Restoration and History

The Search for a Usable Environmental Past

Edited by Marcus Hall

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For Alex, Aldo, and Elena

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Part I
Introduction

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1 Introduction
Tempo and Mode in Restoration

Marcus Hall

Give a man a seed and he will grow a tree; teach a man to restore and he will save the planet. But do we restore by growing trees? The carbon-sinkers would have us bring back whole rainforests to reduce global warming as the extra foliage would consume a good deal of carbon dioxide. But these newly planted forests would certainly be different than those that formerly grew on the land. Planting a new forest might restore the earlier function of taking up carbon, but there would be plenty of other functions no longer performed, be they utilitarian or aesthetic. Canopy structures, biodiversity levels, flower aromas, and bird behaviors all may well be different in a replacement rainforest, even after the most conscientious of restoration programs. Other characteristics or functions of the new forest, meanwhile, might be enhanced beyond those found in the old forest, satisfying biocentrists or anthropocentrists, to include improved soil retaining, timber growing, wildlife propagating, and scenery viewing. One might set out to "restore a forest" but some functions will be diminished or lost at the same time that others are recovered or multiplied. Deforested forests can never be brought back, if for the simple reason that those forests are now gone. With these limitations in mind, should we plant new forests to be as much as possible like their former counterparts, or else plant designer forests to satisfy our day's most pressing needs? Should we attempt to re-create forests, or simply create them? Should the past determine our restorative methods, and should the present influence our restorative goals? Can we predict the future of restoration?

This book explores how a consideration of *time* can improve the practice of environmental restoration. Historic ecosystems can serve as models for our restorative goals if we can just describe such ecosystems. Here, the historian's craft, from archival to palaeoarchaeological, can help reveal the composition of former ecosystems: yet, exposing every last detail of an earlier ecosystem will be impossible by any historic method, even if we have numerous old photographs of a site and detailed oral histories of its changes. At the very least, one needs to decide which of the many former

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snapshots to emulate. Even if an ecosystem's snapshot is not a restoration practitioner's goal, which instead centers on revealing former ecological processes for relaunching former ecological trajectories, historic information can still be useful for describing recurring events, such as the frequency of forest fires or early lists of species. Ecosystems are historic entities that depend on what happened before to become what they are now. Despite attempts by last century's ecologists to discover and describe "true" climaxes and accurate successional communities, ecosystems—like human systems—never exactly repeat themselves. Sites with nearly identical rainfall, temperature, soil, and sunlight may nurture very different plant and animal communities. The past can reveal process, but some of this process may not be made to reappear by any method—natural or human—so that restoring for former process also has its limitations.

Baselines, also called reference states, are useful measures in evolving ecosystems, but here again, a crucial challenge to relying on environmental baselines is selecting and describing such states. In the Americas, flora and fauna changed dramatically after Columbus made his famous voyages so that 1492 is an excellent baseline for those who want to bring back former conditions. After this date, novel species and human immigrants would start transforming landscapes of North and South America. But there were other dramatic turning points in human-induced change, be these the eighteenth century's agricultural revolution, the nineteenth century's industrial revolution, or even the Pleistocene's arrival of *Homo sapiens* to North America some 13,000 years ago. Each of these turning points has been justified as an appropriate restorative goal. For restorationists working in the Old World of Europe, Asia, or Africa, one can envision very different baselines that might depend on human population thresholds, for example, or else settlement events or technological and agricultural breakthroughs, such as the 1910 Haber–Bosch invention of capturing atmospheric nitrogen for adding to fertilizer. Europeans may therefore hold more recent or else more distant restoration goals then their colleagues overseas. Perhaps Americans (and Australians) simply confront less ambiguity in establishing restoration goals, and need not worry about the dilemmas posed by Europe's increasingly popular pursuit of "renaturing"—sometimes called "new naturing"—which can be understood as the process of returning appropriate nature to a site. When Germans *renature* their canalized streams and rivers, as by removing dykes and reinserting meanders, are they assuming fundamentally different historic baselines than when Canadians *restore* their own rivers, as by removing alien species or reintroducing natives? What conditions should be brought back, and do such conditions represent new natures or better pasts—or is an ecosystem's former "health" and "integrity" more important than the physical re-creation of a baseline? Can non-native species belong in properly restored sites? Can *re-wilding* be a legitimate goal in Europe, or is this a Holy Grail better pursued in the New World?

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These were the questions posed to an interdisciplinary group of ecologists, geographers, anthropologists, sociologists, historians, and philosophers who met in Zurich, Switzerland, in July, 2006. Their collective answer is given in the following pages, and it is not a unified answer. If restoration in its barest form is retrieving a previous condition, as David Lowenthal points out in Chapter 2, we realize that there have been many earlier conditions and many ways of identifying those conditions. Time's role in restoration reveals that there is also a past of restoration, as well as past assumptions about restoration, and such assumptions have implications for current restoration practitioners that are social and political and not just ecological. It was our meeting's conviction that many amateur and professional restorationists set out to bring back original natural conditions without thinking very hard about their own notions of "original" or "natural." Before we ever reinsert meanders in a dyked river, reflood a drained wetland, reintroduce a native species, weed or cull an invasive plant or insect, or allow a lightning-ignited forest fire to continue burning, we must appreciate that the past and our understanding of it are crucial to successful restoration. Our governments are willing to spend billions on restoration projects—in Florida's Everglades, along the Rhine River, across the South China Sea—without acknowledging that many former ecosystems existed on these sites, that there have been many former ways of understanding such systems, and that former generations have already wrestled with repairing elements of them. The following pages aim to reveal how the consideration of restoration's temporal dimensions can improve our practice of it.

The organizational structure in the upcoming six parts is broadly chronological and topical, by taking the past of restoration as a way of highlighting its current challenges and of outlining its future possibilities. The first part considers *restoration in history*, by presenting several historical case studies, while the second part turns to *history in restoration*, by surmising the role of historical thinking in restoration projects. The third and fourth parts address restorationists' perennial questions about *target states* and then *initial states*: before one sets out to bring back certain conditions (be they wild or humanized or something else), one must first decide on which sites to work on. The restorative process requires selecting conditions one hopes to produce, as well selecting places that need to be restored. In the fifth part, authors offer tentative answers to questions raised in preceding chapters, while acknowledging restoration's complexity and outlining the progress made in understanding it. Implementing good restoration is the subject of the sixth part and conclusion: these last chapters consider the "uses of history" for identifying better restorative practices and improving land management.

For sake of clarifying our arguments, "rewilding" in the following pages is the human endeavor of bringing ecosystems toward untouched conditions, usually ones like those found in pre-degraded pasts; "regardening" is the effort of reproducing desirable humanized conditions and humanized

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natures; "renaturing" denotes activities pursued to make new natures or better natures, which depend on inherited assumptions and human relationships. Thus, rewilding counteracts the human propensity to degrade, regardening reinforces the human ability to improve, while renaturing positions humans alongside the non-human world for the benefit of both. Distinctions between these restorative types are necessarily messy, and one of the book's larger goals is to explore how these somewhat unconventional terms can contribute to better practices of restoration. Here I review the major themes taken up later in greater detail.

In Chapter 2, David Lowenthal contextualizes the temporal role of restoration by underscoring that time's passage can be cyclical as well as linear. Elements of natural systems and human systems can be viewed as cycling backward as well as marching irreversibly forward: if *restoration* manifests time's cycle, *sustainability* manifests time's arrow. Both pursuits are vital to the way we set out to promote and preserve life on earth. Whether one aims to restore or sustain, Lowenthal believes that we must acknowledge a past ecosystem's future, prehistory's tendency toward diversity, and restoration's value for informing natural and human history.

James Feldman takes us to the shores of Lake Superior and the Apostle Islands to show how forest rewilding and spontaneous regrowth stemmed more from last century's economic and political circumstances than from hands-on restorers in the field. While enlarging the concept of "wildness," Feldman's message is that *restoring* involves much more than ecological issues. Timo Myllyntaus then brings us to Europe and the restoration of Finland's coniferous forests. His study sets up the book's recurring transatlantic (and transpacific) contrasts, so that pre-settlement, pre-industrial, and pre-Pleistocene baselines take on more complicated meanings when located in Europe. Myllyntaus notes that in the nineteenth century, his country's forest managers restored with cultural values in mind (such as productivity) and only in the late twentieth century did they aim to create natural or "near-natural" states, despite sixty centuries of previous human inhabitation. Feldman's story suggests that time's passing may be the only real way to reinstate wild conditions, while Myllyntaus's contribution forces us to reconsider the nature of "original" states.

Mairi Stewart and Althea Davies turn to Britain in order to expose historical assumptions of restorationists. They find that mythic truths are often more important than objective field data for providing information about what formerly grew on the land. Good-meaning restorationists currently plant trees over barren lands where forests never grew, at least in human memory. Stewart and Davies suggest that while land managers need not replicate precise historical conditions, such managers at least need to acknowledge human values—not historic landscapes—as the main inspiration for their projects. Davies, and then Nicola Whitehouse, point to evidence from the deeper past, stemming from pollen deposits in soggy heaths and fossilized insects in prehistoric bogs, to demonstrate that biotic

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communities varied widely in the intervening centuries, so that restoration goals should not rely on single vegetational states. Depending on climatic patterns, geological and biological processes, as well as human land uses, vegetation has shifted in the northern part of the British Isles from mixed woodlands to wet bogs and back again. It seems that any one single former ecosystemic state should not be favored. But if ecological processes are the restorationist's goal, how is one supposed to reproduce "moving trajectories" that include a potential for producing various vegetational states? Restorers may need to plan on centuries, if not millennia, for regenerating wild heaths and bogs, each one uniquely adapted to its site.

Closed canopy forests may *not* have been the norm in medieval Europe, despite popular opinion to contrary. Frans Vera argues in his contribution that the myth of unbroken deciduous forests in pre-agricultural, mainland Europe (and eastern North America) must be reconsidered in light of evidence for extensive grazing by former wild herbivores and other large ungulates. Etymology as well as ecology, says Vera, provide evidence for shifting assumptions about vegetational baselines, so that many of today's land managers in these temperate areas mistakenly aim to reestablish thick forests instead of woodlands laced with meadows and pastures: if "original-natural" conditions are desired in restored sites, Vera argues that managers should reintroduce grazing analogues (such as Heck Cattle) instead of planting trees. While critics counter that central Europe's medieval ecosystem was itself very different from still earlier, Ice-Age states, one can see that restorationists working on any landscape must be well informed about historic assumptions they have inherited.

Even if former natures are ultimately unknowable and former natural processes can never be exactly repeated, an appreciation for time on the land is still fundamental to those hoping to reinstate natural conditions. Our very notions of *natural*, after all, are derived from those who came before us. In the early twentieth-century, "wild gardens" and "wildflower gardens," for example, became fashionable in the United States and Britain even though such garden plots hardly represented untouched renditions of pristine nature. Rather, these wild gardens reflected the day's idealized notions of wildness, which at the time included colorful flowers in pleasing arrangements that depended on the gardener's tastes. Such gardeners borrowed from (and reacted to) former gardeners, so that even today's "native plant gardens" continue to reflect biases handed down from earlier gardeners. Restorationists always stand on the shoulders of former restorationists. If the aim of restoration is *assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed* (a definition adopted by the Society of Ecological Restoration International), we automatically depend on our forerunners to understand what is meant by *ecosystem*, and how one interprets or measures *degraded*, *damaged*, and *destroyed*.

An ongoing debate for those who assist ecosystems to recover is the extent to which restorationists are simply gardeners with a deep concern

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for biodiversity and native species. After all, wild gardeners, native plant gardeners, ecological engineers, and naturalistic landscape designers also restore elements of former landscapes. These designers may largely be re-gardening so as to maintain or reinstate previous humanized landscapes. In his chapter, Chris Smout helps distinguish regardeners from rewilders, pointing out that the latter generally avoid designating any historic snapshot as their goal while often working on larger-scale projects. He also notes that in Britain many botanists classify non-native plants as so-called *archaeophytes* or *neophytes*, the latter arriving in the British Isles after 1500. A British alien plant's degree of belonging apparently depends on its date of arrival, rather than on its ecological role in the ecosystem—or else on its usefulness to people or their psychological attachment to it. A rewilder in the Scottish Highlands may therefore be able to rely on history, after all, for identifying target flora. Smout believes that nature and culture, both, are crucial to the pursuit of restoration. Both undergo changes through time, and both are understood by us through our changing perceptions of them.

The third part focuses on the challenges of planning restoration, especially through selecting target states. Anita Guerrini and Jenifer Dugan introduce us to a typical degraded site along coastal California that is in need of repair. They find natural as well as human remnants worth saving and enhancing, and search the historical record for clues about former states that might be reestablished: they conclude that it is ecologists and historians working together who can produce the best results. Ian Rotherham and Keith Harrison next aim to reveal the condition of a British fens before it was drained, employing palynological and archival analyses for revealing restoration's best goals for the site; their theme is that a rich wetland heritage was lost and should now be recreated. Jan Dizard cautions that restorers must not be merely striving for historical fidelity, as the results will always fall short: one can never predict how an ecosystem would be today if it had never been altered by the human hand. Instead, restorers should rely on historical study and its insights for learning about human mistakes, and for finding ways to avoid repeating them. For Dizard, those who repair the earth should ultimately marvel at nature's ways even more than lament nature's losses.

Restorationists spend a great deal of energy thinking about the natural systems they want to create, but they don't spend enough effort examining their reasons for choosing the site they work on. Should we concentrate on rehabilitating landfills and mining quarries, or else on weedy prairies and drained wetlands? Should we dedicate ourselves to a site near home or to a remote site—or should we concentrate intensively on a small area or superficially on a large area? One site may be deemed more degraded than another, and so more worthy of restoration, but there are many definitions of degradation: soil erosion may be more—or less—serious than infestation by alien species. Human values and human biases inevitably factor into any restoration project. Soil erosion, biodiversity loss, and diminished

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productivity, moreover, can be entirely natural processes, so that even pristine sites exhibiting these traits may be judged worthy of restorative management.

David Sprague and Nobusuke Iwasaki in the fourth part take up this issue of degradation, and identifying initial states, by asserting that Japanese rice paddies can be critical natural spaces. Re-flooding and re-wetting abandoned rice paddies can bring benefit to wetland creatures as well as human societies. While so many wetlands in Europe were once despised and so were drained, Japan's wetlands were once revered but were then abandoned, and so dried up. Now restorationists around the world set out to bring back their watery landscapes, but for different reasons. Concepts and assumptions, as well as politics and power, determine what gets restored. David Tomblin looks at traditional restoration in North America's Indian lands to discover that White Mountain Apache regardeners and Western rewilders may hold irreconcilable differences. Renewing Indian lands integrates the human element; Western rewilders scrupulously exclude that element.

Next, David Casagrande and Miguel Vasquez juxtapose two very different restoration projects in the United States to show that collective, not personal, decisions are usually key to determining what gets restored. They see promise in *renaturing*, which they interpret as reinstating healthy human and natural relationships, appropriate for lower-income urbanites in Connecticut as well as the Hopi of Arizona. Historical fidelity is integral to these renaturation projects, but so is a community's needs and its ability to participate in both process and product. According to Casagrande and Vasquez, deciding on the target state, as well as the place to be targeted, should be a community process that is negotiated and democratically agreed upon. Lynne Westphal, Paul Gobster, and Matthias Gross then do the Herculean task of categorizing renaturing activities, which span from holistic to partial goals according to whether one tries to bring back a species, a habitat, or a cultural landscape. Their concern is large urban areas in Europe and the United States so that, in their case, historic replacing and narrow rewilding are not options. But here again, historical process in both conception and implementation is crucial to each of their restoration models.

Having considered history *of* restoration and history *in* restoration, and then turning *to what* and *from what* to restore, the last two parts are more concerned with the future of the field. Instead of relying on their own judgments about restoration's target states and initial states, Kathy Hodder and James Bullock ask the interest groups themselves for answers to these questions. They dwell on the potentially enigmatic practice of rewilding, whereby human action is meant to remove the results of human action. Deciding on goals and sites, on species and features, becomes a matter of consensus. Here, rewilding is the greatest good for the greatest number over the longest period of time. Jozef Keulartz and then David Kidner

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in turn offer philosophical responses to the answer of the human role in restoration. Lacking public surveys, Keulartz summarizes a host of theoretical issues that have arisen concerning the restorative endeavor, while reminding us that we have no choice but to interpret the world through metaphors, and that restoration is a supreme metaphor. The fields of art, engineering, and medicine all provide restorers with ways of understanding degraded and idealized systems, so that converting the former to the latter depends on the restorer's particular background. For his part, Kidner emphasizes that restoration necessarily relies on non-rational thinking to utilize intuition and passion instead of inflexible definitions. There is a psychology of restoration that makes process as important as product, and both are tied to a restorer's relations with other people. One sets out to assist an ecosystem to recover, but *assistance*, *ecosystem*, and *recovery* are all mediated by humans pondering other humans.

Daniel McCool considers three American river restoration projects to show how rewilding, regardening, and renaturing have been adopted to different sites. His is a pragmatic approach that views a river's future needs along a background of political contingencies. Power relationships—between person and person, between individuals and organizations, between local and distant interests, between culture and nature—all form the riparian system on which decisions are made. Eileen Crist then leads us into the future-present of high technology applied to restoration. Creating anew takes on a literal meaning with cloning at the genetic and organismal level: if science can allow us to replicate endangered species, Crist wonders about the implications of a science that can replicate endangered ecosystems.

As a prelude to a conclusion, Josh Donlan and Harry Greene reflect on the aftermath of their controversial Pleistocene Rewilding proposal. They predict distinct advantages to ecosystems in reproducing prehistoric evolutionary processes through the introduction of African lions, cheetahs, and elephants to serve as megafauna analogues for extinct North American cheetahs and mastadons. What Donlan and Greene discovered in their reading public was either immense enthusiasm or else instinctual repulsion for their proposal. These ecologists have been forced to confront the social aftermath of their biological reasoning, which assumes that nature's purest state was the one before humans entered it. Here is surely an extreme view of restoration from which other restoration projects can be judged. Yet it turns out that analogues of extinct species are already being introduced within and beyond North America for reproducing biological processes, so that Donlan and Greene's rewilding scheme is not as fantastical as their responders may at first assume. Pleistocene Rewilding forces us to think again about restoration's optimal target and initial states, about the species that make up those states.

Winding up our query is Eric Higgs' call to restore dirt under our fingernails. Higgs undertakes the critical task of grounding our insights, reminding us that there are real consequences for why, how, and what we restore.

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Rampant pollution, pesky invasives, marred scenery, and environmental injustice are not going away, so that assisting the recovery of damaged environments is one of our most crucial pursuits.

Our goal here is not to criticize restoration or to belabor the assumptions on which it depends, much less to offer policy recommendations, but to ask harder questions so that we can better understand and improve this endeavor we all embrace. Growing trees is not always restoration. But growing trees will anchor soil and absorb carbon, and if we can incorporate the historic record while discovering our core values, we can select appropriate tree species, plant them in the right places, and nurture them along with other biota and ourselves, to begin to restore. Ultimately, by *restorying* nature we can offer richer histories of past environments, and so identify better ways of bringing them back.

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