Prologue

Already growing as a small community for a quarter century, the field of environmental economics announced itself to the world on January 23, 1979.

On that day, the so-called God Committee met to decide the fate of the Snail Darter, a small perch that was the first big test of the 1973 US Endangered Species Act. The fish had only just been identified in three Tennessee rivers and quickly listed as endangered. That move eventually halted construction of the Tellico Dam, which threatened the snail darter's habitat. "The case was depicted as an irrational obstruction of a valuable project, a quixotic conflict between a trivial fish of no known value and a huge hydroelectric dam." Reacting to this turn of events, the US Congress had amended the Endangered Species Act, creating the God Committee to review projects and bring "common sense" to the act's enforcement. The committee's charge was to grant an exemption from the act and allow a development project to go forward if the benefits of doing so outweighed the costs.[1]

Staff economists for the committee, which comprised environmental economists like Robert Davis (chair) and Reed Johnson, had found that the net economic benefits of the dam were dubious, at best. Without quantifying monetary values for the fish, their report essentially suggested that if one were to give any credit to that fish at all, it would tip the scales against the dam. After the summary of the staff's economic report, there was an awkward pause before the God Committee began its deliberations. Participants describe a tension in the room, with the outcome uncertain. Who would break the silence first?

Charles Schultze, head of Carter's White House Council of Economic Advisors, signals his willingness to start. A gasp comes from the environmental lobby. Uh oh. Schultze had been placed on the committee at the

[1] On the politics of the Tellico Dam, see Platter (2013). Quotation from p. 2.

insistence of pro-development Sen. Howard Baker in lieu of the White House environmental advisor. Somebody from an environmental lobby groaned, "oh no, not the economist."[2] But Schultze's comment surprised them. He said,

> It seems to me the examination of the staff report, which I thought was excellently done, would indicate that … it would be very difficult … to say there are no reasonable and prudent alternatives to the project. The interesting phenomenon is that here is a project that is 95 percent complete, and if one takes just the cost of finishing it against the benefits and does it properly, it doesn't pay, which says something about the original design![3]

Schultze then moved to deny the exemption, and the motion was approved unanimously.

On that day, if not for the first time, at least in a very public way, the environmental movement saw that economics could be on "their side" of the debate. This book is the story of how that happened – and why it was so surprising.

[2] Plater (2013 p. 287); personal conversation with F. Reed Johnson.
[3] *Proceedings* (1979 p. 26).

1

Introduction

Environmental Economics in Context

> I looked around the store and there was nothing but healthy people, educated-class naturalists…. They were evidently well informed about their outdoor gear options, judging by their boots, packs, and shopping bags. Moreover, as they sat there reading Aldo Leopold's *A Sand County Almanac* …, they radiated environment concern. Here was a community of good stewards, people who were protecting the earth and themselves. Nature used to mean wildness, abandon, Dionysian lustfulness. But here was a set of people who went out into nature carefully, who didn't want to upset the delicate balance, who studied their options, prepared and trained.
>
> –David Brooks, *Bobos in Paradise* (2000)

Inevitably, humanity conceives its relationship with the natural environment by holding together two contradictory ideas. We delight in the wilderness as we encounter it, beautiful and sublime, and we bend it to our will, making it tame and useful.

Economists too have wrestled with that tension. Consider their efforts to quantify nature. Over the course of the twentieth century, these efforts evolved along with other efforts to measure an ever wider range of objects in monetary terms. For example, economists began to measure abstract indices like Gross Domestic Product and inflation as well as the benefits and costs of public investments. When they similarly turned to quantifying natural resources and the environment, economists realized that if they limited themselves to those resources traded in markets, which come with a readily observed market price, they would omit much of what society holds dear. On the other hand, to quantify the value of untraded nature would seem to focus attention on its tame and useful aspects, or even, in some sense, to tame it.

This book is a history of how economists have thought about this dilemma. Far from being a comprehensive review of everything that could

be classified as environmental economics, it is limited in time, space, and subject matter. First, it focuses on the twentieth century, especially the postwar period up to the 1980s.[1] This limitation fits the modern environmental movement. Indeed, as Hays (1982) and other historians have emphasized, merely to use the modifier "environmental" is already to restrict oneself to the postwar period, when the environmental movement emerged through the realignment of two earlier movements, one grounded in the rational planning and conservation of material resources, the other emphasizing the beautiful and the sublime. In the United States, these earlier movements had been represented by Gifford Pinchot and John Muir, respectively, but similar tendencies existed globally. With the concept of "environmental" being new, the term "environmental economics" was not used until the late 1960s, becoming common usage around 1970.[2]

Second, though European influences certainly play a role, the book primarily focuses on applied economics in the United States. This focus is reasonable as well, as US economists had enormous influence on the profession worldwide in the postwar period. Too, they were among the first to conduct large-scale benefit–cost analyses of natural resource projects and environmental regulations. Nevertheless, this limitation leaves much ground uncovered.[3]

Finally, the book also focuses on economists' efforts to understand and quantify the value of scarce environmental resources and amenities, particularly by institutional and neoclassical economists of various strands. This emphasis thus leaves for others to explore additional aspects of the history of environmental economics, including property rights and institutional

[1] Previous books on the history of environmental economics include Kula (1998), de Steiguer (2006), and Wolloch (2017). De Steiguer (2006) considers the history of modern environmental thought through a series of episodes, many of them intersecting economics. Kula (1998) and Wolloch (2017) consider a broader sweep of the history of environmental economic thought.

[2] The term first appears in JSTOR (an electronic database of publications) in 1966, with the announcement of a new Environmental Economics Branch, in the new Natural Resources Division of the USDA's Economic Research Service. The branch was to be "concerned with recreation and natural beauty; resource conservation and multiple use; quality of the environment, including air and water pollution; and urbanization of rural areas" (*Journal of Farm Economics* 1966 p. 177).

[3] In recent years, several authors have considered international aspects to the history of environmental economics. Fourcade (2011) makes interesting comparisons between US and French approaches to valuing nature. Franco (2018), Franco and Missemer (2023), and Røpke (2004) consider the international history of a more heterodox ecological economics. Leonard (2019) considers the small-is-beautiful approach of German-British economist E. F. Schumacher.

factors; causal studies of the effects of environmental quality on human health and economic productivity; and modern heterodox approaches such as ecological economics, which tends to emphasize the biophysical constraints on economic activity.[4]

Following this introduction, Chapters 2 and 3 discuss the prewar historical context inherited by environmental economics. Rational planners like Pinchot and romantics like Muir had been at an impasse, holding incommensurable values. One wanted to tame wilderness and bend it to human wants, the other accepted it for what it was. In the following decades, economists and others trying to measure the economic value of wilderness concluded it could not be done. In their view, because economics was a study of material wealth, whereas wilderness involved decidedly immaterial and intangible experiences, economics simply could not address it. Thus, at the mid-century mark, there appeared to be little future for anything like an environment economics.

As discussed in the remainder of the book, that inauspicious beginning was overcome, slowly in the late 1950s, then swiftly in the 1960s. By about 1970, one could recognize the existence of a new and successful research program in environmental economics. This success was attended by three key moves. One was to approach the problem of valuing the environment through the lens of the consumer enjoying environmental amenities, rather than through the lens of a producer using natural resources as a material input. For example, Chapter 4 tells the story of efforts to incorporate outdoor recreation into benefit–cost analysis, by modeling individuals as consumer "purchasing" a recreation trip when selecting where to travel.

Indeed, economists during this period were considering increasingly abstract measures of consumer welfare for ever more intangible objects. Whereas, in the 1940s, they viewed outdoor recreation as too immaterial to value, by the 1970s, it was on the more material and concrete side of the spectrum of things they were attempting to value. As told in Chapter 9, economists then were extending measures of environmental values from uses such as recreation to so-called "non-uses:" values for simply enjoying the existence of wilderness.

A second move was to accompany the broader economics profession as it redefined itself as the study of tradeoffs and opportunity costs, rather

[4] Franco (2018), Franco and Missemer (2023), Missemer (2017, 2018), and Røpke (2004) consider the history of ecological economics. The bio-physical approach has led to some very different suggestions for pricing the environment from the neoclassical approaches discussed in this book (e.g., Costanza, Farber, and Maxwell 1989).

than as the study of material welfare. As discussed in Chapter 5, the economist John Krutilla pointed out that there is always a tradeoff between developing a natural resource or preserving it. The price we pay for developing a resource is the opportunity cost of enjoying the natural amenities (and vice versa). As discussed in Chapter 7, Thomas Schelling and others similarly considered how to value health and mortality risks. They argued that, while, from one point of view, an individual life may be infinitely precious, from another individuals are constantly making tradeoffs between small *risks* and other goods.

A third move was to draw on the large body of thought by land economists and others on property rights. For example, Chapter 6 discusses work by Allen Kneese and others on how to use pollution fees to incentivize pollution abatement. This work drew on the American experience with designing new institutions to govern common property resources, ones that create a different set of incentives than private property. Whereas when property is held privately people have an interest in caring for it, when it is held in common their private interests push them toward over depletion. Thus, farmers may have an incentive to exhaust the fertility of a commonly owned farm or to overuse water from a commonly held source, fishers may have an incentive to overfish the seas, and so forth. Experience with these problems informed the work of applied economists in the 1960s as they began to think about the degradation of commonly held environmental resources.

Although focused on postwar pricing of the environment, the story told in this book obviously fits into a wider historical context. The remainder of this introductory chapter reviews six topics in the history of economics that serve as essential background. These include: (i) the long history of thinking about humanity's relationship to the natural environment, (ii) the increasing role given to the consumer in the twentieth century, (iii) ideas about pricing and incentives as found in the public finance literature during the period, (iv) the creation of separate schools of agricultural economics in the early twentieth century, (v) developments in postwar neoclassical economics, and (vi) the spread of economists into government and think tanks.

1.1 The Economy of Nature

Almost axiomatically, human thought about the natural environment is as old as our interaction with it. While a book on postwar environmental pricing is no place to attempt a thorough survey of such vast ground, it

will be useful to establish some of the enduring questions and themes that thinkers have wrestled with.[5]

In the opening chapters of Genesis, we read that God created the world, and all that lives in it, and declared it to be good. After creating humanity, He gave to us all good things to eat and commanded us to name the animals and to till the garden. Taking this as an origin story about the history of thought about our natural environment, we find already three dialectics that remain in tension over time. First, according to this account, we are placed into a natural world that is outside us and exists independently of us. Yet in this, we are no different than the plants and animals, so if they are part of "nature" then so too are we, and presumably so too is our relationship with them. Second, insofar as we use it to meet our own need for food and other material needs, we receive nature passively, as a gift, yet we also inherit it to actively manage, as a gardener. Third, taken in isolation, this parable of a gardener and a garden invites an anthropocentric thinking that situates the worth of nature in its instrumental use. Yet it is nested within a broader story, in which the inherent worthiness of nature is antecedent to humanity.

In his posthumously published essay *On Nature* (1874), John Stuart Mill (1806–1873) made a sharp distinction between two senses of the word. He wrote,

> [I]n one sense, ["nature"] means all powers existing in either the outer or inner world and everything which takes place by means of those powers. In another sense, it means, not everything which happens, but only what takes place without the agency, or without the voluntary and intentional agency, of man. This distinction is far from exhausting the ambiguities of the word; but it is the key to most of those on which important consequences depend.[6]

Mill's first meaning of the word, as everything that takes place whether outside or inside the aegis of human agency, arguably had been more pertinent to classical political economy up to his time (DesRoches 2018a, Schabas 2005). François Quesnay (1694–1774) and the French physiocrats, for example, insisted that good political economy required discerning and complying with the laws of nature. T. Robert Malthus (1766–1834) based his political economy on two postulates about the essence of human

[5] For historical discussion of the interplay between nature and the economy, see DesRoches (2015, 2018a), Jonsson (2013), Kula (1998), Schabas (2005), Warde (2011), Wolloch (2017), and Worster (1994). For still broader discussions of the meaning of "nature" and "wilderness" in Western thought, see Coates (1998), Cronon (1995), Daston (1998), Kaufman (1972), Nash (1982), and Smout (2000).

[6] Mill (1874 pp. 8–9).

nature: that (i) food is necessary to sustain human life and (ii) the passion between the sexes is necessary and enduring. These postulates gain their significance when confronting two equally important natural laws of the external world: that the fertility of the earth can increase at most arithmetically, whereas populations, if unchecked, increase geometrically. Thus, Malthus's theory is, in its essentials, about the interplay of human nature and the natural world. Perhaps most importantly, if less famously for economists, Carl Linnaeus (1707–1778) described, in his *Œconomy of Nature* (1791), the interdependence of the earth, the vegetable kingdom, the animal kingdom, and humanity, all bound together by common interest in the functioning of the food web. In the United States, the early conservationist George Perkins Marsh (1801–1882) expressed similar views in his *Man and Nature* (1864), warning that "we can never know how wide a circle of disturbance we produce in the harmonies of nature when we throw the smallest pebble in the ocean of organic life."[7]

Mill himself preferred the second meaning for "nature," as the world external to humans, or the environment in which we find ourselves. As Margaret Schabas (2005) has argued, this move freed humans from natural law, making us the masters of our own destiny. At the same time, it set aside "nature" as something untouched by humans, in contrast to the artificial ways in which we have transformed and, indeed, conquered nature. This meaning of the term arguably had been in ascendance since at least the time of Francis Bacon, whose project was to exert human mastery over nature, to control it. But its importance grew after Mill. According to Schabas, it has reached its pinnacle in neoclassical economics. Dynamically, neoclassical economics essentially assumes that wealth can grow indefinitely, without bound. Statically, it is focused on constrained optimization, but the constraints are so highly abstracted that they lose their connection to real physical objects, objects existing at a point in space and guided by physical laws. As discussed in Chapters 2 and 6, the history of environmental economics is about humanity becoming reacquainted with its dependence on nature while also coming to terms with the effects of its actions on it.

These questions about humanity's place in nature coevolved with questions about the role of nature in economic productivity. What makes nature productive? Is it something inherent in the earth, which humans

[7] On Linnaeus and his importance for political economy, see DesRoches (2018a), Jonsson (2013), Schabas (2005), and Worster (1994). "We can never know…" (quoted in Worster 1994 p. 269). Though receiving attention in the history of ecology, Marsh is an understudied figure in the history of political economy.

receive passively, or something coaxed out of nature by human agency? Donald Worster (1994) organized his classic study of the history of ecological ideas along a continuum, anchored at one end by the Arcadian paradigm of Gilbert White (1720–1793), in which humanity must live a simple agrarian life and accommodate itself to nature, and at the other end by the imperial paradigm of Linnaeus, in which humanity must organize nature to its own ends. Excepting White's emphasis on simplicity, in the canon of political economy, Quesnay and his fellow physiocrats exemplify the former view. They contended that agriculture alone can yield the so-called net product, or a return above costs, making it the sole source of wealth for the economy. It is a free gift from Nature. Its primacy is both temporal, for it sustained humanity before agriculture, and causal, acting as a kind of prime mover putting economic circulation in motion. So humanity can best take advantage of nature's powers by complying with natural laws.[8]

Similarly, Adam Smith referred to the importance of the "spontaneous productions of the earth." For, "No equal capital puts into motion a greater quantity of productive labour than that of the farmer. Not only his labouring servants, but his labouring cattle, are productive labourers. In agriculture, too, Nature labours along with man; and though her labour costs no expense, its produce has its value, as well as that of the most expensive workmen." Yet Smith also argued that "The most important operations of agriculture seem intended, not so much to increase … as to direct the fertility of Nature towards the production of the plants most profitable to man." In other words, humanity needs to direct natural fertility, managing nature to create wealth.[9]

Of course, humanity's direction of nature only accelerated through the invention of the steam engine, the factory system, and other modern arts. Beginning in the nineteenth century, the scientific management of natural resources like forests and waterways emerged as a means of bringing social control to nature through rational planning, with the "conservation" of resources offered as a way to minimize both human and natural waste alike. By the twentieth century, such management increasingly

[8] Banzhaf (2000) discusses the role of Nature in physiocracy in more detail. While humanity is an agent in the production of wealth, the circular flow of exchange requires a first cause, which is rooted in Nature. This motion, not land *per se*, is the ultimate "free gift" from nature. Such gifts, free of human agency, are one way of distinguishing different forms of capital or assets, separating natural capital from man-made capital (e.g., Barbier 2011). DesRoches (2015, 2018a, b) offers further discussion.

[9] Quotations from *Wealth of Nations*, II.iii.3 and II.v.12.

incorporated formal economics, for example in benefit–cost analysis of dams and water projects.

These questions about the "productivity" of nature beg the additional question of what is the good to be "produced," or rather *whose* good. Linnaeus, for all his belief that humans were members of nature's œconomy, believed that "all things are made for the sake of man," though ultimately only as an intermediate good that enabled mankind to glorify God. Marsh too believed that it is a mark of civilization when man subjects the world to his control and subjects it "to his uses." As discussed in Chapter 2, this view was echoed by Gifford Pinchot (1865–1946), the great forester and pioneer of US conservation policy. Pinchot paired his intense utilitarianism with an equally intense materialism, reaching the conclusion that "there are just two things on this material earth – people and natural resources."[10]

This emphasis on human *use* may be contrasted to human *delight* (Smout 2000), not unlike Worster's distinction between the "imperial" and "Arcadian" attitudes to the world. Smout discusses how in Scotland, for example, at the same time improvers were bemoaning the barren wastelands of the Highlands and the Hebrides, Walter Scott was writing panegyrics to such places, "where the proud Queen of Wilderness hath placed … her lonely throne." In the United States, transcendentalists like Emerson and Thoreau emphasized the spiritual value of experiencing wilderness. By the close of the nineteenth century, such views found their way into American political debates about land use. As discussed in Chapter 2, John Muir (1838–1914) in particular elevated natural landscapes, ecosystems, and other species to "sparks of the Divine Soul." Challenging Pinchot's anthropocentricism, he argued that they are good in themselves and should be preserved regardless of any practical use they may or may not have for humanity.[11]

The tension between the imperial and the Arcadian, between use and delight, was a defining feature shaping conservation and preservation in the Progressive Era, leaving a lasting intellectual legacy. But as Hays (1982, 1987) discusses, when "environmentalism" emerged in the postwar era, it was as a new synthesis emerging from these opposing forces. This synthesis allowed a new economics of aesthetic consumption to bridge the gap

[10] On Linnaeus, see DesRoches (2018a) and Worster (1994). Marsh quoted in Worster (1994 p. 173). "People and natural resources" (Pinchot 1947 p. 325).

[11] On romantic views of wilderness, see, in addition to Smout (2000), Cronon (1995). For the American tradition especially, the classic reference is Roderick Nash's *Wilderness and the American Mind* (1982). On the specific case of Scotland and especially the work of the improvers, see Jonsson (2013). "Divine Soul" (Muir [1875] 1980).