16. | The Call of the Wild

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Abstract: Archaeology and related fields that contemplate time periods of centuries or millennia have shown that diverse environmental features are legacies of past human–environmental interactions, a finding documented for numerous locations, settings, and periods around the world. Yet, scholarly disciplines and management activities that would benefit from this information are not making efficient use of it. Rather, several basic postulates fundamental to ecology, conservation biology, environmental restoration, and wildlife management derive not from scientific study but instead from sociocultural phenomena. This is especially evident with concepts such as "Nature," "pristine," and "wild"—concepts that are basic to the perception, interpretation, evaluation, and valuing of academic pursuits and management activities. It is essential that archaeological findings and approaches to understanding human–environmental interactions be integrated into these other disciplines.

For decades academics from diverse disciplines have questioned the concepts of "pristine" and "wild" areas, associating them with the "invention of an American tradition" and the "pristine myth." Archaeologists, ecologists, geographers, historians, philosophers, and other scholars have shown that human impacts on diverse environments have been widespread, profound, and sustained over millennia. Yet, myths and traditions once established do not simply disappear, despite evidence marshaled to debunk them. Moreover, advocates of these myths and traditions are not just illiterate, uneducated, emotional, irrational laypeople: many practitioners of scientific disciplines tenaciously battle various socioeconomic activities to achieve protection and restoration of "pristine" areas. Nature is widely understood by Westerners to refer to something that is both measurable and sacred. Yet, this is a social construct, and initiatives to protect

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it—despite the intentions—are driven by sociocultural values, not genetically innate biological phenomena. No doubt, humanity faces, and always has faced, serious environmental problems—some of the most serious of which are of its own making. However, if conservation biology is truly to be a science-based, as well as mission-oriented, discipline, concepts and actions must be guided by testable hypotheses—not simply by myths and customs. Archaeology is uniquely suited to provide substantive evidence about how *Homo sapiens* is, and has been, a critical component in the modification, development, and maintenance of diverse ecosystems, terrestrial and marine, from subpolar to tropical latitudes. Understanding the role of humans in ecosystem structure and function is essential for enlightened management of human–environmental interactions, and archaeology must play a leadership role in this area.

Environments—Anthropogenic and Otherwise

The word *environment,* like so many commonly used expressions, has various meanings. In broad terms, the expression refers to "the totality of circumstances surrounding an organism or group of organisms" (*American Heritage Dictionary of the English Language* [*AHDEL*] 2000). Excluding definitions that refer to computer environments (which in the source noted involve nearly half the senses), there are two different ways to perceive "the totality of circumstances surrounding an organism": "the combination of external physical conditions that affect and influence the growth, development, and survival of organisms" and "the complex of social and cultural conditions affecting the nature of an individual or community" (*AHDEL* 2000).

Different academic disciplines conceive of, and investigate, the environment in various ways, some focusing on the physical conditions, others concerned with social and cultural conditions, with further important differences within these broad generalizations (Balée 2006). Archaeology must deal with both facets of the environment, for this discipline not only involves the recovery, measurement, identification, and evaluation of tangible "external physical" components, but it also contemplates the "social and cultural conditions" that interacted with the tangibles that are under study. Hence, archaeology forms a disciplinary and conceptual bridge between the "earth and natural sciences" on the one side and the "social sciences" and "humanities" on the other.

Anthropogenesis and Environments

It may seem trivial to state that environments are—in the majority of the definitions and senses—created by humans, whether they are computer systems or social-cultural systems. But, this appreciation is essential to bear in mind when contemplating environments as "external physical conditions," the primary theme of this Visiting Scholar Conference, for in some disciplines environments are routinely considered to exist independently of humans and their

actions. Thus, even this apparently straightforward concept is commonly confounded. For example, in providing the above definitions for *environment,* the *American Heritage Dictionary* gives the following quote, supposedly to help elucidate the idea of external physical conditions: "We shall never understand the natural environment until we see it as a living organism" (*AHDEL* 2000). Hence, no matter how hard we may try to extricate them, humans and their cognitive processes are inextricably connected to understanding environment (Hassan 2000; McIntosh 2000; McIntosh et al. 2000; Rozzi 1999).

This truism is gradually being accepted by practitioners who deal with mitigating human impacts on the physical environment, but there are still numerous active semantic, philosophical, epistemological, and ethical debates—many of which are presented as if they were simple, pragmatic, "objective, scientific" proposals. Part of the problem stems from confusion or misunderstanding about the history of environmental enlightenment. Although it is often claimed that the conservation movement is a recent phenomenon (e.g., Meffe and Viederman 1995; Raven 1987), concerns about human impacts on the physical environment, or ecology, date back millennia. One of the more cited examples includes the pillar and rock edicts of Emperor Ashoka, which date to the third century B.C.E. and are located throughout what was once the Mauryan Empire, present-day India (Dhammika 1993). Other ancient examples of environmental concerns include the Greeks (Hughes 1985) and the Mande of the Middle Niger (McIntosh 2000), and Balée (2006:78) gives other examples.

Evidence of premodern human impacts on environmental features is widespread and abundant, involving all continents but Antarctica and all ocean basins, as well as a wide diversity of environments; in many cases these involve the creation and even maintenance by human societies of specific external physical conditions (e.g., Bailey et al. 2000; Balée 1989, 2006; Blondel and Vigne 1993; Bowden 1992; Broughton 2002; Butzer 1996; Chapman et al. 1989; Cronon 1983; Denevan 1992, 1996; Diamond 1986a; Edwards et al. 1994; Endfield et al. 2000; Flannery 1994; Hames 1996; Hayashida 2005; Hughes 1985; Hunter 1996; Kay 1995; Kay and Simmons 2002; Kirch 1988, 1996; Lewis 1980; McDonnell and Pickett 1993; Marsh 1864; Miller et al. 1999; Nicholson and O'Connor 2000; Rick and Erlandson 2008; Turner and Butzer 1992; Willis and Birks 2006; Wilson 1992). Intentional prehistoric human impacts range from below sea level to nearly 7,000 m above sea level; for example, there are ceremonial Inca sacrifice and burial sites on various high Andean peaks, such as Llullaillaco, Argentina, 6,739 m above sea level (Previgliano et al. 2003). Even although the recognition of pervasive anthropogenic effects has become well established for terrestrial species and environments, it has not been until relatively recently that there has been a wider appreciation that freshwater (Hoffmann 1996, 2000, 2008; Humphries and Winemiller 2009) and marine species are subject to substantive human impacts, such as extinction (Dulvy et al. 2003; Musick et al. 2000; Roberts and Hawkins 1999), with conclusions that freshwater and coastal marine environments are far from "pristine" (e.g., Carlton et al. 1991; Hoffmann 2008; Humphries and Winemiller 2009; Jackson 2001; Jackson et al. 2001; Rick and Erlandson 2008; Simenstad et al. 1978). Human impacts on coastal environments are widely documented throughout the

Mediterranean since well before the time of Christ, including Lanarca, Cyprus (4000 B.P.; Morhange et al. 2000) and Marseilles, France (3700 B.P.; Morhange et al. 2003), as well as elsewhere in Europe, such as San André, Portugal (400 B.P.; Cearreta et al. 2003). In summarizing the "dynamic environment" at Niuatoputapu Island and surrounding marine area in Polynesia, Kirch (1988:247, 250) concluded that "there is little that could be said to represent a 'natural' environment" and "we now recognize that entire island ecosystems must be understood as the consequences of human actions." As he explained (Kirch 1996:5300), "It will behoove those interested in understanding the 'human dimensions of global change' to take account of archaeological and paleoenvironmental records spanning at least the full Holocene period." In the case of some marine species that migrate long distances, such as marine turtles, prehistoric exploitation in certain localities may have impacted populations in other distant localities millennia before humans actually arrived (Allen 2007:968).

Not all scholars agree on the level of importance of past human impacts (e.g., Bush and Silman 2007; Keeley 2002; Russell 1983). Indeed, during the nineteenth century a common school of thought was that external physical conditions of the earth were entirely the result of nonhuman actions, and humans were simply helpless witnesses to the "forces of Nature." This supported a cultural mind-set, particularly in the United States, in which Nature was regarded as a synonym for "environment," while "wild," "wilderness," and "pristine" were qualifiers describing perfect states of "natural" environments, or Nature (Bowden 1992; Nash 2001). However, in the mid-nineteenth century G. P. Marsh broke with this convention to argue that there is interdependence between humans and the external physical environment (Marsh 1864). Over the past century and a half there have been countless publications documenting profound human–environmental interactions, and in the past decade these have included scholarly books, semi-popular books, articles in "high impact" professional journals, and popular articles (e.g., Diamond 1997; Flannery 1994; Mann 2006; Martin 2005; Martin and Klein 1984; Martin and Wright 1967; Pearce 2007). Moreover, very readable books on this topic, such as *Changes in the Land* (Cronon 1983) and *1491: New Revelations of the Americas Before Columbus* (Mann 2006), have been given rave reviews. Cronon's classic study was even given a shining review by the organization Religious Studies in Secondary Schools (RSiSS 2003), in which it has been made very clear that there are "natural and human influences on what is a dynamic natural system." Hence, the visibility and impact of these publications have been notable in various sectors of society, from academic to scholastic to popular; and this has been the case for decades.

One of the most dramatic aspects of human–environmental interactions involves prehistoric fauna and the decades-old debate about extinctions—particularly megafaunal extinctions—and aboriginal overkill (Alroy 2001; Grayson 1991, 2001a, 2006a, 2007; Grayson and Meltzer 2002, 2003; Jones et al. 2008; Martin and Klein 1984; Martin and Wright 1967; Miller et al. 1999). There is ample evidence that the faunas of islands in the Caribbean, Mediterranean, and Pacific were permanently and irreversibly altered by human colonization, resulting in extinctions, or decimations of certain species and the introductions of others; and these effects

are documented in both terrestrial and marine environments (e.g., Kirch 1988, 1996; Nagaoka 2002, 2005, 2006; Rick and Erlandson 2008; Sonddar 2000; Spennemann 1987; Steadman and Stokes 2002; Steadman et al. 2002). Hence, there is a general consensus that contemporary island biotas, environments, and landscapes are legacies of past human actions. However, the situation regarding continental faunas is much less clear and has been hotly debated for decades (Bowman 2002; Diamond 1986b, 1989a, 1989b, 1997; Flannery 1994; Grayson 1984a, 1991, 2001a, 2001b, 2007; Grayson and Meltzer 2002, 2003; Miller et al. 1999).

Regardless of whether or not some ancient group of *Homo sapiens* exterminated the last member of some now-extinct species, there is a more consequential—although perhaps less spectacular—question of how human actions have contributed to changes in broader environmental, ecological, conditions: changes that subsequently resulted not only in population decimation or extinction of certain species but also transformations at the level of ecosystems and landscapes. The potential for these sorts of major environmental changes is well established in the ecological literature (e.g., Chapin et al. 1997). Contemporary ecological studies have concluded that human-induced extinctions have been more frequent than previously estimated, especially because of habitat destruction (Pimm et al. 2006). For example, in situations where complex ecological interactions and webs are involved, simple population reductions of one or more keystone species can have enormous ramifications on not only fauna (da Fonseca and Robinson 1990; Diamond 2001; Gilbert 1980; Memmott et al. 2006) but also on vegetation, as well as physical components and processes of the environment, such as humidity, temperature, soil pH and nutrients, erosion, precipitation, wind, and other environmental variables (e.g., Cronon 1983; McDonnell and Pickett 1993). In this vein, it is important to understand that *Homo sapiens* has often served as a keystone species during prehistoric times, and this function can have enormous impacts on prey species, vegetation, and landscapes (e.g., Balée 2006:85; Kay 1995; Wolverton et al. 2007).[1] Although most research on this issue has been carried out on terrestrial environments, some dramatic examples from marine and freshwater ecosystems are known (e.g., Hoffmann 1996, 2000, 2008; Rick and Erlandson 2008; Simenstad et al. 1978; Springer et al. 2003); "there are very few wilderness regions whose freshwater fish populations remain unexploited" (Humphries and Winemiller 2009:678). The process of single-species disruptions to food webs that result in dramatic alterations, even extinctions, to flora and fauna, with major effects on vegetation, has been termed "ecological meltdown" (O'Dowd et al. 2003; Solé and Montoya 2006; Terborgh et al. 2001). Despite the dramatic imagery of this expression, environmental transformations can occur through subtle, cascade events, that in the end produce gradual but significant changes to the environment (e.g., the decimation of a freshwater detritivore with subsequent impacts on carbon cycling, nutrient cycling, and primary production in freshwater ecosystems [see discussion in Humphries and Winemiller 2009:679 and following]), many of which may be irreversible, e.g., through the introduction of a predator (Croll et al. 2005). And, as the studies already cited have shown, again and again, for different places, times, and ecological and social situations, humans can clearly be agents of such change.

While students of the natural sciences have provided copious amounts of information on the effects that humans in contemporary times have had on various environments, there are several other disciplines that may be even more relevant to this issue. Of particular importance are studies that go under the names of ecological history (Hayashida 2005), environmental history (Bowman 2002; Foster 2002a; Hoffmann 2008; Motzkin and Foster 2002; Turner and Butzer 1992; van Gemerden et al. 2003), evolutionary history (Russell 2003), historical ecology (Balée 2006; Crumley 1993; Crumley, ed. 1994; Swetnam et al. 1999), historical geography (Foster 2002b), paleoecology (Willis and Birks 2006), and political ecology (e.g., Kay and Simmons 2002);[2] archaeology is of special importance because in many ways it runs transversally through all of these. There is no question of the unique contributions that archaeological studies have made to understanding—and managing—the interrelationships between humans and their environments; this has been clarified and emphasized by several leaders in the field (e.g., Balée 2006; Butzer 1996; Grayson and Meltzer 2003; Lyman 2006a; Thomas 1996), as well as in recent reviews (e.g., Frazier, ed. 2007; Lyman and Cannon 2004). The landscapes of the Near East provide a classic example, where throughout the Holocene humans altered the environment to such an extent that the land has been transformed into a human artifact (Wilkinson 2003). These, and many other, studies have provided diverse, abundant, and convincing evidence for substantive impacts on the environment by past human societies (e.g., Balée 1989, 2006; Bottema et al. 1990; Bowman 1998; Briggs et al. 2006; Denevan 1992; Fish et al. 2006; Foster 2002a, 2002b; Gilson and Willis 2004; Hayashida 2005; Heckenberger et al. 2003; Heizer 1955; Kühne 1990; McIntosh et al. 2000; Roosevelt 2000; Stahl 1991; Sullivan and Downum 1991).

Archaeologists and Environments

Archaeologists provide unique information about prehistoric ranges of various animals (e.g., Graham et al. 1996; Grayson 2005; Lyman 2006a, 2006b, 2009; Newsome et al. 2007; Wake 2006), as well as about prehistoric landscapes and other aspects of the physical environment: information that is essential for contemporary interpretations and policies about reintroductions, ecological restoration, and other conservation activities. Yet, there has been a fundamental lack of communication, and even less cooperation, between the natural sciences and archaeology (e.g., Briggs et al. 2006; Butzer 1996; Crespi and Greenberg 1987; Foster 2002b, 2002c; Gilson and Willis 2004; Heckenberger et al. 2003; Murphree 1998). As Bowman (2002) explained, ecology eliminates humans, while history focuses on them. McIntosh and colleagues (2000:7) concluded that "there seems to be a growing gap between biophysical and historical scientists, a 'dialogue of the deaf,' in which each camp pursues its own agenda almost oblivious to the concerns of the other." Historians have reached similar conclusions: "Natural scientists commonly lack training to find or interpret characteristically fragmentary data from the past. Sometimes this results in the false assertion that no science means no change. . . . At best, this encourages self-defeating acquiescence in ignorance" (Hoffmann 2008:47).

In addition to the voluminous evidence compiled by archaeologists, historians, and others, there is another thesis that goes beyond all these, put forth by a climatologist of considerable repute. His argument is that historic trends in atmospheric accumulation of methane and CO^2 over the past millennia deviate from predicted values, and this becomes noticeable about the time that large-scale agriculture began. Hence, he hypothesizes that human societies had major effects on the earth's climate beginning some 5,000 years ago (Ruddiman 2001, 2005). The implications of this argument transcend ecological meltdowns involving a keystone species and the ecological community that it sustains, and even anthropogenic transformations of specific landscapes. If Ruddiman is correct, then humans changed the planet's climate thousands of years ago and have been intensifying the level of this all-important environmental perturbation ever since, with ever greater impacts on various aspects of the earth's environment.

In part the problem of lack of cooperation between archaeology and the biological sciences may stem from the fact that archaeology routinely employs proxy measures to interpret how environments in the past may have appeared before human impacts drove them to their present condition (e.g., Grayson 2007; Oslisly 2001; Pokines 2001; Wolverton et al. 2007). This gives the appearance of a "soft" science, based on hypotheses that cannot be tested; this is the stuff for interdisciplinary sanction and exclusion among the "hard sciences" (Brown 1994). However, the climatological interpretations of Ruddiman are based extensively on proxy measures, but this field of investigation tends to carry greater credibility than the "social sciences." This situation has led to disparaging comments such as those of Butzer (1996:142), who argued that biologists or earth scientists have "monopolized" work on environmental change, ecological degradation, or sustainability—and he pointed out that "contemporary ecosystems are the product of millennia of co-evolution between environmental components and human activities. . . . Biologists are certainly no better qualified than archaeologists to deal systematically with the human side of that interrelationship. Like most larger problems confronting human society today, ecological issues are sufficiently complex to demand a new and greatly expanded medium of interdisciplinary interaction and collaboration. Archaeology should, indeed must, be a major player. It has unique capabilities not only to generate an indispensable archaeological database, but also to understand long-term land use and its implications."

Natural Sciences, Unnatural Sciences, and the Nature of Their Practitioners

If humans, both individuals and societies, interact with the external physical environment producing significant alterations, some of which are irreversible, this begs the question of how to conceive of Nature. This question in turn leads to a centuries-old, and still active, debate about the dichotomy between Man and Nature. For decades ecologists and conservation biologists have been struggling to define fundamental concepts such as Nature or "naturalness" (e.g., Anderson 1991), which are often expressed in other terms such as "bio-

logical integrity," "biotic integrity," "ecological health," "ecological integrity," or "intact nature" (Karr 1990; Kinne 2006; Machado 2004). One exercise (Steinhardt et al. 1999), to give a higher degree of scientific "sophistication," used abstruse terms to express varying degrees of naturalness, or "hemeroby," beginning with "ahemerobe" (= "natural") and extending through "oligohemerobe," "mesohemerobe," "β-euhemerobe," "α-euhemerobe," "polyhemerobe," and finally "metahemerobe" (= "artificial"). The debate also involves politically delicate questions, such as whether or not aboriginal/first-nation/indigenous peoples are "natural" and part of Nature (e.g., Haila 1997; Hunter 1996; Machado 2004).[3]

Despite one's position regarding whether or not certain members of the human race should be regarded as part of Nature, there is a steadfast position among many (a majority of?) ecologists and practitioners of conservation biology to separate *Homo sapiens* from Nature (Bowman 2002) and treat conservation as the protection of specific parts of the physical environment, with a blissful ignorance of any past human impacts (Willis and Birks 2006). Moreover, conservation discourses generally indicate that conservationists have little concern for the usual dilemmas that archaeologists must confront when trying to interpret past human–environmental interactions and trends. For example, Moseley and several other colleagues also working in Peru have championed the basic need to understand past environmental perturbations, such as droughts, floods, and tectonic movement and tsunamis, events that overshadow anthropogenic activities and drive human adaptive responses (Bird 1987; Moore 1991; Moseley 1983, 1987; Moseley and Richardson 1992; Reitz and Sandweiss 2001; Rollins et al. 1986). Yet, droughts, floods, landslides, hurricanes, wildfires, volcanic eruptions, earthquakes, tsunamis, and other such "natural disasters" are conspicuous by their absence from the literature on conservation planning and priorities. Similarly, Graham (1988:391) explained that with few exceptions the design of conservation reserves usually does "not take into consideration the potential response of the biota to long- and short-term climatic changes," despite the fact that studies of past faunas clearly show the need to include contingencies for climate change in reserve design.

Many of the statements and general concepts about the seriousness of human impacts on the environment show that there is a basic assumption that physical environments exist "in balance" or something close to a steady state—until humans perturb them: e.g., "[i]n some areas the natural processes have been so degraded by our activities that, if humans were removed, it might take millennia for those processes to recover" (Anderson 1991). Various attempts to categorize, or even quantify, "naturalness" have excluded, or even expressly omitted, temporal factors (Machado 2004; Sanderson et al. 2002 and references therein).

Some of the world's most influential and powerful people in the world of conservation biology developed a thesis for "mapping the conservation landscape" (Redford et al. 2003). Aside from the paradox of criticizing conservation literature for employing vague and undefined terms, but then using their own buzzwords, or the fact that the authors assign society the simplistic role of providing support for the conservation mission, this paper—published in one of the leading conservation journals—gave only passing mention of "human-altered species

and communities." Indeed, human impacts on the environment were referred to as "handiwork," suggesting that they are just minor and superficial. There is repeated reference to the importance of "the wild" and wild lands as conservation priorities, indicating that a major priority of the more powerful conservation organizations is to rehabilitate ("re-wild") areas where human impacts are absent or minimal—i.e., where Nature is unburdened by *Homo sapiens*, with the implicit assertion that these areas bear no influence of past human activities. Spatial scales are given exhaustive treatment, while temporal scales are virtually absent.

A similar effort in the same vein was to quantify the "human footprint" on the land and then map "the last of the wild" (Sanderson et al. 2002). "Wildness" is used as an index of low human impact; and the authors state that "it is in these wildest places that the greatest freedom and opportunity to conserve the full range of nature still exists" (Sanderson et al. 2002:897). For example, the multicomponent map of the northeast of the United States clearly shows intense human impact, or "footprint," in the megalopolis area from Boston to New York City, with refreshing patches of green, low impact, in the Catskill and Adirondack Mountains—just as one would expect. However, the article indicates that land transformation during historic times begins with a state of no impact—perfect wildness—and proceeds to degrade from there. The problem with this approach is illustrated in the case of Gabon, West Africa. Sanderson and colleagues report low human impact in the Ogooué Valley, in the northeast of the country, the site of Lopé-Okanda National Park, emphasizing the need to protect this area. However, archaeological studies clearly show that this same area that is "wild" today was the site of numerous significant human impacts dating from the Early Stone Age through the Iron Age; and it has been concluded that today's vegetation is the result of over a hundred thousand years of human impacts (Oslisly 2001). This area that is today regarded as "wild" is in fact a "relict cultural landscape" (World Heritage Committee 2007). There are many other examples of "wilderness" areas around the world that have high conservation values, despite the fact that they are cultural landscapes (e.g., Balée 2006; Delcourt and Delcourt 2004; Denevan 1992; Hayashida 2005; Mann 2006).

The Unnatural Nature of Nature

Hence, the contemporary perception of Nature depends intimately on a variety of basic assumptions—most of which are never explained, and many of which are simply indefensible. This in turn leads to arbitrary decisions about what to prioritize and how to proceed in regards to Nature conservation (e.g., see debates such as Karr 2009 and Lackey 2009). It seems that few people involved in the debate fully appreciate that Nature is an allegory,[4] a social construction, and that conserving Nature must involve the consideration and discussion of social values and ethical questions (Murphree 1998; Rozzi 1999): that not only space—but also time—must be considered in relation to environmental issues (Comer 1997; Haila 1997). For example, Bowden (1992) argued that there has been a conscious effort to "invent an American tradition" through the consecration of Na-

ture and wild environments. Other authors have written about the relationship between the ideal of "wilderness" and the American mind (Nash 2001). There are curious examples of how seemingly unrelated events, such as the development and popularization of the automobile, promoted the development of the wilderness movement (Sutter 2002). Geographer William Denevan (1992) summed up this state of affairs with the insightful expression "the pristine myth."

The environmental historian William Cronon has championed scholarly investigation of human–environmental relations, nurturing careful reflection and interaction between academics and practitioners of different disciplines and backgrounds. Several edited, multiauthor books spawned from these exercises (Cronon 1995, 1996) have illustrated, in chapter after chapter, the complexities involved in human interactions with the environment and the central importance of understanding a diversity of social issues, including, for example, commercial enterprises and media ventures (Davis 1996; Page 1996). As Soper (1995:254) explained, "[t]he ecology movement, when viewed as a whole, draws its force from a range of arguments, whose ethical underpinnings are really quite divergent and difficult to reconcile."

There are signs that the mythical nature of the wild is gradually being recognized among some conservationists. A 2007 issue of *Conservation Magazine,* the semipopular journal of the Society for Conservation Biology—one of the most influential and powerful conservation societies—carried a special article stating that "[p]ristine forests of the Amazon were not encountered in the sixteenth and seventeenth centuries; they were *invented* in the late eighteenth and early nineteenth centuries" (Pearce 2007:23, emphasis added). In addition, highly respected theoretical ecologists have made very clear pronouncements in the same vein (e.g., Lawton 1997). Hence, while often ignored, there is enormous importance in understanding the ways that past and present humans have *perceived* the environment and their role therein (e.g., Hassan 2000; McIntosh et al. 2000; Sutter 2002); and this realization may gradually be infiltrating into disciplines from which it has been absent, if not rejected. For example, there are now well-organized initiatives to support protected areas and biological conservation through diverse faith-based alliances (e.g., Dudley et al. 2005). Indeed, the reciprocal influences between scientific investigation and ethics are profound: "Ecologists are not neutral scientists, nor are they observers of nature who are passively influenced by their culture; instead, by providing scientific views of nature, ecologists play a central role in shaping social attitudes toward nature. . . . Nevertheless, some ways of observing and understanding the natural world are more concordant with the styles of life and the kinds of relations that societies establish with the natural world" (Rozzi 1999:919). In this light it is essential to understand that humans not only have a long history of interacting with and impacting many components of the physical environment, but also that for millennia we have been shaping evolutionary processes for countless species (Russell 2003). Whether or not one refers to this as "playing God," it means that the moral and ethical implications of human actions on environmental features are complex and profound.

Discussion

The importance of understanding the true nature of Nature transcends academic debate and scholarly pursuits. Different sectors of society have divergent, often conflicting, views and expectations of how to relate with the physical environment, or "Nature." For some, the environment is a source of material resources and benefits, while for others, it is a source of inspiration and emotional fortitude, requiring protection and sacred admiration. The divergence can produce intense social conflict, if not violence (Murphree 1998; Orlove and Brush 1996; Theodossopoulos 2003) and such misunderstanding and social conflict are useless to all but a small fraction of society that profits from discord.[5]

Enhancing understanding and cooperation requires proficient use of various sources of information and knowledge. The omission, undervaluing, or rejection of fundamental sources of information on human–environmental interrelations does not serve scholarly investigation or practitioners who manage these very complex relationships. As described above, basic—highly relevant—information from archaeology, history, and related disciplines is not integrated into many aspects of biological conservation. For example, a concept central to conservation biology is "sustainable use," but this issue is normally evaluated over periods of a few years, or perhaps decades, ignoring the fundamental need to understand trends over significant time periods: archaeology, a singular source of information on human–environmental interactions over periods of centuries or millennia, is rarely considered, and as a result, most statements and conclusions about sustainable use are not defensible within a context of "deep time" (Frazier 2007).

Disciplinary barriers must be bridged with conceptual and academic constructs. One essential step is to demystify, or deconstruct, some basic beliefs about Nature: to elucidate basic assumptions that are routinely formulated but rarely made explicit—much less defended. Implications of such epistemological frameworks, on both academia and society as a whole, also need to be illuminated. In addition, it is important for practitioners of undervalued, or rejected, disciplines to understand what sorts of communications and academic products are likely to promote greater acceptance and appreciation of their scientific wares: some suggestions follow.

Fundaments of the "Pristine Myth"

In many respects—some profound—the environment is as much a social construction as a physical entity: e.g., Nature as an allegory, regularly coupled with the pristine myth. Hence, attempts to measure and quantify Nature have been severely confounded by basic, often ignored, assumptions, typified by indefensible generalities. When spelled out, the incongruity of these underlying assumptions becomes obvious. For example, when establishing conservation priorities the following postulations are routine, although rarely stated specifically:

- large-scale spatial features are critical, but large-scale temporal considerations can be ignored or excluded;
- physical environments are essentially stable, until perturbed by *Homo sapiens;*
- nonhuman environmental variation (e.g., tectonic uplift, earthquakes, volcanism, landslides, climatic change, wildfires, floods, droughts, tsunamis, wind) can be ignored or excluded;
- *Homo sapiens,* as long-term agents of environmental change, or continuity, can be ignored.

These generalities stem from other, more basic beliefs—which are also rarely articulated:

- Nature and "naturalness" can be reduced to physical, measurable properties;
- uncertainty in human–environmental relationships can be overcome;
- social construction is irrelevant to the concept of Nature.

In turn, these beliefs are nurtured by fundamental mind-sets:

- *Homo sapiens* can be separated from Nature and the environment;
- all, or most, human impacts on the environment are "bad";
- "natural" and "wild" environments are sanctified.

Hunting the (Natural) Snark

The obsession with categorizing, evaluating, quantifying, and scientizing a metaphor (i.e., Nature) distorts the way we conceive of the environment and understand our—complex—interrelationships with the world, thereby putting conservation at risk. The usual priorities for conservation biology to measure, define, and restore Nature are formulated with a partial, often romantic and biased, perception of how confounded the concept "Nature" really is. Other attempts to capture an allegory, *Hunting the Snark* (Carroll 1891), have been described by comparative psychologists, sustainable-use advocates, and ecologists (Beach 1950; Bennett and Robinson 2000; Bond 2001). Ecology and conservation biology have struggled with the natural Snark for a century, and as with all Snarks, the natural Snark is always beyond our reach: surely it is a Boojum and cannot be restrained in the usual scientific traps![6]

Naturalizing Archaeology

Despite its unique value and importance to understanding and managing human–environmental interactions, archaeology is underused and underappreciated in ecology and conservation biology: "Broadening the scope of zooarchaeology [to link with wildlife management and conservation] will not

be easy, but it will be beneficial to our future, not only from the perspective of contributing to ensuring the preservation of biological diversity for future generations, but also . . . from the perspective of our discipline, which might otherwise become increasingly perceived as the pursuit of esoteric knowledge of little practical use" (Lyman 1996:120). In the same vein Hayashida (2005:43) cautioned against "possible uses and abuses of [archaeological] findings in management and policy debates." In this light, several programmatic recommendations may help promote the naturalization of archaeology; these can be grouped into five general topics.

Fortifying Archaeology

Comprehensive treatment of several basic issues would help strengthen the robustness of archaeological investigation and interpretation and build a more unified professional community. Develop:

- clear lists and explanations of basic assumptions that must be contemplated when reporting archaeological studies (e.g., consistency or change in environmental parameters or stability of certain social characteristics, or predictable recovery rates of certain boney elements; see for example Bartosiewicz 2008; Broughton et al. 2007; Cruz 2008; Lyman 1984, 1994; Pike-Tay et al. 2004);
- and promote clear protocols for quantitative and comparative analyses (e.g., Grayson 1984b; Lyman 1994, 2008);
- proposals for innovative, robust syntheses and comparisons, to respond to "real world" exigencies;
- workshops for standardization of archaeological methods, terms, and analyses;
- training and information exchange workshops;
- networks for collaboration and integration with specialists in other disciplines and practices.

Standardized procedures and protocols, promoting the transparent handling of assumptions, nurture a more scientifically robust and defensible corpus for archaeology, strengthening the discipline under the gaze of other scientific disciplines, some of which regard archaeology as a "soft science" of little relevance to the scientific enterprise. At the same time, these efforts at standardization need to be used as guidelines, to facilitate communication, comparisons, and standardized analysis—but they must not become "straightjackets" to innovation and intellectual freedom.

Integrating Archaeology

Illustrated, scholarly treatises that make archaeological findings readily available, and easily assimilated for other disciplines, will be invaluable for enhancing greater integration with other specialists involved in initiatives that are both academic and management oriented. Produce:

- atlases of archaeological species range maps, with changes and constancies over time (e.g., Graham 1988; Grayson 1981, 2005, 2006b; Lyman 1986; Lyman and Livingston 1983, and particularly FAUNMAP, see Graham et al. 1996);
- syntheses on past changes in food webs, or "ecological meltdown," or environmental-landscape change from anthropogenic causes;
- atlases and maps of cultural landscapes and anthropogenic environments;
- syntheses on "sliding baseline syndrome" (see Pauly 1995) of cultural landscapes (e.g., those that have taken on the quality of "natural," "pristine," or "wild" environments);
- atlases of environmental changes that impacted human societies;
- syntheses on social responses to environmental and landscape change;
- syntheses on economic-cultural resiliency and/or sensitivity to environmental and landscape change (e.g., McIntosh 2005).

These diverse atlases, maps, compilations, and syntheses will be invaluable for illustrating the central importance of archaeology to understanding how humans and their societies interact with various environmental and social scenarios over time and how changing components of the environment and society interact, affecting each other. A more thorough understanding of these interactions will be indispensable for integrating archaeology into the conceptual, theoretical, and management realms of various other disciplines. As mentioned above, there are excellent contributions in some of these initiatives, but there need to be more compilations and syntheses, so that they get into the mainstream of biological, ecological, and management initiatives. At the same time, efforts to synthesize, summarize, and simplify large amounts of often heterogeneous, complex information must not be used as caricatures, and become their own Snarks and Boojums.

Projecting Archaeology

The central importance of archaeological information and interpretations can be projected into other disciplines by relating directly to their respective priorities and critical issues. In this regard, documentation of the effects of degeneration, or abandonment, or succession in cultural landscapes would be invaluable for illustrating options for future land management and protected-area designation. Compile:

- syntheses of information on the recuperation and/or maintenance and/or loss of biological diversity (at the level of genes, species, ecosystems) in anthropogenic environments;
- case studies of the recovery of "the wild";
- case studies of responses, adaptation and resilience, of social systems to landscape changes.

That vast areas of land modified by past human activities have "recovered" (e.g., Anschuetz and Merlan 2007), or that many human-modified landscapes

have greater biological diversity than nonmodified (Balée 2006), "not only challenges some popular assumptions but, more constructively, could be used to estimate rates for the reconstitution of forests and their species diversity" (Butzer 1996:142). Moreover, "the success of ecological restoration projects depends on understanding how ecosystems respond to environmental changes, rather than mimicking past reference conditions" (Gilson and Willis 2004:994; see also Balée 2006; Lawton 1997). Making information available on how "the wild" has "recovered"—or been generated—from human-modified environments will be invaluable in projecting the value of archaeology into ecology and conservation biology. Of course, it is essential to understand—as emphasized above—that Nature is an allegory and "wild" is a culturally dependent concept. Hence, whether an environment has "recovered" or not will depend very much on the eyes of the beholder. The debate about the natural state of Yellowstone National Park is a clear example of this conceptual dilemma (Kay 1995).

Employing Archaeology

Once the basic information and tools described in the steps above are available, it will be necessary to effectively employ archaeological information and perspectives in multidisciplinary, multi-institutional proposals. Develop:

- protocols and plans for the rehabilitation and maintenance of biodiversity;
- protocols and plans for the recovery of "the wild";
- guidelines for the institutionalization of resilient policies for interdisciplinary approaches to conservation.

Archaeology will be more readily accepted and integrated with other disciplines when presented with academically robust arguments and harmonized procedures and protocols. When its scholarly products are easily assimilated by other disciplines, and when these products clearly show its unique contributions and strengths, archaeology will be more appreciated and valued. If these also include clear proposals for clarifying and reaching the goals of other disciplines, archaeology would be instrumental in purging unscientific postulates—such as the pristine myth—and avoiding futile attempts to scientize metaphors and capture Snarks, natural or otherwise. These conceptual exorcisms are essential for understanding how humans and environments interact and will enable more informed management of this relationship.

Respecting Archaeology

Factual and theoretical foundations can be established with the information described above. Applying these foundations effectively requires making adjustments in simple habits that have profound implications, such as the way common expressions are employed.

- Ban the words "Nature" and "natural" from scientific writings!
- Use great caution while in the "conservation" swamp!

While there is great urgency for archaeology to integrate with and support conservation, at the same time archaeologists must be aware that this sister discipline has many terms and concepts in common usage that are vague, loaded, or contradictory (Frazier 2005a:10; Redford et al. 2003); *biodiversity*—a much used (and abused) term in conservation biology—is a classic example of this problem (Vandermeer and Perfecto 1995). The difference between the modus operandi of most modern-day conservationists on the one hand (intimately dependent on vast material acquisitions and economic growth) and fundamental conservation principles on the other hand is an even starker example of basic contradictions between stated objectives and actual practices (Czech 2000). Moreover, there are numerous cases of complex sociopolitical issues involving conservation organizations: often idolized, but in reality characterized by questionable policies and practices (Chapin 2004; Frazier 2005b; MacDonald 2008).

Conclusion

In conclusion, careful, honest evaluations of long-belabored questions of Nature, "wild," and "pristine" environments must make use of interdisciplinary, more enlightened, vantage points. This involves a reexamination of commonly accepted assumptions about the relationships between humans and their environments, particularly concepts such as Nature and "wild." Much-accredited policies and proposals need to be reviewed objectively, with great caution paid to untested assumptions. For example, proposals such as the mapping of "the human *footprint* and the *last* of the wild" (Sanderson et al. 2002) might be more effective if reconceived as maps of "human *tracks* and *rejuvenation* (or *resilience*) of the wild." This approach would lead to fundamental transformations of several scholarly and management endeavors: notably, replacing *Homo sapiens* back into the environment, where several authors consider us to be—and to have been since prehistoric times—a keystone species (Briggs et al. 2006; Day 1953; Kay 1998; Meilleur 1994; O'Neill and Kahn 2000). In fact, including humans in Nature would be an effective way of reclaiming ecology.

Notes

1. For a discussion of "keystone species" see Frazier (2005a, especially the account starting on page 11).

2. See Balée (2006) for a detailed epistemological discussion of the different programs, paradigms, postulates, theories, etc. related to these various fields of study.

3. This philosophical-conceptual-epistemological separation between Man and nature, or man and Nature, raises many fundamental questions. When did it begin? How is it useful in helping humans understand their place in the world? How does it vary between cultures? And so on.

4. As the term *allegory* may not be in common use, it is important to avoid misunderstanding and explain explicitly what it means. A definition of this noun is "indirect representation, storytelling," and several synonyms include "*apologue, emblem, fable, figuration, moral, myth, parable, story, symbol, symbolism, symbolization, tale, typification*" (Thesaurus.com 2009).

5. Conflict may be useful in power struggles between certain sectors, or even disciplines (see Nader 1996), but this question is beyond the scope of this chapter.

6. At the end of their classic hunt for the Snark, the Baker, Banker, Barrister, Beaver, Bellman, Billiard-maker, Boots, Broker, and Butcher discover that the Snark was a Boojum, and thus not only impossible to capture but also dangerous, for it can cause disappearances (see Carroll 1891).

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