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Untamed Unmasking of Permaculture

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habitat functions for native animals as the indigenous habitat slowly returns?

6. ...

I could continue on in similar fashion critiquing every page, it's full of fallacious fodder. If someone gets permission from the publisher, I'll do so.

“The more the human primate resists its primal nature, the more it rationalizes exploiting and dominating. It disconnects from innate awareness and fully intact empathy, falsely perceiving itself as safe, free and supreme. Detached from organic interconnection within rich, diverse habitat leaves it jaded to suffering as it commits carnage in all forms.”

To Rewild

Just beneath a thick cracking veneer of denial modern humans sense the end throes of civilization. Many compliantly follow the herd sacrificing their lives as fodder for the insatiable beast. Some shed pseudo-life bypassing the leviathan, looking to pre-civ for ways to live feral in collapsing-civ and inevitable post-civ. Being that noncommercial sustenance will be needed in the shifting biota-scape, permaculture is pitching a sale to transitioning rewilders.

Does the pitch reflect the way of wild? While some permaculturists collaterally include a premise of innate compassion for wildlife, does the overarching paradigm remain supreme man in the middle of his designed environment, even incorporating nonindigenous life? Does ‘*all plants play an ecological role*’ rationale in homesteading permaculture signal acquiescence to humans unrelenting dominating and manipulating the world on their terms? Restorer of native wildlife habitats Benjamin Vogt calls for humans empathetically reconnecting with wilderness by actively reviving local wild lands:

Our gardens are places of arrogance and alienation. We are a species very much alone in the world, trying to find an intimate, stabilizing connection we once had with other species. But somehow we are unable to give ourselves to the rather simple communication of empathy, compassion, and shared fate. In our gardens, we may show the greatest alienation, placing plants how and where we want and using species unrecognizable to wildlife.

In our gardens, then, is arrogance- that we matter more, that our passions and loves, our losses and agonies, are separate and even superior to those of other species. While our gardens could ideally function as bridges between our world and the worlds of an infinite number of lives, too often they are walls of hubris and human-made disorder we impose upon a world already ordered to maximum benefit through millions of years of trial and error. What we wish to improve upon may be our own human-made alienation as creatures who struggle with an ethics that must encompass not just different races and creeds, but also animals, plants, and fungi. In a world of climate change and mass extinction, intimate gardens out our back door might be the best places to generate a landscape ethic that evolves into an activist-based global ethic of creation care for all life.¹

Whether logically or emotionally, is permaculture intention for rewilding intrinsically breeched with use of nonindigenous species being naïve at best, insensible at worst?

Permaculture Snake Oil

Two nonfiction books flirt with transitional rewilding. While neither fully embraces anti-civ or post-civ notions, distinctions in ethos between the two are revealing. The true story of Carol Ruckdeschel, *Untamed: the Wildest Woman in America and the Fight for Cumberland Island*² is archetype of contemporary human rewilded as adaptive creature connected in and contributing to indigenous community. Carol's kindred shared life with nonhuman others is closer to the connections anthropologist Nurit Bird-David observed of South India foragers, with whom 'family' includes an interwoven diversity of biota and

¹ Voigt, Benamin. *A New Garden Ethic: Cultivating Defiant Compassion for an Uncertain Future*. New Society Publishers, 2017. Pgs. 96-7.

² Harlan, Will. *Untamed: the Wildest Woman in America and the Fight for Cumberland Island*. Grove, 2015.

corporates? Trained in ethnobotany, Tao should know that before European 'settlement' indigenous people in Cascadia foraged and gathered berries such as Salmonberries (*Rubus spectabilis*), Thimbleberries (*R. parviflorus*), Trailing Blackberries (*R. ursinus*), Blackcap Raspberries (*R. leucodermis*), Salal (*Gaultheria shallon*), Dull Oregon Grape (*Berberis nervosa*), Tall Oregon Grape (*B. aquafolium*), Red Huckleberry (*Vaccinium parvifolium*) and Evergreen Huckleberry (*V. ovatum*). In 1885 plant breeder Luther Burbank imported seeds of a blackberry from Asia with berries so plump and tasty it sold well to his fellow colonizers. In addition to birds spreading the berries, it rapidly propagates vegetatively by root and stem tip, choking out indigenous plants as it rampantly spreads in a new bioregion not adapted to hold it in check. Efforts to diminish this noxious yet human valued species are simply acts of decolonizing undoing our species' harm.

3. Page 3 – Nonnative invasives “appear” to dominate and replace native flora and fauna? This is just an illusion? That needs to be backed up with something other than permaculture biased misconception.

4. Page 4 – “*Herbicides are favored as a restoration tool...*” In restoration ecology, integrated management utilizes chemical and biological controls as the last resort.

5. Page 5 – When using burning as a control method and accidentally burning an endangered frog, Tao calls into question eradication methods that do harm. Unfortunately the colonizing human species leaves hard decisions in ecosystems we've seriously degraded and are now trying to recover. Does she know the entire assemblage of species that have moved out of or struggle within the invaded wetland? Since she seems here to support conservation of native species, are there other methods she can utilize that are less harmful or can she adjust her method, such as if adjacent to native patches, burning in plots slowly allowing time for native plants to grow in to provide

Page by Page Rewilding Critique of

Beyond the War on Invasive Species: A Permaculture Approach to Ecosystem Restoration

“The problem of invasive species today is not that humans are trying to hold species in place against their will instead of letting them naturally shift their ranges, but that as humans have invaded and colonized Earth, they have tugged other species about with them doing the same. For humans to decolonize, they must recognize and remedy best they can all their mutilations.” Ria

1. Page 1 - Tao is experienced and trained in farming, agroecology and permaculture design, but some government department hired her as a botanist to lead the restoration of a wetland. Her profound lack of experience in restoration ecology is demonstrated throughout the book. Not that restoration ecology is flawless or should escape critique, but if modern humankind learned the practices and principles of restoration ecology, during human transition toward lifeway embedded in nature there might be enough worldwide manual effort where last resort methods like use of chemicals are unnecessary. The clash between pro-agriculture human-centered land management and pro-rewilding humans returning wildland for wilderness’ own terms begins on the next page.

2. Page 2 – Tao incorporates invasive species such as Himalayan blackberry (*Rubus armeniacus*) into managed pasture. She says in pastureland invasives *“find their homes on land where conditions are less than ideal for native or other desirable vegetation.”* Does she understand the devastation humans wrought upon wildland when they began transforming swaths of Earth into domesticated cropland and grazeland, how it eradicated 1/3 of Earth’s arable wild land and is still increasing? Does she understand the advantage some species take when introduced into a habitat of others who have not had time to co-evolve with them to achieve homeostasis? Does she know the origins of the Himalayan blackberry she in-

abiota coalescing in a place.³ The exposé *Beyond the War of Invasive Species, Resilient Permaculture Design, and Transition Homesteading*⁴ is promotion of permaculture through rebuke of restoration ecology, and a calling to surround oneself in a constructed sustaining nature by managing nonhuman others in a manner flourishing in beneficial functions centered around humans. Opposite restoration ecology, permaculture oft incorporates nonnative species into a designed anthropocentric permanent agriculture/culture.

In sync with restoration ecology, Carol in *Untamed*, for example, discourages expansion of human-introduced feral pigs decimating the island’s indigeneity by turning them into meat to fuel her body’s work saving threatened sea turtles. Since childhood Carol followed her instinctive awareness of and compassion for wild life. More feral than refined, she feels most at home in wild communal life as a pauper sustaining herself on a biologically diverse barrier island; but it’s under civilization’s attack. Fortuitously, being a self-taught published scientist gives her standing to leverage the eminence of science and politics to support her conservation efforts, though she’s most willing to take Edward Abbeyesque action for some quick and fun results. Driven by her primal purpose, she performs washed-ashore sea turtle necropsies, connects with a blind gator, befriends vultures, grieves for human introduced wild horse castaways ailing outside their habitat, and serves witness to a wild mourning ritual. Her intertwined personal life tragedies do not deter her fight for a true wild family, protecting it from commercial development and exploitation.

Colonizing humans transferring species into bioregions, exponentially fragmenting and degrading interconnected assemblages, has left many hard decisions on how to halt their over-

³ Bird-David, Nurit. *Us, Relatives: Scaling and Plural Life in a Forager World*. University of California Press, 2017. Pg. 173.

⁴ Orion, Tao. *Beyond the War of Invasive Species, Resilient Permaculture Design, and Transition Homesteading*. Chelsea Green Publishing, 2015.

powering impact and revive a lifeway embedded in wild. In *Beyond the War*, Tao Orion, a permaculture design teacher and farmer degreed in agroecology and sustainable agriculture, proposes a strategy to include invasive species based on permaculture principles. Seeing restoration practices as untenable and ineffective, she promotes utilizing invasive plants for uses such as compost, medicine, farm animal feed, and human food. Without knowing how invasives will impact nature in the future, she proposes taking a leap of faith in moving forward into the unknown with inventiveness and tools to create a new thriving of shifting biotic collections for human sustenance. She believes that humans worry too much that some introduced species ‘appear’ to overtake native communities forever altering ecosystems, threatening not only existence of individual species but intact bioregions and global biodiversity. To her, permaculture offers a way to incorporate nonnative invasives through revamping the root cause of ecological destruction: routines of humans’ everyday consumptions, or she’d reframe as productions.

⁵ Broderick, James, and Tao Orion. “Tao Orion: Beyond the War of Invasive Species, Resilient Permaculture Design, and Transition Homesteading.” *Ancestral Health Radio*, 15 Mar. 2017, ancestralhealthradio.com/podcast/tao.

⁶ Compared to restoration ecologists, permaculturists don’t commonly studiously know or aim to know invasive behavioral implications of plants they work with, such as Japanese Knotweed (*Fallopia japonica*), now hybridized into Bohemian Knotweed (*Fallopia x bohemica*). In addition to re-rooting vegetatively from dropped cuttings, cutting itself triggers root growth up to 4’ deep and 20’ across. Large roots’ physical properties destabilize soil, and along waterways this triggers soil erosion that degrades aquatic habitats such as salmon-bearing streams. Juvenile salmon cannot handle the sediment load. Handling plant without cautious awareness of that plant’s characteristics and behaviors can inadvertently cause chain reactions overpowering nearby indigenous biotic communities, even on immense scale, replacing biodiverse species communities with virtual monocultures. Human-triggered species invasions can become such a threat to indigenous biotics that they can result in management practices such as herbicides that most permaculturists and restoration ecologists alike abhor.

ignorance of primal ways, the best domesticated humans can do is attempt to undo what they can of the harm domestication has done. Domesticated humans liberate themselves and others by re-engaging with wilderness in a recompensing liberation ethos of de-colonizing restoration, such as returning indigenous plants co-adapted to a site and freeing them to naturally evolve over time. “If we garden with native plants that form living communities... we begin to cross-pollinate again. We begin to learn to speak languages we’ve forgotten. We mend. We bind.”²⁷ With ecological dynamics returned species will reestablish their niches and spread seed until they settle into spots with others they remember and prefer, rekindling thriving resilience.²⁸ But continuing to promote architecting the world around humans only emboldens domestication’s menace.

To be anti-civ comes from primal pain of deep losses and resolve for restoration. *Untamed Carol* is a wild warrior whose personal story is the story of wildness under siege, and a plea for humans to let go of civilization’s primacies, to become deeply aware of indigenous life around them, to take action to assist wild recovery. To be rewilding human in transition times is not preparing oneself to live through changing conditions. Instincts will manifest sustenance in the moment, tis the way of the nomad. Accepting wild fate is the cost of free living. To rewild away from colonizing lifeway is to rejoin the primal force through action based on innate empathy, tending to wilderness not for human dominion but simply for wild.

Ria Montana, Forest and Wetland Rewilders

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Endnotes

²⁷ Voigt, 2017. Pg. 151.

²⁸ Weaner, Larry, and Thomas Christopher. *Garden Revolution: How Our Landscapes Can Be a Source of Environmental Change*. Timber Press, 2016.

awareness and more about rationalizing domineering manipulation reflective of a supreme human within contrived hierarchal power structures. A keen eye is needed to sift through civilization bias. If the only egalitarian way for humans to live wild is located at wild tending or earlier, how will humans undo what they can of domestication's impact on wilderness during transition toward post-civ? How can humans shift the locus of control back to wilderness as they adapt into ecologically contributory roles?

Humans across the wild-civilized spectrum on some level intuit intensifying globalization pressures lunging toward a boiling point. Introducing plants and animals began with agriculture for settling lands and grazing domesticated animals for human colonization of new lands.²⁵ While behavior change from introduction to invasion can be delayed, once introduced into homeostatic habitats nonindigenous species can outcompete, eat, infect and hybridize with indigenous species, exponentially impacting flora and fauna. This harm is often compounded by overarching dynamics such as climate change.²⁶ Even with civilization's science confirming ecosystems everywhere are degrading and collapsing under human linked invasions, tamed humanway cannot begin to envision renouncing its terra-conqueror thrown. Nor is permaculture, however charming and benevolent, relinquishing humans' peculiar omnipotence over nonhuman others.

There are endless unintended consequences of domesticated humans rearranging species about on domestication's terms. Introduced, domesticated and wild species are all puppets and victims of colonizing, predatory human folly. With palpable

Inferred from Ancient DNA in Dental Calculus." *Nature, International Journal of Science*, vol. 544, 2017, pp. 357–361. www.nature.com

²⁵ Nibert, David Alan. *Animal Oppression and Human Violence: Domestecration, Capitalism, and Global Conflict*. Columbia Univ. Press, 2013.

²⁶ Plumwood, Val. *Environmental Culture: the Ecological Crisis of Reason*. Routledge, 2007.

On the podcast *Ancestral Health Radio* self-described “ancestral health coach, rewilding advocate, and 21st-century hunter-gatherer-gardener” James Broderick interviews Tao.⁵ Some of their topics include supplementing chicken feed with grains for egg production, buying land for homesteading, vegetable gardening and animal husbandry products. In suggesting people dig up noxious knotweed to use the root for medicinal purposes, the lack of depth of Tao's awareness of plant behavior is revealed when she neglects to caution that any 4” cutting of this plant landing on soil can re-root expanding the habitat invasion, cascading into suffocating aquatic life like juvenile salmon.⁶ Acknowledging that there's not enough wild game to support hunting, her theme is on creating an agricultural society where humans acquire enough land to support their diet. It is clear that Tao's permaculture homesteading is intended as the anthropocentric endpoint, not a feasible transition toward a rewilded human embedded in rewilded Earth. Akin to how Leirre Keith's *The Vegetarian Myth: Food, Justice and Sustainability*⁷ failed in logic for carnists' leap of faith out of speciesism, so to Tao Orion fails in logic for permaculturists' leap of faith out of human supremacy.

Tao's minimizing the concern over civilization's introduced species' impact on wilderness resilience is reckless and uninformed.^{8, 9} Essential truths are misconstrued and ignored such as 1. Many indigenous animals depend on indigenous plants to thrive, for example, wildlife are generally not adapted to eat introduced plant foliage¹⁰ 2. Indigenous plants and ani-

⁷ Keith, Lierre. *The Vegetarian Myth: Food, Justice and Sustainability*. Flashpoint Press, 2009.

⁸ Simberloff, Daniel. “Introduced Species, Impacts and Distribution Of.” *Encyclopedia of Biodiversity*, 2013, pp. 357–368., doi:10.1016/b978-0-12-384719-5.00251-3.

⁹ Jarić, Ivan, et al. “Crypticity in Biological Invasions.” *Trends in Ecology & Evolution*, 2019, doi:10.1016/j.tree.2018.12.008.

¹⁰ Tallamy, Douglas W. *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants*. Timber Press, 2016. Pgs. 52-4.

mals have co-adapted in intricate and complex ways with de-

Ninety percent of native fauna are slow adapting specialists (pg. 58) unable to complete their life cycle with nonnative plants. Entomologist Douglas Tallamy studied the ability of native insects to utilize nonnative plants to support various parts of their life cycle. Comparing insects eating native and nonnative species, the native vegetation supplied four times more insect biomass simply because the insects' chewing mouthparts were unable to process nonnative plants (pg. 328).

¹¹ Occhipinti, Andrea. "Plant Coevolution: Evidences and New Challenges." *Journal of Plant Interactions*, vol. 8, no. 3, 2013, pp. 188–196., doi:10.1080/17429145.2013.816881.

¹² Tallamy. 2016. Pgs. 48–64.

When a plant or animal is introduced into the habitat of others, dynamics that kept it in check before are suddenly removed giving it potential for advantageous, opportunistic and colonizing tendencies (pg. 66). While some native species can behave aggressively in certain situations, they are still symbiotically sustaining themselves and others, not impacting the health of the community at large.

¹³ Mooney, Harold, and Elsa Cleland. "The evolutionary impact of invasive species." *Proceedings of the National Academy of Sciences USA*. 2001 May 8; 98(10): 5446–5451. doi: 10.1073/pnas.091093398

"Since the Age of Exploration began, there has been a drastic breaching of biogeographic barriers that previously had isolated the continental biotas for millions of years. We explore the nature of these recent biotic exchanges and their consequences on evolutionary processes. The direct evidence of evolutionary consequences of the biotic rearrangements is of variable quality, but the results of trajectories are becoming clear as the number of studies increases. There are examples of invasive species altering the evolutionary pathway of native species by competitive exclusion, niche displacement, hybridization, introgression, predation, and ultimately extinction. Invaders themselves evolve in response to their interactions with natives, as well as in response to the new abiotic environment. Flexibility in behavior, and mutualistic interactions, can aid in the success of invaders in their new environment."

¹⁴ Divišek, Jan, et al. "Similarity of Introduced Plant Species to Native Ones Facilitates Naturalization, but Differences Enhance Invasion Success." *Nature Communications*, vol. 9, no. 1, 2018, doi:10.1038/s41467-018-06995-4.

¹⁵ Seebens, Hanno, et al. "Rise in Emerging Alien Species." *Proceedings of the National Academy of Sciences*, vol. 115, no. 10, 2018.

Sixteen percent of introduced species can later emerge as invasive.

¹⁶ Essl, Franz, et al. "Socioeconomic Legacy Yields an Invasion Debt." *Proceedings of the National Academy of Sciences*, vol. 108, no. 1, 2010, pp. 203–207., doi:10.1073/pnas.1011728108.

While Tao points to native people wild tending and the notion that nativity is not a fixed state to promote permaculture, (pgs. 148-50) indigenous people are connected members of indigenous habitats, something permaculture cannot replicate. Primal biocommunities emerge and transform their characteristics, relationships and ranges, on their own terms. For permaculture to attempt to co-opt wild tending is the epitome of supremacy. A more respectful and cautious ally approach would be for permaculture to invite and assist native food plants supporting members of local native ecosystems, encouraging resistance to civilization's introduced invasives. Incorporating invading colonizing plants reflects an invading colonizing ethos where colonizer preferences take precedence over indigenous habitat needs. Permaculture reasoning exposes domination culture and power positioning used to willfully ignore or justify human supremacist control over others.

Tao's book is swimming in human supremacy bias with faulty oversimplified reasoning. She brews an impassioned tincture of logical and illogical thinking and proposals based on valid and invalid criticisms. She makes claims of an invasive species' benefits while neglecting to mention more significant massive detriments. She bases colonial misbalanced 'biodiversity' on indigenous people's wild tended habitats without seeing the difference. A fallacious book like this can be dangerous for indigenous life if accepted by well-intended humans lacking fuller understanding on how to assist an injured place to return its vitality, much less embed within it.

Primal Empathetic Rewilding

For eons since origins humans like all animals found their food and medicines based solely on instincts and primal senses.²⁴ Science is less about increasing this kind of primitive

²⁴ Weyrich, Laura S., et al. "Neanderthal Behaviour, Diet, and Disease

ing that ecological role because they are waning under civilization, then rewilding permaculturists could either give indigenous animals back their habitat, or if that's not possible replicate the function. However take caution, substitutes such as cattle for bison degrade the system further.^{21, 22} Addressing ethos directly, intercepting human domination by restoring indigenous ecosystems could take the form of honing and collaborate on more gentle, responsive approaches timed with natural rhythms, such as the Bradley Method.²³

While living within the local natural environment is key to rewilding, using that setting to rationalize craftily introducing, maintaining or propagating nonnative species that risk escaping into and degrading other areas is more of the same dominating doctrine. Civilized humans have so rapidly introduced species that most wildernesses have succumbed to fundamental permanent losses leaving skeletons of themselves as sitting targets vulnerable to ever increasing invasion. The problem of civilization cannot be resolved with a more appealing version of civilization that alleviates fears of sustenance in preparation to survive societal collapse. Returning habitat and setting it free from civilization overcomes humans' domesticating ethos.

Hawkesbury sandstone bushland could also be applied to the moist sclerophyll woodland growing on the richer shale-derived soils and, ultimately, rainforest. With the support and sponsorship of the National Trust... the demand by local councils for the services of trained regenerators grew rapidly...

With demand for regenerators outstripping supply, a school was established to teach the Bradley Method to conservationists keen to assist in bringing back their local bushland. Joan was commissioned to provide tuition and gradually that small band of previously unpaid workers grew – former pupils became teachers, and the Bradley Method is now being used throughout Australia and in some countries overseas...

In Joan's words, 'As a very old-fashioned scientist and former chemist, I had a thorough grounding in what was then the simple scientific method of experiment and observation. Repeatability still remains for me the acid test. This method is repeatable anywhere as long as the three principles are followed.' pgs.. 9-12

fense mechanisms to establish balance,^{11, 12, 13} 3. Docile non-indigenous plants and animals can become invasive as conditions change,^{14, 15, 16} 4. Alien plants beget alien animals up the food chain, exponentially expanding competition with native species,¹⁷ and 5. Hybridization of introduced species with natives has subtler but insidious impact contributing to decline and extinction of native species.¹⁸ Only folly would refute that introduced invasive plants and animals degrade indigenous habitat sparking spirals of vulnerability for other nonnatives to move in.

While fair to critique restoration ecology, it's unreasonable to dismiss and re-apply it with blatant bias. For example, coevolution is dismissed if it explains species' community interconnectedness, and how some introduced species wreak ecological havoc, but is given credence when convenient in backing her nonnative integration ideal. Yes, species shift their ranges, but

The full habitat impact of a relocated species may be delayed for decades after its intentional introduction. Permaculturists rationalize that humans have been moving plants and animals for thousands of years. While true, earlier humans' intended and unintended species dispersion does not scientifically or otherwise justify today's less intuitively aware, less wilderness connected modern human dislocating and relocating species en masse in whimsical whirlwind speed. Modern human's accidental activating species into invasive behavior has irrefutably resulted in worldwide indigenous habitat devastation. If the nonindigenous human species aims to retake position in a thriving wild world, transporting species in and out of the habitats of their choosing would either be ended or limited for entire biotic community benefit, de-centered on nonindigenous humans. To rewild, begin with compassion for present-day ecosystems experiencing profound stresses, from humans' climate change to habitat fragmentation, leaving them fragile instead of their pre-anthropocentric robust and resilient form.

¹⁷ Tallamy, 2016. Pgs 75-9.

When fewer native insects are available that native birds co-evolved to eat, they too decline (pg. 63). Thriving indigenous species comprise the networks of thriving indigenous communities.

¹⁸ Muhlfield, Clint C., et al. "Invasive Hybridization in a Threatened Species Is Accelerated by Climate Change." *Nature News*, Nature Publishing Group, 25 May 2014, www.nature.com/articles/nclimate2252.

it's on their own terms, usually slowly, sometimes quickly and rarely with enough aggressiveness to destabilize robust diverse communities. Yes there are natural mass changes such as volcanoes where waves of species colonize the disturbed space in succession. But Tao seems unaware that domesticated humans shuffling species about, out of and into various habitats at a spiraling rate, outpaces ecological dynamics.

While Tao's criticism of herbicides is a popular and valid critique, she fails to dig deep enough in addressing the root cause of wilderness devastation: anthropocentric command over nature.¹⁹ The hollowness of her ideas is revealed in what she does not contemplate. For example, instead of using herbicides as pretext to cultivate nonindigenous species, rewilding permaculturists could collaborate on nonnative species control through targeted harvesting for the goal of recovering indigenous habitat. Top priorities could go to removing small patches of new nonnatives before they spread,²⁰ and species with excessive advantages over others outside their indigenous habitat (e.g. allelopathic properties) such as Garlic Mustard (*Alliaria petiolata*). Strategies could include awareness of risks of harvesting plants that for example spread vegetatively from segments left on soil, like notorious vegetative propagator Japanese Knotweed (*Polygonum cuspidatum*).

Regarding indigenous plants behaving invasively, in remnant wild communities, herbivory plays a crucial role in limiting rampancy. If indigenous herbivores are no longer play-

¹⁹ Tallamy, 2016. Pgs. 26-37 and throughout the book.

Permaculturists sustaining themselves in designed biodiverse zones around their homes paint an idealized picture, but a complete picture includes the spread of their nonnative choice plantings into local native wild places sometimes sparking swaths of devastation. Invasions can indirectly impact overarching dynamics such as hydrology cycles, water quality, wild-fire frequencies and intensities. (pg. 85).

²⁰ Béguinot, Jean. "Disentangling and Quantifying the Functional Determinants of Species Abundance Unevenness in Ecological Communities." *Advances in Research*, 2019, pp. 1–14., doi:10.9734/air/2019/v19i130114.

²¹ "Are Cows Just Domestic Bison? Behavioral and Habitat Use Differences between Cattle and Bison." *Western Watersheds Project*, www.westernwatersheds.org/gw-cattle-v-bison/?fbclid=IwAR1OPf9GB11VhD6o5FfqvglUDtkw-jLyNTeQuQdefqIn9BCkx06pU-S44hA.

²² Carter, John, et al. "Holistic Management: Misinformation on the Science of Grazed Ecosystems." *International Journal of Biodiversity*, vol. 2014, 2014, pp. 1–10., doi:10.1155/2014/163431.

²³ Bradley, Joan. *Bringing Back the Bush: the Bradley Method of Bush Regeneration*. New Holland, 2002.

Inspired by witnessing ample effort in restoration practices with questionable long term effectiveness, naturalist Joan Bradley and her sister Eileen experimented with a naturalistic method, eventually shifting well-intended yet damaging restoration efforts into a more nuanced, bio-centric approach. They chronicled the recovery of Australian plant communities based on regeneration principles proven not just effective but generalizable to a variety of settings. After the 'gentle art' proved itself over time, education and training in the 'Bradley Method' spread locally and abroad.

"My sister and I had for years been pulling up seedling weeds growing near the walking tracks in Ashton Park, and had looked despondently at the big ones scattered through the bush further in. We had always found these widespread invaders particularly offensive, and longed for the strength we believed was needed to cope with them. We felt that, because of their threat to the whole of the bush, these should be the first weeds to be destroyed, and were therefore delighted to see unsightly walls of tall lantana fall to the mattocks and brush-hooks of the park staff.

We had never thought it possible that such very bad areas could be restored by anything other than this sort of clearing followed by replanting. The clearing was mostly confined to very heavy lantana infestations, where the few native seedlings that came up were quickly swamped by an explosion of assorted weeds, but in a few places work was extended into areas of mixed weeds and natives. Here, where they were not hopelessly outnumbered, the natives responded magnificently. Shrubs, despite disturbed roots and broken branches, put out new shoots, and seedlings of many species germinated along with the weeds

With growing enthusiasm, we began to understand that there might be another way to fight the invaders. Given half a chance, the bush would fight back on its own behalf... systematic hand weeding, carefully done, was a spectacular success...

...The turning point for bush regeneration came in 1975 when the National Trust commissioned Joan, Toni May and their small team of regenerators to demonstrate their techniques in Blackwood Reserve, Beecroft. While regenerating Blackwood, Joan also proved to herself that the principles established in