phytologist*, vol. 242, no. 6, 2024, pp. 2411–29. <https://doi.org/10.1111/nph.19772>.

Tauro, Alejandra, et al. "Field Environmental Philosophy: A Biocultural Ethic Approach to Education and Ecotourism for Sustainability." *Sustainability*, vol. 13, no. 8, 2021, article 4526. <https://doi.org/10.3390/su13084526>.

Tsing, Anna Lowenhaupt. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton University Press, 2015.

Tsing, Anna Lowenhaupt, et al., editors. *Feral Atlas: The More-Than-Human Anthropocene*. Stanford University Press, 2020, feralatlas.org/. Accessed 8 July 2026.

Vanderpoorten, Alain, and Bernard Goffinet. *Introduction to Bryophytes*. Cambridge University Press, 2009.

van Dooren, Thom. *Flight Ways: Life and Loss at the Edge of Extinction*. Columbia University Press, 2014.

Wandersee, James H., and Elisabeth Schussler. "Preventing Plant Blindness." *The American Biology Teacher*, vol. 61, no. 2, 1999, pp. 82–86. <https://doi.org/10.2307/4450624>.