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## Introduction

Some of us have the privilege to live with the type of affluence in which worries about food and shelter never impinge upon our subjective consciousnesses. We succumb to other sources of anxiety. Some, even in the highest echelons of the United States government, are concerned about the possibility of asteroids hitting Earth and the prospects for designing weapons to protect us from them.<sup>1</sup> In recent years, many of us have been worrying about what we call the “environment.” Some of us worry about the extinction of species, some about the pollution of our physical surroundings, yet others about changes in our climate. These are all related problems: extinction is often a result of pollution; evidence is mounting that extinction can result from climate change;<sup>2</sup> pollution is a major source of climate change, and so on. The general worry about all these problems constitutes worry about issues that may be broadly categorized as environmental.<sup>3</sup> By and large, explicit worry about most issues in this category, though not about pollution, is confined to the privileged North.<sup>4</sup> The situation is

<sup>1</sup> See <<http://impact.arc.nasa.gov/congress>>. The gravity of these discussions suggests that they are intended to be taken seriously.

<sup>2</sup> In addition to the obvious plausibility of such a claim (climate changes would make the habitats of many species no longer suitable for them), climate change has been directly, though as yet controversially, implicated in at least one extinction, that of the golden toad (*Bufo perigrines*) that was endemic to the Monteverde cloud forest reserve of Costa Rica (Pounds, Fogden, and Campbell 1999).

<sup>3</sup> It does not matter whether all these problems are lumped together as one worry/concern or kept as separate and distinct worries/concerns. Both usages will be employed here.

<sup>4</sup> For the purpose of this book, the North consists of northern America, Europe, Japan, Australia, New Zealand, and similar developed countries elsewhere. The category is intended to be loosely defined on the basis of economic and cultural features that these countries have in common. The South comprises the underdeveloped countries of the rest of the world. Some Latin American countries and most of the Arab countries do not fall naturally into either category. However, these definitional difficulties are not particularly relevant to the issues that are the focus of this book.

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rather different with those for whom everyday life is a struggle for material existence, for instance, for the vast majority of those who live in the so-called Third World (or South) and for many of our own poor or underprivileged. They may never worry explicitly about the general category of the “environment.”

This does not necessarily mean that our worries are unjustified or even parochial – a result of an excess of leisure and a lack of social concern for those less fortunate than us. But it does mean that we must be able to justify through adequate argumentation the concerns we express for the environment. This need for justification is especially critical if we believe that these concerns deserve our attention despite equally important, if not more important, concerns we should have for improvements of the material conditions of the lives of the underprivileged. It is easy to condemn the Japanese and the Norwegians for whaling. Neither the Japanese nor the Norwegians are suffering from a deficit of available protein in their diets. Neither face economic collapse if they allow depleted populations of whales to recover to sizes at which they are beyond reasonable danger. In North America, similarly, there is no excuse for continued logging in the Pacific Northwest irrespective of the fate of the northern spotted owl (*Strix occidentalis caurina*). Terminating logging will undoubtedly result in some social disruption. However, these forests are nonrenewable in the short run, and sooner or later logging will have to stop (because, with continued logging, the forests will disappear and there will be nothing left to log). Banning logging completely will almost certainly lead to social dislocation for local communities. However, a rich democratic society should be willing to pay what it takes to ease such social dislocation while protecting a significant part of our dwindling biological heritage, exemplified by the entire forests and not merely by the spotted owl.

But in the South, the situation is not always quite so simple. In 1972, the world’s largest *arribada*<sup>5</sup> (arrival for egg laying) of Olive Ridley turtles (*Lepidochelys olivacea*) was discovered on a few beaches in Orissa in eastern India. Once a year, at roughly the same time, hundreds of thousands of Olive Ridleys congregate to form a flotilla a few miles from the coast. This enormous congregation is large enough to be observed from the air. Over the course of a few nights, the turtles clamber in to lay their eggs on the beaches. In one recent instance, between 23 and 27 March 1999, 230,000 females were estimated to have nested in Orissa in one rookery

<sup>5</sup> The term is from the Spanish, because the first instances of this phenomenon were recognized in Costa Rica and Mexico.

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alone.<sup>6</sup> Each female turtle always returns to the same beach, which is also believed to be the one on which it was hatched. Between successive returns, it often travels thousands of miles – sea turtle navigation is one of the natural masterpieces produced by evolution. Olive Ridleys are highly endangered and face many threats, including the loss of nesting habitat throughout their range. In 1972, the “Northern worry” that was expressed was a concern over the harvesting of eggs and turtles for food, not only for local consumption but also for export to the markets of Kolkata. Turtle meat was not a delicacy; it was an important source of protein in one of the poorest regions of the world. If our concern for the future of the Olive Ridleys is to trump concern for the livelihood of the poor, we must have very good arguments.

In Orissa, there is cause for optimism. In 1972, while many Northern conservationists clamored for an immediate end to the harvest, others, more responsibly, noted that the need of the poor for food must also be addressed.<sup>7</sup> The Indian government sided with the conservationists but did little to address the concerns of the poor. By 1975, the area had been turned into a wildlife reserve and trade in turtles was banned. However, the Indian state wisely did not enforce the ban to the extent of inducing starvation among the poor. But the presence of the ban probably encouraged the local inhabitants to enlarge their resource base. Eventually, conservation of the turtles found sufficient local support that the conservation measures became successful. However, in the 1980s and 1990s a new threat emerged: death by entanglement in the nets of illegal fishing trawlers. In 1997–98, there were reports of 13,575 Olive Ridley deaths from this source, and the *arribada* had all but disappeared. Proper protection by local voluntary groups, as well as by several government agencies, led to a recovery in 1999.<sup>8</sup> Meanwhile, it has also become far from clear that a complete ban on the harvest of turtle eggs is necessary for successful conservation. Almost all the eggs laid during the first few nights of an *arribada* are destroyed as turtles that arrive later dig nests to lay their own eggs. The eggs that are laid early can be harvested – partly for human consumption, partly for artificial incubation – probably without any harm to the turtle

<sup>6</sup> See Pandav and Kar (2000); the *arribada* has only occasionally been seen since – see the following text.

<sup>7</sup> See Carr (1984), p. 256. To their credit, the conservationists N. Mrosovsky, P. C. H. Pritchard, and H. Harth have all championed the interests of the poor along with the necessity for sea turtle conservation.

<sup>8</sup> See <<http://ens.lycos.com/ens/apr99/1999L-04-14-04.html>>. After some lean years, the *arribada* was back to its original size in 2004 (Sarkar, personal observations).

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population.<sup>9</sup> They would then continue to be an important food resource in a region in which many people continue to eke out a meager existence on an inadequate diet. However, the story of the Orissa *arribada* may be atypical in the sense that conflicts between social justice and biodiversity conservation often have no easy resolution.

Returning to the question with which we started, there are many plausible stories that can be told to justify our concern for the environment. For instance, we may argue that worry about the environment is a long-term worry motivated by a concern for the quality of lives and the state of the planet many generations into the future. Those for whom even the survival of this generation is a matter of uncertainty may not be able to afford such a worry. At least they may not be able to afford it to such an extent that it trumps worries connected to their need for immediate survival. Thus, we should not blame the underprivileged for their lack of explicit environmental concern. At most, we can say that, to the extent that it is consistent with their need to ensure daily survival, even the underprivileged should share our environmental concerns. The poor on the Orissa coast belong in this category. However, those of us who are privileged not only should have such environmental concerns, we should also act on them. Precisely because of our privilege, we have a greater obligation than the less privileged to act in this way. Moreover, such action even indirectly benefits the less privileged: we help to assure the long-term future of their descendants even as they worry about the short-term future through which they must survive in order to produce those descendants. This may well be a good argument, independent of whether it also serves our own privileged interests.

However, to show that the argument of the last paragraph is a good one will require some work. First, it must be shown that the conclusions are logical consequences of the premises. There are two substantive premises explicitly stated in the last paragraph:

- (i) worry about the environment is a long-term worry, and
- (ii) those for whom immediate survival is uncertain may, at most, be able to afford a long-term worry only to the extent that it is consistent with ensuring their immediate survival,

and two conclusions:

- (iii) to the extent that it is consistent with the need to ensure daily survival, even the underprivileged should act on environmental concerns, and

<sup>9</sup> Mrosovsky (2001). The harvesting of early eggs in this way is already successfully practiced in Costa Rica, the locus of another somewhat smaller but better-known *arribada*.

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- (iv) not only should the privileged have such concerns and act on them, they also, precisely because of their privilege, have more of an obligation to act than the less privileged.

Premises (i) and (ii) are incomplete in the sense that, without being supplemented by other assumptions, they do not logically imply these conclusions. To obtain conclusion (iii), we need at least the following two additional premises:

- (v) there is reason to have worries about the environment, and  
(vi) we should act on our reasonable worries, long- or short-term.

Further, obtaining conclusion (iv) also requires another premise:

- (vii) the privileged have more of an obligation to act than the less privileged.

So far, all that has been shown is that the conclusions finally follow from the assumed premises, that is, that it is not possible for the premises to be true and the conclusions false.<sup>10</sup> But notice that this does not tell us much: it does not tell us that the conclusions are, in fact, true and that (therefore) we should believe them.<sup>11</sup> Crucially, we have to establish claim (v), as well as another assumption that is deceptively embedded in premise (vi):<sup>12</sup>

- (viii) these worries are of the sort that require action on our part.

Without assuming claim (viii), we have no obligation to respond to our worries by intervening in the world; we do not even know that our worries are more important than, say, a worry about the heat death of Sun. Not all worries deserve action; for some, such as the worries of hypochondriacs, the desirable response is precisely the opposite. Are biodiversity conservationists more like doctors than hypochondriacs? “Environmental skeptics” do not believe that the answer is obvious;<sup>13</sup> if we genuinely believe that our environmental concerns are justified, we must be able to answer such skeptics.

Establishing claim (v) requires a close look at the state of the world. Most importantly, it requires judging what we should – and should not – believe about the world given the empirical data we can collect, the best scientific

<sup>10</sup> In philosophical terminology, the argument is *valid*.

<sup>11</sup> In philosophical terminology, if the premises are true in a valid argument, the argument is then *sound*.

<sup>12</sup> The other premises are being taken as unproblematic.

<sup>13</sup> See, for example, Lomborg (2001), who doubts that extinctions are occurring at a rate significant enough for there to be reason to worry. See also Chapter 5, § 5.3.

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models we have, and the uncertainties involved in both data collection and model construction. Ecology, the science to which biodiversity conservationists most routinely turn for empirical support, is notorious for being unable to make claims about the world with much certainty. For instance, are species' extinctions taking place at a much higher rate than the normal rate (that is, the average or background extinction rate during evolutionary periods other than mass extinctions)? Those who believe that the rate is several times higher than normal often talk of a biodiversity or extinction "crisis." Crisis talk has tremendous rhetorical value in the political terrain of the North. Whether it is justified is entirely another matter. Moving on to another topic, are we certain that climate change is taking place? Crucially, are we certain that these processes, if they are occurring, are occurring for anthropogenic reasons (human interference with the natural world)? If they are not, merely modifying some aspects of our usual behavior may not solve the problems. Answering these questions involves normative considerations that are epistemological: what *should* we *believe* (the *should* reflecting normativity and the question of *belief* placing these considerations centrally within epistemology). We must try to answer these questions with such intellectual rigor as to silence skeptics (provided that they also accept such a requirement of rigor).

Establishing claim (viii) also involves normativity, but this time the considerations are ethical and, on occasion, aesthetic. Even if it is taken as established that there are serious ongoing environmental problems, it does not immediately follow that we have an obligation to act. To get to such an obligation, we have to analyze carefully the nature of our relation to the environment. For instance, we have to assess whether the environment embodies some sort of value that requires us to refrain from harming it, in the same way that we have an ethical obligation not to harm another human being. Or perhaps, alternatively, we should not harm the environment because of how we value humans themselves. For both alternatives, moreover, it may be the case that we have not only an obligation not to harm, but also a positive obligation to nurture features of our environment (for instance, endangered species at risk of impending extinction).

Suppose that we have successfully established claim (viii). Epistemological considerations return to haunt us when we take seriously the obligation to act and begin devising strategies to protect the environment. Moreover, now they often become intertwined with ethical and aesthetic ones. Some of the purely epistemological considerations are similar to those mentioned earlier. Given our empirical knowledge, our models, and all the uncertainties involved, what policies are likely to produce the desired results? There also

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is a radically new element. Environmental change is often irreversible: recall the much-used slogan “Extinction Is Forever.” Not only must we act under uncertainty, but sometimes we may also feel that it is imperative to act immediately. We may not have the time to collect all the data we would like or to satisfactorily complete theoretical analyses before acting. Suppose, for instance, oil interests threaten a wildlife refuge.<sup>14</sup> Oil industry managers claim that oil exploration will have, at most, a minimal negative impact on the future of wildlife. The data needed to establish the veracity of this prediction would take years to collect. But in the political arena, the oil industry must be answered now. We have to decide whether we are willing to accept the risks involved in oil exploration. If we opt to allow exploration and the industry managers’ predictions about the impact on wildlife are wrong, the harm done to wildlife may be irreversible. Somehow, we must navigate between our epistemological uncertainties and the potential ethical, aesthetic, and even economic costs of irreversible harm to wildlife and other components of biodiversity. Scenarios such as these are not at all uncommon: the fossil fuel industry threatens habitats almost everywhere in the world; logging threatens rainforests; the Japanese and Norwegians seem to have an irreplaceable appetite for whale meat; elephant ivory from Africa remains a lucrative trade.

## 1.1. A FOCUS ON BIODIVERSITY

These are the sorts of issues that concern environmental philosophy: like the rest of philosophy, it is inherently a normative discipline. This book will explore how environmental philosophers and scientists (and others) analyze and navigate these issues when confronted with concrete environmental problems in everyday practice, but with an emphasis on general conceptual issues and the principles on which policies are based rather than on contextually contingent detail. The focus of this book will be on the loss of biodiversity, which will be taken to be exemplary of the environmental problems we currently face. (“Biodiversity” will be formally defined in Chapter 6, § 6.4; devising a satisfactory definition is not easy. For now, it will be used informally to refer to diversity at all levels of taxonomic organization, particularly the level of species.)

<sup>14</sup> In the United States in 2004, this is not a purely hypothetical example: oil interests, with the active support of an erstwhile oilman president, continue to threaten the pristine Arctic National Wildlife Refuge.



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However, except for one chapter (Chapter 6), which is specifically concerned with the details of conservation biology as it is currently practiced, virtually all of the arguments and analyses will be applicable to many other environmental contexts. Issues such as the difficulty of estimating parameters and teasing out definite predictions from ecological models, coping with unquantifiable uncertainty, and yet having to make decisions with irreversible consequences, permeate all thoughtful discussions of biodiversity conservation. But they are also equally relevant to all other significant environmental concerns. For instance, they have been central to the recent debates about the existence and anthropogenic etiology of climate change, and about the risk posed to communities by the storage of nuclear or other hazardous wastes in their neighborhoods.<sup>15</sup> Thus a focus on biodiversity conservation does not illegitimately constrict the issues considered in environmental philosophy. Except for the fact that the present context requires the use of ecological models, many of these epistemological discussions – in particular, the analysis of uncertainty – are also relevant to many other contexts in which science interacts with society, for instance, medical contexts.

At least to some mitigated extent, the focus on biodiversity can also be defended by arguing that many other, though certainly not all, environmental concerns can ultimately be accommodated within an exploration of our concern for the persistence of life on Earth. It is worth examining how far this argument can be pushed. To the extent that it is legitimate to distinguish between biological and cultural requirements for human life and well-being, these other environmental problems are generally perceived as such because they mainly threaten the *biological* basis of human life.<sup>16</sup> For instance, pollution biologically threatens human health and life in the short term; climate change is similarly threatening in the long term. But pollution also threatens many other forms of life wherever it occurs: oil spills from tankers are notorious for devastating marine life. Climate change has already been implicated, though not yet uncontroversially, in at least one extinction, that of the remarkable golden toad, *Bufo periglenes*, in the otherwise pristine Monteverde cloud forest reserve in Costa Rica.<sup>17</sup> These are typical cases.

<sup>15</sup> See, for instance, Shrader-Frechette (1991), a work that is primarily concerned with pollution. Much of that discussion of risk can be co-opted without modification for use in the context of biodiversity conservation.

<sup>16</sup> This, perhaps, helps to explain why environmental politics often does not respect the traditional cultural political boundaries between the Left and the Right.

<sup>17</sup> See Pounds, Fogden, and Campbell (1999). The extinction of the golden toad is usually taken to be an exemplar of a general amphibian decline “crisis” – see Sarkar (1996) for a critical discussion of the issues raised by this and similar examples.



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Any biological factor that is systematically threatening human life will also threaten many other forms, at least of animal life: human biology is not special at this level of generality. Consequently, exploring the problems that threaten life on Earth in general – that is, biodiversity – ipso facto includes an exploration of these other problems. If anything, what is special about biodiversity depletion is that it also raises other environmental problems, for instance, concerns about seemingly useless pieces of land, desert habitats, remnants of prairie in abandoned rail tracks in the North American Midwest, and so on.

While biodiversity depletion should perhaps be central to any exploration of environmental philosophy, it would be illegitimate to suggest that the issues covered in this book exhaust the scope of environmental philosophy. For instance, many political issues, including those concerning equity and environmental justice that arise in the context of discussions of pollution, and that are central to political philosophy, are usually not discussed in the context of biodiversity depletion.<sup>18</sup> But even here, it is difficult to draw a clear line. The claims made at the end of the last section implicitly assume that there is a higher social cost involved in compromising the diet of the poor than in changing the diet of the rich. This is an assumption about equity, and it arose in the context of biodiversity conservation.

Finally, it is probably worth noting that the problem of biodiversity conservation does not exhaust all the themes that fall within the practice of contemporary conservation biology. Two themes that will not be explored here are those of sustainability and restoration.<sup>19</sup> Both merit much more philosophical attention than has so far been afforded to them. This book remains limited in its scope even within the domain of philosophical issues raised by conservation biology.

## 1.2. THE STRUCTURE OF THE BOOK

The remaining chapters of this book will explore a variety of issues connected with thinking about the environment, particularly biodiversity, and the interrelations among these issues. The purpose of this book – as noted in the Preface – is not to defend any single position definitively. Rather,

<sup>18</sup> For a recent philosophical exploration of issues surrounding environmental justice, see Shrader-Frechette (2002). Important earlier works include, especially, Wenz (1988).

<sup>19</sup> In the case of sustainability, Norton's (2003) collection of essays, *Searching for Sustainability*, provides a start.

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it is to lay out a set of related tentative positions that deserve further exploration. Throughout, because of the potentially broad interest in environmental philosophy, an attempt has been made to avoid unnecessary philosophical jargon, whether it be in ethics or epistemology. Roughly, the first half of the book (Chapters 2–4) concerns ethical (and, to a lesser extent, aesthetic) rationales for biodiversity conservation (and, somewhat more generally, other aspects of the conservation of nature). What is defended is a broadly anthropocentric perspective for biodiversity conservation. The second half of the book (Chapters 5–7) explores epistemological issues. “Epistemology” is being construed here broadly, to include questions about the so-called logic of the sciences (the confirmation of scientific models and theories, the quantification of uncertainty, etc.), the representation of nature in models (realism versus instrumentalism, etc.), as well as the relationships among the various sciences. The most important claim defended in the second section of the book is that conservation biology should be viewed as a discipline distinct from ecology. The structure of conservation biology is also explored. Together, these two parts provide a reasonably complete exploration of the philosophical issues arising from biodiversity conservation.

It is important for the program pursued in this book that the normative justification for biodiversity conservation be developed first, before the discussion turns to the technical foundations of conservation biology. The particular justifications for biodiversity conservation that are found acceptable will constrain what is permissible in the practice of conservation, for instance, whether an accommodation of identifiable human interests alone is sufficient for the design of an ethically defensible conservation policy. The justification for biodiversity conservation defended in the first part of this book is anthropocentric. Consequently, the framework developed in the second part for incorporating both biodiversity-related and other human values into a conservation plan employs techniques co-opted from the social sciences. Had the first part of the book concluded that biodiversity conservation has its ethical basis in nonhuman values and interests, no such seamless transition between biodiversity-related values and other human values would have been possible.

Chapter 2 consists of a philosophical exploration of the nature of our concern for the environment at a very general level. It explores the question of what it means for us to be concerned about the environment. In particular, it explores the role played by two myths, that of lost futures and that of the golden age, that often lie behind this concern. The latter myth is also shown to lie behind the concern for wilderness preservation, which is a dominant