

**Global Warming and Virtues of Ecological Restoration<sup>1</sup>**

Ronald Sandler

**1. Introduction: Global Warming and Adaptation**

In this chapter, I explore the implications of global warming for virtues associated with ecological restoration and assisted recovery. In doing so, I begin from the premise that global warming is now part of the ecological present and future of the planet. Returning to climactic trajectories that would have obtained absent anthropogenic greenhouse gas (GHG) emissions, if possible at all, would require massive and, in my view, ill-advised technological interventions (Hegerl and Solomon 2009; Gardiner, in press). Therefore, I take seriously the idea that global warming needs to inform our ecological practices and ethics as an ecological reality, not just as something to be avoided, resisted, feared, and lamented. Throughout this chapter, I will refer to *forgone global warming*. Forgone global warming is the amount of global warming or climactic change that we are already committed to in virtue of obtaining levels of GHGs in the atmosphere plus the most optimistic scenario for future GHG emissions, absent massive technological intervention. How much warming there might be beyond that--i.e. warming associated with additional GHG emissions--is of course not foregone.

The relevant features of global warming for the purposes of this chapter, as well as those in virtue of which it is on many people's reckoning the ecological challenge of our time, are increased *rate* of ecological change and increased *uncertainty* (or unpredictability) of ecological

---

<sup>1</sup> The author thanks Allen Thompson, Jeremy Bendik-Keymer, William Throop, Ned Hettinger, Philip Cafaro, John Basl, and Benjamin Miller for the helpful comments on earlier versions of this paper.

change, in comparison to that with which human (particularly agricultural) civilizations are accustomed. That the rate of change is accelerated and the information deficit and uncertainties about the ecological future are exacerbated by global warming makes biological and cultural *adaptation* to ecological changes more difficult, for both us and other species. As long as there has been climate, there has been climate change--and with it ecological change. As long as there have been systems involving living organisms, adaptation has been needed, and it has occurred. However, the magnitude and rate of climactic and ecological change--and the associated adaptation challenges--have not always been constant. At the core of the concerns about global warming is that species, ecological systems, and human societies will not be able to meet the adaptation demands of anthropogenic climate change, and that failure to do so will have high social, economic, and biological costs (IPCC 2007).

The challenge of adaptation that is the product of the rate and uncertainty of ecological change is exacerbated by several factors. These include the *types* of ecological changes expected to be produced, such as increased incidence of extreme weather events and increased climatic variability, as well as the possibility of there being “climactic tipping points” that could result in abrupt changes in climatic and ecological trajectories. In addition, the *range* of possible climatic/ecological futures--e.g. with respect to surface air temperatures, sea levels, species’ ranges, weather events, precipitation, air velocities, and natural resource availability--within a given time frame is broader. Moreover, the challenge of adaptation is exacerbated by several factors, such as other anthropogenic stressors on ecosystems (e.g. pollution and habitat loss) and the social inertia and myopia encouraged by many social and institutional structures (e.g. neo-liberal trade agreements, transnational corporations, 24-hour news media, and election cycles).

*The challenge of adaptation* is thus a complex social, political, cultural, and ecological challenge. It is also the crux of the social and environmental problems associated with global warming. It is because people, populations of non-human species, and ecological and social systems cannot adapt quickly enough that there will be increased rates of species extinction, instability of ecological systems (or ecosystem reconfiguration), agricultural and natural resource insecurities, exposure to severe weather events, incidence of disease, and ecological refugees (and climate injustice) (IPCC 2007).

In this chapter I argue that, when considered through the lens of the challenge of adaptation, the fact that our ecological future is accelerating away from our ecological past with increasing rapidity and that it is increasingly unclear where it is going has several implications for virtues associated with ecological restoration and assisted recovery:

1. Global warming *raises* the salience of virtues related to *openness* and *accommodation* that are commonly associated with restoration and assisted recovery.
2. Global warming *weakens* the justification for *historical fidelity* as a virtue associated with assisted recovery.
3. Global warming *raises* the salience of *reconciliation* as a virtue associated with assisted recovery.
4. Global warming *reduces* the prominence of *restoration* among the types of assisted recovery.

Before elaborating upon and trying to motivate these claims I need to clarify what I mean by ecological restoration and assisted recovery, as well as what I take to be the relationship between virtue and ecological restoration.

## **2. Restoration**

It may be that a precise, exceptionless definition of ecological restoration—one that would distinguish all cases of restoration from all cases of all other types of assisted and unassisted ecological recovery—is not possible. But a functional account—one that captures what is central to ecological restoration and is good enough for present purposes—is possible. The account of ecological restoration that I employ in this chapter is largely that developed by Eric Higgs (2003) in *Nature by Design*. It is a conception of ecological restoration that can be applied in urban environments, agricultural environments, aquatic environments, industrial environments, as well as large wilderness environments. Its three core elements are: ecological integrity, historicity, and design.

The ecological integrity element captures the idea that a restoration improves (or, at least, aims to improve) the condition of an area from an ecological perspective by contaminant remediation, removing dams or impermeable surfaces, or increasing biodiversity, for example. An activity that degrades an area or leaves it no better off than it was prior to the intervention (or does not aim to make it better off) is not a restoration—nor is it any other form of assisted recovery. Whether ‘integrity’, ‘health’, or ‘functioning’ is the superior concept for capturing the ecological quality of a space, and how these are best operationalized or measured in practice—for example, in terms of resilience, self-maintenance, population dynamics, energy flows through the system—is not something I address here. Nothing that follows hinges on it. For present purposes, the crucial point is simply that restoration involves improving an area from an ecological perspective (e.g. removing contaminants, increasing biodiversity, or increasing stability).

It is tempting to formulate the ecological dimension of restoration in value terms—i.e. that restoration increases the environmental value of an ecological space. But the value of the

space might go up while the ecological condition goes down, since there are environmental values other than ecological integrity (e.g. aesthetic, recreational, and scientific values). When this occurs—i.e. when a number of environmental values are amplified in a space even as ecological integrity is diminished— it would not be an ecological restoration. Thus, it is necessary to distinguish the ecological integrity of a place from its environmental value overall.

The historicity element of ecological restoration captures the idea that restoration returns something to the way, state or place that it was previously. In the case of ecological restoration, it is returning something of the ecology that previously obtained in a particular place or region; or else establishing something of the ecology that would have obtained in a particular place or region absent anthropogenic degradation. If an assisted recovery does not “return to the past” in some sense—ranging from replication (i.e. approximating as much as possible some previous state) to incorporating (or amplifying) elements from a previous state (such as native species or abiotic features)—then it is not a restoration. As I am using the term in this chapter, then, restoration is a type of assisted recovery that is distinguished by historicity. (And assisted recovery is a type of ecosystem management, along with, for example, conservation and preservation.) *A particular assisted recovery is a restoration to the extent that historicity is incorporated into the project*, in intent, process or product. Other types of assisted recovery—i.e. other activities that involve intervening in or around an ecological space in order to help improve its ecological integrity include revitalization (which, as I am using the term, does not involve a commitment to historicity) and some cases of reclamation.

The third element of ecological restoration is design. Design is similar to ecological integrity in that it is characteristic not only of ecological restoration, but of assisted recovery more generally. It is inherent to the ‘assisted’ part of “assisted recovery.” All restorations involve

decisions about where to restore (if at all), what to aim for, and how to go about accomplishing it—and these decisions are made by people. This is so even when the design of the restoration is to replicate the “design” of nature, since we choose which nature, at what time, and in what respects, in addition to our choosing to pattern the recovery on nature’s “design” and not other considerations--e.g. aesthetics, economic efficiency, recreation, or rarity.

In this way, all restoration (and all other assisted recovery) has anthropocentric dimensions. It is anthropocentrism in a sense inextricable not just from restoration or assisted recovery, but from environmental ethics and ethics more broadly. We are the ones responsible for making decisions regarding the considerations that we are responsive to and our forms of responsiveness. There is no other option. Even if we try to abdicate the choice (the design) to nature (or god), we choose the aspects of nature (or the theology) to which we “defer” (Vogel, 2006). This sort of anthropocentrism is distinct from anthropocentrism that denies the moral considerability or inherent worth of all non-human entities or that denies the intrinsic value of human-independent aspects of nature. After all, even if non-humans (or human-independent parts of nature) do have inherent worth in the strongest possible sense—i.e. independent of their being valued—it is still up to us to recognize that value and respond appropriately to it (i.e. to do what we should). Therefore, that design is inextricable from ecological restoration, and that design is inherently anthropocentric (or, perhaps more appropriately, *anthropogenic*), does not itself imply that restoration is problematic on any theory of environmental values.

### **3.3 Virtue and Restoration**

A very general account of the virtues is that they are character traits that dispose a person to respond well to values in the world. More specific theories of virtue are developed by

providing substantive accounts of “character traits”, “dispose”, and “responding well”, as well as by providing a value axiology (i.e. an account of what sorts of things are valuable and what sorts of value they have).

The value axiology presumed in this chapter is a pluralistic one that includes one’s own flourishing, the flourishing of other people, and human-independent environmental values (e.g. aesthetic values or the worth of non-human living things). The conception of responding well to value presumed in this chapter is that it typically involves or is related to protecting and promoting value in the world. Therefore, a character trait is a virtue to the extent that its possession is generally conducive to promoting the good, and a character trait is a vice to the extent that it is generally detrimental to promoting the good. It may be that there are other forms of responding well to value in the world—e.g. appreciation. However, the primary form of responding well to value is to protect and promote it, and this functions as a constraint on other forms. For example, dispositions to respond to beautiful and wonderful aspects of the natural environment in ways that degrade it—as is often done by recreational SCUBA divers and ORV enthusiasts—are not virtues, even if they involve recognition of the aesthetic value of the places.

The conception of character traits and dispositions presumed here is that they are states that decide regarding feelings, actions, and emotions (Aristotle 1985, Book II, Chas. 5-6). To possess or exhibit a particular character trait is to standardly take certain types of considerations (under certain types of circumstances) as reasons (or motivations) for acting, feeling, or desiring in certain ways (Sandler 2007). For example, a person is compassionate if she standardly takes the (undeserved, unnecessary, and unwanted) suffering of others as a reason (or motivation) for acting to relieve the person’s suffering and she has the corresponding affect and desire to do so under certain circumstances—e.g. when she is in a position to help. A person who typically is

unaffected by and ignores the (undeserved, unnecessary, and unwanted) suffering of others is not compassionate, but indifferent. Thus, compassion and indifference--as well as cruelty--are different character traits regarding the same value (i.e. the well-being of others). They dispose their possessor to respond differently to that value. Because the well-being of others is good, a compassionate person is disposed to respond well to value in the world (i.e. by promoting it), whereas an indifferent person is disposed to respond poorly to value in the world. Compassion is the virtue; indifference is a vice.

Virtue is relevant to restoration in at least three respects. First, some character traits may be virtues in part because they promote value in the context of restoration (or assisted recovery more generally). If ecological integrity is a value and some character traits regarding assisted recovery promote that value better than others then those character traits are more justified -and more virtuous- than are the alternatives. Second, and related, some character traits make for good restorationists and help to explicate what constitutes good restoration. A good restoration expresses (or hits the target of) the operative virtues. So, for example, if openness and patience are virtues operative in restoration or assisted recovery, then a good restorationist will possess those character traits, and a good restoration will be one in which the design is not too rigid and has a time frame consistent with the rate of ecological processes. Third, among the appropriate goals of a good restoration is moral improvement--i.e. reinforcing or developing (individual, social, and environmental) virtues. Good restorative practice encourages perspectives--or evaluative, affective (emotional), conative (desires), and practical dispositions--that are sensitive to environmental and social values and are conducive to their possessor living well (Higgs 2003; Light 2000a, 2000b). For example, it might encourage connection to a particular place or understanding of and appreciation for ecological complexity.

These relationships between virtue and good restoration have featured prominently in the ethics of restoration discourse. For example, Eric Katz's familiar criticisms of restoration are virtue-oriented. On his view, restoration is problematic because it *expresses* and *encourages* the human tendency to dominate and control nature, as well as over-confidence in our ability to do so. It expresses and encourages a vice, *hubris*. Katz also appears to hold the view that those who engage in restoration tend to be *disingenuous* or else *insensitive* to natural value. They claim to be re-establishing something—naturalness and natural value—that it is impossible for them to put back, since their involvement entails that the product will be an artifact, which he considers contrary to naturalness (Katz 2000). This is virtue-oriented evaluation of restoration.

However, as Higgs and Andrew Light have well argued, it is not an accurate evaluation (Higgs 2003; Light 2000a). It may be, as Higgs puts it, that “intentionality courts hubris” (2003, 285) and its associates: domination, techno-fixes, anthropocentrism (in the sense that only human welfare is morally significant), and commodification. But restoration can, and often is, approached virtuously, with, for example, humility, ecological sensitivity, caring, cooperativeness, respect for nature, patience, a sense of restitutive justice, gratitude and cultural, communal and historical (including natural historical) sensitivity and engagement. Moreover, particularly when it includes communal involvement and participation, restoration can also provide opportunities to develop many of these (and other) virtues (Higgs 2003; Light 2000b).

For the remainder of this chapter I will refer to character traits that make for good restorationists and the cultivation of which are among the goals of restoration as *virtues of ecological restoration*.

## **5. Virtue, Restoration, and Global Warming**

The central issue of this chapter can now be formulated more precisely: To the extent that our world is becoming relatively less stable and less predictable climactically and ecologically, what are the implications for the substantive content of character traits that promote value through restoration and that we ought to try to cultivate through restoration?

## **5.1 Openness and Accommodation**

The additional uncertainties introduced by accelerated climate change reinforce the significance of dispositions opposed to highly control-oriented, domineering restoration. Our capacity to predicate and control the outcomes of our ecological interventions is likely to be reduced. Even greater *humility* regarding our ability is therefore justified. This is particularly so for interventions (including restorations) whose designs would take a long period of time to be realized (such as a farm land to woodland restoration), given the amount of ecological change possible over that period. In such cases, *patience* will also be crucial, since the recovery may not occur on the time-scale we might prefer, and we may not know until well into the process what the product is going to be like.

Similarly, *restraint* with respect to how strongly we impose our designs and desires on an ecological space will be crucial. The increased rate and unpredictability of ecological change associated with global warming means there is a broader range of possible (and plausible) ecological futures. Therefore it will be increasingly necessary to allow the recovering systems to take their own course in response to factors that we may not (and, perhaps, could not) have foreseen and ought not to try to control. Restraint is also necessary because under these conditions (of rapid climatic change and increased uncertainty) we are more likely to make

mistakes and misplace resources, particularly if we try to execute detailed, less accommodating or flexible designs.

The need for humility and restraint extends beyond restoration to other types of responses to the challenge of adaptation. The difficulty with technological, control-oriented approaches to addressing climate change and its ecological effects, such as seeding the oceans with iron and releasing aerosols into the atmosphere, is that they depend for their success on our capacity to predict and control the effects of the intervention. We have not done this well in the past, and doing it well in the future is likely to be made more difficult by global warming. Technology must play a prominent role in our response to the challenge of adaptation. However, the ethical profiles of energy and climate related technologies vary dramatically. Some technologies address the cause of the problem (e.g. those that reduce GHG emissions, such as hybrid vehicles and wind energy technologies) and contribute to our adapting to the ecological realities we confront. Others, such as geo-engineering, involve further manipulation of ecological systems rather than changing our societal, cultural and production systems. In an age marked by amplified ecological uncertainty, technologies that are more control oriented are likely to be less successful than those that are not, and technologies that are more interventionist into complex ecological systems are likely to be less successful and have greater unanticipated effects than those that are not. This is a straight-forward function of complexity and uncertainty in dynamic and integrated systems. It is no different for restoration than it is for prevention and mitigation. The greater the complexity, unpredictability, possibilities, and uncertainties, the more flexible we must be in our ecological practices, processes, and goals if we want to be successful in promoting ecological integrity, and the more humility and patience are going to be required.

What these virtues (and others associated with them, such as *tolerance*) have in common is openness toward the ecological future of a place and accommodation of nature and natural processes in determining that future. Even (or, perhaps, especially) in restoration, where design and intervention are ineliminable, openness, pliability, and restraint are needed more than ever given the increasingly uncertain future associated with global warming. I have suggested only that the dispositions constitutive of them may be refined and their relevance to good restoration amplified in light of global warming.

## 5.2 Historical Fidelity

I turn now to another virtue standardly associated with restoration, *historical fidelity*. As I have used the term, *historicity* is an element of ecological restoration. An assisted recovery exhibits historicity (and is a restoration) to the extent that its product (or its goal) resembles or incorporates elements from a past ecology of the place. *Historical fidelity* (or historical faithfulness, perhaps) is not, as I use the term, an element or feature of an assisted recovery. It is a character trait. It is -roughly- to be disposed to value, desire, feel pleased about, and act towards accomplishing historicity in assisted recovery. It is to prioritize historicity in the goals of assisted recovery. Historical fidelity is thus a feature of some people, not of some ecosystems. Historical fidelity (though not always understood as a virtue<sup>2</sup>) is valued highly by some advocates of ecological restoration (e.g. Higgs). However, in the age of global warming, in which greater openness and accommodation to an increasingly uncertain ecological future is

---

<sup>2</sup> It is possible to translate the character trait of historical fidelity into a rule of historicity (and vice versa): Prioritize historicity in assisted recovery. The discussion that follows regarding historical fidelity understood as a character trait applies, *mutatis mutandis*, to historical fidelity understood as a rule.

appropriate, the justification for historical fidelity as a virtue of ecological restoration is weakened.

One of the primary justifications for historical fidelity is that it helps to promote ecological integrity by setting goals and incorporating elements that are well suited to the site of the restoration, since they have obtained and thrived there in the past. Moreover, by grounding the goals of assisted recovery in (past) ecological realities of a place (rather than just our desires or visions for it), historical fidelity functions as a check on hubris. It is also associated with and encourages ecological sensitivity, humility and restraint.

However, in the age of global warming, the ecological future is less likely to resemble the ecological past. According to the most recent report of the IPCC (2007) -which is now widely regarded as providing a conservative estimate of the likely magnitude of climate change and its impacts- even with probable climate trajectories (i.e. the reality of global warming), there are going to be (with at least “high” confidence) substantial increases in the rate of ecosystem transitions. Rain forest will very likely turn to savannah; and desertification, reduction in glaciers and ice sheets, losses of coral reefs, and flooding of coastal regions will also be very likely. There will probably be significant increases in species at risk of extinction (likely between 20%-70%) and rapid changes in species ranges. The ecological impacts of global warming will be geographically differential--they will be greater in some places than in others. But, in general, historical ecosystems are going to be increasingly poor proxies for ecological integrity; and native [invasive] is going to be an increasingly poor proxy for ecological beneficial [ecologically detrimental]. As a result, good assisted recoveries from the perspective of ecological integrity will in general resemble less strongly the systems or places prior to degradation, and too strong of a commitment to historicity could become a form of ecological insensitivity to ongoing

ecological changes.<sup>3</sup> Strong historical fidelity could increasingly involve imposing ourselves against ongoing ecological processes. It could amount to a denial of ecological reality. The implication for historical fidelity would seem to be that *prioritizing historical systems (and elements of those systems) in assisted recovery will have diminishing value (i.e. will be less conducive) to realizing the ecological (and moral development) goals of assisted recovery.* Therefore, the ecological integrity justification for historical fidelity being a virtue of restoration (or, more appropriately, a virtue of restoration) is weakened. Or, perhaps more accurately, a weaker historical fidelity (i.e. a weaker commitment to historicity in assisted recovery) would be justified.

William Throop argues that even as the effects of anthropogenic climate change increase, those with “the virtues of humility, sensitivity and self-restraint...will tend to adopt conservative restoration goals...that exhibit a high degree of historical fidelity” (in press). For example, he suggests that, given climate change, restorationists should use genetic stock from the southern portion of a species’ range, rather than looking to a different species altogether. However, getting genetic stock from a place different than the site of the restoration is to incorporate less historicity. It is a diminished role for the history of the place. If this is the case systematically--that is, if historicity diminishes as a component of good restoration in general--then historical fidelity must diminish as a virtue of assisted recovery. Humility, sensitivity and self-restraint would increasingly be in tension with historical fidelity. As Throop recognizes, the extent to

---

<sup>3</sup> For example, in the Long Island Sound, lobster populations are declining while blue crab populations are increasing. This is due in large part to a few degrees change in temperature; and it is going to have significant ecosystem effects. Actively intervening to maintain the sound as fertile lobster habitat (or to try to maintaining the associated ecosystem features) is not feasible. Even on conservative global warming estimates, the sound is going to increasingly suit blue crab rather than lobster, and this needs to be part of the ecosystem management (and expectations) for the place.

which this will be the case is an empirical matter. It is for this reason that the claim defended here is conditional: to the extent that the ecological future less resembles the ecological past, the ecological justification for historical fidelity is diminished. However, as discussed above, given our current ecological and climactic trajectories, it does appear that the ecological futures of most places will be quite different from even their recent ecological pasts.

Another justification for historical fidelity is based on *natural value*--i.e. the value of the continuity of ecological processes and the productions of those processes in virtue of their being free from human intervention and design. Let us assume that there is such value. Some (Katz 2000; Elliott 2000) have argued that (even if there is natural value) appeals to it cannot justify restoration (and by extension historical fidelity) because it is part of the concept of the value that it could not be recaptured by restoration. The need for restoration entails that the natural history (the basis of the value) has already been broken and execution of the restoration involves further human intervention and design. Therefore, even a restoration high on historicity cannot increase or create natural value.

In response, advocates for restoration and historical fidelity might argue that natural value is not an all-or-nothing matter. Natural value can be possessed by systems (and individuals) to greater or lesser degree based on the extent to which they are free (or their production was free) of human intervention (or the marks of human intervention and design). In this way, an assisted recovery high on historicity would have more natural value (because it bears less of a mark of human intervention and design) than one that does not; and historical fidelity might be justified (at least in part) because of its conduciveness to promoting natural value in assisted recovery.

However, even granting this (not-all-or-nothing) account of natural value, the relevant features of global warming reduce the extent to which it justifies historical fidelity. This is because even as it would be *in principle* possible to re-establish or increase natural value through restoration, it is *in practice* going to be more difficult to do. As discussed earlier, given the reality of global warming, assisted recoveries that aim for ecological integrity will involve less historicity. As a result, they will have less natural value. The implication for historical fidelity is that this justification for it--i.e. that it is conducive to promoting natural value--is diminished, since it will not promote it as much or as effectively. More intervention, not less, will be required to accomplish high levels of historicity.<sup>4</sup>

Alternatively, suppose that a previously degraded ecological place can develop natural value over time if it is free of human intervention, design, and control. On this conception of natural value, an ecological space can come to possess natural value proportional to the extent to which and duration for which it is free from human interference. However, even this conception of natural value does not support historical fidelity in a climate changed world. The reason is that natural value emerges by allowing nature to develop independently. But to the extent that global climate change is ecological reality and the ecological future is accelerating away from the ecological past, realizing historicity will require greater intervention and control.

The distinctive features of global warming appear to weaken both the ecological integrity and the natural value justifications for historical fidelity (or favor a weaker historical fidelity). These are not the only justifications that have been offered for historical fidelity. However, they are the primary ones. Therefore, to the extent that the reality of global warming and the challenge

---

<sup>4</sup> One possible response to this argument is that the importance of natural-historical value actually becomes greater (people value it more) given its scarcity and tenuousness given global warming. So even though historical fidelity is less conducive to promoting it, it is as justified due to the greater importance of the value.

of adaptation weaken them, the case in favor of historical fidelity as a virtue of restoration is substantially reduced.<sup>5</sup>

I want to try to be as clear as I can about what I am and am not suggesting. First, I am not claiming that ecological knowledge--e.g. regarding the past ecology of an area or similar areas (or regarding global warming for that matter)--will be immaterial to designing a goal and developing a process that effectively realizes or promotes ecological integrity. I am making the weaker claim that, in general, *appropriate ecological goals (designs) for assisted recoveries will bear less resemblance to past ecosystems of recovery sites*. And, therefore, a weaker historical fidelity in setting goals and developing processes is justified.

Second, I am not claiming that in the age of global warming appropriate ecological goals -designs- for assisted recovery of a place will *not at all* resemble the prior ecology of that place. I am claiming that, *in general, to the extent that the relevant features of global warming obtain, appropriate ecological goals will less strongly do so*. Context specific assessments of the role of historicity in assisted recovery are of course needed, and historicity will appropriately play a larger role in some recoveries than in others (Harris et al. 2006). Relevant considerations include

---

<sup>5</sup> Higgs (2003) argues that filling our nostalgic needs is a justification for historicity in restoration. If this is true, then in an age of global warming our nostalgic needs are increasingly in tension with the goal of ecological integrity. Our nostalgic needs--our desire for the past--could increasingly become nostalgic impositions on ecological integrity within the context of assisted recovery. As a result, our nostalgic needs are increasingly unsatisfiable (or more difficult to satisfy), or satisfiable in a less robust (or sustainable or difficult to sustain) form. Moreover, they are increasingly in tension with ecological sensitivity and humility, which are among the important moral education goals of assisted recovery. For these reasons, satisfying our nostalgic needs might well be another casualty of global climate change.

Higgs (2003) also suggests that historical fidelity is particularly conducive to developing connection to place, which is good in itself and conducive to promoting ecological integrity. However, there are other factors besides historicity that are conducive to developing connection to place. Many people's connection to a place seem to have more to do with *their* history with the place and the opportunities (recreation, relaxation, education, study, art) that it enables, than it does with the general history (or historicity) of a place.

the global warming impacts on the area's climates (not all places will be equally impacted); the purpose of the restoration (e.g. research, memorial, habitat, or water purification); the desires (and values) of those involved; available resources; and the time gap between the degradation and the recovery.

Third, I am not claiming that the historical continuity of ecological processes or the productions of those processes are any less (or differently) valuable given global warming. That is, I am not suggesting that the significance of natural value is somehow reduced by global warming.<sup>6</sup> I am claiming that, given global warming, *reestablishing natural value through assisted recovery will (as a matter of ecological fact) be increasingly difficult to achieve, and therefore, appeals to natural value will do less to justify historical fidelity.*

Fourth, I am not claiming that historical fidelity is completely unjustified or should be given up altogether. It is rather that the bases for historical fidelity--the commitment to having recovered systems resemble past systems--are weaker given global warming. *To the extent that global warming is part of the ecological present and future, and to the extent that global warming involves increased ecological unpredictability and rates of change, historical fidelity, in general, is less conducive to accomplishing ecological integrity and reestablishing natural value, and is for that reason less justified.*

Finally, I am not claiming that the justification for assisted recovery is diminished in the age of global warming. There is considerable evidence that assisted recovery of degraded ecosystems can increase substantially the biodiversity and ecosystem services of the system (Rey

---

<sup>6</sup> If the basis of natural value is that people value deeply places that are independent of human impacts and designs and in the face of global warming more people value this (or value it more deeply), given its increased scarcity or fleetingness perhaps, then the significance of natural value might even be greater in the age of global warming. Alternatively, if people give up on this sort of value (i.e. value it less), given the ecological realities, its significance would be diminished.

Benayas et al. 2009). What is at issue here is not the extent to which we ought to try to contribute to repairing ecological damage. It is rather the extent to which we ought to incorporate a commitment to historicity in our efforts to do so.

Given the definition of restoration that I am working with--i.e. that assisted recovery is restoration to the extent that it incorporates historicity--an implication of the diminished role of historicity and historical fidelity in good assisted recoveries is that assisted recoveries will, in general, be less restorations.

### **5.3 Reconciliation**

The last character trait that I am going to consider is *reconciliation* (or, more properly, reconciliatoriness); and I am going to suggest that global warming elevates its importance as a virtue of ecological restoration.

Reconciliation, as I mean it here, is- roughly - a disposition to accept and respond appropriately to ecological changes that, though unwanted or undesirable, are not preventable or ought not be actively resisted. Reconciliation is not a commonly discussed environmental virtue (or virtue of restoration, for that matter). But it has, I think, always been relevant to ecological engagement and practice (and recognized as such). Even independent of global warming, ecosystems are always dynamic, and individuals, species, and abiotic features are always coming into and going out of existence. Good ecological engagement (for example, love and wonder towards nature) and practice (even preservationist activities) require accepting and not resisting (too strongly) such changes and losses.

Given the increased rates of changes and losses associated with global warming, the salience of reconciliation as a virtue of ecological practice (including in assisted recovery) would

seem to be raised. Reconciliation with respect to global warming is not merely acknowledgment. It involves accepting the unwelcome fact of forgone global warming and its consequences. It is to have global warming inform our environmental perspectives, norms and practices. It involves being disposed towards restraint (if not acceptance) of ecological changes that cannot (or should not) be prevented, population or species losses that cannot be avoided, and aspects of the past that cannot be put back--even though they would not be occurring were it not for anthropogenic GHG emissions.<sup>7</sup> It also involves cultivating sensitivity and appropriate responsiveness to the value of biotic systems and living things that are the successors or beneficiaries of global warming.

Again, I want to be clear. Reconciliation as I mean it here is not resignation to global warming beyond what is foregone. That is, it is not contrary to working to, so far as possible, *reduce* further GHG emissions and *prevent* further anthropogenic climate change. Nor is reconciliation passive acceptance. It is not contrary to trying to *mitigate* the effects of global warming. It is to have those efforts appropriately informed by, or adjusted to, the ecological realities associated with global warming. Nor is reconciliation absolution. It is not contrary to culpability for global warming or remorse over what is lost. It is to accept the consequences and take responsibility for the activities that brought it about.

It involves recognizing that accommodating ourselves to the world--adapting ourselves to it, rather than it to us--now requires accommodating the effects of foregone global warming.

Pushing back futilely, inefficiently, or dangerously against those effects, trying to remake things

---

<sup>7</sup> Take, for example, species extinctions. According to the IPCC (2007), even on the more modest global warming projections, it is foregone that some species (e.g. some alpine, arctic, and slow migratory species) will be lost due to global warming. We need to reconcile ourselves to that. Species come and go, and even when it is anthropogenic, sometimes one has to let them go (though, of course, not gladly, or without remorse or guilt) (Sandler, in press).

as they were or otherwise would have been (out of a sense of guilt, responsibility, restitution, historicity or nostalgia) is trying to remake the world --trying (yet again) to adapt it to us, rather than us to it.

## **5. Conclusion**

I have tried to take seriously the idea that some anthropogenic global warming is part of the ecological present and future of the planet; and I have suggested several possible implications of this for *virtues of ecological restoration* (or perhaps, more aptly at this point, *virtues of assisted recovery*): the salience of virtues associated with openness and accommodation is raised; the justification for historical fidelity is diminished; and reconciliation will be crucial. These claims are premised on global warming increasing substantially the rate of ecological change and decreasing substantially our capacity to predict ecological change. They are justified only to the extent that this is the case. Thus, ultimately, whether these claims turn out to be true will depend not only on the reasoning behind them, but (rather heavily) on the facts about global warming (i.e. whether and to what extent it increases ecological unpredictability and rates of change) and the facts on the ground (i.e. how these impact the effective practice of assisted recovery).

## REFERENCES

- Aristotle. 1985. *Nicomachean Ethics*. Trans. T. Irwin. Indianapolis, IN: Hackett.
- Elliott, Robert. 2000. "Faking nature." In *Environmental restoration*, ed. William Throop, 71-82. Amherst, NY: Humanity.
- Gardiner, Stephen. In press. "Is 'arming the future' with geoengineering really the lesser evil? Some doubts about the ethics of intentionally manipulating the climate system." In *Climate Ethics*, eds. Simon Caney, Stephen M. Gardiner, Dale Jamieson and Henry Shue. Oxford, UK: Oxford University Press.
- Harris, J.A., Hobbs, R.J., Higgs, E. and Aronson, J. 2006. "Ecological restoration and global climate change." *Restoration Ecology* (17): 170-176.
- Hegerl, Gabriele C. and Susan Solomon. 2009. "Climate change: risks of climate engineering." *Science* 321 (325): 955-956.
- Higgs, Eric. 2003. *Nature by Design*. Cambridge, MA: MIT Press.
- Intergovernmental Panel on Climate Change. 2007. *Fourth Assessment Report*. Available at, [http://www.ipcc.ch/publications\\_and\\_data/publications\\_ipcc\\_fourth\\_assessment\\_report\\_synthesis\\_report.htm](http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm)
- Katz, Eric. 2000. "The big lie." In *Environmental Restoration*, ed. William Throop, 83-94. Amherst, NY: Humanity.
- Light, Andrew. 2000a. "Restoration, the value of participation, and the risks of professionalization." In *Restoring Nature: Perspectives from the Humanities and Social Sciences*, eds. P.H. Gobster and R.B. Hull, 163-181. Washington, D.C.: Island Press.
- Light, Andrew. 2000b. "Restoration or domination? A reply to Katz." In *Environmental Restoration*, ed. William Throop, 95-113: Amherst, NY: Humanity.
- José M. Rey Benayas, Adrian C. Newton, Anita Diaz, and James M. Bullock. 2009. "Enhancement of biodiversity and ecosystem services by ecological restoration: A meta-analysis." *Science* (325): 1121-1124.**
- Sandler, Ronald. 2007. *Character and Environment*. New York, NY: Columbia University Press.
- Sandler, Ronald. In press. "The value of species and the ethical foundations of assisted colonization." *Conservation Biology*.

Throop, William. In press. "Environmental virtues and the aims of restoration." In *Virtues of the Future: Climate Change and the Challenge of Restoring Humanity*, eds. Allen Thompson and Jeremy Bendik-Keymer.