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Why Environmental Policies Fail

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Prologue

This is a book about environmental policy, and how this policy, in its many forms, has largely failed to prevent a human-caused deterioration of the Earth's natural systems. There are three storylines. First, there is an economic system, embraced by most societies on this planet, that rewards and encourages anthropogenic growth and development. Second, there are the Earth's natural systems, ranging from stock resources like soil and minerals, to renewable resources like water and fisheries and trees, to environmental sinks like the atmosphere and the oceans, to ecosystems. These have been the preconditions to capitalist production. These natural systems have either been "fuels" used and exploited by humans to achieve economic growth, or a seemingly limitless dumping ground for our wastes and by-products of resource development. Third, when human societies began to realize that economic growth had overused or destroyed natural resources, and failed to internalize the environmental social costs of pollution and waste disposal, they turned to legal-governmental institutions. These institutions were tasked with devising environmental policy in order to address the disturbing consequences of our unchecked reliance on earth systems and natural resources for economic success.

The focus of this book is this third storyline – the saga of various proposed and tried environmental policies and their disappointing or failed record. The book reviews the history of these policies and critiques their outcome. It then attempts to explain *why* these good-faith attempts at environmental policy have all failed to do what they were intended to do – mitigate anthropogenic changes to natural systems and restore environmental conditions on this planet to the point where humans can continue to survive and even thrive. The book then proposes a new policy paradigm that might bring about a happy ending to this third storyline. This proposed policy will hopefully have a better chance of success than past and present policies because it seeks to conform to a universal truth that is consistently followed by Nature on Earth, as well as the larger forces of the Universe.

But before we consider the failed policies, we should have as our starting points the first and second storylines, because they caused the initial need for environmental policy. It was an anthropocentric choice to create societies that coveted a particular kind of growth, economic growth, that in turn put growing pressures on the natural world. There have historically been close links between social economic systems and the natural world. However, human activities based on economic drivers have so expanded recently that the planet's natural environment is for the first time being altered not by natural forces, such as glacial epochs or asteroids or volcanoes, but by purely anthropogenic actions.

A. The Economic System

The chief "driver" behind these human activities affecting our environmental surroundings has been a generally shared belief among organized societies and nation-states about the benefits of economic development and capitalistic production and material accumulation of goods and wealth. This resource *use* is elevated over collective stewardship and conservation of natural resources and environmental goods and systems. Faith in economic growth has meant that the natural world around humans – trees, minerals, land, water, air – has been seen as a means of achieving human-centric ends such as population growth and urbanization, higher gross domestic product, increasing personal wealth, more carbon-based energy use, and competitive market advantage.[1] As a result, this natural world has been overused, degraded, polluted, poisoned, and sometimes destroyed, because prior to the advent of environmental policy, Nature had no voice and no legal protection. It was just there to be taken, or to be used as an endless waste dump, usually free of charge.[2] The dominant worldview that emerged from Judeo-Christian and Greek thought characterized Nature as nothing other than an array of seemingly limitless raw commodities, to be exploited, used, and changed to benefit people. Nature became commodified; land and natural resources belonged to humans.

This emphasis on economic, material prosperity, fueled by resource use, overuse, and abuse, has been grounded in several near-irrebutable

[1] Gar Alperovitz, America Beyond Capitalism: Reclaiming Our Wealth, Our Liberty, and Our Democracy (2d ed. 2011); Cormac Cullinan, Wild Law: A Manifesto for Earth Justice (2d ed. 2011); Charles Derber, Greed to Green: Solving Climate Change and Remaking the Economy (2010); William Greider, The Soul of Capitalism: Opening Paths to a Moral Economy (2003).

[2] Elizabeth Kolbert, Field Notes From a Catastrophe: Man, Nature, and Climate Change (2006); David Korten, The Great Turning From Empire to Earth Community (2006).

presumptions. One has been the presumption that the present is more valuable than the future. We can phrase this principle using a scientific example. If we can benefit today by cheaply or freely emitting greenhouse gases that will adversely affect global temperatures fifty years from now, we should not sacrifice now, by reducing reliance on cheap carbon-based fuels, to gain benefits or to avoid costs fifty years from now. Or to put the presumption even more succinctly, we prefer instant, real-time present gratification, even if by doing so we are sacrificing the benefits that could be experienced by others in the (not so) distant future.

Most legal policies, even environmental policies, are skewed toward the present while marginalizing the future. For example, it is quite difficult for anti-pollution rules to reflect in present emission control rules the damage that continual emissions will cause later. It is difficult because policymakers have a hard time determining how much future pollution mitigation is worth to us today.[3] And policymakers have an even more difficult political task in convincing constituents that a (relatively) distant future in which there is less pollution should be preferred over present needs that are satisfied by polluting enterprises.[4] This reality has led environmental policy, affected by economic growth pressures, to discount the value of future benefits while encouraging choices that yield present benefits.

Another presumption justifying a close connection between economic systems and the natural world has been the Myth of Inexhaustible and Unpollutable Resources. For centuries, humans believed that the Earth's natural bounty was so large and plentiful as to be, in effect, infinite. No matter how many trees were cut down, or fish caught, or oil pumped out of the earth, or water diverted, the assumption was that there would always be more of the needed resource available for both present and future use. A parallel belief arose about the three great environmental "sinks" that humans used as waste receptacles: the planet's atmosphere, the world's water sources, particularly the oceans, and the soils and dirt under the earth's surface. Each was so vast that none could ever be permanently impaired by pollution.

A textbook example of the Myth of Inexhaustible Resources is the case of Easter Island. The Easter Island "natives" first arrived on an island that

[3] See, e.g., Laurie T. Johnson & Chris Hope, The Social Cost of Carbon in U.S. Regulatory Impact Analyses: An Introduction and Critique, 2 Journal of Environmental Studies and Sciences 205 (Sept. 2012).

[4] Jacob Hacker and Paul Pierson, American Amnesia (2016); Daniel A. Farber & Paul A. Hemmersbaugh, The Shadow of the Future: Discount Rates, Later Generations, and the Environment, 46 Vanderbilt L. Rev. 267 (1993).

supported a healthy, subtropical forest whose trees were suitable for building homes and seaworthy canoes so that the island inhabitants could live off a steady diet of ocean porpoise. The trees could also be used to make rope latticing so that the great stone Easter Island statues could be moved from the rock quarries to their positions overlooking the ocean. Because of the Myth of Inexhaustible Resources and the revealed time preference where the present benefits of tree harvesting outweighed future benefits of forest conservation, the island's forests were eventually decimated and the last tree was finally cut down. Deforestation caused the quality of life for the Easter Islanders to plummet, and the society there collapsed.[5] The key natural resource on Easter Island was not inexhaustible, and when it was gone, it would never return there. The notion that there was always one more tree to cut down turned out to be a myth.[6]

The parallel Myth of Unpollutable Resources was based on the sheer size and power of the Earth's atmosphere, oceans, waterways, and land. There was just so much there on this planet that it seemed inconceivable that puny humans could ever have much of an effect on them, or their functioning, no matter how many gigatons of waste we put in them. And not only were these sinks unimaginably large; there was "bad science" that for years held that they could not be polluted. For example, it took a long time to refute the hoary canard that "running water purifies itself to drinking water quality" within a stated distance.[7] Indeed, throughout the nineteenth century, air pollution was not feared, but considered a sign of economic progress; smokestacks belching black smoke were sought after for their symbolic value connoting a vibrant, thriving community.[8]

Another presumption was that the Earth's natural resources were there for a reason, which was for humans to exploit, develop, and use them. Moreover, much of American legal activity during the eighteenth and nineteenth centuries sought to further this larger purpose by devising ways to transfer natural resources – agricultural land, water, timber, mineral deposits, and energy resources – from public, state ownership to private control. That transfer was necessary so that these resources could be extracted and used, through an economic system based on private

[5] See Jared Diamond, Collapse: How Societies Choose to Fail or Succeed (2005).

[6] The same Myth of Inexhaustible Resources drove the deforestation of the vast virgin forests of Wisconsin throughout the nineteenth century. J. Willard Hurst, Law and Economic Growth: The Legal History of the Lumber Industry in Wisconsin, 1836–1915 (1964).

[7] U.S. Food and Drug Administration, PMO 2007: Appendix D-Standards for Water Sources at 10 ("the old saying ... is false").

[8] Jan Laitos, Legal Institutions and Pollution: Some Intersections Between Law and History, 15 Natural Resources Journal 423 (1975).

incentives and market transactions. In other words, legal policy assisted in creating the close link between the private economic system and the natural world.[9]

B. The Earth System

When the humans on this planet pursue economic growth requiring natural resource use and development, there will be effects on the Earth's natural systems.[10] There will be, and there has been, intensified use of Earth's resources, higher levels of pollution, loss of ecosystems, natural capital, and biodiversity, and changes to the world's oceans. There has been an anthropogenic alteration of the planet's biosphere, that thin layer on this Earth occupied by living organisms on the surface, atmosphere, and hydrosphere. Our use of natural resources has grown so dramatically that we are endangering the key environmental systems that we rely on. The Earth possesses the only known biosphere in the universe, and its stability and suitability for human life is now threatened.[11]

The most notorious and well publicized of these changes to the Earth system involves the phenomenal amount of atmospheric emissions of greenhouse gases, such as carbon dioxide, methane, and nitrous oxide, which have caused climate change and global warming. The United Nations Intergovernmental Panel on Climate Change (IPCC) predicts that without significant mitigation of greenhouse gas emissions, the world will face a mean surface air temperature increase of 3°C in less than two decades.[12] Worse, these predicted temperature increases could be irreversible.[13] Already these changes in the concentrations of greenhouse gas have caused unprecedented record heat; loss of forests, freshwater systems,

[9] Paul W. Gates, History of Public Land Law Development (1968); J. Willard Hurst, Law and Conditions of Freedom in the Nineteenth Century United States (1956); Harry N. Scheiber, Ohio Canal Era: A Case Study of Government and the Economy, 1820–1861 (1969); Gary Lidecap, Economic Variables and the Development of the Law: The Case of Western Mineral Rights, 38 J. of Economic History 338 (Jun. 1978).

[10] Peter Victor, Questioning Economic Growth, 468 Nature 370 (Nov. 2010).

[11] World Wildlife Fund for Nature, Living Planet Report 2016; Bill McKibben, Earth: Making a Life on a Tough New Planet (2010).

[12] Intergovernmental Panel on Climate Change, www.ipcc.ch; Robin Kundis Craig & Stephen R. Miller, Contemporary Issues in Climate Change Law and Policy: Essays Inspired by the IPCC (2016).

[13] Patrick J. Egan & Megan Mullin, Recent Improvement and Projected Worsening of Weather in the United States, 532 Nature 357 (Apr. 2016); Kirstin Dow & Thomas A. Downing, The Atlas of Climate Change: Mapping the World's Greatest Challenge 40 (3d ed. 2011).

land, and biodiversity; melting glaciers and ice sheets; and significant sea level rises.[14]

Another Earth system affected by humans is ecosystem services. Such services encompass benefits people obtain, at no cost, from functioning ecosystems. Ecosystem services provide food, fresh water, fuel, and fiber; they regulate climate and water-cycles and they support soil formation and nutrient cycling. Land-based ecosystem services have been compromised because of ecosystem loss, caused by climate change, pollution, resource overexploitation, and land-use changes resulting in loss of open space.[15] Ocean ecosystem services have also been impacted by accelerating loss of marine populations and species, caused by human overfishing and pollution.[16]

Human economic activities have disrupted the Earth's natural nitrogen and phosphorous cycles. Anthropogenic emissions of reactive nitrogen to the atmosphere and water bodies damage human health and ecosystems. For both developing countries and wealthy established countries, the global nitrogen footprint has grown.[17] Similarly, the quantity of phosphates flowing into the oceans and rivers from crop fertilizer runoffs has increased exponentially in the last 100 years. This alteration of the natural phosphorous cycle causes algae blooms and an oxygen deficit for marine life.[18]

The purely anthropocentric need for cropland and grazing areas, in order to feed the growing world population, has put enormous pressure on existing forests. Yet, forested ecosystems store more carbon than any other land cover type per unit area. They host a considerable percentage of global biodiversity and provide ecosystem services essential for humans. They also play a key role in the global climate system. Despite being an important constituent in the Earth system, humans have so deforested the

[14] Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (2014); John Metcalfe, The U.S. Hits Never-Before-Seen Milestone for Warmth, CityLab (April 13, 2016).

[15] United States Dept. of Agriculture, Forest Service, More About Ecosystem Services, www.fs.fed.us/ecosystemservices.

[16] Boris Worm, et al., Impacts of Biodiversity Loss on Ocean Ecosystem Services 314 Science 787 (Nov. 2006).

[17] The nitrogen footprint is the sum of emissions of ammonia, nitrogen oxide, and nitrous oxide to the atmosphere, and of nitrogen exportable to water bodies. Azusa Oita, et al., Substantial Nitrogen Pollution Embedded in International Trade, 9 Nature Geoscience 111 (2016).

[18] Eric Roy, et al., The Phosphorus Cost of Agricultural Intensification in the Tropics, Nature Plants #16043 (2016).

planet that now three-quarters of the Earth's terrestrial, ice-free surface is tree-free, and appropriated for human use.[19]

Human economic activities have brought about species extinctions and loss of biodiversity. High rates of extinctions have been due to habitat loss, overharvesting, and pollution, all caused by humans seeking to economically develop land and resources. Loss of biodiversity is not simply a problem because humans may not be able to see charismatic animals like polar bears or wolves except in a zoo; it is an Earth system problem, because biodiversity effects reduce plant production and damage entire ecosystems. In fact, it appears that loss of biodiversity affects ecosystems as much as do climate change, pollution, and other human-caused environmental stressors.[20]

Despite their impressive size, the Earth's oceans have not been able to escape the effects of anthropogenic actions. Rising dissolution of human-generated carbon dioxide in seawater causes ocean acidification and desalination. This ongoing, and excessive, carbon dioxide–driven acidification/desalination has disastrous effects on the ocean's phytoplankton.[21] But humans do more than just dump greenhouse gases into the Earth's oceans. We also dump plastic, mountains of it, into the oceans. It has been estimated that the quantity of plastic that ends up in the ocean is equal to five plastic grocery bags per every foot of coastline around the globe.[22]

Three powerful conceptual frameworks have been proposed to capture the sheer scale of the human influence on Earth systems. One is the suggestion, now largely accepted, that we have entered a new post-Holocene geologic epoch, called the "Anthropocene."[23] This new era marks the time when purely human activity expanded to the point that anthropogenic choices made a global imprint in the geologic record. All of the aforementioned changes in Earth systems, from climate change to ocean acidification, are due to anthropogenic actions. Nature and Earth systems, for the very first time in the Earth's 4.5 billion-year history, are responding to the decisions of one species – humans. These actions have been driven by economic influences. Although there is no consensus on when the

[19] Karl-Heinz Erb, et al., Exploring the Biophysical Option Space for Feeding the World Without Deforestation, 7 Nature Communications #11382 (Apr. 19, 2016).

[20] National Science Foundation, Ecosystem Effects of Biodiversity Loss Rival Climate Change and Pollution, www.nsf.gov/news (May 2, 2012).

[21] Feng-Jiao Liv, et al., Effect of Excessive CO_2 on Physiological Functions in Coastal Diatom, 6 Scientific Reports #21694 (Feb. 15, 2016).

[22] Laura Parker, Eight Million Tons of Plastic Dumped in Ocean Every Year, National Geographic (Feb. 13, 2015).

[23] P. Crutzen, Geology of Mankind, 415 Nature 23 (2002).

Anthropocene began, it appears to have its genesis in the industrial revolution of the nineteenth century, when carbon-based energy fuels began to be burned and initiate the steady growth of greenhouse gas pollution of the Earth's atmosphere.[24]

Another marker demonstrating the extent to which the forces of economic growth have affected the natural world is the concept of "Planetary Boundaries."[25] The idea behind planetary boundaries is that there is a "safe operating space for humanity" to exist on this planet, but if anthropogenic actions push certain critical Earth systems outside of this safe place, then human life is no longer sustainable.[26] Evidence suggests that some of these boundaries have already been exceeded, and others are heading toward dangerous levels.[27] Scientists are warning that we may be "at a planetary tipping point ... incompatible with the planet on which civilization developed ... and to which life is adapted."[28] More ominously, some commentators have correctly pointed out that there is a distinction between boundaries we can breach and fixed limits that we cannot, because once fixed limits are crossed, humanity can never repair the damage and restore the boundary. We may be precariously close to breaching some of the latter, fixed-limit boundaries.[29]

A third realization about the scale of human influence on Earth systems is the idea of a "Great Acceleration." In updating an earlier 2004 analysis of twenty-four indicators of global change in the natural world,[30] researchers saw a steepening of trends since about 1950 toward intensified use of Earth's natural resources, higher levels of pollution, and more anthropogenic alteration of Earth systems. They termed this speeding up of anthropomorphic environmental change "The Great Acceleration."[31] The

[24] Damian Carrington, The Anthropocene Epoch: Scientists Declare Dawn of Human-Influenced Age, The Guardian (Aug. 31, 2016); F. A. Jonsson, The Industrial Revolution in the Anthropocene, 84 The Journal of Modern History 679 (2012).

[25] J. Rockstrom, et al., A Safe Operating Place for Humanity, 461 Nature 472 (2009).

[26] Alastair Brown, Planetary Boundaries, 5 Nature Climate Change 19 (2015).

[27] Jonathan Foley, Boundaries for a Healthy Planet, 302 Scientific American 54 (2010).

[28] James Hansen, et al., Target Atmospheric CO_2: Where Should Humanity Aim?, www.columbia.edu.

[29] For example, fertilizer is often produced from rock phosphate, and phosphorous, an ingredient in fertilizer, is a key plant nutrient. If we use up all of the earth's supply of rock phosphate in fertilizer, it is then gone and there is no more. A boundary with fixed limits will have been breached. Simon L. Lewis, We Must Set Planetary Boundaries Wisely, 485 Nature 417 (May 2012).

[30] W. Steffen, et al., Global Change and the Earth System: A Planet Under Pressure (2004).

[31] W. Steffen, W. Broadgate, L. Deutsch, O. Gaffney, & C. Ludwig, The Trajectory of the Anthropocene: The Great Acceleration, 2 Anthrop. Rev. 1 (2015).

notion of a Great Acceleration indicates that from the starting point of the Anthropocene Epoch,[32] the current trajectory is rapidly moving toward a breaching of Planetary Boundaries, not in the distant future, but in the near term.[33] In short, the close links between the world's economic system and the natural world lead to only one conclusion: human activity affecting the natural world, and Earth systems, is not sustainable for continued human life on this planet.

C. The Policy System

There is a growing agreement among academics and commentators that the United States, along with all other policy-driven countries, can no longer adopt a "business-as-usual" approach to these anthropogenic changes to the Earth system. There is near-universal adoption of the view that "[w]orking only within the [existing] system will, in the end, not succeed."[34] If there is "inertia" in environmental policy, then humans are heading to an inevitable rendezvous with global environmental disaster.[35] Even when there is a worldwide agreement, such as the 2015 Paris "Agreement" on Climate Change,[36] acknowledging the need to rein in certain human activities that are altering basic Earth systems, there is skepticism that the policy will actually yield results that will slow the Great Acceleration.[37]

Apart from a shared reluctance to use traditional environmental policy tools to address Earth system changes, there has been a collective embrace of the need for a "transformative change in the system itself."[38] As one leading book on ecological survival puts it, "[I]t is impossible to think that

[32] See *Jonsson*, *supra* note 24.

[33] Editorial, Our Planet and Us, 8 Nature Geoscience 81 (2015).

[34] James Gustave Speth, The Bridge at the End of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability 86, 225 (2008).

[35] William D. Nordhaus, Managing the Global Commons: The Economics of Climate Change (1994).

[36] Doyle Rice, 175 Nations Sign Historic Paris Climate Deal on Earth Day, USA Today (Apr. 22, 2016).

[37] Indeed, even ardent supporters of the Paris Treaty acknowledge that it will do little to actually slow global warming. The United Nations estimates that if every country were to make every single promised carbon cut between 2016 and 2030, carbon dioxide emissions would still only be cut by one-hundreth of what is needed to keep temperature rises below 2°C. Bjorn Lomborg, Trump's Climate Change Plan Might Not Be So Bad After All, The Washington Post (Nov. 27, 2016); Karl Ritter, Huge Cuts Are Needed to Meet Emissions Goals: Even Paris Agreement Targets Not Enough to Avoid Dangerous Temperature Change, Associated Press (Nov. 4. 2016); Eli Kintisch, After Paris: The Rocky Road Ahead, 250 Science 1018 (Nov. 2015).

[38] *Speth*, *supra* note 34.

policy responses to our 'planetary emergency' can be successful without innovative transformative action."[39] This call to arms for "transformative" and "innovative" environmental policy has not gone unheeded. Creative, imaginative, exciting new approaches to environmental policy have been powerfully and effectively advanced by authors suggesting, for example: (1) a reconceptualization of the human "right" to a clean and healthy environment and the modern rediscovery of the "commons"[40]; (2) that instead of viewing economic growth as the cause of an ecological crisis we view targeted environmental economic investments as the solution to the crisis[41]; (3) the need to rely on economic optimization and economic modeling[42]; (4) integration of truly science-based environmental policy with the behavioral drivers behind human choices[43]; (5) another look at non-regulatory "collective" action[44]; (6) resurrection and expansion of the "public trust" doctrine[45]; and (7) an acknowledgment and legitimatization of "nature's rights."[46]

These and other "innovative" environmental policies certainly fill in the third storyline of how societies, and governments, might address the near-catastrophic consequences of economic systems that plunder and contaminate the natural world. But what is needed, before one turns to new policy, is an understanding of *why* old policy or existing policy has failed. This book seeks to supply that understanding, that explanation for the question: Why do environmental policies fail?

Without considering the reasons for the failure, policymakers (and commentators) are simply leaping from failed policies to suggestions

[39] Burns W. Weston & David Bollier, Green Governance: Ecological Survival, Human Rights, and the Law of the Commons xxiii (Cambridge 2013).

[40] *Id.* at xix–xx.

[41] Ted Nordhaus & Michael Shellenberger, Break Through: Why We Can't Leave Saving the Planet to Environmentalists (2009).

[42] William D. Nordhaus & Joseph Boyer, Economic Models of Global Warming (2000); Daniel Fiorino, Making Environmental Policy (1995).

[43] Oswald Schmitz, The New Ecology: Rethinking a Science for the Anthropocene (2016); Michael Marchetti and Peter Moyle, Protecting Life on Earth: An Introduction to the Science of Conservation (2010); Cass R. Sunstein, Why Nudge? (2014); Alessandro Tavoni & Simon Levin, Managing the Climate Commons at the Nexus of Ecology, Behavior, and Economics, 4 Nature Climate Change 1057 (2014).

[44] Elinor Ostrom, Governing the Commons: The Evolution of Institutions for Collective Action (1990).

[45] Mary Christina Wood, Nature's Trust: Environmental Law for a New Ecological Age (Cambridge 2013).

[46] Jan G. Laitos, The Right of Nonuse (Oxford 2012); Susan Emmengger & Axel Tschentscher, Taking Nature's Rights Seriously: The Long Way to Biocentrism in Environmental Law, 6 Geo. Int'l Envtl. L. Rev. 545 (1994).

of alternative policies that hopefully will slow the Great Acceleration and thereby provide humanity with a "safe operating space." But there is another step that needs to be analyzed, before offering grandiose proposals for alternative environmental policy, and that step is the topic of this book – the one that answers why past and current environmental policy has failed. Once we have an idea why present (or even proposed) policies have failed, we can construct a policy that is more likely to succeed, because it avoids some of the underlying causes for other policy failures.

In Part I, we begin with a summary of the two central themes featured in the book: why environmental policies have failed, and what a proposed policy would have to do to succeed (Chapter 1). Part II is both a history and an assessment of traditional environmental policies. The history of environmental policies in the United States reveals how laws first encouraged natural resources use and exploitation, and then, for purely anthropocentric purposes, sought to preserve natural spaces and clean up polluted environmental sinks (Chapter 2). The upshot of this legal legacy has been a natural world anthropologically altered by climate change, global warming, ecosystem and biodiversity loss, pollution, and ocean acidification and contamination (Chapter 3).

Part III discusses the first category of reasons for the failed policies recounted in Chapter 3. Part III argues that these failures were due in part to several recurring faulty assumptions that traditionally have grounded environmental rules. Among these have been a false worldview of humans' relationship to nature, premised on the twin beliefs that we are both separate from and superior to our environmental surroundings (Chapter 4), an incorrect model of how Nature works (Chapter 5), an equally incorrect model of how we should perceive and value Earth systems (Chapter 6), and an unrealistic model of how humans behave (Chapter 7). Part IV then takes up the second category of reasons for failed policies: internal limits and weaknesses embedded in virtually all tried and proposed environmental policies. Chapter 8 considers each type of policy that has been suggested as a solution to global environmental changes, and points out how each contains flaws that interfere with its effectiveness.

Part V seeks to offer a policy that might avoid failure because it (1) hopes to avoid the false models and flawed assumptions outlined in Parts III and IV, and (2) tries to conform to certain universal truths that are followed by Nature and Earth systems. Chapter 9 advances the proposition that environmental policies need to reflect, and be consistent with, the universal "laws" and "truths" that guide how Nature works. The most central of these truths is the all-encompassing principle of symmetry. Notions of

symmetry, along with derivative concepts of equivalence, unification, and conservation, seem to guide, if not control, much of what is in the natural universe. Policy that wishes to have an impact on the natural world needs to obey these same rules that are followed by Nature and environmental systems.

Part V then offers an environmental policy that both rejects the flawed assumptions and models that have been the basis for much past and present policy and embraces the universal requirements of symmetry that seem to influence many natural processes. In Chapter 10, it is suggested that for symmetry to be satisfied, the policy must do more than just create a legally enforceable *right* to a natural world conducive to human survival. The policy must also impose a correlative *duty* to make conditions compatible with planetary boundaries providing humans with a "safe operating space." The right is held by humans and their ecological surroundings, not just by humans. The duty is imposed only on humans. And unlike most negative duties embedded in current policy, which tell humans what *not to do*, the duty suggested here is a positive one, urging humans *to do* certain acts that ameliorate the effects of Anthropocene alterations on Earth systems. Such an affirmative obligation is more consistent with how humans naturally wish to behave.