4

Conceptualization

Laws for Defining What Matters, Who Matters, and What Unacceptable Harm Means

Links with Other Chapters

- Chapter 1 explains how examples used in this chapter were chosen.
- Chapter 2 synthesizes key challenges related to conceptualization and introduces the CIRCle Framework of regulatory functions to address cumulative environmental problems.
- Chapter 3 sketches the landscape of laws that may respond to cumulative environmental problems, including those that focus on a matter of concern (the conceptualization of which is the core of this chapter).
- Chapter 5 ("Information") discusses rules for collecting and analyzing data and information that link with conceptualization.
- Chapter 6 ("Regulatory intervention") discusses how rules can influence behavior to ensure that cumulative harm to the matter of concern stays within acceptable limits.
- Chapter 7 ("Coordination") covers coordinating between and among agencies and levels of government, nongovernment, and quasi-government entities, including to inform conceptualization.
- Each case study (Chapters 8–10) focuses on specific CIRCle Framework functions. Chapter 8 examines conceptualization in detail using the context of groundwater management and environmental justice in California, and explains how conceptualization links to the CIRCle Framework functions of information, regulatory intervention, and coordination.

4.1 CONCEPTUALIZATION AS A REGULATORY FUNCTION

At the heart of a regulatory regime to address a cumulative environmental problem[1] is the thing that matters, and that is threatened by cumulative impacts, such as water quality, or biodiversity, or a sacred site. This is the "matter of concern," the subject matter for protection or restoration. The first function of rules for addressing a cumulative environmental problem is articulating in law what matters, or providing a process for doing so. I use the term "matter of concern" for brevity and because it is intentionally neutral: This book does not suggest that environment-related laws should adopt any particular matter of concern. Indeed, matters of concern may vary widely, corresponding to the wide range of laws that are capable of regulating cumulative impacts – from environmental impact assessment ("EIA") law, to natural resources laws dealing with fisheries, water allocation, and forestry, to land use planning and endangered species and beyond.[2] A matter of concern may be a part of the nonhuman environment described without an express link to humans (e.g., water quality, a national park, or a species); or a part of the nonhuman environment expressed in a way that directly links either with humans in general (e.g., ecosystem services, or cultural landscapes) or with a specific human community that is affected by changes in the environment (e.g., children, Indigenous Peoples, or disadvantaged communities).

The main argument of this chapter is that while matters of concern vary, legal mechanisms can better address cumulative harm to them if they conceptualize the matter of concern in a way that addresses challenges inherent in cumulative environmental problems,[3] using rules that have specific features. This involves more than simply stating a goal or writing a definition into a rule – it is a challenging, multidimensional task that engages with questions of values – hence "conceptualization." As discussed earlier in this book, the multiple dimensions that need to be clarified to respond to cumulative harm, the subjective, value-rich nature of decisions about these dimensions, and the demonstrable risks of incoherent decisions about these matters are all notable challenges. They point to the need for rules to provide structure, transparency, and some degree of stability for conceptualization.

Conceptualization is part of a broader framework of interlinking functions that form the "CIRCle Framework" – conceptualization, information,

[1] For the full definition of cumulative environmental problems used in this book, see Section 1.1.

[2] See Chapter 3 (Landscape for Analysis).

[3] See Section 2.2.1.

regulatory intervention, coordination – for formal rules, broadly defined,[4] to respond to cumulative environmental problems. Formal rules are the focus of the CIRCle Framework and of this book, while also acknowledging that informal practices and nonlegal factors (e.g., courage of leaders) have an important role to play that rules cannot replace.

A foundational premise of this chapter is that it is important for rules to distinguish deciding the thing that matters and thresholds at which its conditions would become unacceptable (conceptualization), from understanding the current conditions of the matter of concern and what threatens it (which relates to information), from deciding what do about those threats (a decision about intervention), from coordinating among government and nongovernment entities to do these things. These are interlinked and potentially contested – but, importantly, separate – functions in the CIRCle Framework.

Conceptualization has links to well-established constructs and principles. Emphasizing conceptualization aligns with the scientific focus on clearly defined "valued environmental components" in cumulative impact analysis[5] – though the intention here is to address broader legal contexts beyond EIA.[6] By contrast, "problem framing" in the policy analysis literature refers to unpacking what actors do to persuade decision-makers and others about a problem and its importance, drawing simultaneously on values, narratives about cause and effect, the difference between observed and desired conditions, and preferred solutions.[7] However, the purpose of the CIRCle Framework differs from the goals of scientific cumulative impact analysis and policy analysis: Here, the goal is to design rules to guide decision-making. The function of conceptualization, then, takes that part of "problem framing" that defines what is important to protect or restore, and what protection or restoration means. Conceptualization relates more closely to policy aims, objectives, and targets in policy design,[8] but is here elaborated in a way that is specific to cumulative environmental problems and formal rules.

After setting out the place of conceptualization in the CIRCle Framework, Section 4.2 explores how variation in the matter of concern can affect how

[4] See Section 1.3 for a discussion of the scope of rules adopted in this book.

[5] Peter N. Duinker and others, "Scientific Dimensions of Cumulative Effects Assessment: Toward Improvements in Guidance for Practice" (2013) 21 *Environmental Reviews* 40–52, 43; see also Sections 1.2.4 and 2.2.1.

[6] For an overview of the landscape of laws that can be useful in dealing with a cumulative environmental problem, see Chapter 3.

[7] Brian W. Head, *Wicked Problems in Public Policy: Understanding and Responding to Complex Challenges* (Palgrave Macmillan 2022) 8–12.

[8] Michael Howlett, *Designing Public Policies: Principles and Instruments* (2nd edn, Routledge 2019) 44–45.

difficult it is to clearly conceptualize it. This alerts rule designers to issues that deserve special attention in their context. Using the findings of Chapter 2 as a foundation,[9] and drawing on illustrative legal examples from around the world, Section 4.3 advances four categories of design features that help conceptualize a matter of concern fully, clearly, and transparently, by specifying, or providing a process for specifying its key dimensions: key environmental and human elements of the matter of concern ("what matters" and "who matters"); the spatial boundaries of the matter of concern; the limit of conditions to it that are acceptable, and their relationship to time, or the conditions that are sought, in the case of something that needs restoring; and adapting each of these things when required. Chapter 8 then provides deeper insights about conceptualization in a case study of concerns about groundwater and environmental justice in California's Central Valley.

4.1.1 *What Is Conceptualization?*

As used in this book, conceptualization refers to how legal mechanisms define what and who matter for protection from cumulative threats, noting that processes for resolving conflicts about conceptualization among governments and with stakeholders are discussed separately, through the function of coordination.[10] Mechanically, legal mechanisms may undertake conceptualization through statutes or regulations or indirectly through policies or processes for which they provide. This should be distinguished from deciding what matters on a case-by-case basis, as developments arise that might affect something that matters. That approach does not provide for stability or certainty, and invites shifting baselines.[11]

As suggested by the cross-disciplinary insights in Chapter 2, legal mechanisms can support conceptualizing a matter of concern by providing clarity and transparency about its important dimensions: its environmental and, if relevant, social dimensions ("what" and "who" matters); its spatial boundaries; important thresholds that describe the limits of acceptable conditions, which may have a temporal element; and providing for adapting these things (Figure 4.1). Section 4.3 takes up these dimensions as design features for conceptualization, providing illustrative examples of legal approaches to specifying them.

A conceptualization that is clear in these ways reduces ambiguity and uncertainty about what matters. Without clarity about elements that matter

[9] See Section 2.2.1.
[10] See Chapter 7 on Coordination.
[11] See Section 2.2.2.1.

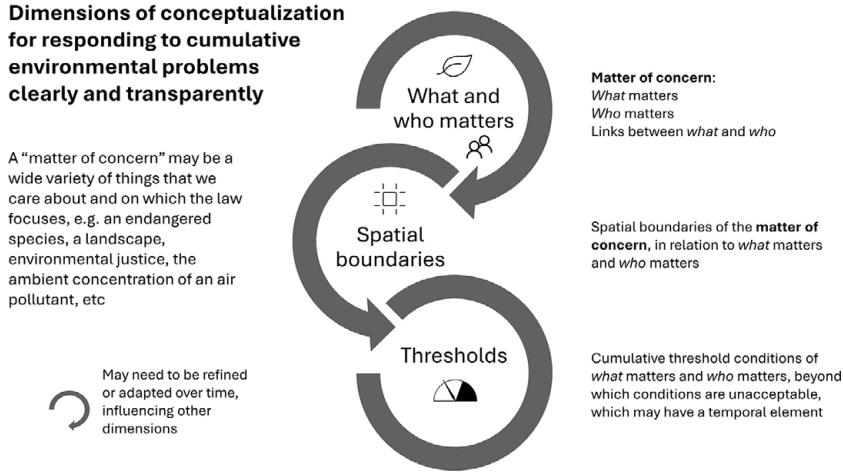


FIGURE 4.1 Clearly and transparently conceptualizing a matter of concern to facilitate responding to cumulative environmental harm requires identifying its key elements and the spatial boundaries and cumulative threshold conditions that correspond to those elements in a way that facilitates adaptation over time

and thresholds, it is difficult to know what to monitor to understand the extent of cumulative change and when to intervene to control cumulative change. Clarity about a matter of concern allows policymakers, public servants, and others to consider the ways in which different rules might be unaligned and make it difficult for the law to achieve its objects. For example, interventions might be directed at subtly different things. The California groundwater case study in Chapter 8 illustrates this, showing how different laws aimed at protecting groundwater actually take different views of what and who matter.

While the need for clarity may seem self-evident, in practice, a failure to clearly identify important dimensions of a matter of concern "sometimes obscures policy debate and the capacity for evaluation [and] contributes to poor practice … at both the level of particular impacts and across landscapes or jurisdictions."[12] Consider the ambiguity and contestation surrounding well-established (and still ambiguous) terms such as "resilience" or conceptualizations of elements of the environment as legal persons, which has garnered popular support but may lack clarity in relation to rights and duties and spatial delimitation.[13] Regulatory clarity

[12] Martine Maron and others, "The Many Meanings of No Net Loss in Environmental Policy" (2018) 1 *Nature Sustainability* 19–27, 19.

[13] Ruth Barcan, "The Campaign for Legal Personhood for the Great Barrier Reef: Finding Political and Pedagogical Value in a Spectacular Failure of Care" (2020) 3 *Environment and Planning E: Nature and Space* 810–832, 822–824; Erin O'Donnell, "Rivers as Living Beings: Rights in Law, but No Rights to Water?" (2020) 29 *Griffith Law Review* 643–668, 655–656.

about what matters and important thresholds also helps head off key difficulties in dealing with cumulative environmental problems, such as baseline shift and policy drift.[14]

Transparency requires articulating the values underlying why something matters. This can influence the dimensions of conceptualization (such as thresholds or spatial boundaries) and other CIRCle Framework functions, like publicly justifying plans for a future intervention even if it is not immediately possible; or clarifying whether a specific type of intervention is appropriate. For example, if an area of natural heritage is protected because it is unique, this would probably rule out a regulatory strategy that allows offsetting harm to the unique thing by creating a benefit somewhere else.[15] Transparency also helps identify parties relevant to coordination (e.g., involving a bird protection association where an area is conserved as habitat for birds). Formal rules can be useful for transparency because they are often accompanied by publicly available elaborations of what is intended by a rule, for example, through committee debates, explanatory memoranda, and management plans or policies.

As noted in Chapter 2, having rules that clearly and transparently conceptualize a matter of concern does not imply that this conceptualization should be set in stone. It may need to change with time, for example, with significant changes in social values. Contemporary environmental law seeks to protect many things that were not protected even fifty years ago.[16] Environmental stressors like climate change may require triage or "directed adaptation."[17] Therefore, legal mechanisms to support conceptualization should also include processes for transparently modifying how a matter of concern is conceptualized.

4.1.2 *Conceptualization as an Integrated Regulatory Function in the CIRCle Framework*

Conceptualization of the matter of concern is the basis for functions related to information, regulatory intervention, and coordination. This section explains how these functions work together to contain cumulative change to the matter of concern within acceptable limits (Figure 4.2, buliding on Figure 2.1, which depicts basic links between regulatory functions).

[14] See Section 2.2.1.

[15] See Section 6.2 for a discussion of offsetting as a regulatory strategy for intervention.

[16] Benjamin J. Richardson, *Time and Environmental Law: Telling Nature's Time* (CUP 2017) 98–107.

[17] Gregor W. Schuurman and others, "Navigating Ecological Transformation: Resist-Accept-Direct as a Path to a New Resource Management Paradigm" (2022) 72 *BioScience* 16–29, 20–22.

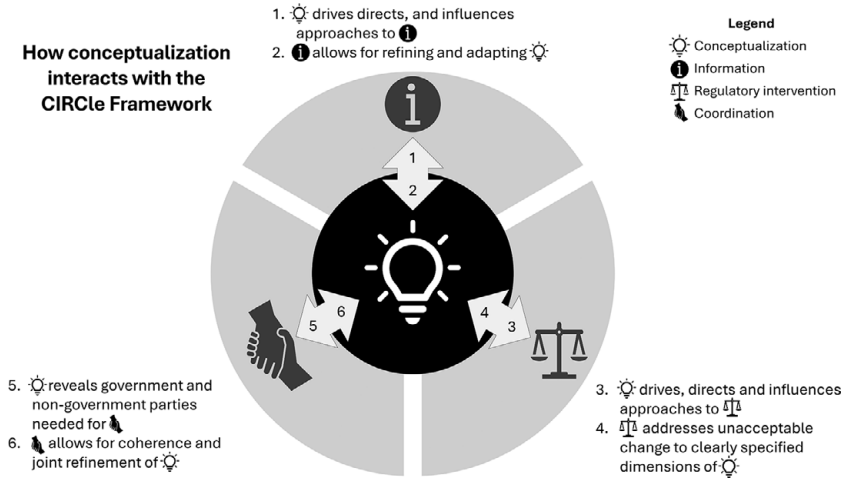


FIGURE 4.2 Integration of legal mechanisms for conceptualization with other CIRCle Framework functions, each necessary for regulating cumulative environmental problems

Clearly and transparently conceptualizing a matter of concern drives efforts to collect information about its conditions and to prevent unacceptable change to it by intervening. The way a matter of concern is conceptualized will indirectly influence and may even rule out some approaches to gathering information and intervening. A "reductionist" natural capital accounting approach to information or intervention, for example, would seem poorly aligned with a conceptualization that rests on holistic concepts of ecological integrity.[18] What is perceived as a threat – and therefore a candidate for intervention – will vary based on how the matter of concern is conceptualized.[19] If pesticide concentrations in irrigation water is a matter of concern but nitrates are not, regulatory intervention would consider farmers that use excess pesticides but not those who produce excess nitrates.

Clear conceptualizations also facilitate identifying regulatory actors with responsibility for the matter of concern for the purpose of coordinating approaches. This includes, for example, actors whose responsibilities are determined by the spatial boundaries of a matter of concern (e.g., within the

[18] See Section 4.1.1.

[19] Guido Plassmann, "Nature Protection in the Alps – Which Motivation?" in Guido Plassmann and others (eds), *Alpine Nature 2030: Creating [Ecological] Connectivity for Generations to Come* (Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Germany) 2016) 17–24 ("the definition of threats may vary according to which concept of natural environment we are employing"), 21.

territory of a province or city) or its legal designation (e.g., the listing of a species as endangered).[20]

A key variable for conceptualization is the degree to which it includes people.[21] This has flow-on effects for approaches to coordination. In settler jurisdictions, for example, some matters of concern will inherently require the central involvement of Indigenous Peoples – not just as an exercise in respecting and including Indigenous knowledges as information (though that is also important)[22] but to help legal articulations of what matters reflect Indigenous views in a way that is inseparable from the involvement of Indigenous Peoples and their local contexts.[23] An environmental justice lens that highlights cumulative impacts on disadvantaged communities also points to involving those communities in responding to impacts as a matter of procedural justice.[24] The implication of this relationship between conceptualization and coordination is not merely expanding the circle of nongovernment actors involved in conceptualization: Enabling their meaningful involvement may require dedicated resources.[25] Clearly conceptualizing a matter of concern is also necessary (but not sufficient[26]) to address risks of different regulatory actors adopting different and incoherent conceptualizations of what and who matter. Coordination makes it possible to act, taking a coherent, or at least not mutually undermining, view of what matters.

Conversely, other regulatory functions in the CIRCle Framework influence how a matter of concern is conceptualized. Legal mechanisms for information may lead to adapting a conceptualization by producing information about the current conditions of the matter of concern or current or likely impacts to it. For example, better understanding how a species or ecosystem responds to stressors – say, a coral species being more sensitive to high marine temperatures than previously known – may lead to a desire to protect or promote different, more heat-tolerant coral species.[27] Understanding that water wells used by a

[20] See also Coordination, Section 7.2.2.
[21] See Section 4.2.2.
[22] See Chapter 5 (Information), Table 5.2 and accompanying text.
[23] Mihnea Tănăsescu and others, "Rights of Nature and Rivers in Ecuador's Constitutional Court" (2024) *The International Journal of Human Rights* 1–23, 15 (in relation to "variegated Indigenous traditions" in the context of contextualizing rights of nature in Ecuador).
[24] Gordon Walker, *Environmental Justice: Concepts, Evidence and Politics* (Routledge 2012) 47–50 (discussing impacts in general).
[25] E.g. Section 8.4.2.2.
[26] See Chapter 7 on Coordination for processes for resolving conflict among governments and stakeholders in relation to the other CIRCle Framework functions: conceptualization, information and regulatory intervention.
[27] See Section 9.5.3 (Reef Restoration and Adaptation Program).

groundwater-reliant disadvantaged community are going dry because others are overpumping the aquifer may prompt incorporating groundwater sustainability issues into conceptualizations of environmental justice, or vice versa.[28] Equally, by facilitating new interactions between agencies, levels of government, or nongovernment actors, legal mechanisms for coordination may lead to refining how a matter of concern is conceptualized.

4.2 DIFFERENT APPROACHES TO WHAT AND WHO MATTER

A matter of concern can take many forms. This is unsurprising: Different nations, cultures, and communities value different things. Even taking a single thing that we care about, there are multiple ways to conceptualize it as a matter of concern, each of which expresses different values and none of which is universally or objectively "correct." "Clean water," for example, might be expressed as a river that is swimmable, a municipal water supply that meets detailed drinking water standards, or lake water that is so clear that it attracts tourists for its aesthetic value. Some matters of concern have characteristics that make it more challenging (but no less important) to articulate the dimensions of a conceptualization that help deal with cumulative impacts (Figure 4.1). Other matters of concern inherently adopt a cumulative impacts mindset.

This part explores two ways in which a matter of concern can vary and present challenges: the degree to which the matter of concern is reductionist or multidimensional and the degree to which it includes human communities (summarized in quadrants in Table 4.1). Multidimensional and human-linked matters of concern are entirely legitimate but can pose special challenges because they are prone to ambiguity and specifying thresholds may be difficult – issues to which regulatory designers ought to be especially attuned. Ultimately, no quadrant is universally "right." Rather, it is clarity and transparency that are important so that rules can protect what matters. Exploring the diversity of matters of concern also supports the earlier argument that a wider range of laws is relevant for controlling cumulative effects than is typically conceived to be so.[29]

4.2.1 *From Reductionist to Multidimensional Matters of Concern*

Environment-related laws traditionally break up pieces of the nonhuman environment into smaller parts, say, individual species or pollutants – an approach termed atomism or reductionism.[30] Some contemporary

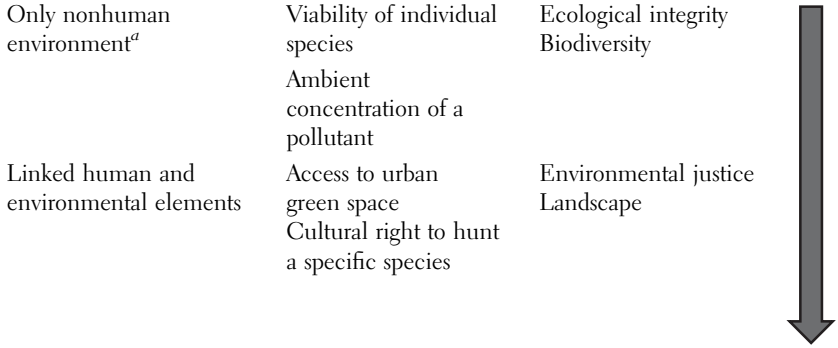
[28] See generally Chapter 8.

[29] See generally Chapter 3 (Landscape for Analysis).

[30] Klaus Bosselmann, "Losing the Forest for the Trees: Environmental Reductionism in the Law" (2010) 2 *Sustainability* 2424–2448, 2430, 2432.

TABLE 4.1 *Varying matters of concern and implications for the challenges of conceptualization: illustrative examples*

Elements of concern	Reductionist	Multidimensional
Only nonhuman environment[a]	Viability of individual species Ambient concentration of a pollutant	Ecological integrity Biodiversity
Linked human and environmental elements	Access to urban green space Cultural right to hunt a specific species	Environmental justice Landscape



[a] Note that a focus on the nonhuman environment may be motivated by human needs, e.g., sensitivity to air pollutants.

environmental legal scholars criticize a reductionist approach to environmental protection or praise a more holistic or integrated view of what we ought to care about through law. They point to broader matters of concern like the connectedness between people and places, or planetary boundaries, as better reflecting ecological reality or spotlighting unaddressed harms.[31]

The distinction between reductionist and multidimensional matters of concern highlights risks that make clarity especially critical for regulatory designers. Multidimensional matters of concern may increase ambiguity and therefore the potential for interpreting the matter of concern in different ways, as well as increasing the difficulty of specifying an acceptable threshold of change. This, in turn, risks producing information-gathering measures, interventions, and coordination that undermine or do not support each other. The meaning of fine particulate (PM2.5) air pollution (which causes illness with both short- and long-term exposure)[32] is clear. By contrast, a law may seek to protect "air quality," without more detail and without a process for elaborating which components matter. This gives decision-makers significant discretion to

[31] E.g. Christine Parker and Fiona Haines, "An Ecological Approach to Regulatory Studies?" (2018) 45 *Journal of Law and Society* 136–155; Elizabeth Macpherson and others, "Designing Law and Policy for the Health and Resilience of Marine and Coastal Ecosystems – Lessons from (and for) Aotearoa New Zealand" (2023) 54 *Ocean Development and International Law* 200–252.

[32] Ioannis Manisalidis and others, "Environmental and Health Impacts of Air Pollution: A Review" (2020) 8:14 *Frontiers in Public Health* 1–13, 5–6.

decide precisely what matters in a way that may depart from what was intended, privilege "loud voices," or lead to different interpretations in different places or through time, failing to guard against inadvertent cumulative harm.

Lack of clarity is a pronounced problem for cumulative impact analysis under project-level EIA laws. These laws tend to be vague about what matters (e.g., "resources, ecosystems and human communities" in the United States[33]). This, in turn, means that different analysts may interpret what matters differently, either inadvertently or strategically, making it difficult to gain a clear view of cumulative impacts on something affected by multiple projects.[34] To reduce the potential for ambiguity and incoherence in regulating cumulative harms, broadly specified matters of concern benefit from more detailed definitions, policies, and regulatory processes for understanding what and who matters in a local context.[35]

Whether a matter of concern has a reductionist or multidimensional nature also has important implications for other regulatory functions in the CIRCle Framework. A reductionist matter of concern produces a narrower scope of activities that can be understood as contributing to cumulative environmental harm. If the ambient concentration of PM2.5 is the matter of concern, only activities that increase PM2.5 – such as power plants, vehicles, and wood stoves – are potential contributors to cumulative harm. If "air quality" is what matters, without further detail, then additional activities, say, activities that contribute to ozone, contribute to cumulative harm. This has flow-on effects for collecting information about potentially threatening activities, designing diverse interventions required to deal with more diverse threats, and considering the actors relevant to coordination.

4.2.2 *From Separation to Links between Human and Environmental Elements*

Diverse legal concepts link humans and their environment. Traditionally, Western law conceives of humans as separate from the other-than-human environment (for brevity, "environment").[36] Western law has tended to link the two through constructs like property and narrowly specified rights, like

[33] Council on Environmental Quality (U.S.), *Considering Cumulative Effects under the National Environmental Policy Act* (1997) 23.

[34] See Section 2.2.1.2, Note 20.

[35] This is discussed as a design feature later, and further in the context of groundwater in California (Chapter 8).

[36] Bosselmann, "Losing the Forest for the Trees: Environmental Reductionism," 2430–2431.

water rights or a right to access a beach. Conversely, some Indigenous laws emphasize interconnectedness and "consider[] reductionist worldviews to be fundamentally flawed."[37] There is much in between. Legal concepts of landscape and heritage recognize and value the way humans shape an environment, from outstanding landscapes to those that are ordinary or ecologically degraded.[38] Some recent concepts recognize the value of the environment to humans in a utilitarian way. In this category, we see ecosystem services, environmental accounting, and natural capital conceived at different scales, from individual parcels of land to the whole globe.[39]

Other legal concepts focus on the way that damaging the environment hurts people, or their rights. Environmental justice may be interpreted as ensuring that no subpopulation experiences disproportionate environmental burden.[40] "Solastalgia" captures the emotional pain felt by human individuals experiencing environmental loss.[41] Environmental rights focus on human dependence on the environment. This occurs through some rights of nature approaches[42] and rights to a healthy environment.[43] Similarly, the human-centered principle of intergenerational equity may be interpreted as requiring "assessment of the cumulative impacts of proposed activities on the environment."[44] Impact assessment also increasingly addresses how changes to the

[37] Martuwarra RiverOfLife and others, "Recognizing the Martuwarra's First Law Right to Life as a Living Ancestral Being" (2020) 9 *Transnational Environmental Law* 541–568, 547 (regarding First Nations Peoples in Western Australia). See also Macpherson and others, "Designing Law and Policy for the Health and Resilience of Marine and Coastal Ecosystems," 238 (regarding relatedness of Māori and oceans).

[38] E.g., Council of Europe Landscape Convention, October 20, 2000, Florence, in force March 1, 2004, E.T.S. 176, arts. 1, 2. See Chapter 10 for further discussion of this Convention in the context of Alpine grasslands.

[39] See generally J. B. Ruhl and James Salzman, "A Global Assessment of the Law and Policy of Ecosystem Services" (2020) 39 *University of Queensland Law Journal* 503–523. See also note 49.

[40] See generally Jon A. Mueller and Taylor Lilley, "Forty Years of Environmental Justice: Where Is the Justice?" (2022) 25 *Richmond Public Interest Law Review* 75–125.

[41] See generally Lindsay P. Galway and others, "Mapping the Solastalgia Literature: A Scoping Review Study" (2019) 16 *International Journal of Environmental Research and Public Health* 1–16.

[42] Erin O'Donnell, Cristy Clark and Rachel Killean, "Rights and Relationality: A Review of the Role of Law in the Human/Water Relationship" (2024) 17 *Water Alternatives* 207–238, 219–221. See pp. 221–224 for a discussion of water relationality more generally.

[43] See generally John H. Knox and Ramin Pejan (eds), *The Human Right to a Healthy Environment* (CUP 2018).

[44] *Gray v The Minister for Planning & Ors* [2006] NSWLEC 720, [122] (Pain J), cited by *New Acland Coal Pty Ltd v Ashman & Ors and Chief Executive, Department of Environment and Heritage* [2017] QLC 24, [1309] (Smith J).

nonhuman biophysical environment affect humans through visual, cultural, health, human rights, and socioeconomic impacts.[45]

Like multidimensional matters of concern, human–environment "linked" matters of concern can be ambiguous and increase the potential for different interpretations of what the matter of concern actually is. This risk requires special attention. A central and difficult question is: *Which* humans matter, and form part of the matter of concern? There is often no objective definition of a "community."[46] In the context of environmental justice, for example, foundational questions remain about the identity of the "community of justice": at the extremes, international and intergenerational, or local and intragenerational.[47] Chapter 8 demonstrates how choices about which communities matter can influence acceptable thresholds of harm (conceptualization) and feasible mitigation measures (intervention). Sometimes including human communities even introduces fundamental ambiguity about whether an effect is positive or negative. A cultural practice, say, Alpine grazing, may itself be what matters, or it might adversely affect a nonhuman part of the environment that matters, like forests that would expand in the absence of grazing (as discussed in Chapter 10).

Thresholds can also be more difficult to specify for human–environment linked matters. Take distributional environmental justice: It is difficult to quantify a threshold total environmental burden that is "too much," and legal approaches tend to express the threshold in a relative sense, as a "disproportionate" burden. The difficult question remains, though: disproportionate compared to the burden experienced by whom and where? Some kinds of harm to people involve a degree of subjectivity that also involves ambiguity, such as noise pollution or negative impacts on the aesthetic quality of an environment. The potential for greater ambiguity in human–environment linked matters suggests the need for even more attention to specifying the matter of concern in a detailed way, (or a process for specifying it) to avoid manipulation or inadvertently allowing unacceptable cumulative effects.

A matter of concern that links human and environmental elements has important implications for other regulatory functions in the CIRCle Framework. Effects on coordination have already been mentioned.[48] Human links may influence the type of effects and activities that are considered harmful and are candidates for intervention. On the face of it, recognizing a human dimension to a matter of concern expands the types of

[45] See generally Riki Therivel and Graham Wood (eds), *Methods of Environmental and Social Impact Assessment* (Routledge 2018).

[46] A. R. Siders, "The Administrator's Dilemma: Closing the Gap between Climate Adaptation Justice in Theory and Practice" (2022) 137 *Environmental Science and Policy* 280–289, 284.

[47] Walker, *Environmental Justice*, 42–43.

[48] See Section 4.1.2.

impacts that are cognizable as harm if humans rely on something that most or all nonhuman biota do not (e.g., deep groundwater).

While these concepts highlight some risks for well-chosen regulatory features to mitigate, some matters of concern, advantageously, have an inherently cumulative character. Environmental accounting and natural capital are inherently about aggregation.[49] Distributive environmental justice considers the cumulative burden of a range of different sources of pollution or other environmental harm on communities, often those that also suffer demographic disadvantage or social vulnerability or difference.[50] These burdens may be specified in some detail, as demonstrated by government efforts to quantify and map environmental (in)justice.[51] This inherently cumulative character provides a useful structure for appreciating and keeping track of the slow accumulation of individually minor harms.

4.3 CROSSCUTTING DESIGN FEATURES

Despite the great variation in conceptualizing matters of concern discussed above, Chapter 2 identified common challenges. This section now turns to regulatory design features that cut across different approaches to conceptualization, drawing illustrative regulatory examples from across the world.

4.3.1 *Specifying What and Who Matter*

To regulate cumulative adverse effects, we need to understand what constitutes harm to a matter of concern. This requires clarity about what the matter of concern is, or who they are, or both, including how human and environmental elements are linked.[52] Knowing this, we can determine whether a change from one state to another is harmful,[53] which informs other regulatory functions.

In practice, some rules specify a matter of concern broadly, perhaps for reasons of political compromise or to maximize administrative discretion, and rely on the courts to figure out or constrain what they mean.[54] This is slow,

[49] See Section 2.2.1.1, Note 9.

[50] Walker, *Environmental Justice*, 2–3 (setting out the range of social and environmental dimensions evident in the literature).

[51] See generally Charles Lee, "A Game Changer in the Making: Lessons from States Advancing Environmental Justice through Mapping and Cumulative Impact Strategies" (2020) 50 *Environmental Law Reporter* 10203–10215. See also Section 8.3.2.2.

[52] See Section 4.2.2.

[53] Albert C. Lin, "Unifying Role of Harm in Environmental Law" (2006) (3) *Wisconsin Law Review* 897–986, 980–981.

[54] E.g., Macpherson and others, "Designing Law and Policy for the Health and Resilience of Marine and Coastal Ecosystems," 220.

less democratic than available alternatives, inefficient (as bureaucracies guess at a meaning before a court clarifies things), and uncertain. Incoherence can emerge if different bureaucracies or courts come to different conclusions. It is far preferable for rules to clarify the matter of concern – or provide for a process to do this – so that other regulatory functions can support it. Clear rules do not necessarily need to be specified in highly technical scientific terms (see Table 4.2), they just require an absence of ambiguity from the perspective of those in the local context.

It may not always be possible or desirable for rule makers to specify the matter of concern in precise terms at the time a rule is drafted. Perhaps not enough is known about public values or scientific information, or perhaps specifying what matters requires negotiation between government and non-government entities. In such cases, rules can provide for processes, including coordination,[55] to clarify what and who matters. Table 4.2 sets out illustrative examples of approaches to regulatory design that facilitate clearly specifying the matter of concern even where further work is required.

4.3.2 *Specifying Boundaries of Matters of Concern*

Clearly specifying the spatial boundaries of the matter of concern is an important dimension of conceptualization to address cumulative impacts[56] (time is also important, and is most relevant to thresholds and adaptation[57]). The boundaries of environmental resources often do not match jurisdictional or administrative boundaries,[58] and clarity about the boundaries of the matter of concern indicates which jurisdictions, regulators, and potentially traditional rights holders[59] are relevant in regulating cumulative harm. Comparing the boundaries of the matter of concern and jurisdictional boundaries may also

[55] See generally Chapter 7 (Coordination).

[56] This is well established in the project-level cumulative impact analysis context. See, e.g., F. Chris Jones, "Cumulative Effects Assessment: Theoretical Underpinnings and Big Problems" (2016) 24 *Environmental Reviews* 187–204, 199, 201; see generally Riki Therivel and Bill Ross, "Cumulative Effects Assessment: Does Scale Matter?" (2007) 27 *Environmental Impact Assessment Review* 365–385. Chapter 7 refers to this as a regulatory offsetting strategy for intervention.

[57] See Section 4.3.3.2, and Rebecca Nelson, "Big Time: An Empirical Analysis of Regulating the Cumulative Environmental Effects of Coal Seam Gas Extraction under Australian Federal Environmental Law" (2019) 36 *Environmental and Planning Law Journal* 531–551, 533–536.

[58] See generally Graeme S. Cumming, David H. M. Cumming and Charles L. Redman, "Scale Mismatches in Social-Ecological Systems: Causes, Consequences, and Solutions" (2006) 11:14 *Ecology and Society* 1–20.

[59] E.g., Macpherson and others, "Designing Law and Policy for the Health and Resilience of Marine and Coastal Ecosystems," 233–234.

TABLE 4.2 *Mechanisms for clearly specifying a matter of concern, including in a precautionary way*

Legal mechanism	Illustrative example
Rule directly specifies elements of matter of concern	Islamic religious law provides for *Himas* (protected areas), which are centuries-old, community-managed areas of public resources traditionally designated by an imam for activities such as beekeeping, grass harvesting, or grazing.[a] Himas exist in diverse nations, including Indonesia, Iraq, Lebanon, Saudi Arabia, and Zanzibar, and are reflected in formal state laws to varying degrees.[b] Himas in Lebanon are being reestablished with high social acceptance through municipal laws and ministerial decrees.[c]
Rule specifies broad elements of a matter of concern, to be detailed by a local plan	In the California groundwater case study (Chapter 8), state legislation conceptualizes "what matters" in groundwater sustainability by reference to six specified sustainability indicators, which are elaborated by local plans to suit local contexts.[d]
Rule specifies analytical process to clarify dimensions of the matter of concern	Impact assessment for a designated project in Canada must take into account "changes to the environment or to health, social or economic conditions" that it is likely to cause, including cumulative effects.[e] Formal cumulative assessment policy guides the identification of "valued components," the matters of concern that are the subject of the assessment.[f] Specific guidance applies to assessing cumulative impacts on the rights of Indigenous Peoples, which involves evaluating "whether the present ability of the community to exercise rights has been diminished due to factors such as cumulative adverse effects and historical or current interferences with traditional practices."[g]
Rule specifies matter of concern in a precautionary way, to be confirmed	The water laws of the US state of Nebraska include a focus on groundwater pumping depleting river flows in systems that are hydrologically connected. A state agency may make a preliminary designation that an area is fully appropriated (a precautionary indication that hydrologically connected resources in an area are a matter of concern requiring intervention). This

(*continued*)

TABLE 4.2 (*continued*)

Legal mechanism	Illustrative example
	leads to default rules while investigations are ongoing. A final determination follows. Even where the final determination reverses the preliminary one, special rules are put in place for at least four years as a further precautionary measure.[h]
Rule broadly expresses matter of concern, clarified through court-ordered directives	The Constitutional Court of Ecuador found that a provincial government had breached the Aquepi River's legal right to ecological flows by authorizing an irrigation project, and ordered "directives for conceptualizing and measuring [rights of nature] violations in water-related ecosystems," thereby setting "concrete standards" and "giving specific content" to rights of nature norms.[i]

[a] See generally Hala Kilani, Assaad Serhal and Othman Llewlyn, *Al-Hima: A Way of Life* (IUCN 2007) 1–6.
[b] Rianne C. ten Veen, "Hima as a Protected Area – Opportunities and Challenges in the 21st Century" in Radhika Borde and others (eds), *Religion and Nature Conservation: Global Case Studies* (Routledge 2022) 215–224, 218–220.
[c] Kilani, Serhal and Llewlyn, *Al-Hima*, 9–11.
[d] See Section 8.4.2.4.
[e] Impact Assessment Act 2019 (Canada) art. 22(1)(a).
[f] Government of Canada, "Policy Framework for Assessing Cumulative Effects under the Impact Assessment Act" (*Government of Canada*, 2023) www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/policy-framework-assessing-cumulative-effects-under-impact-assessment-act.html, archived at https://perma.cc/EUU2-44PM. Note that reforms to this guidance were anticipated at the time of writing.
[g] Government of Canada, "Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples" (*Government of Canada*, 2020) www.canada.ca/en/impact-assessment-agency/services/policy-guidance/practitioners-guide-impact-assessment-act/assessment-potential-impacts-rights-indigenous-peoples.html, archived at https://perma.cc/DC9Q-75G8. Note that reforms to this guidance were anticipated at the time of writing.
[h] Nebraska Revised Statutes § 46-714.
[i] Craig M. Kauffman and Pamela L. Martin, "How Ecuador's Courts Are Giving Form and Force to Rights of Nature Norms" (2023) 12 *Transnational Environmental Law* 366–395, 383.

illuminate problematic spatial gaps in regulatory responsibility, where harms can accumulate free of formal rules.

Boundaries are also important because they can influence available approaches to intervention. For example, if the concept of "favorable conservation status" of a species under the EU Habitats Directive refers to species present in a nation, rather than in Europe as a whole (i.e., same species, but

different boundaries for the matter of concern), a nation may not be permitted to undertake positive action elsewhere to excuse harm in its own territory.[60]

Setting boundaries may be controversial and require extensive processes for information gathering, coordination, and trust-building among government and nongovernment bodies.[61] For human-linked matters of concern, it is not immediately clear, for example, which boundaries correspond to concerns about environmental justice and more complex ideas of spatiality may be needed.[62] For some environmental matters of concern, the relevant space is complex, being both lateral and vertical, as for groundwater, airspace, and oceans.

Concerns about the cost and other burdens of delineating legal boundaries arise in diverse contexts, from registers of communal land in the Philippines[63] to groundwater protection zones in France.[64] In such cases, laws may usefully set out a process for delineation, rather than doing it directly. The Great Barrier Reef Marine Park, discussed in the case study in Chapter 9, was formally proclaimed in 1983 under a 1975 law[65] that initially only referred to a roughly described "Great Barrier Reef Region."[66] A statutory body then arranged surveying and studies to establish boundaries. Spatially defined zones under subsequent statutory plans provided for conceptualizing different matters of concern across the Reef.[67] The legislation also intentionally made it more difficult to de-establish marine park areas by requiring each House of

[60] Hendrik Schoukens, "Legal Considerations in Operationalizing Eco-Restoration in the European Union: A Sisyphean Task or Unlocking Existing Potential?" in Afshin Akhtar-Khavari and Benjamin J. Richardson (eds), *Ecological Restoration Law: Concepts and Case Studies* (Routledge 2019) 167–191, 176.

[61] E.g., see Amanda E. Cravens and Nicole M. Ardoin, "Negotiating Credibility and Legitimacy in the Shadow of an Authoritative Data Source" (2016) 21:30 *Ecology and Society* 1–14; Section 8.4.2.1 regarding groundwater basin boundaries.

[62] See generally Gordon Walker, "Beyond Distribution and Proximity: Exploring the Multiple Spatialities of Environmental Justice" (2009) 41 *Antipode* 614–636, 618–622 (in relation to distributional issues).

[63] E.g. John Price, "The Status of Title to Land in Representative Jurisdictions of Asia and the Pacific" in Piyush Tiwari, Grant B. Stillman and Naoyuki Yoshino (eds), *Equitable Land Use for Asian Infrastructure* (Asian Development Bank Institute 2020) 107–128, 113.

[64] Kelly L. Warner and others, "Interactions of Water Quality and Integrated Groundwater Management: Examples from the United States and Europe" in Anthony J. Jakeman and others (eds), *Integrated Groundwater Management: Concepts, Approaches and Challenges* (Springer 2016) 347–376, 358–360.

[65] Great Barrier Reef Marine Park Act 1975, Act No. 85 of 1975 (Australia) ss 30–31; Commonwealth of Australia Gazette S195, August 31, 1983, 1–3.

[66] Great Barrier Reef Marine Park Act 1975, Act No. 85 of 1975 (Australia) s 3(1), Schedule.

[67] See generally Great Barrier Reef Marine Park Zoning Plan 2003 (Australia).

the national Parliament to pass a resolution to do so.[68] This raises the issue of adaptability, which is addressed further later on.[69] Table 4.3 illustrates diverse approaches to specifying spatial boundaries in conceptualizing a matter of concern.

4.3.3 *Specifying Cumulative Threshold Conditions of Matters of Concern*

It is not enough to be clear about what we want to protect from cumulative harm. We also need to know what protection means: the state or conditions of the matter of concern, beyond which additional impacts would be unacceptable, in relation to the elements that matter.[70] I term this set of conditions at the limit of acceptability "cumulative threshold conditions." "Threshold" indicates that one side is acceptable, while the other side is not. This is distinct from an ecological threshold, as discussed later on. Transparency about how thresholds are selected is also important to expose the role of values[71] (and whose values) and to guide any subsequent consideration of adapting a threshold by exposing the rationale for the threshold conditions as originally set.

4.3.3.1 Cumulative Thresholds versus Intervention and Information

The CIRCle Framework helps distinguish between conceptualizing the matter of concern, and intervention, being the decision about what to do to prevent the matter of concern being unacceptably affected. Logically, and tautologically, the *only* way to prevent an unacceptable change to the conditions of something that we care about is to be clear about the limits of conditions that are acceptable (conceptualization). Clarifying limits must come before, and is distinct from, ensuring that we act on an impact that would cause aggregate conditions to become unacceptable (intervention).[72] It is also related to, but distinct from, scientific ecological thresholds that describe the point at which there is a sudden shift in conditions in response to

[68] Great Barrier Reef Marine Park Act 1975, Act No. 85 of 1975 (Australia) s 31(4).
[69] See Section 4.3.4.
[70] See Section 4.3.1.
[71] David P. Lawrence, "Impact Significance Determination – Back to Basics" (2007) 27 *Environmental Impact Assessment Review* 755–769, 762.
[72] Cathryn Clarke Murray and others, "The Insignificance of Thresholds in Environmental Impact Assessment: An Illustrative Case Study in Canada" (2018) 61 *Environmental Management* 1062–1071, 1063 ("a clear delineation between acceptable and unacceptable levels of impact; a decision point at which action must be taken to prevent unacceptable negative outcomes").

TABLE 4.3 *Mechanisms for specifying boundaries of a matter of concern*

Legal mechanism	Illustrative example
Rule that directly specifies precise boundaries	The boundary of the Boundary Waters Canoe Area Wilderness Area appears as a map reference in US legislation, which also (controversially) sets out spatial zones in which activities such as logging, snowmobiling, and mining are restricted.[a] These designations act as a link to related legislation in the state of Minnesota.[b]
Regulatory process used to specify boundaries	In Bangladesh, air pollution rules provide for declaring a "degraded airshed" in areas that exceed threshold values; priority areas for designation have "unique natural, historical and cultural significance."[c] Designation leads to a regulatory action plan.
	Matters of concern under South Korea's carbon neutrality legislation include socially disadvantaged groups. As well as legislating a focus on social groups vulnerable to climate change using a "climate justice"' principle,[d] the law provides for designating "special districts for a just transition," in which specified measures are to be implemented to resolve socioeconomic imbalances that result from a green transition.[e]
Public register that specifies spatial boundaries	Chile's water law, which emphasizes water markets, provides for a register of water rights (Catastro Publico de Aguas). The details recorded for each water right include the right holder, source of water, spatial location of extraction, and relevant water user organization.[f]
Rule-based policy process to identify spatial area relevant for cumulative impacts	Policy on cumulative impact assessment under US environmental impact assessment legislation provides guidance on selecting geographic areas for analysis based on different types of valued resources.[g]

[a] Boundary Waters Canoe Area Wilderness Act, Pub. L. No. 95-495, 92 Stat. 1649 (1978) ss 3, 4, 10.
[b] See generally John Helland, "Chronology of Historical Actions for Boundary Waters Canoe Area Wilderness within Minnesota's Superior National Forest" (*Minnesota House of Representatives Research Department*, 2004) www.house.mn.gov/hrd/pubs/bwcawild.pdf, archived at https://perma.cc/RC53-NGAA.
[c] Mohammad Mostafa Hosain and Mohammad Ershadul Karim, "Bangladesh" (2022) 33 *Yearbook of International Environmental Law* 184–190, 187.
[d] Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis (기후위기 대응을 위한 탄소중립 · 녹색성장 기본법) (Republic of Korea), Act No. 18469, September 24 2021, amended by Act No. 20514, October 22 2024, art. 2(12) (definition of climate justice), 3(4) (principle of climate justice), 4(6) (obligations re climate justice).
[e] Ibid art. 48.
[f] Código de Aguas [Water Code], Decreto con Fuerza de Ley [Decree with the Force of Law] No. 1122, 1981, as amended (Chile) Title VIII art. 119.
[g] Council on Environmental Quality (U.S.), *Considering Cumulative Effects*, 12–16.

impacts (information). A water quality example of cumulative harm illustrates this: A cumulative threshold condition might quantify and transparently justify a desired level of water clarity in a lake threatened by nutrients and sediment in catchment runoff (conceptualization).[73] That is separate from predicting the impacts, such as the contribution of nutrients, climatic conditions, and so on, that would cause loss of water clarity to different degrees (information).

Scholars have long worried about thresholds, especially in impact assessment laws[74] that provide for assessing whether a proposed action would have a "significant impact" and laws that require "no net loss" of biodiversity, without clarifying "no net loss compared to what?"[75] "Significant impact" or "net loss" to a matter of concern triggers intervention, like not approving or requiring changes to a project. Commentators have characterized determinations of significance as value-dependent, imprecise, and context-dependent.[76]

Significance determinations also have another problem: They can conflate the functions of conceptualization and intervention. Conceptualization focuses on what and who matter and defines overall aggregate conditions of the matter of concern that are unacceptable, without being distracted by any particular proposed project. If actual or predicted conditions exceed cumulative threshold conditions – however this occurs, whether by 1 project or 1,000 projects or a cyclone or a heat wave – then, by definition, conditions are unacceptable and intervention is needed. The kind of intervention that should follow, its strictness, the burdens it entails, who must undertake it and when – these are different questions, discussed later in detail.[77] The important thing here is that the rules clearly define what constitutes unacceptable conditions, raising the question of what to do if they are predicted, rather than sweeping unacceptable conditions under the regulatory rug by providing a path for saying that a predicted impact is not "significant." This just invites shifting baselines and masks unacceptable cumulative impacts. Rules should clearly identify what we want to protect, provide for a threshold, and safeguard it from being warped by the influence of considering any particular proposed activity. In the EIA context, this could mean better linking EIA laws with other types of

[73] E.g., as has occurred in relation to Lake Tahoe, California: Rebecca Nelson, "Regulating Nonpoint Source Pollution in the US: A Regulatory Theory Approach to Lessons and Research Paths for Australia" (2010) 35 *University of Western Australia Law Review* 340, 357–359. See also US Environmental Protection Agency, Lake Tahoe Water Quality Improvement Programs (n.d.) www.epa.gov/lake-tahoe/lake-tahoe-water-quality-improvement-programs, last accessed March 18, 2025, archived at https://perma.cc/KG2L-TAR2.

[74] See generally Lawrence, "Impact Significance Determination."

[75] See generally Maron and others, "The Many Meanings of No Net Loss."

[76] Lawrence, "Impact Significance Determination," 759–761.

[77] See Chapter 6.

laws that are better suited to determining thresholds for matters of concern, or processes under EIA laws for triggering or informing strategic assessments to determine thresholds.[78]

Some ways of specifying thresholds exacerbate the risk of shifting baselines and unplanned cumulative harm. It is risky to describe cumulative threshold conditions using current authorizations or levels of development. For example, a law might provide for assessing a project's significance by comparing predicted impacts to pre-project "baseline" conditions.[79] This comparison relates to a trigger for intervention – it does not clearly conceptualize the environmental elements that matter. A baseline of preexisting conditions is irrelevant if that does not reflect what society wants in terms of improving conditions (in the case of a restoration goal), or if the matter of concern could undergo significant cumulative change from baseline conditions and still be acceptable.

In addition, current conditions or current authorizations do not accurately indicate the impacts that current activities will cause to a matter of concern, so taking these approaches to thresholds risks overlooking unacceptable harms. Authorizations may have been granted but not activated fully or at all (e.g., years between infrastructure approvals and construction and impacts commencing). Further time lags can separate activities starting and impacts manifesting (e.g., pumping from groundwater wells reducing groundwater levels at distant locations over decades or longer[80]).

Other laws might set a "regulatory limit" based on an assumed "ecological threshold," which predicts the impacts of disturbance. Such a threshold seeks to identify when an ecosystem, for example, would enter an entirely different state.[81] Again, a regulatory limit speaks to intervention, not necessarily conceptualization that expresses a threshold of acceptable conditions; and ecological thresholds are information, not conceptualization: "no matter how precise and accurate, [ecological thresholds] represent information, not objectives. . . ."[82]

The discussion thus far has generally framed cumulative threshold conditions in the context of linked interventions to limit harm – ensuring that conditions do not fall below an acceptable level – but cumulative threshold

[78] This is one form of "tiering," discussed further in Section 6.5.1.

[79] E.g., Murray and others, "The Insignificance of Thresholds," 1063.

[80] Anthony J. Jakeman and others, "Integrated Groundwater Management: An Overview of Concepts and Challenges" in Anthony J. Jakeman and others (eds), *Integrated Groundwater Management: Concepts, Approaches and Challenges* (Springer 2016) 3–20, 11. For a discussion of the impacts of this for regulating cumulative effects, see generally Nelson, "Big Time."

[81] Chris J. Johnson, "Identifying Ecological Thresholds for Regulating Human Activity: Effective Conservation or Wishful Thinking?" (2013) 168 *Biological Conservation* 57–65, 59–60.

[82] Ibid 62.

conditions are also important in the context of restoration goals. A restoration threshold says that current conditions are not acceptable and need to improve to meet the threshold. This requires interventions both to improve conditions and limit further harm. If current conditions are unacceptable, any further harm requires intervention – indeed, further harm negates others' investments in restoration. Along these lines, Möckel argues that if a conservation objective under the EU Habitats Directive is to restore favorable conservation status, and a proposed development would cause an adverse effect and thus "substantial delays to this process . . . this then has a significant adverse impact on the conservation objective."[83]

Cumulative threshold conditions that express restoration goals would address cumulative impact problems noted around the world. Controls on project-level cumulative impacts on reindeer herded by Indigenous Sámi in northern Sweden are criticized for "never deliver[ing] anything better than what existed before an industrial project was proposed. . . There are no planning processes in place that would allow for proactive improvements in reindeer pastures or other ways to develop reindeer herding according to their own aspirations."[84] A clear restoration threshold would do these things. In Canada, Murray and others point to the "scorched earth" justification of project proponents who argue that a project would have an insignificant impact where pre-project conditions are already below acceptable conditions.[85] By contrast, case law in California has noted that "the greater the existing environmental problems are, the lower the threshold should be for treating a project's contribution to cumulative impacts as significant."[86] A clear, rule-based restoration threshold – the threshold above which conditions will become acceptable – would help avoid this.

4.3.3.2 Specifying Thresholds

Clearer cumulative threshold conditions are not impossible, and in fact appear in legal contexts outside EIA in diverse ways using different terms and underlying ideas (Table 4.4). Some reflect visions of the past,[87] the

[83] Stefan Möckel, "The Assessment of Significant Effects on the Integrity of 'Natura 2000' Sites under Article 6(2) and 6(3) of the Habitats Directive" (2017) 23 *Nature Conservation* 57–85, 63.

[84] Carl Österlin and Kaisa Raitio, "Fragmented Landscapes and Planscapes – The Double Pressure of Increasing Natural Resource Exploitation on Indigenous Sámi Lands in Northern Sweden" (2020) 9 *Resources* 1–27, 21.

[85] Murray and others, "The Insignificance of Thresholds," 1066–1067.

[86] *Communities for a Better Environment v. California Resources Agency*, 103 Cal.App.4th 98 at 120, 126 Cal. Rptr. 2d 441 at 457 (2002) (now disapproved of by later cases for other reasons).

[87] This approach has been criticized, e.g., in the biodiversity context, as discussed later.

TABLE 4.4 *Mechanisms for formulating cumulative threshold conditions for a matter of concern, and the role of time*

Legal mechanism	Illustrative example
Threshold conditions that refer to the past	Wilderness legislation in South Australia expressly seeks to achieve conditions in wilderness areas as they were "before European colonisation" and to protect them "from the effects of modern technology and exotic [species]."[a]
Threshold conditions that refer to the time of designation	Under the EU Habitats Directive, a favorable conservation status for a relevant habitat or species must remain stable, so that it regains its original state after a disturbance, and an unfavorable conservation status must not deteriorate further.[b] Temporally, ecological characteristics must not deteriorate "below their level at the time of designation" of a site.[c]
Threshold conditions that refer to a limited future decline	The Paris Agreement focuses on global average temperature as the matter of concern, and sets its goal by reference to a departure from preindustrial levels: "[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[d]
Threshold conditions that refer to present distributive issues	The 2023 Environmental Justice Rules in New Jersey, US, focus on "overburdened communities" defined by income, minority status, and English proficiency;[e] a frequently updated online tool maps them.[f] Applicants for certain facility types must submit environmental justice impact statements demonstrating the facility will "avoid a disproportionate impact that would occur by creating adverse cumulative stressors in the overburdened community as a result of the facility's contribution."[g]
Atemporal threshold conditions	India's Central Pollution Control Board sets National Ambient Air Quality Standards, quantitative limits on air pollutants to protect public health, vegetation, and property.[h] Bhutan's Constitution requires that a minimum of 60 percent of its total land be maintained under forest cover.[i] Its national Climate Change Policy is to remain carbon neutral, in part by conserving its forests.[j]

(*continued*)

TABLE 4.4 (*continued*)

Legal mechanism	Illustrative example
Regulatory process for setting threshold conditions for elements of matter of concern	California's sustainable groundwater management planning process seeks to achieve "sustainability" within twenty years.[k] Local agencies must plan to avoid "undesirable results," being "significant and unreasonable effects" in six areas (e.g., chronic lowering of groundwater levels, water quality degradation), for which they must quantify goals.[l]

[a] Wilderness Protection Act 1992 (South Australia) ss 7(1)(d), 12(2)(b).
[b] Möckel, "The Assessment of Significant Effects on the Integrity of 'Natura 2000'," 61.
[c] European Commission and Directorate-General for Environment, *Managing Natura 2000 Sites – The Provisions of Article 6 of the "Habitats" Directive 92/43/EEC* (Publications Office 2019) 29.
[d] Paris Agreement under the United Nations Framework Convention on Climate Change, December 12, 2015, in force November 4, 2016, 3156 U.N.T.S. 79, art. 2(1)(a).
[e] New Jersey Administrative Code § 7:1C-1.5 "overburdened community".
[f] New Jersey Department of Environmental Protection, "Environmental Justice Rules Frequently Asked Questions" (2023) 10 https://dep.nj.gov/wp-content/uploads/ej/docs/ej-rule-frequently-asked-questions.pdf, archived at https://perma.cc/S5DJ-223Z; New Jersey Department of Environmental Protection, "Environmental Justice Law" (n.d.) https://dep.nj.gov/ej/law/, last accessed March 18, 2025, archived at https://perma.cc/V3WJ-5YE3.
[g] New Jersey Admin. Code § 7:1C-3.2(a)(9).
[h] Air (Prevention and Control of Pollution) Act 1981, as amended (India) s 16(2)(h); Central Pollution Control Board (India), National Ambient Air Quality Status and Trends 2019 (2020) 3, annex 2.
[i] Constitution of The Kingdom of Bhutan 2008, art. 5(3).
[j] National Environment Commission (Bhutan), *Climate Change Policy of the Kingdom of Bhutan* (2020) 5–6 www.nec.gov.bt/publications/climate-change, archived at https://perma.cc/KZ9K-JEVP.
[k] California Water Code § 10727.2(b)(1).
[l] 23 California Code Regs. §§ 354.22–354.30. See also Chapter 8 case study.

present, or even a future in which there has been some limited degradation. Some seek to preserve a "pristine" set of conditions because those conditions are inherently valued, such as "wilderness" conditions or a "heritage" landscape. At the other end of the spectrum, some laws adopt restoration objectives, which inherently seek to reverse cumulative damage and "challenge the scourge of shifting baselines."[88] Time can also feature in thresholds in a different way, as the achievement of conditions by a particular point in time.[89] An alternative, atemporal approach is to describe threshold conditions by

[88] Benjamin J. Richardson, "Timescales of Ecological Restoration" in Afshin Akhtar-Khavari and Benjamin J. Richardson (eds), *Ecological Restoration Law: Concepts and Case Studies* (Routledge 2019) 50–71, 52, 54.
[89] See Table 4.4, last row related to the sustainability goal of California's groundwater law.

reference to specific utilitarian environmental benefits that the law seeks to secure.

However they are expressed, detailed cumulative threshold conditions make it easier for different decision-makers to approach protection coherently, reducing the potential for inadvertent cumulative impacts. In some cases, quantified thresholds will be appropriate, and can relate to diverse matters of concern, for example, maximum air pollutant concentrations[90] or place-based cultural health indices developed by and for Indigenous Peoples from Aotearoa/New Zealand to the Marshall Islands and Nepal.[91] Quantification can helpfully reduce the discretion that can make decision-makers vulnerable to inappropriate influence from powerful interest groups associated with proposed projects.[92] But for emerging matters of concern and those that are considered indivisible, quantification may not be possible or desirable.[93]

Cumulative environmental problems inherently involve numerous and diverse contributors to harm, and multiple regulatory actors, so setting cumulative threshold conditions benefits from participatory, collective, and collaborative coordination.[94] Who is involved may affect both what and how threshold conditions are specified. Consensus may not always be possible, but, as discussed later in this book, rules for coordination can create conditions for fruitful interchange and dispute resolution in often politicized debates.[95] Under past Canadian EIA legislation, setting thresholds appears rarely to have been collaborative or reflected the values of affected communities,[96] but EIA policy now requires considering Indigenous community–defined thresholds in assessing whether impacts of a designated project are acceptable.[97]

4.3.4 *Adapting Conceptualizations*

Finally, and for completeness, the ways that rules conceptualize what matters for the purpose of regulating cumulative environmental harm may need to

[90] Murray and others, "The Insignificance of Thresholds," 1063.

[91] See generally Te Kīpa Kēpa Brian Morgan and others, "Towards Best-Practice Inclusion of Cultural Indicators in Decision Making by Indigenous Peoples" (2021) 17 *AlterNative: An International Journal of Indigenous Peoples* 202–214, especially table 1.

[92] Eric Biber and Josh Eagle, "When Does Legal Flexibility Work in Environmental Law?" (2016) 42 *Ecology Law Quarterly* 787–840, 790.

[93] Murray and others, "The Insignificance of Thresholds," 1063.

[94] Ibid 1068–1069; Lawrence, "Impact Significance Determination," 762.

[95] See Section 7.3.2 for more detailed discussion of coordination related to conceptualization.

[96] Murray and others, "The Insignificance of Thresholds," 1065, 1068–1069 (based on ten EISs from 2010 to 2014 in British Columbia, Canada).

[97] Government of Canada, "Policy Context: Assessment of Potential Impacts on the Rights of Indigenous Peoples."

change with time, especially in the context of climate change. This need for adaptation is not unique to regulating cumulative environmental problems; extensive scholarship deals with the issue,[98] which is covered only briefly here by reference to issues already raised.

In encouraging adaptive conceptualization, rule designers may consider rules that positively facilitate adaptation by including change processes and ways to frame rules to avoid creating barriers to important change. As with conceptualization generally, the less desirable alternative is to rely on courts to change how rules are interpreted to catch up (slowly) with changing times. At the same time, the cumulative context cautions against making a matter of concern too easy to reconceptualize, lest this invite frequent changes that would only serve to disguise shifting baselines.

All the dimensions of a conceptualization (Figure 4.1) might theoretically need to adapt over time. What matters and who matters might change in response to changed community values, changing populations or environments or simply better information about what already exists. The twentieth century saw water laws of many jurisdictions adapt to recognize water rights for environmental uses, as well as traditional consumptive uses like irrigation.[99] Climate change may make certain environments newly desirable as objects of legal protection as they become more ecologically valuable (e.g., aquatic refugia in environments predicted to become more arid) or more threatened (e.g., grasslands in regions predicted to become more valuable for farming and more subject to agricultural pressure). In relation to boundaries, rule designers should consider avoiding permanent static boundary delineations if a matter of concern might move, whether a species distribution or a natural feature like a river's course.[100] Rule designers should be alert to criticism that cumulative thresholds in biodiversity-related laws, such as species protection and protected area laws, focus excessively on historical preservation and restoration, reducing their power to "counter biodiversity

[98] E.g., Victor B. Flatt, "Adapting Laws for a Changing World: A Systemic Approach to Climate Change Adaptation" (2012) 64 *Florida Law Review* 269–293, 282–286; Craig Anthony Arnold, "Environmental Law, Episode IV: A New Hope: Can Environmental Law Adapt for Resilient Communities and Ecosystems" (2015) 21 *Journal of Environmental and Sustainability Law* 1–46; Robin Kundis Craig, "Stationarity Is Dead-Long Live Transformation: Five Principles for Climate Change Adaptation Law" (2010) 34 *Harvard Environmental Law Review* 9–73.

[99] Rebecca Nelson, "Allocations and Legal Trends in the 21st Century" in Josselin Rouillard and others (eds), *Water Resources Allocation and Agriculture: Transitioning from Open to Regulated Access* (IWA 2022) 25–36, 29–31.

[100] Matteo Nicolini, *Legal Geography: Comparative Law and the Production of Space* (Springer 2022) 69–72.

loss in a changing climate."[101] This may occur, for example, where climate change would make it impossible to return to historical conditions. An alternative approach would be to focus laws on sustaining biodiversity in the context of a changing climate, for example, delineating the boundaries of protected areas to allow species movement through "corridors" of connected areas.[102]

4.4 CONCLUSION

Rules for regulating cumulative harm depend on knowing: harm to what and whom? Rules can help to conceptualize what and who matter ("the matter of concern") for restoration or protection from cumulative harm as the basis for regulatory functions related to information, intervention, and coordination. These other functions, each the subject of a chapter that follows, interlink to the function of conceptualization to help contain cumulative change to the matter of concern to acceptable levels. In particular, since articulating what matters is fundamentally a question of values, it benefits from coordination – interactions among government and nongovernment bodies – that allows values to be contested in resolving a conceptualization.[103]

Matters of concern can vary widely, from a sacred place to the ambient concentration of a micropollutant. This chapter has suggested that rules for conceptualizing what matters should set out, or provide a process for setting out, the key dimensions of what and who matter, their spatial boundaries, and thresholds of acceptable conditions, each in a way that is clear and transparent as to underlying values. Clarity will usually require detail. That said, there is no universally "correct" way to specify elements, boundaries, and thresholds, or rules for doing so. This chapter has presented examples from around the world to illustrate some diverse possibilities. Rule designers should also be alert to the greater potential for ambiguity in matters of concern that are multidimensional and that link people and the environment (e.g., landscape, environmental justice, sustainability), which counsels even more attention to clarity. The case study on California groundwater (Chapter 8) analyzes these issues in more detail in a local context, with a focus on environmental justice as a challenging multidimensional matter of concern.

[101] Alejandro E. Camacho, "De- and Re-Constructing Public Governance for Biodiversity Conservation" (2020) 73 *Vanderbilt Law Review* 1585–1642, 1611.
[102] See generally Graeme L. Worboys, Wendy L. Francis and Michael Lockwood (eds), *Connectivity Conservation Management: A Global Guide* (Taylor & Francis 2010).
[103] See Section 7.3.2.