

## **The “New Conservation’s” Surrender to Development**

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### **Abstract**

When a functioning ecological system is perturbed by human activity, processes are distorted and species diversity often declines. Research has shown that loss of species diversity decreases productivity, resilience (stability), efficiency of ecosystems, and increases chances of catastrophic disease. Recently, powerful interests propose to manage wild places and biodiversity for human benefits alone. We argue that this ideological leap rests on several flawed assumptions: (1) nature is a warehouse for humans; (2) humans can construct new ecosystems from non-native species (exotics); (3) humans don't have to live within limits; (4) nature is resilient; (5) nature is nowhere pristine; (6) nature is a social construct; (7) conservationists preach too much doom and gloom; (8) humans can manage nature intensively while preserving biodiversity. We contend that these revisionist anthropocentric doctrines are faith-based, resting more on an engineering world view and wishful thinking than on evidence.

Key Words: New Conservation, Biodiversity, Ecosystem Function, Exotic Species, Ecosystem Resilience

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### **1. Why is Natural Diversity Important to Nature**

Currently, there are 5 to 8 million species living on the planet. Scientists began studying the ecological implications of this extraordinary diversity during the 1980s, sparking a tidal wave of research in the 1990s. Ecologists have

concluded that diversity *per se* in ecosystems is salient. Meta-analyses of several hundred investigations showed that a loss of diversity negatively affects ecosystem function (Balvanera et al., 2006; Cardinale et al., 2006; Cardinale et al., 2011; Tilman, 2012). Yet, the planet's biodiversity is squeezed by explosions in population, technology, and per capita consumption, forcing an extinction spasm that may rival the great extinctions of the paleontological past (Wilson, 2002).

Specifically, research is showing that loss of species diversity decreases productivity, resilience, and efficiency of ecosystems, while increasing chances of catastrophic disease (Keesing et al., 2010; Tilman, 2012). Diverse communities also reduce chances that exotic plant species can invade (Sax et al., 2007; Tilman, 2012). A meta-analysis of 63 manipulated field studies reported that native herbivores make it more difficult for exotic plants to establish, but exotic herbivores facilitate invasion of exotic plants (Parker et al., 2006). A host of other studies demonstrate a decline in diversity of native fauna following introductions of exotic species on islands (Roemer et al., 2002; Keitt and Tershy 2003; Croll et al., 2005; Kurle et al., 2008; Jones et al., 2008, to name a few). Thus, there is a strong field of Conservation Science, and it says that diversity is one of the most important factors in the optimal functioning of ecosystems (Tilman, 2012). We argue that it is unethical to expunge native species and substitute exotic species for them. In sum, both ecological and ethical considerations compel the protection of native biodiversity.

## **2. Gardening Nature**

Lately, a growing, well-funded movement headquartered in The Nature Conservancy, an \$800,000,000 a year organization, proposes to replace biodiversity protection, its traditional mission, with economic development

objectives. This includes exchanging native landscapes and diversity for man-made systems to provide food and pleasure for people, a global-scale process that we call “Gardening.” Joining The Nature Conservancy are neoliberal economists and social ecologists who advocate business-oriented initiatives.

The Nature Conservancy and its partners propose that the future of conservation lies in managing nature for the economic benefit of human communities, and that increasing the standards of living in societies everywhere will indirectly evoke in people a new respect and tolerance for non-human life, although they present no evidence for the latter hypothesis based on “gardening” relatively undeveloped lands (Kareiva et al., 2007, 2012a; Marris, 2011). Here we critique some of the most egregious ideas proposed by Kareiva (Chief Scientist at The Nature Conservancy), Marris (journalist and author of *The Rambunctious Garden*), and others.

### ***2.1. Ethics of gardening nature as a warehouse for humans***

In their pursuit of humanitarian causes, gardeners deflect attention away from how their ideas are killing life. Their argument centers on nature as a warehouse for human needs and protecting what humans value (Kareiva et al., 2007; Marris, 2011; Kareiva and Marvier, 2012). Granted, there are anthropocentric arguments for protecting some species, often couched under the term “ecosystem services.” There is a cottage industry in academia that quantifies the dollar value of such services. But, when economics can justify the existence of species we value, it can justify the extinction of those interfering with profit. If our exploitation eliminates a few species that are undervalued by humans, it matters not to economists—as if a lyric missing a few words, or a melody missing some notes, doesn’t change the tempo or meaning of a song. Those arguments assume that species and ecosystems evolved to serve us, even those species and

ecosystems that pre-date us—in many cases by millions of years. This is the message of global gardeners, or “new conservation” as Kareiva and Marvier (2012) call it. They are not the arguments of conservation. They are neoliberal arguments of corporate economics.

Anytime a group of people are exploited by discrimination, we are poorer for it. Unfortunately, humanity has too much racism, chauvinism, and religious fundamentalism, and we must fight to change that (Soulé, 1995). Discrimination is the antithesis of fairness and equality. Contrary to the new conservation, however, traditional conservation dictates that just as we fight exploitation of one group of humans by another, we should equally fight exploitation of life by humans (Soulé, 1995). In sum, the value of a species can't be calculated by economics. A species is valuable because it exists and because of the role it plays in the web of interactions that defines life on this planet.

***2.2. Gardeners propose that people can use exotics to construct people-friendly ecosystems (presumably lacking inconvenient plants and animals).***

Citing the work of Lugo in Puerto Rico, Marris (2011: 145) claimed human-made systems were superior, saying “*The understory in the plantations was richer in species, had greater aboveground biomass, and used nutrients more efficiently than the native understories.*” Yet, a publication by Lugo and Helmer (2004) about these same Puerto Rican forests said, “*New [novel] forests have fewer endemic species, lower soil carbon and litter stocks; and they accumulate aboveground biomass, basal area, and soil carbon more slowly than mature [native] forests of the same age*” (Lugo and Helmer, 2004: 145). Even though novel and native forests have similar species richness and structural features, there are

important differences, and forests in New England showed a similar result (Lugo and Helmer, 2004). A major proportion of the lower 48 states is occupied by people-friendly ecosystems of exotics we call croplands, improved pastures and tree plantations. Do we want the entire continent to be covered with such artificial monocultures?

Marris (2011) referred to studies by Sax et al. (2007) showing that oceanic islands had doubled their species richness of plants, thanks to introductions. But such gains in richness may be transient because the competition-induced extinction of endemics can take hundreds or thousands of years (Sax et al., 2007). Data showing that exotic herbivores facilitate the invasion of exotic plants (Parker et al., 2006) is another confounding process. Exotic herbivores such as rabbits and goats often devastate island floras.

On oceanic islands, the massive increase of exotic birds is accompanied by native birds lost to extinction (Sax et al., 2002). Human introductions often substitute endemic, native birds for exotic generalists that previously had no tie to the area. Marris makes an error of scale when she proposes that richness does not change. Local richness on the islands does not change, or even increases, but global diversity declines because exotic generalists replace local endemics. The trend is for increasing biological homogeneity, not diversity. Exotic forests are gradually replacing the last vestiges of native forests in Hawai'i (Zimmerman et al., 2008).

Marris (2011) also claims that exotic species can help restore native species if the native habitat is changed. This may be true in limited circumstances, but we propose that Marris (2011) overextends the argument. While Lugo and Helmer (2004) showed that native species benefited from stand-initiation by exotic pioneer

trees, they were also looking at new forests grown on degraded, and abandoned, agricultural land. Marasco et al. (2008: 597) stated that in Hawai'i "*native species appear unable to recolonize areas already dominated by exotic species,*" with native species in wet, exotic forests nearly absent.

Wilcove (1998) showed that 49% of imperiled vertebrate species were negatively affected by alien species. Mack et al. (2000) documented the ecological damage imposed by successful invaders. Marris (2011) emphasized interactions that benefit humans while ignoring the costs of ecological disruption. Most damning, her anecdotes tell a different story compared to the primary literature she cites and the total number of species is more important, in her view, than their function or provenance.

### *2.3. Gardeners propose that we don't have to live within limits.*

Social scientists, like Nordhaus & Shellenberger (2007), openly advocate an ecological movement based on growth and production, not limits. Such gardeners celebrate our power to paint nature's canvas with human dominion. Like the gardeners, we believe in justice and opportunity for people, but we advocate extending compassion to all life forms.

The gardener's agenda is also short-sighted. During the 20<sup>th</sup> century, the world's human population increased by a factor of four, while the world economy increased by a factor of 40 (Wright, 2005). Already, we use 72% of the Earth's ice-free surface to provide our food and shelter (Tilman, 2012). Yet, by 2050, we may reach 10 billion people with a predicted per capita increase in buying power of 150% (Tilman, 2012). We can't continue to expand when life relies on finite resources. Further evidence for the gardener's policy myopia is their failure to emphasize anthropogenic climate change.

***2.4. Gardeners propose that nature is more resilient than previously thought.***

Kareiva et al. (2012a) stated that past anthropogenically-related perturbations had few catastrophic effects. They cited the example of the virtual extirpation of the American chestnut (*Castanea dentate*). But it is clear for the chestnut and other once dominant foundation species, including Eastern hemlock (*Tsuga canadensis*), white-barked pine (*Pinus albicaulis*), bison (*Bison bison*), and prairie dogs (*Cynomys* spp.), among other examples, that consequential ecological changes did occur following their disappearance (Soulé et al., 2003, 2005; Ellison et al., 2005; Kotliar et al., 2006; Soulé in review).

After Kareiva et al. (2012a) stated on the web that “*nature is so resilient that it can recover rapidly from even the most powerful human disturbances,*” Kareiva et al. (2012b) hedged this statement by saying that ecosystems “*demonstrate the ability of nature to bounce back once a perturbation is curtailed.*” That is an important caveat. The examples Kareiva et al. (2012a) cited were pulse events (Chernobyl, atomic bomb testing on Bikini Atoll, and the eruption of Mt. St. Helens) after which there was no human settlement, vehicular traffic, livestock, or development. The catch is that the cumulative, unrelenting impacts of heavy human use are the factors that usually prevent ecological recovery. In the face of human population growth, technology, and consumption, it is guaranteed that those human impacts will continue to prevent recovery, something that gardeners ignore.

Furthermore, Kareiva et al. (2012a) claimed that cod (*Gadus morhua*) around Saint Georges Bank are making a recovery from collapse, citing Frank et al. (2011). Frank et al. (2011) documented the transient dynamics following the collapse of the cod fishery which disrupted interactions across four trophic levels. While the trend Frank et al. (2011) reported is upward, the prospects of total



recovery are unclear. Cod and haddock (*Melanogrammus aeglefinus*) numbers are increasing, but they are half the body size from before the crash (Frank et al., 2011). Body size is important in regulating trophic interactions. Haddock are recovering faster than cod. If they replace cod as the top predator the system may become unstable or flip (Frank et al., 2011). Finally, recovery in other over-exploited marine systems has been hindered by invasive species, jellyfish bloom, and eutrophication, which may also happen around Saint Georges Bank (Frank et al., 2011). Climate change is still a wild card. Given all of this uncertainty, predictions about resilience are unscientific and irresponsible. Those predictions serve to justify massive ecological tinkering, but unlike Aldo Leopold's sage advice, these tinkerers throw away the pieces.

***2.5. Gardeners claim that human influence has left no pristine nature.***

This is largely a straw man to justify unlimited growth of the human project, as well as an excuse to avoid protection for ecological systems. Nature knows nothing but degrees and variation (Soulé, 1995). Furthermore, aboriginal occupation was not uniform across a landscape (Bush and Silman, 2007; McMichael et al., 2012). Generalizing from a local disturbance to an entire region is an error of scale that could lead to misguided management policies (Bush and Silman, 2007). No one reasonably denies that humans have affected the planet, but the level of effect varies around the globe, and there are still extensive regions populated by large mammals (Caro et al., 2012), though such systems will not persist long absent traditional conservation interventions, like secure protected areas. Wild areas are important to biodiversity, may harbor important ecological interactions, and should be protected (Laurance et al., 2012). Because an area has been affected by humans at some level (like every point on earth) should we write it off? Typos in books do not justify burning the library.

***2.6. Gardeners propose that nature is a social construct of western thought.***

This statement ignores the reality of evolution and ecological interactions (Terborgh, 1999; Estes et al., 2011). It is also an example of the arrogance of humanism (see Ehrenfeld, 1978), ignoring the fact that the biota of continents and oceanic islands is constituted mainly of autochthonously evolved species. By establishing nature as a social construct, relativists then claim that the decision to exploit a species is a societal choice. A relative choice of artistic styles is not the same as choosing to destroy species diversity for our benefit (see section on ethics above). If we justify that, can we also justify Apartheid or the Holocaust as a societal choice? Economics is the human construct. Nature is real, no matter how battered. Gardeners have it backwards.

***2.7. Gardeners say that the public is tired of hearing messages filled with doom and gloom.***

How would Frederick Douglas have reacted if someone complained that his anti-slavery campaign had too much doom and gloom? No one likes to hear bad news, but that doesn't mean the public should be sheltered from it. Saying that messages have too much doom and gloom deflects attention from the hard, societal choices necessary for solutions to a conservation crisis. Ignorance and denial do not make for good public policy.

***2.8. Gardeners say we can manage nature for human use and still protect biodiversity.***

According to Baillie et al. (2010) the four largest extinction forcers are: (1) agriculture and pastureland, (2) logging, (3) residential and commercial development, and (4) exotic species including livestock. Forcers 1 and 2 alone cover 72% of Earth's ice-free surface.

Kareiva and Marvier (2012) claimed that even highly modified systems can offer conservation value and cited Daily et al. (2003). Daily et al. (2003), however, stated that the mammalian fauna in that 40 year-old study-site around the Las Cruces Reserve had no guarantee of persistence. They attributed survival of the existing mammals to the remaining forest fragments, the value of coffee plants near the forest, and the decline of hunting (Daily et al., 2003). Indeed, the Las Cruces Reserve “*was key to maintaining the regional diversity of mammals because it was the sole locus of some of the most specialized species*” (Daily et al., 2003: 1820).

Similarly, Kareiva and Marvier (2012), citing Ostrom (2009), challenged the inevitability of the Tragedy of the Commons. Kareiva and Marvier (2012: 966) said “*.... communities will impose costs to themselves to sustainably manage resources when the benefits of such management are transparent and the potential of cheating is reduced..... Instead of relying on national governments to impose restrictions, or on endless involvement of NGOs, sustainable conservation can be achieved by empowering local people to make decisions for themselves.*”

This social policy has been applied in the western U.S for a century; it has failed. For example, there is little tolerance of key species such as wolves, prairie dogs, and bison outside of national parks. We propose that trying to extend Ostrom’s (2009) thoughtful ideas about human resource use to conserving biodiversity is over-reaching—and a panglossian error of scale.

For example, Ostrom’s paper (2009) identified variables that affect efforts toward sustainability. Among them, she noted that it is harder to organize for sustainability across large territories than it is within small areas, that “*users need to observe some scarcity before they invest in self-organization,*” that users will not

manage for the future if the resource is very abundant or already exhausted, that self-organization is harder if the resource is mobile than if it is stationary, that large numbers of users make it more costly to organize, and that if the resource regenerates slowly and human numbers grow rapidly “*users may not understand the carrying capacity of the resource, fail to organize, and destroy the resource*” (Ostrom, 2009: 420-421). Similarly Ludlow et al. (1993), writing about the failure of maximum sustainable yield, noted that large levels of natural variability in a system masked the effects of over-exploitation; complexity precluded a reductionist approach to management; wealth, corruption, and power worked against sustainability; and thus there have been spectacular failures to manage forests and fisheries—as we continue to see in large parts of the world today.

The evidence presented by Kareiva and Marvier (2012) about managing for humans and protecting biodiversity is weak. Ecological processes and interacting species push a natural system toward complexity and resilience, but for economic benefit, humans must simplify and control ecosystems. That is the conundrum of those who say they can garden nature for the benefit of humans and still maintain biodiversity. The Tragedy of the Commons targets resources used by humans, not biodiversity. There is no evidence, at relevant scales, that biodiversity, growing human numbers, the technological juggernaut, and unregulated corporations can coexist.

### **3. Conclusion**

Kareiva and Marvier (2012) stated that much in conservation is anecdotal, and it needs to be more firmly based in data. Yet, conservation science united traditional wildlife management with academic theory. This synthesis gave an evolutionary-ecological view to conservation issues, and academic standards gave

it rigor. There are peer-reviewed journals, such as this one, and the competition for publication is steep. Significant additions to ecological theory from conservation science include the value of highly interactive species to ecosystem integrity, area effects, fragmentation, risks of small population size, population models and viable populations, genetic models and effective population size, trophic cascades and the value of top-down ecological interactions, global climate change, and changing the overall emphasis from managing single species as a resource to the importance of nature's diversity. Kareiva and Marvier (2012) acknowledge none of this. What has become of conservation biology? It appears to have gone up in smoke—just waiting for the new conservation to fill the void.

We agree with Kareiva and Marvier (2012) that conservation should provide benefits to humans. For example, President Obama's Great Outdoor Initiative documents the aesthetic, spiritual and commercial benefits of nature protection. Yet, we never hear a gardener talk about endangered species, loss of species, existence value, or the consequences of declining diversity, and managing the remnants of wild nature for economic benefit denigrates the idea of protected areas.

Instead gardeners present poorly substantiated ecological assumptions, like those listed above, that seem to do little more than open a door for economic development and close a door to protection of species and ecosystems. The arguments that gardening nature without strictly enforced limits can help people and maintain biodiversity are ungrounded and do not address the root causes of biological destruction. We contend that much of the current interest in gardening nature is faith-based, resting more on wishful thinking than on evidence.

The ethics of gardeners, or the new conservation, is to exploit nature for human benefit. It is an economic argument based in neoliberal, corporate philosophy. Increasingly, the boards of the larger environmental NGOs are dominated by financial and corporate interests whose values are antithetical to the protection of biodiversity for its own sake. Gardeners view the value of nature in utilitarian terms, as something for people to use. Indeed, the title of Kareiva et al. (2007) is “Domesticated nature: Shaping landscapes and ecosystems for human welfare.” Gardening nature for humans is merely continuing the present trend of habitat conversion for economic purposes. The assumption that increased standards of living will increase sympathy for wild creatures (Kareiva and Marvier, 2012) has no proof. If history indicates anything, it is that greed is insatiable.

Robinson and Redford (1991), Wright (2005), and others stated that when populations grow, technology improves, and participation in market economies increases, humans inevitably deplete resources. Yet, gardening nature for humans relies on exactly those same factors. Plans for sustainability are often designed and managed by people who view progress as economic growth and accumulation of material goods in a market economy (Frazier, 1997). A system based on short-term profit and unlimited growth is the enemy of sustainability.

The goal of conserving biodiversity should be to save as many species as possible with well-connected networks of protected lands (Soulé and Terborgh, 1999). Laurance et al. (2012) included a group of over 200 authors, all agreeing that large areas protected for biodiversity are necessary. Barnosky et al. (2013) recently produced a scientific consensus on saving humanity’s life support systems. They stated that the extinction of biodiversity, climate change, wholesale loss of ecosystems, pollution, and ever-increasing numbers of people devouring the planet’s resources all act synergistically to lead us in a dangerous direction.

Furthermore, they stated, “*Until now, these have often been viewed as “necessary evils” for progress, or collateral damage that, while unfortunate, would not ultimately stand in the way of serving the needs of people*” (Barnosky et al. 2013: 4). The mantra of the gardeners, or new conservation, addresses none of these problems and indeed seems to continue the view that they are collateral damage along the road to economic development.

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