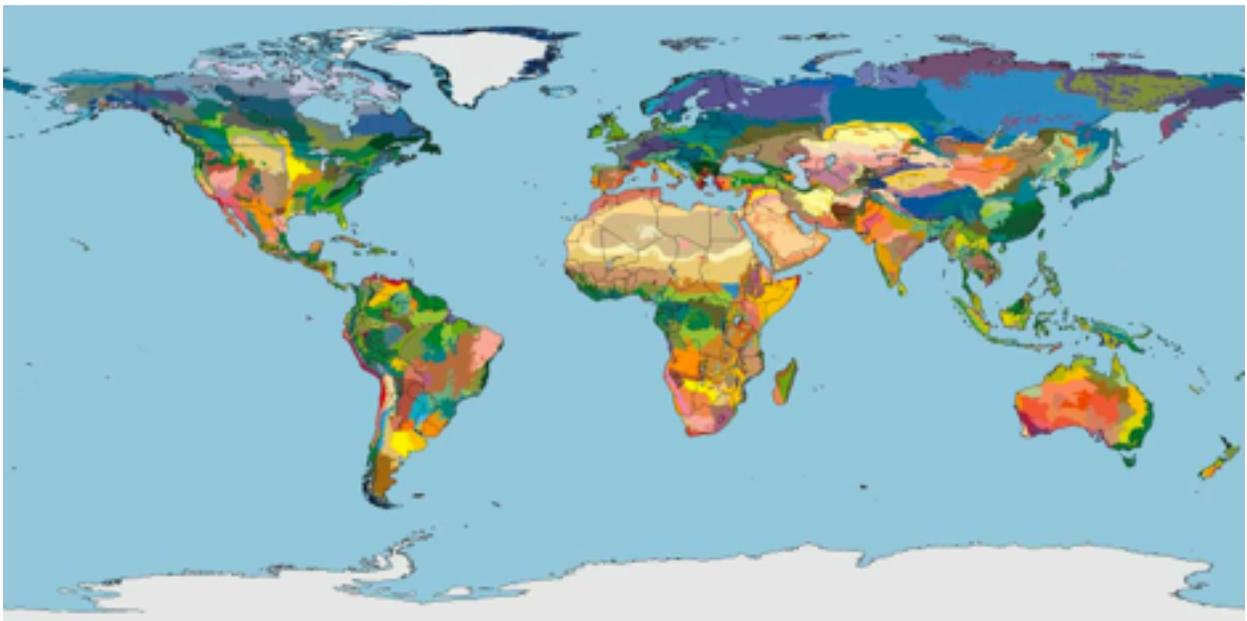


Guiding the Emergence of Humanity's Future



Reflections on the Pedagogy of Bioregional Regeneration

With Joe Brewer

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Summary Statement

This document is a synthesis of inquiry that incorporates ideas and inspiration from many people. It grew out of conversations with Federico Bellone, Eduard Müller, Juan Sostheim, Melina Angel, Pramod Parajuli, Luis Camargo, Daniel Wahl, Stuart Cowan, and several others. What I learned from this diverse dialogue—accompanied by extensive reading—is that *pedagogy* is the most important thing to get right for any educational initiative that seeks to cultivate bioregional regeneration.

Pedagogy refers to the *many ways of learning* and how people evolve in their thoughts, feelings, actions, and social arrangements. It is a multifaceted concept that draws attention to capacities for cooperation, ability to trust others, perspective-taking, and a lot more that must be carefully addressed (and elegantly integrated) in the design of education programs. Pedagogy is often framed as a way to teach a particular concept or subject. I prefer to turn this around and employ it as a design perspective for how to assist the learning process, even if no teacher happens to be involved.

Shared here are some of the key pedagogical insights and thematic elements that have arisen so far in this inquiry. This learning journey is far from complete and will continue well after these words are written to the page. It is my earnest belief that **Bioregional Regenerative Training Centers** must emerge all over the world as integrative programs that help spread the practices and mindsets for regeneration of human communities and the ecosystems on which they depend for their survival.

Please consider this a work in progress. It is nowhere near complete but may help stimulate constructive dialogue as we all strive to bring forth those change processes that truly empower regeneration to occur.

Key Design Elements for Bioregional Regeneration

This document is organized as a collection of short passages. Each contains a pedagogical strategy (way of learning) or topical theme (area of study) that I have found to be worthy of serious consideration for any curriculum in bioregional regeneration or for collaborative efforts that aspire to create resilient bioregional communities.

The topics are not listed in any particular order. They arose in various conversations I have had with collaborators and through readings absorbed during a four month period of deep critical inquiry. The inquiry was about the design of education programs that may help train people to guide the evolution of their local communities and regional economies toward greater health and resilience.

During this time I have also worked as capacity cultivator for the Regenerative Communities Network—a role I continue to perform now—and have engaged in stimulating discussions with people who are actively implementing plans for bioregional regeneration from as far north as Nova Scotia all the way south into the mountains of Peru. My own focus has been on the design of curricula for bioregional regeneration where my family currently resides in Costa Rica. We have lived at Rancho Margot in the mountainous rainforests of Central America with the aspiration that it might evolve into one of the learning centers the world so desperately needs.

Some efforts focus on regenerative agriculture and sustainable food systems; others look at supply chains and the removal of toxins from material flows. There is as much diversity in existing efforts as there are landscapes in which the various expressions continuously unfold. What I have learned is that there is no shortage of knowledge for doing this kind of work. Nor is there a lack of frameworks or tools that have proven themselves in the field. Bioregional regeneration is underway in places like Buffalo and the Hudson Valley of New York. It is emerging in efforts to

protect biodiversity in Mexico, Costa Rica, Colombia, and Peru. It is adapting to place in the Carpathian Mountains of Eastern Europe and high up in the Himalayas on the plateau of Nepal. Many other places are quietly at work beyond my ability to perceive—and I am deeply grateful that they exist outside of my awareness.

What I provide here is a discussion piece. Something we can use as a springboard for birthing a global network of bioregional learning centers into and across the great diversity of existing efforts. It is an open source document. Something to breathe in and make your own. Take it and ponder how you might include some of these elements in your own transformational work at home. I merely hope it is helpful in some small way.

1. Inhabitation or Learning to “Live in Place”

Our globalized economy is built on the commodification of nature. It treats places as sources of extraction that feed globalized supply chains. A key learning process is the rediscovery of ways to live in local places that cultivate deep personal identification with specific landscapes. This is eloquently written about by bioregionalism thinkers Peter Berg and Gary Snyder as *inhabitation* which is the active process of learning how to live in a specific place.

There needs to be a major experiential learning focus on how to *open up awareness* to the local and cultivate deep personal connections (at the level of identify-formation) for people to feel themselves to be part of their local landscapes. This is how they might become active stewards for their own cultural history, degraded present conditions, and potential regenerative futures.

2. Address Grief and Trauma Head On

Every place on Earth is scarred by some combination of colonialism, extraction, and degradation. There is grief in the loss of species; trauma in the loss of livelihoods; and healing that must be done. To learn about regeneration of landscapes is to find atonement for the loss and to transform the pain of grief into active love of place.

A great Truth-and-Reconciliation is needed in each little piece of land. Education programs for bioregional regeneration will need to actively deal with grief and trauma in culturally appropriate ways for each context in which healing needs to occur.

3. Comprehend the Planetary Context of Dynamic Change

We are in a crisis of planetary proportions. Tipping points have been reached (or soon will be) that cascade across Earth systems to destabilize climate, unravel major parts of the biosphere, and alter geochemical flows at planetary scales.

No effort to regenerate a specific region of the planet can safely ignore the planetary context of dynamic change that we are all living through today. Each region will only succeed by actively working with the larger webs of interdependencies associated with plate tectonics, biological corridors, ocean currents, and atmospheric phenomena. Similarly each region will need to contend with globalized finance, policies and practices of other regions, and supply chain disruptions from other parts of the world.

Recognition that the Earth is in overshoot-and-collapse is required to see how degraded landscapes within one region are connected with human and ecological systems in neighboring regions—as well as remotely linked via loose couplings to global processes in other parts of the world.

4. Ground Efforts in Historical Context of How We Got Here

Developmental patterns in the past have shaped the inheritance of risk and opportunities in the present. Every region has its own legacy of infrastructure and policy frameworks, displaced peoples and lost cultural heritage, lineages of land-use practices, and evolving ecosystems of life.

How these developmental patterns arose and what shaped their trajectories will largely determine the contingencies that must now be worked with in the present. Each bioregion must ask “how did we get here?” for itself locally. It must also inquire about how we all got here at the planetary scale for the reasons mentioned in the previous section.

The collective future for each bioregion will only be successfully navigated by working from its developmental history in context-appropriate ways for how things are emerging and unfolding now.

5. Focus on Functional Landscapes as Key Organizing Principle

Cooperation will be essential for managing the complexities of systemic change at bioregional scales. Every landscape has *functional processes* associated with it that are natural expressions for how it organizes itself.

Perhaps the easiest example to understand is the drainage of water as it flows through a landscape in a gravitational basin for what constitutes the boundaries of a watershed. This function of downward flow shapes how energy and nutrients are transported across the region. It influences the types of biomes and migration patterns of species through the various ecosystems that arise in the presence of water.

Other functional processes are discernible in the ecosystems as well. And each can help organize the formation of human management systems for the coordinated efforts necessary to regenerate the region. It is no accident that all major cities are located near a large river or accessible coastal area. The functions of landscapes have long ago shaped the organization of human settlements and trade networks. The regeneration of bioregions will depend upon the identification of these vital functions and the conscious organization of human societies around their preservation and regeneration.

6. Project-based and Immersive or “Learn-by-Regenerating”

Much of the modern world is plagued by false dichotomies of separation. Pedagogically speaking, addressing the segregation of theory from practice (or knowing from doing) is of fundamental importance for bioregional regeneration. All educational programs will need to be project-based with emphasis on practical implementation on the ground.

I like to call this *learning by regenerating* because the only work that ultimately matters is that ecosystems are stabilized, soils restored, nutrient cycles brought into balance, and human wellbeing integrated into the whole. In other words, the training programs need to be a kind of applied permaculture practice that gets organized and expressed as real-world immersive projects.

7. Deep Listening and Creating Conditions for Emergence

The complexities of bioregional regeneration are immense. A great deal of care is needed to listen deeply, inquire thoroughly, and gently begin to co-create with

whatever happens to be emerging. The science of living systems reveals how often it is the case that subtle, local interactions give rise to self-organizing patterns that either culminate in robust circulation at systemic scales or destabilize and cascade into various expressions of collapse.

It will be vital to learn how to listen deeply and partner with the local interactions at all appropriate scales of emergence. This will need to be learned by individuals, enacted across organizations, and embedded within decision-support systems at regional and trans-regional levels.

8. Mapping to See the System

Every complex organism in the biological world has sense-making capacities for the vital life functions that enable it to thrive. Human communities that lack the sense-making capacities to perceive and act upon the systems of which they are part will be greatly limited in their ability to manage themselves effectively.

This is powerfully expressed in the role of mapping—to make visible and actionable the management of vital systems in the bioregion. There are maps for geology and geography. Maps for ecosystems and functional processes in landscapes. Maps for social networks and interdependent human relationships. Maps for driving causes and likely consequences in the incentive structures and dynamic feedbacks of management systems.

Education programs that help people learn how to see, sense, and act within their region will make extensive use of mapping activities.

9. Cultivate Regenerative Mindsets

Living systems thrive on the creative flows of energy. Children going through critical developmental stages of social and emotional intelligence will need to have immersive experiences with nature—so that they can cultivate mindsets of curiosity and compassion, empathy and insight, solution-making and evolution.

Adults too will need regenerative mindsets as they grapple with chronic stress, cascading disruptions, and the continual need to reinvent themselves throughout these times of exponential change. Mindsets of regeneration become *enactments* of regeneration. This is true for learning across the lifespan, though it is especially important to be cultivated in children growing up in the world today.

10. Work Simultaneously at Multiple Scales

Reality has a “nested” quality to how it is structured. Everything is linked between scales as whole-part relationships. Yet still to this day there is a reductionistic focus on one level of analysis for most efforts that are undertaken.

What we have found by working with bioregional efforts is that they always *seek to work systemically* by simultaneously dealing with changes at multiple scales. Food systems require healthy functioning of individual farms. Cities need functional boundaries to keep from encroaching on surrounding landscapes. Small groups within organizations need to perform tasks well that cohere with higher-level strategies.

11. Spiritual Regeneration and Ethical Integration

Many religious and spiritual traditions have been contaminated or coopted in recent decades by the spread of extractive economic practices and the marketing influences of consumerism. There is a profound need for the integration of ethical livelihoods with the structured routines of daily life.

In a time when human activities are literally destroying Earth’s life systems, there is a halcyon call for deep spiritual inquiry, alignment of meaning with purpose, and ethical developments of moral character. This is essential for individuals. It is vital for social organizations of all kinds. And it is foundational to the formation of prosocial norms and behaviors that need to persist into the foreseeable future.

12. Map Local Projects and Weave Tapestries of Collaboration

Regenerative projects have taken root literally all over the planet. There are organic and regenerative agriculture projects on farms of all sizes. Landscape restoration projects in every type of biome. Locally-sourced business practices in every major city. Ecovillages and Transition Towns on all continents with human settlements.

Missing is the *weaving into a tapestry* of these diverse projects. Every bioregion is filled with seed kernels of possibility for envisioning new ways of living in place. By mapping out where these local projects are and what are their capabilities, it becomes natural to convene the people working on them to begin developing territory-level strategies that achieve outcomes desired by all.

Education programs that actively work with existing local projects will have places to send students for project-based learning. This is how they can *learn by regenerating*

with little start-up time—because the partnerships and location-based projects are already nascent and ready to be engaged.

13. Combine Land, Finance, and Education into Integrated Approach

Many efforts are underway to regenerate specific pieces of land. Each in some way explores how financial flows enable the preservation and continued function of life systems that are involved. What is often missing is the educational role of *learning how to regenerate land* that must become widely spread as a large swath of humanity “re-tools” itself for the next phase of our planetary evolution as a species.

Simply put, we need to think of landscape regeneration as an integrated approach that explicitly includes project-based learning as the way people learn how to restore ecological functions. The work exchanges create relational opportunities to lower the cost of paid labor, make training programs more affordable, and track value flows of economic interactions using regenerative finance tools.

An example is the creation of a database for regenerative projects in a region that helps link students in training programs to real-world opportunities to practice what they learn. Flows of financial and social capital interweave with flows of intellectual and material capital in the dynamic relationships that arise. Landscape regeneration merges with finance and education in an integrated approach.

14. Employ Regenerative Economics Principles

A great deal has been learned in the last 40 years about how to build economic systems based on insights from the cognitive and behavioral sciences, evolutionary studies of living systems, complexity science, and empirical approaches to history.

The regeneration of bioregions is an *overt expression of regenerative economics* that treats the human society as the living system that it is, ecologically embedded within larger interdependent life systems. Among the principles outlined by the Capital Institute are robust circulation, being in right relationship, empowered participation, edge-effect abundance, and adaptive agility for continuous learning. Education programs that teach regenerative economics will have more designers and practitioners living in their bioregions who know how to think in this fundamentally important and scientifically rigorous way.

15. Apply “Theory U” Cycles of Engagement

Living systems must be *fit for the future* by remaining open and responsive to changes in their environments. Pedagogically this expresses itself in human social learning by first sensing into the situation to feel what is emerging; and only then to work with what is occurring *at that exact moment* to create support structures and follow through from there.

Otto Scharmer famously describes this as “Theory U”—the framework of starting on the upper right side of a U-shaped process with open inquiry and a readiness to co-create with whatever happens to be sensed in the field. The bottom of the U is where structure begins to clarify itself in an improvisational way that motivates the formation of support structures to realize shared goals as they arise. Projects take shape on the upward arc of the U as concrete actions begin to make sense in the context of present-moment emerging activities.

This becomes a cycle of engagement that repeats over and over again. It is an orientation toward *open-ended participation with what is emerging* as a primary way to engage the world.

16. Partner with Communities and Co-Create the Future

Right now most communities are made to feel like powerless victims of globalized processes. They have very little agency or visionary capacity to set collective intentions and see them play out through coordinated actions. This fundamentally needs to change.

Bioregional regeneration is an active expression of cooperation for multi-stakeholder groups—including entire communities—that contextualize the unfolding of their lives as the dynamic interplay of ecological functions and desired future outcomes.

A key learning process is how to engage entire communities in scenario planning and agenda setting for their own collective futures. This builds on the mapping activities described above; contextualize planetary change as drivers and consequences of local actions; and engage with cycles of emergence through whatever may be happening at any given time.

17. Currencies as Biophysical Flows

Nearly all money in the world today is fiat and based on debt. This means it is issued with the authority of national banks and is created as interest-bearing loans that must be paid back through future productive activities. Note how none of what I just said requires that money be linked with anything that is *physically real in the world*. Financial systems are flooded with speculation and gambling.

Urgently needed are the creation of monetary currencies based in thermodynamically and biologically legitimate forms of energy. They might be based on energy consumption (like the Solaris currency that is based on units of solar energy); or perhaps they are literally traced to what ecologists call “trophic flows”—which are the exchanges and movements of energy and nutrients through an ecosystem.

Food webs are networks of relationships that constitute trophic flows. The fish that eats the worm takes in its energy and nutrients, while releasing (through inefficient conversion processes) those waste materials that become food sources for other organisms. All ecosystems are constituted in limited (and very real) flows of energy and nutrients. There is no reason that human currencies cannot be constructed to honor this foundational truth of all living systems on Earth.

Note how the accelerating drive to consume more in extractive economies is deeply driven by the need to pay off debts. An explosion of consumption in recent decades has been tied to the pathologies deeply wired into the core of this kind of financial system. Now more than ever we need to replace debt-based fiat currencies with biophysically credible alternatives.

18. Immerse Yourself in Nature to Realize You ARE Nature

A fundamental error was made when philosophical traditions arose that presumed humans to be separate from the rest of nature. The entire Western Tradition has been based on this incorrect understanding that is easily demonstrated to be flawed by showing how humans are body-based organisms that require healthy relationships with larger ecosystems to even exist at all.

Pedagogically speaking, this makes it important to facilitate meditation processes and immersive experiences that help people learn how to feel themselves as part of their life system. Humans are wonderful biological creatures with amazing cultural

abilities—including the profound abilities to experience awe and feel connected with the cosmos.

19. Cultivate “ProSocial” Groups and Multi-Group Collaboratives

Humans succeed in the world by skillfully working in teams. This is one of the most important “common-pooled assets” to govern effectively. *Every team is a commons* that must meet the clear set of design criteria outlined by Elinor Ostrom for how to manage one.

This means cultivating the capacities for prosocial behavior—trusting and open, generous and altruistic, supportive and helpful—along with all of the social norms and psychological capacities that are associated with them. There should be clear pedagogical approaches to the formation of effective teams and their abilities to work in alliances with other teams.

Bioregional regeneration is ultimately what arises when collaboration occurs among many diverse groups of people who are all together seeking to increase the health and resilience of their communities.

20. Planetarians, Not Globalists

This one is specific to the writings of bioregionalist Peter Berg. He made the subtle framing distinction between those who live out their lives as people who are located on a specific part of the planet (which he called “Planetarians”); and those who live out their lives as temporary residents of any place where they can earn a living as part of globalized market transactions (which he called “Globalists”).

The basic idea is to learn how to live in a specific place by actively building awareness and relationships with the landscapes and ecosystems that make it livable. This includes learning how watersheds are shaped by tectonic plates and other planetary-scale dynamic processes.

Imagine if education systems helped people learn how to see themselves as planetary citizens who care for specific places where they live while collaborating when appropriate to preserve planetary health. This could be a replacement for placing one’s self “on the job market” and continually being open to relocating for the next employment opportunity.

21. Becoming Gaia's Immune System

When James Lovelock described the Earth as having a deeply integrated biological capacity for self-regulation in his “Gaia Hypothesis”, he was talking about a planetary pattern that is analogous to homeostasis in the body. It is now thoroughly documented that the biosphere and all its life forms are fully integrated into geochemical cycles, planetary dynamics, ocean mixing processes, and atmospheric phenomena. Biological feedbacks influence the timing and responses of planetary-scale patterns for self-regulation.

One way to think about the *Age of Empires* in the last 10,000 years is that humans engaged in agricultural and economic practices that came to function as a kind of *planetary immune-deficiency disorder* because these activities weakened or removed the Earth's self-regulation capacities. Framed in this way, efforts for bioregional regeneration can be seen as human management systems being set up to *restore and maintain Earth's immune system*.

Imagine if children were taught in schools that regenerative agriculture is part of the Earth's way of keeping itself healthy. How humans might come to view ourselves differently as active managers of planetary health. This is what arises in the imagination if one begins to think in this way.

22. Regenerative Campuses and Passports for Wayfinding

An empowering way to reframe schools and universities is that they can become *regenerative campuses* that function as training grounds and demonstration sites for permaculture projects. They currently are structured as places for teaching universalized knowledge that is haphazardly connected to local environments, if at all.

Universities can evolve toward serving the ecological and social development for the cities in which they are embedded. Schools can weave local, historic, and indigenous knowledge into their curricula. Retreat centers can host regenerative training programs with projects on their land. Students can navigate their education by immersing themselves in local environments where they connect with regenerating nature and engage in restorative projects that employ regenerative principles.

Every campus is located in a place. When framed in this way it becomes possible to envision a new kind of passport system for finding one's way through their own education. A student might go to a local farm to learn organic agriculture; then get stamped with certification that they know about green building design using local materials by participating in a project where construction is being done.

Entire training programs can move away from pursuit of degrees in disciplinary silos (e.g. getting a bachelors in physics) to instead cultivating meshwork knowledge that is transdisciplinary, holistic, and practical by regenerating the places where learning occurs. Students will gain professional contacts and fill their resumes with project-based learning credentials instead by wayfinding across regenerative campuses—either within their own bioregion or through exchange programs with other bioregions.

23. Community Resilience in a World of Climate Refugees

One of the driving patterns of destabilization in the world today is shifting climatic regimes that contribute to emergency migrations of people. Many of the “business-as-usual” scenarios from Earth Systems modeling indicate that 100 million or more people will be displaced by rising sea levels, increasing severity of storms, desertification, and other climate-related concerns.

We are living in a world that will soon be filled with climate refugees. Their unplanned and forced movements will be the result of *absent resilience* in their current communities. And their displacements in the future will *create newly destabilized communities* when they move into areas that are not resilient enough to absorb them.

An ongoing systemic challenge will be to firstly create the conditions of community resilience in areas where bioregional regeneration is taking place. This functions as a kind of “stop gap” for future displacement of local peoples. Yet this must be done in conditions where people may be *forced to migrate into the bioregion* from other areas where capacities for resilience have not been achieved.

We are going to need education programs that emphasize this interconnectedness from one region to another. Making your own community resilient will not be sufficient if you don't also develop the relationships of trust and interregional

exchange that help spread resilience across neighboring and more distant bioregional economies.

24. Embrace the Real State of Planet and Seek Regeneration

This section is about the need to carefully navigate all of the psychological defense mechanisms that keep a person's mind from internalizing the truth about cascading collapse dynamics for the Earth.

It is well known that *climate denial is a cottage industry* with billions of dollars spent to keep entire populations from discerning or acting upon the world as it really is. Less appreciated are all of the subtle ways that people fail to think systemically, feel into real-world complexity, and act with integrity of information on the dynamics of our changing planet.

There will need to be many pedagogical inquiries about how to *embrace reality* in ways that make discernment possible so that effective actions might be taken. For example, the landscapes of Earth have been so thoroughly degraded in the last 100 years that the planet is currently in a state of overshoot-and-collapse. To presume that collapse is a singular event at some point in the future is to fail at discerning the numerous patterns of destabilization that have already taken place as various kinds of systemic collapse.

Many fisheries are already gone. Nearly 80% of insect biomass has disappeared. More than half the world's topsoils are gone. The human population grew at the expense of biodiversity for millions of other species. Each of these trends—and many more that could be named—is a collapse dynamic that occurred at some point in the past. Only by regenerating ecosystems from their currently degraded conditions of post-collapse can they be stabilized in the future.

25. Regenerative Design for Many Worlds

An intriguing idea is that the singular expression of unity in universities could itself be a deeply rooted problem for imagining new ways of being. Cultural anthropologists and design thinkers who work with worldview can tell you that a plurality of them exist in the world.

Or said another way, *there are many worlds* inhabited by the minds of humans.

Bioregional design is an expression of the “biocultural uniqueness of place” (as Daniel Wahl calls it) or the “ethnic ecology” of cultural expression (as described by

Pramod Parajuli) that is particular to how evolution has adapted each human community to its distinctive landscape.

Arturo Escobar calls for the need to engage in *ontological design* that embraces the plurality of worldviews that exist in any large and culturally diverse area. He has worked extensively with indigenous communities in Colombia where it is so profoundly the case that many worlds co-exist in proximity with one another.

Pedagogies need to be explored *for each life system* that exists in the many cultures and ecological niches of the Earth.

26. Become the Indigenous Elders of Future Generations

This topic is about two related ideas that are not often woven together. The first is better known—that great wisdom can be found by learning from indigenous cultures that have proven themselves to be well-adapted to a specific area for hundreds or even thousands of years. This is related to a more subtle, and lesser known idea, which is that the people who become well-adapted to their bioregions today *will become the indigenous ancestors* for future generations.

The pedagogical approach here is to learn from ancestors worthy of passing on wisdom about how to regenerate landscapes. Then become ancestors for those not yet born by *enacting this role* in your own life. This is how you can become the continuity of life for human cultures that are “future fit” and worthy of being called wise by those who benefit in the future from how we live today.

27. Cultural Heritage for Environmental Adaptation

A related idea is that *human cultures historically evolved to be well-adapted to local environments*. We can study historical cultures as they related to different landscapes in the past and treat their accumulated successes as “evolved adaptations” for similar environments we might try to live in today.

For example, archaeologists have studied the dwellings and tools left behind by people who abandoned their settlements due to rapid environmental change. By creating empirically-based narratives about how these cultural practices were altered for those living in the same area after it had been thoroughly altered, it is possible to create “test cases” for how to functionally live in one environment as contrasted with another.

Bioregional regeneration will be largely a process of learning to live in altered environments—because human activities have now changed almost every location on Earth. It is not sufficient to simply ask how people lived here before; because the conditions of the past may not be able to come back after the extreme alterations that have occurred in the last several hundred years.

There will be some cases where the historical patterns can be reproduced through regenerative design. But in other cases this will not be achievable, and it is important to learn how to discern this vital difference.

28. Bioregional Learning Centers

Those who know the work of Donella Meadows will be familiar with *systems thinking* and the Limits to Growth study that kicked off much of the numerical modeling work for planetary sustainability. Less familiar will be that she wrote an essay in the early 1980's describing how the only way she could find to make the transition to sustainability would be to create *bioregional learning centers* around local living economies that respect ecological limits.

I came to the same realization independently and then was given a copy of this essay. It was amazing to see how mature the thinking was nearly a half century ago about the need for each bioregion on Earth to establish at least one learning center (preferably more in some places) that teach cultural history of place, convene the mapping efforts and learning processes for bioregional development, and support the systemic changes that will be necessary along the way.

29. Embodied Carbon and Biodiversity as Key Indicators

There are many ways to measure progress in the regeneration of a bioregion or for restoring planetary health. Two fundamental indicators that track global processes of destabilization are (a) sequestration of carbon from the atmosphere as it gets absorbed into microorganisms in soils and the bodies of other species; and (b) overall biodiversity spread across multi-layer ecosystems of trophic flows that enable landscapes to be resilient to change.

We are entering a Mass Extinction Event largely due to changes in the carbon cycle on Earth. Because all life forms that exist on our planet are carbon-based, the cycling of carbon *includes everything that has ever lived*. The measure of carbon dioxide in the atmosphere is interwoven with the loss of species that get measured in lost

biodiversity. Life is consumed and spewed out as heat-trapping gases amidst the decay of extinct species. Biodiversity is the measure of complexity lost in this industrial death process.

This means we need to measure embodied carbon (the total amount stored in an ecosystem) alongside the diversity of living forms that constitute functional landscapes as vital to all regeneration efforts. We can only say that regeneration is occurring if biodiversity goes up and carbon sequestration increases with the passage of time.

30. Planetary Boundaries and Global Goals

In the 1970's it was possible to talk about bioregionalism in aspirational terms because there were clear benefits to increasing self-sufficiency and continuity for local populations. There have now been several decades of highly sophisticated research about the planetary boundaries altered by human activities and how destabilization has been occurring.

We need to *embed bioregional regeneration* within the framework of planetary boundaries to see how each territory contributes to systemic health or the lack thereof. For example, the hole discovered in the ozone layer prompted an immediate global response in the late 1980's because ultraviolet radiation is so dangerous to land-based life all over the planet.

Humanity has now either crossed or will soon cross planetary boundaries for land-use change, biodiversity loss, climate destabilization, and geochemical cycles associated with industrial agriculture. We need to set global goals (as attempted in the “Sustainable Development Goals” adopted by the UN) that engage bioregions in regenerative processes that move local and global patterns toward a convergence on systemic planetary health.

31. Social Foundations and Biophysical Limits

Kate Raworth created a powerful visual image for combining the social factors that constitute wellbeing for communities with ecological limits that must be honored for the long-term viability of their survival. She calls this the “doughnut” for economic development.

The basic idea is that 11 “social foundations” establish the baseline for a healthy society—things like education, health care, democratic engagement, and inclusive

levels of equality—that are universally sought by modern societies. This baseline need be reached in ways that don't overshoot the ecological limits that degrade the society over time.

Bioregional regeneration is a process of seeking to *get within the doughnut* as understood in these terms. Learning to think with this concept is a pedagogical tool for guiding collective actions toward widely shared goals.

32. Living Theater and Enactive Play

An entire domain of learning has been explored through the the performance arts—where the full range of human emotions come into play for creative inquiry and expression. One powerful way to think about *regenerative lifestyles* that make bioregions function is that people need to “enact” character roles the way they would when performing in a theatrical play.

There has been a lot of thinking, reading, writing, and speaking about what it will take to transform the world away from extractive systems toward those that are regenerative. Much less attention has been devoted to *embodied actions* that “act out” this transformation.

When a person leaves their normal life and enters a regenerative campus, they open themselves to the possibility of taking on new roles and performing in ways that are novel to them. Experiential theater (and the gambit of improvisation techniques) provide a powerful collection of training practices that let people playfully experience different ways of being in ways that increase social cohesion and open up new behavioral pathways.

33. Create “Living Boundaries” Around Economic Territories

One of the foundational concepts in biology is that life is organized in *living cells* with an outer membrane that enables it to continue the inner dynamics of being alive. If we take seriously that humans are living biological creatures, it naturally follows that human communities are living systems as well.

This opens us to an inquiry about *what constitutes a living membrane?* for human economies. Does it make sense to create living boundaries around economic territories that function with the full complexity of cellular boundaries? When seeking to manage a watershed, fishery, or other ecological system it becomes

apparent that governance issues quickly come to include what is allowed in and what is kept out.

The question of what the system boundaries do and how they preserve internal function is one that more policymakers and managers should begin to explore on a regular basis.

34. Robust Circulation and Integrated Value Chains

Another way of seeing economic functions in a regional system is to think in terms of *robust circulation* as it relates to the value exchanges that take place within it. Managers who work with *value chains* get the importance of mutual benefit for all parties involved.

The regeneration of bioregions comes about when value chains actively create mutual benefits between human and non-human species, watersheds and marine life, food production and healthy soils, small businesses and community organizations.

It is helpful to think about these things in pedagogical terms—as *ways of learning* how to be in right relationships that nurture the parts while sustaining the whole. This is as much a perspective as it is any particular practice or technique. As such it can be learned and relearned in many new ways as the bioregional economy evolves.

35. Weaving the Bioregions for Restoring Planetary Health

This topic is specifically about how local efforts weave into a narrative for global impacts. The functional link that is often missing in people's minds is that *territories and landscapes* “*scale-link*” across systems.

The only way to restore planetary health is to create a patchwork of regions all over the planet that each restores its own health. This is the story we have all been waiting for. It tells us that we can take local actions and have global impacts—but only if we organize ourselves into territories at the bioregional scale. And also only if *most or all bioregions* do the same thing.

As a pedagogy this is about learning to connect scales in your mind and see nested functions that mutually support each other as they move toward health-related goals.

36. Feel Regeneration in Your Own Body

A vital way of knowing that is fundamental to the human experience is that *we all have bodies*. Regeneration is the moment-to-moment process of reproducing the conditions for being alive in any living system. It can be felt in the body and learned experientially in very concrete ways.

Try standing on one foot and you realize how you need flexible ankles and soft joints to be able to stay upright. Balance is a dynamic interplay of adjustments your body knows how to make because it is always subject to gravity.

Breathe deeply and feel how the air creates energy inside of you. Become calm and centered to notice how good it feels simply to be alive. These lessons are fundamental to bioregional regeneration in ways that only become clear by trying them out. There is great pedagogy to be found in everyday experiences as a bodily creature living in the world.

37. Manage Complexity by “Remaining in Inquiry”

The cognitive psychologist Dietrich Dörner dedicated his life to studying how people make catastrophic errors when trying to manage complex systems. He used computer simulations to have test subjects try to make decisions about the evolution of fictitious village life to see how changes in the system corresponded with their thought patterns as they took various actions.

What he learned after many different experiments was that one observable behavior explained nearly all of the system-collapsing mistakes. It was *when a person stopped asking questions* that they were about to do something catastrophically wrong. A person who stops asking questions is no longer in a mode of inquiry. They have a static mental model for the system they are dealing with.

If the system happens to be nonlinear and dynamic—as all complex systems are—their static mental model fails to update with new information coming in and becomes increasingly out of date. Older heuristics for making decisions become increasingly ill-suited for new management tasks.

The lesson for us is that we need to find ways to remain in inquiry. Bioregional regeneration is a very complex meshwork of interconnected systems. We are always in need of *updating our mental models* so they represent the world as it is becoming (and not as it was in the past).

38. Systems Logic First, Measurement Second

Every doctor with proper training will know that a handful of basic measurements like blood pressure, temperature, and heart rate gives a pretty good sense for overall health of the patient.

They know this because *they have learned the “system logic”* for healthy human bodies. Other measurements can just as easily be taken but would not reveal very much because they simply don’t make sense in terms of the bodily systems involved.

For many centuries, medicine was practiced with the wrong system logics for fluid flows in the body—what is known as “Galenic Fluids” of which four were considered to be in balance when the person is healthy. Basic knowledge about how the heart and arteries pump blood through the body; or how electrical and chemical signals process information in the brain. These things were not known.

The lesson for us is that our frameworks of measurement are less important than the logical functioning of systems on which they are based. How we evaluate the health of bioregions will depend on the system logic much more than the measurement framework.

39. Develop Territories in Four Steps

Practitioners working on transformational systems change all over the world have stumbled onto the same four steps that enable them to create *contextually-appropriate solutions* in collaborative ways.

The first step is to *convene a multi-stakeholder group* of people who represent diverse parts of the system under consideration. It is these people who together have personal stakes in how the system performs and each brings partial knowledge about what needs to be improved.

The second step is to *map the system together* and get a shared understanding of it as a whole. This creates a context for shared actions with common language and basic rapport that opens up the possibility for collaboration.

The third step is to *create scenarios of the future* and explore developmental trajectories for how the system might change based on different assumptions and interventions. This helps the group reveal what it values based on how different stakeholders react to the various possible outcomes.

The fourth step is to *set a shared agenda* around what the group most wants to see happen. Now that the group has identified what they care about and how they would most like to see their desired future emerge, they are in a position to construct a collaborative framework for action and evaluation.

This is a powerful pedagogical framework for bioregional regeneration. It is field-tested and has been demonstrated in a variety of diverse settings.

40. Support Systems for Transformational Change

A lot of people talk about systems they would like to see changed. In 2009 when the global financial system crashed, as one noteworthy example, millions organized to protest the “Wall Street Model” and began to call for its replacement.

Yet here we are a decade later and the system is more or less the same as it was before the crash. This is because *there wasn't a “support system” to enable transformational change.*

Steve Waddell is part of a group called SDF Transformations Forum that has been organizing the scientific community that studies system transformation for several years now. A major thing they have learned is that specific support systems are necessary to guide the change process. This includes things like the alignment of financial resources with capable leaders. Or having the right narratives that enable people to take collective action.

Bioregional regeneration is a *place-based strategy* for transformational systems change. It too requires the support systems that enable the evolution away from industrial agriculture to regenerative farming and agroforestry; away from extractive businesses to regenerative enterprises based on circular economy principles; and a lot more.

An area for active pedagogical design is to learn how to build the support systems that are needed in each unique bioregional context.

41. Find Your Carrying Capacity

It is a strange truth to acknowledge that nobody really knows how many humans can functionally live in any specific region of the Earth without destabilizing its ecosystems.

With the aid of technology in its many forms, humans have learned how to increase our lifespans and grow our populations in the last few hundred years. This has converted a great deal of non-human biomass into human bodies and the agricultural feedstocks we use to feed ourselves.

A basic inquiry for each bioregion is to *discover your own carrying capacity* by employing regenerative design principles. It is becoming possible to track systemic health for human communities and entire ecosystems. As we get more skilled at managing all of this complexity there will come a time when we see the thresholds of population size and density for different ecological systems on various parts of the Earth.

The learning process is one of seeking dynamic balance at whole-system scales—starting locally, interwoven to bioregion, and emergent at planetary.

42. Receive Gratitude from Your Descendants

The great storyteller Joanna Macy has offered a mythic narrative about the awakening of ecological consciousness in these times of planetary peril. In this narrative time is reversed and those living in the future are able to offer gifts backward in time to the present day—where we find ourselves now.

The message is potent and clear. Our descendants wish to offer gifts of gratitude that we chose to regenerate the planet so that they might live. But the story is not for them. It is for us.

We need to *receive their gratitude* to ignite a passion in ourselves and face the difficult times ahead. Bioregional regeneration is the pathway back to planetary health. Not all of us will make it through to the other side. Many of us will have broken blood lines and evolutionary branches that come to an end.

But those who do pass on their heritage will give much more than genetic materials—they offer the gift of *regenerative cultural practices*—and it is these that make it possible for our descendants one day to live.

I close this list of passages with this pedagogical tool that tells us why we must do this sacred work today. It is our job to make the world livable for our descendants whom we will never see. If we can learn how to make our lives a service with this depth of sanctity, well then we will have earned the right to have descendants.

And this is what bioregional regeneration is ultimately about.

Onward, fellow humans.