

Towards a half wild Earth

The 'Half Earth' goal for protecting biodiversity is rightly gaining momentum, yet most discussions say little about how to implement a goal that would require we expand protected areas on land four-fold and in the sea 20-fold. This article gives an overview of the specific steps that would take us far towards assuring that at least half of our planet is wild and complete in its biota. The suggested steps are essential to stemming the extinction and climate crises. However, they will not be sufficient if the human overpopulation problem – too many people consuming too many resources – is not also addressed.

Wild Earth must be saved and restored in a stepwise fashion. Biology can lead the way, if politics and economy will allow, but imagination and art will be equally critical.

More and more conservation biologists and wildlife advocates agree that if we are to preserve life on Earth in anything close to its pre-human diversity and abundance – if we are to stem the extinction and climate crises – we must designate as nature reserves at least half the area of terrestrial and aquatic ecosystems. This equitable sharing of Earth, as popularized in books by conservation biologists Reed Noss and EO Wilson and other conservation leaders (e.g. Noss, 1992; Noss and Cooperrider, 1994; Wuerthner *et al.*, 2014; 2015; Wilson, 2017), would mean expanding protected areas on land about four-fold and in the seas about twenty-fold.¹

Before describing some low-hanging fruit for reserves, let me remind any conservationist who has temporarily forgotten, that unless we compassionately stabilize then lower human numbers, we will not halt the extinction and climate crises, even if our land-saving efforts are heroic. Among the first steps toward a planet that is livable for all are worldwide access to effective and safe birth control, increased resources for education of girls and empowerment of women (in culturally fitting ways), and men accepting their share of responsibility for family planning.²

Moreover, an ecologically sound vision for the future must acknowledge the incompatibility of present fossil-fuel-based affluent lifestyles (particularly those in my home country, the US) with the well-being of the natural world. In a better, wilder world of the future, a much smaller and healthier human population will live more frugally and thoughtfully, richer in arts and cultural cross-pollination, but much less extravagant in its consumption of natural resources. As my friend Paula MacKay, author and carnivore ecologist, once succinctly put it: *Here's to a future of big wilderness and small gardens.*

Here, let me also echo other conservationists' calls for stories and songs to convey our messages and visions. Clearly, good science is not enough to save the day. Scientists have known many of the steps to avert ecological disasters for decades, yet the biological melt-down continues apace. Stories move people more than do facts. So in this essay, without pretending to be either a storyteller or a scientist, I'll suggest some elements of a good story for the future of life on Earth.

Forever wild: Protection of public lands

Those reminders made, it must now be asked: *what* do we protect and *how*? The easy answer is that we protect every place we can, by whatever fair means are

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available. Where public lands are sizeable, permanently and fully protecting them by law (as with Wilderness designation on public lands in the United States) or by constitutional fiat (as with Forest Preserve lands in New York’s Adirondack and Catskill Parks) will take us much of the way toward a Half Earth goal. Public lands and state trust lands in the US comprise about 700 million acres, or nearly a third of the land base. In Canada, federal and provincial Crown lands and First Nation lands comprise the vast bulk of the country, and are still largely intact. Mexico is more challenging, from a conservation perspective, as public lands are few and far between; and the *ejido*, or community-land, system does not easily lend itself to designating protected areas. Still, in North America as a whole, a Half Earth vision could be achieved largely by conserving public lands for their highest and best uses: as wildlife habitat open to quiet recreation and supported by accounting for the economic value of ecosystem services, particularly carbon sequestration, pollination, and watershed renewal.

I hasten to add: wild lands and species have intrinsic value and beauty of their own, and should not have to be justified in economic terms. However, in the race to save places and species before it is too late, and until there is a paradigm shift amongst policy-makers toward ecocentrism, finding ways to account for the utilitarian benefits of wildlands may be necessary to securing them.

A caveat about depending on public lands, with or without such a needed paradigm shift: most public lands deserve ‘Forever Wild’ protection, but many natural communities and ecosystem types are not well represented on public lands (which tend to be what was left after the lands most desirable for colonial usurpation were given to corporations and settlers). Hence, adequately protecting waterways, shorelines, grasslands, valleys, temperate forests and other biologically productive landscapes and seascapes will require wildlands philanthropy and strong incentives for private lands conservation.

Wildlands philanthropy

In continents other than North America, public lands may play smaller roles. In many places, including North and South American countries, wildlands philanthropy – buying and saving land – is a critical part of a larger conservation agenda. As Tom Butler explains in his inspiring book *Wildlands Philanthropy*, many of North America’s (and a growing number of South America’s) National Parks and other celebrated natural areas owe their existence at least in part to the generosity of private donors (Butler and Vizcaino, 2008).

Outstanding examples of wildlands philanthropy in the Americas, examples worth replicating and multiplying, include the following:

- Kahtahdin Woods and Waters National Monument and other wildlands in Maine purchased for conservation by Roxanne Quimby.
- Adirondack Park’s hundreds of thousands of acres of former timber company land purchased through the decades by Adirondack Land Trust and other land trusts and usually resold to New York State for addition to the Forest Preserve;
- Hawk Mountain Sanctuary in Pennsylvania, inspired and sponsored by wildlife defender Rosalie Edge;
- the Arc of Appalachia, where director Nancy Stranahan and team have purchased scores of parcels across thousands of acres to create a wildly improbable reserve system in an otherwise heavily developed area in south-east Ohio’s Edge of Appalachia region;
- Southern Appalachian forests in biological hotspots saved by the Stanback family and other wildlands philanthropists, often donated for public parks and forests;
- Great Smoky Mountains National Park, funded in part by school children collecting pennies to donate to its creation;
- Corkscrew Swamp and other bird sanctuaries in Florida inspired by the legendary Marjory Stoneman Douglas

- and protected by Audubon Society and various land trusts;
- Tallgrass Prairie reserves in Kansas and Nebraska secured by The Nature Conservancy;
 - the Southern Plains Land Trust, which has purchased big blocks of Shortgrass Prairie and gradually rewilded them with missing species like prairie dogs, burrowing owls and bison;
 - Catspaw and Mountain Island conservation ranches in western Colorado, protected by Mellon family heirs;
 - Ted Turner's conservation ranches in New Mexico and Montana;
 - Grand Teton National Park, one of many protected areas the Rockefeller family purchased and donated to the public;
 - redwood groves rescued by Save the Redwoods League and partners;
 - cores of inholdings in Alaskan parks and refuges purchased by The Conservation Fund and added to the public domain;
 - a dozen world-class parks and two million wild acres secured by Tompkins Conservation in Chile and Argentina...

The list goes on and on, thank goodness, but the point is made: private individuals, groups and businesses can marshal their economic clout to save wild places. Indeed, there is no nobler use of money today than to save and restore wild places and species.

Green economics

For centuries now, dominant economic systems have essentially been built on wrecking nature. To avert ecological collapse, we must shift to *restoration economies* (Cunningham, 2002; McKibben, 2008). This will be complicated, but might be greatly assisted by putting a high price on carbon. Much of what industrial growth economies now do is remove carbon from the ground, where it belongs, and put it in the atmosphere, where in excess it is a pollutant. We must reverse that trend.

Among steps toward green economies could be providing tax breaks and other economic incentives for broad, forever wild, buffers along and around waterways; government buy-out and removal of homes

and businesses from areas that will likely burn or flood or otherwise succumb to climate chaos in the future, and giving these areas back to wild nature; and ending subsidies (like below-cost timber sales and grazing permits, and corporate tax breaks) for resource extraction in remote areas. In general, we should tax ecologically-damaging activities, including removal and burning of carbon from the ground, and reward ecologically-restorative activities, like reintroducing missing species, buffering waterways and replanting native forests and grasslands.

Currently, the incentives for private owners of wildlands are all wrong. Economic pressures (including property taxes) encourage liquidating natural vegetation and selling for development. We should, instead, reward private land-owners for protecting wildlife habitat and providing ecosystem benefits.

Ecological austerity

Much of the human-built infrastructure that fragments wildlife habitat is expensive to maintain. In many places, lands can be reconnected and restored in ways that save taxpayer money. Again drawing examples from the US and Canada, back-country roads on public lands are built and maintained principally for extractive interests, especially logging, mining and ranching; and they cost citizens countless millions of dollars a year. Undoing unneeded roads in wild places and dismantling unneeded dams will restore wildlife habitat even while reducing taxes.

Priority areas for this include US National Forests, presently fragmented by something on the order of 400,000 miles of roads – more than the US Interstate Highway system – that primarily serve loggers and ranchers; and US Bureau of Land Management lands, likely crossed by an even greater, though less well-mapped, road mileage, serving primarily ranchers and miners (Foreman and Wolke, 1988). Although the cost savings may not be so immediate, the thousands of deadbeat dams across North America and Europe ought also to be removed. Initial costs will

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be more than offset over the long term by reduced maintenance and increased ecosystem services, and life's beautiful bounty restored (including abundant fish runs).

Continental wildways

Wildlife habitat connections need to be protected at all scales and in all regions (Soulé and Terborgh, 1999). To begin with, conservation may gain in the near term by focusing on the broad swaths of lands and waters along regions that remain relatively intact, due to topographic or climatic factors (Foreman, 2004). For North America, these continental habitat connections include:

- Boreal Wildway, across northern Canada and Alaska;
- Atlantic–Appalachian Wildway, running from the South–East Coastal Plain through the Appalachian and Adirondack Mountains to the Acadian Forest;
- Gulf Coast Wildway, along the Gulf of Mexico from Florida to Yucatan;
- Great Plains Wildway, across the largely depopulating Shortgrass Prairie from Chihuahua to Saskatchewan;
- Spine of the Continent, or Rocky Mountain Wildway, encompassing the great mountain chain and adjacent deserts and grasslands;
- Pacific Wildway, centred on the Sierra Nevada and Cascades but also including rivers draining west and wilder parts of the Pacific Coast itself.

Green-lining these continental wildways could make them national and international priority areas for reintroduction of missing native species, installation of safe wildlife crossings on major roads, dismantlement of unneeded dams, tax incentives for private lands conservation, and other land-saving measures. (Here I use 'green-lining' in the sense of circling an area with an honorary pen for purposes of highlighting its ecological importance.) These continental wildways become increasingly important as global temperatures warm, and will encompass many of the micro-climates and refugia that can help imperiled species get through this period of climate chaos

(Hannibal, 2013; Eisenberg, 2014; Davis, 2015).

Last great wildernesses

Priority for protected areas ought also be given to Earth's remaining big core habitats, areas that have so far partly escaped the damages of human overpopulation and industrial economies. These areas include:

- the Boreal Forest and tundra of Siberia, Scandinavia, Canada and Alaska;
- the Sierra Madre Occidental and Rocky Mountains of Mexico, the US and Canada;
- the Amazon Rainforest, Guiana Shield, Pantanal and Ibera wetlands complexes, Andes and Patagonian Steppe, in South America;
- Central African Rainforest, and remote deserts and wetlands of Namibia, Botswana and South Africa;
- the Carpathian and Ural Mountains of Eurasia;
- the Himalayas of the Indian sub-continent;
- the Great Barrier Reef and Western Australia desert;
- coral reefs and mangroves around remote Pacific Islands and along wild Central American coasts;
- most Arctic islands and all of Antarctica, and their surrounding seas;
- the high seas and deep-sea ecologies.

The United Nations and IUCN ought to make protecting these last great wildernesses international priorities. Wealthy nations should find ways to pay for protection of these wild places (perhaps as parts of climate accords), in cooperation with the countries (often developing and economically challenged) home to these places; and, of course, this work should also be done in concert with local people, especially tribes and first nations, and in ways that provide good work for residents of the areas in question.

Rewilding at all levels

As Arctic explorer and cinematographer Lois Crisler famously said decades ago, "wilderness without wildlife is just scenery" (Crisler, 1958). Along with

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protecting much more land in much more connected ways, we must gradually restore the species we have eradicated from so many regions, including the top carnivores and other keystone species that help maintain natural community stability. In North America, priorities for species restoration efforts should include:

- puma, or cougar, in wilder parts of the East;
- disease-resistant American chestnut trees in the Appalachians;
- wolves where still missing from the West;
- beavers wherever they've been eradicated;
- prairie dogs across the Great Plains and Intermountain West;
- gopher tortoises of the US South-East region;
- American eel in most eastern streams from the Saint Lawrence drainage basin through the Gulf of Mexico;
- brook trout in many eastern streams, and rainbow or cutthroat trout in many western streams;
- salmon in rivers of both North Pacific and Atlantic coasts;
- sturgeon and other threatened fish species;
- all sea turtles of the Atlantic and Pacific seas
- grizzly bears in the Cascades and Sierra;
- bison across the Great Plains.

Sometimes species restoration will require active reintroduction. Other times, our job may simply be to protect critical habitat and expand it by giving land and water back to wildlife, removing human intrusions and letting the wildlife multiply and thrive.

Ironically, though the term 'rewilding' was coined by Dave Foreman of The Rewilding Institute (www.rewilding.org) and given scientific credence by Michael Soulé and Reed Noss in *Wild Earth* magazine (Soulé and Noss, 1998), rewilding work so far is perhaps more advanced in Europe (www.rewildingeurope.com), South America (www.tompkinsconservation.org), and Africa (www.awf.org) than it is in North America. The Rewilding Europe movement is vibrant and growing, and already has

successful beaver and lynx reintroductions to its credit. Many African parks and private conservancies have restored missing charismatic megafauna. In South America, Tompkins Conservation teams are systematically restoring missing species to parks they are creating in Chile and Argentina. Importantly, Tompkins Conservation biologists and strategists are finding that an incremental approach, working closely with local communities, and beginning with uncontroversial species, proves most successful. In Argentina's Ibera parks, for instance, macaws and anteaters and tapirs were restored, before a project for jaguar reintroduction was advanced.

Rewilding will be most successful as a discipline and a movement if it includes work at all scales and in all areas, so everyone can participate (Miles, 2018). Our goals should continue to include reconnecting big wild areas and restoring the full range of native wildlife – including top carnivores – but we should also embrace local efforts and reintroduction of plants, herbivores and micro-fauna. Rewilding should become central to the work of restoration economies. As the Rewilding Europe movement is showing, a lot of good work can happen on marginal farmlands that are enjoying passive rewilding after agricultural abandonment, but landscapes may also need active help to regain their full complement of native species.

Coexistence

Successful rewilding, of course, depends on people's willingness to accept wild animals as neighbors, or at least as fellow denizens of a given region. Achieving such coexistence is especially challenging with animals that many people fear or consider nuisances, like top carnivores, snakes, bats, and rodents. So an integral part of any ecological vision for the future must be, if not the improbable ideal of harmony, at least mutual acceptance between humans and wildlife. Appreciation of wildlife, including these 'scary' or 'vexing' species, should be cultivated and encouraged at all levels of education and in all forms of art.

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Short of a broad-scale ecocentric awakening, wildlife governance reform may be achievable even with the limitations of our present, small and fragmented conservation community. In the United States (to which I keep returning not only because I live here, but also because the US, for better or worse, does often have disproportionate political and cultural influences), so-called wildlife management is largely controlled by the states, and state wildlife agencies are usually run by people from ‘hook and bullet’ interests. The interests of naturalists, ecologists and wildlife watchers – not to say the wild creatures themselves – are underserved, in wildlife management decisions (Laundre, 2012; Stolzenburg, 2016). Grass-roots organizing and entry of younger conservation-minded people into wildlife fields can correct this imbalance, though it will take time.

Coexistence also means making our built environment and other human infrastructure more permeable for wildlife movement, as well as more durable in the face of climate chaos. In many countries, including the affluent US, much of the infrastructure, particularly roads and bridges, is deteriorating from deferred maintenance and worsening weather events. Much of the work of a restoration economy, and a crucial component of coexistence, is installing overpasses and underpasses so animals can safely cross roads, and modifying culverts to make them passable for fish and amphibians (Beckman *et al.*, 2010), as well as removing unneeded roads and dams, as noted above. Refraining from building more infrastructure in wild and semi-wild places is also critical. Studies by the Western Transportation Institute in the US show that wildlife crossings commonly pay for themselves within a decade, through reduced vehicle-wildlife collisions and saved human lives (wild animal lives not being valued in most economic calculations, sadly). Again, too, making our built environment more permeable to wildlife movement can be done in concert with making it more durable for worsening storms.

Conclusion

Protecting at least half of Earth’s terrestrial and aquatic ecosystems for the many millions of other species with whom we share the biosphere is an ecological and moral imperative. Doing so will depend partly on peacefully and equitably reducing human numbers – in terms of both population and excessive consumption. It is not too late, but it soon will be as the Sixth Extinction and climate catastrophes accelerate, if we do not greatly speed the pace of protecting land and sea. Satellite images show that big chunks of all continents and many islands still have relatively intact native vegetation. If we fully protect all public lands, use our surplus wealth to buy and save wildlands, and convert to restoration economies, we can achieve in our lifetimes a better, wilder world, with safe homes for all species – furred, feathered, finned, fingered and foliated. Yes, we have allowed the extinction and climate crises to grow so severe that it will take a virtual miracle to save wild Earth. But then, does not wild Earth comprise miracles? ■

Notes

- 1 I am rounding up figures from the World Database on Protected Areas (<https://is.gd/RPBrUm>).
- 2 Two particularly helpful books addressing the population crisis are Crist (2019) and Cafaro and Crist (2012).

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