

A Guide to Bioregional Mapping & Planning

Ecological Design for Place-Based Regeneration

By Félix de Rosen



BioFi Project

1. Introduction

"There are no passengers on spaceship Earth. We are all crew."

- Marshall McLuhan

Where do we begin the journey of regenerating our landscapes and territories? How can we develop a deeper knowledge of our lands and waters to unlock their potential?

The regeneration of our landscapes begins with a shift in perception: embracing the bioregion as a living, interconnected whole, brimming with history, meaning, and possibility. Mapping the ecological, cultural, political, and economic layers of a bioregion and crafting a plan for the future lay the groundwork for such a shift in perspective.

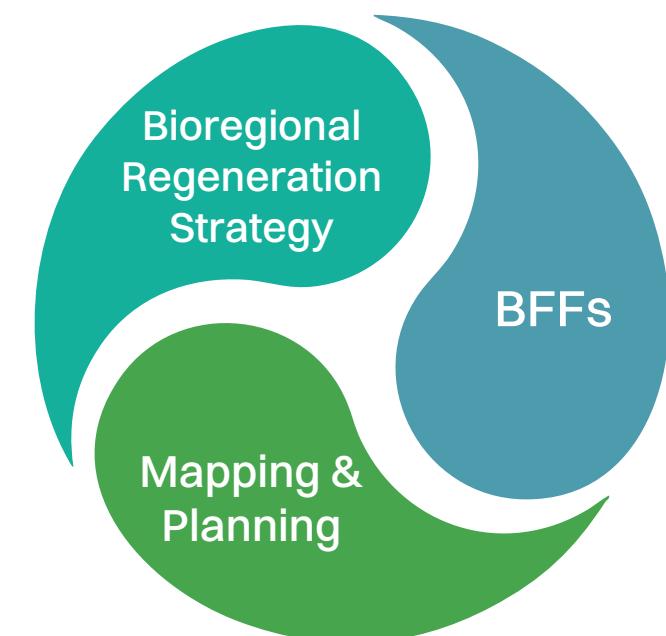
Because they feed into a Bioregional Regeneration Strategy (BRS) and a portfolio of priority projects, mapping and planning are essential in building the enabling conditions for Bioregional Financing Facilities (BFFs) as outlined in the book [Bioregional Financing Facilities: Reimagining Finance to Regenerate Our Planet](#) (see section 3.1). Rather than viewing this process as linear (mapping/planning > BRS > BFFs), we encourage you to view it as cyclical. For example, although mapping and planning will inform the Strategy, implementation of the Strategy may lead to further mapping and new planning principles.

We invite you to embrace a dynamic, collaborative, and adaptive approach to bioregional regeneration. This document serves as a high-level "how-to" guide for the transformative process of moving from initial mapping to developing a Bioregional Regeneration Strategy, so that we can become active crew members, not just passengers, for our bioregions.

Designing for Ecological Integrity

Mapping and planning are essential tools of ecological design, "the art by which we aim to restore and maintain the wholeness of the entire fabric of life, increasingly fragmented by specialization, scientific reductionism, and bureaucratic division."¹ A core goal of ecological design is ecological integrity—the ability of an ecosystem to maintain its functions, support biodiversity, and adapt to disturbances. The conservationist Aldo Leopold championed the "land ethic," emphasizing humanity's moral duty to preserve the integrity and beauty of life. In that spirit, we advocate for a "bioregional ethic"—a responsibility to align our cultures and economies with the places and landscapes we inhabit. The bioregional framework offers actionable pathways to harmonize human activity with the unique intelligence of place.

Unlike arbitrary lines on a map, bioregions² emerge from the interplay of physical, ecological, and cultural layers, which blend together to form a unique living system. There is no single right way to approach a bioregion because each one is shaped by a distinct context. What is required, rather, is a flexible, adaptive approach that takes into account the many ecosystems, species, and cultures within the bioregion and that recognizes the important role humans play in stewarding place.



The tools, frameworks, and organizations shared in this guide are a sampling of the diverse approaches one can take in this process, intended to support you on your bioregional journey. For a more comprehensive guide to designing for place-based regeneration, we invite you to consult the [Practical Guide to Integrated Landscape Management](#) and the associated [Tool Guide](#) by [1000 Landscapes](#).

¹ Orr, David. *The Nature of Design - Ecology, Culture, and Human Intention*. Oxford University Press, 2002, page 29.

² In this document, we use a flexible interpretation of the word bioregion that includes areas of land and water that share social-ecological characteristics, such as watersheds, landscapes, and territories.



Food for Thought

1. What stories and relationships define the landscape where you live? What makes your bioregion unique? What is the energizing spirit of your place?
2. How might the spirit of place – the unique relational fabric that makes up your bioregion – guide you toward regenerative pathways you haven't yet imagined?
3. What does healing and reconciliation in your bioregion look like – among humans and between humans and the more-than-human life there?

2. Mapping

What information do we need to gather about our bioregion to identify the most impactful project portfolios for regeneration? How can we map not just what exists now, but what's possible for our vision of a thriving bioregion underpinned by a regenerative, place-based economy?

Mapping and planning extend beyond understanding physical locations and spatial relationships; they also present deeper questions of identity and well-being. In short, mapping asks, “What is this place truly, in all its complexity and interconnections? What stories does it hold, and who or what has shaped it over time?” whereas planning asks, “What is this place seeking to become? And how do we partner with it instead of working against it?”

Before planning future activities, stakeholders must gain a holistic understanding of the bioregion’s history, current state, and potential futures. Bioregional mapping, as a community-driven process, uncovers both tangible patterns, like land uses and ecosystems, and intangible ones, like the stories, values, and relationships that shape identity. Some data—such as the layout of watersheds or infrastructure—may best be represented through geospatial maps like road maps; other information, like Indigenous narratives or the dynamics of social networks, might require different modes of representation, such as narrative reports, visual storytelling, or artistic performance. In this document, we use the word map to refer to any representation or assessment, whether visual, oral, or other, of the relationships within a system.

Throughout the mapping process, it’s crucial to remember that the map is not the territory. A map is a tool for stakeholders to gain a deeper sense of the

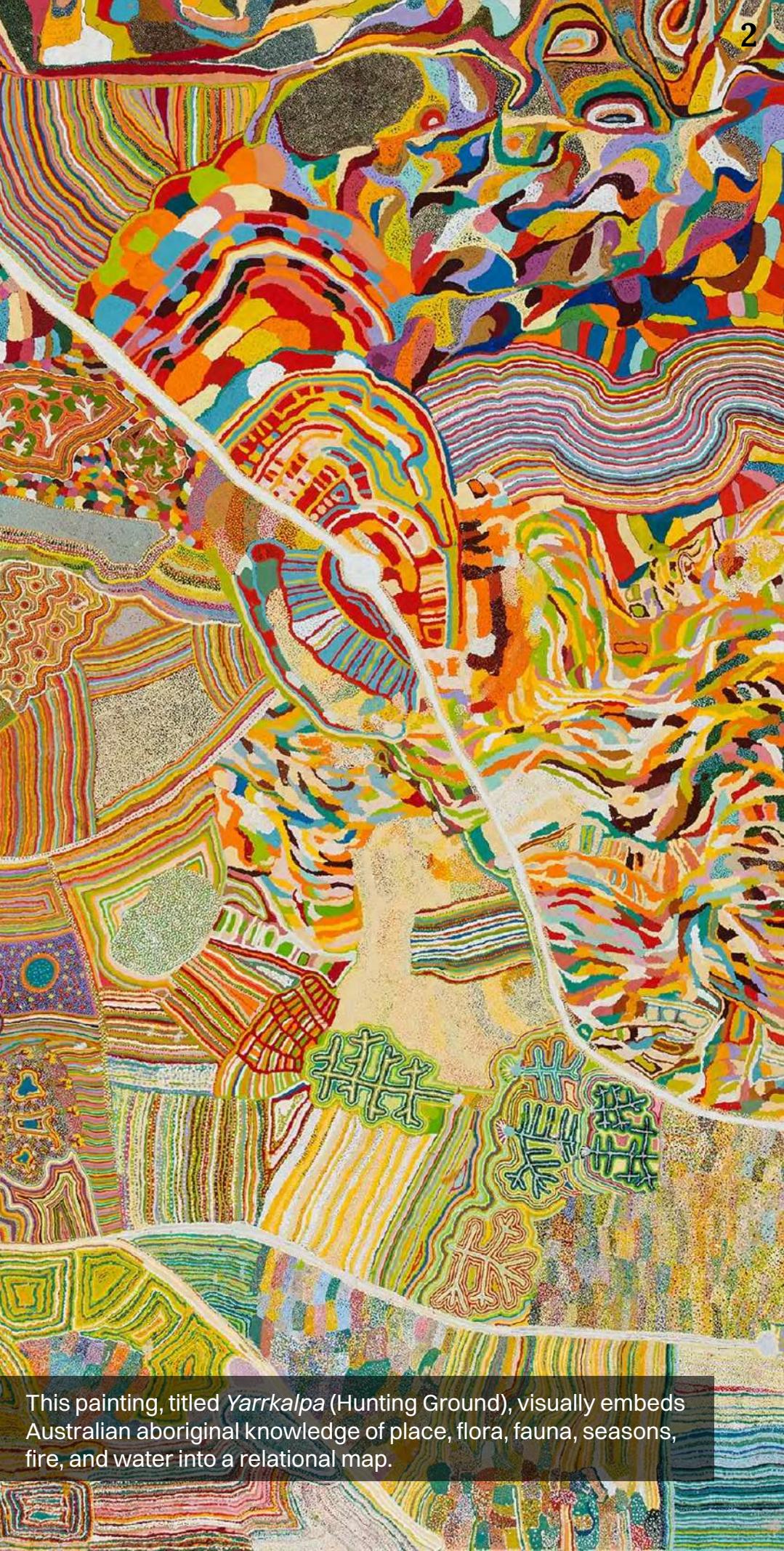
dynamics, assets, and stories unique to a bioregion. Maps are never objective; they inherently reflect the biases and perspectives of their creators. Their power comes from their ability to reveal relationships and patterns that are otherwise invisible, providing insights into the interconnected dynamics of a bioregion.

However, bioregional mapping is not only about creating physical or digital artifacts—it is equally about the relationships built during the mapping process. As social beings, we collaboratively develop intersubjective maps of community, land, trust, and resources, forging connections that are as valuable—if not more so—than the map itself. Ultimately, the bioregional mapping process integrates external realities with internal, collective identities, guiding communities toward ecological integrity and shared well-being. This shared vision then becomes the foundation for bioregional planning, and can signal to potential donors and investors that the bioregional organizers are knowledgeable of their local context.



Storying Place with Regenesis

The [Regenesis Group](#), a regenerative design practice, views mapping as a way to uncover the “story of place”—a holistic narrative that integrates the geological, natural, and human histories of a landscape to reveal its unique character. This story then becomes a guiding framework for future development, promoting long-term co-evolution between people and place. Instead of a rigid linear process, this is a living process that involves active creation by participants, or what Regenesis calls the “storying of place”. Listening to and then speaking this story ensures the ongoing vitality of the community and its context. [Listen](#) to members of Regenesis discuss the role of story of place in regenerative design.



This painting, titled *Yarrkalpa* (Hunting Ground), visually embeds Australian aboriginal knowledge of place, flora, fauna, seasons, fire, and water into a relational map.



Mapping the Heart of Place

A text by Brandon Letsinger

Beyond a map on a screen, or lines on paper, bioregional maps can be stories told around a campfire, sung, danced, quilted, painted, posted or however best communicates the purpose that participants want to communicate. One important feature is that bioregional maps are often concerned with time – stories from the past, things that people find important to share, groups that are making a difference today, or mapping regenerative and sustainable futures that we want to see. From these community maps, we can create road maps to ideas that might not have existed previously, with tangible steps for how to get there.

Bioregional mapping tends to be concerned with everything that current mapping is not – everything left off of google maps, or in between the road maps of interstates, gas stations and fast food restaurants. The plants, the trees, the animals, our stories and lived experiences. Everything that makes a place special. The last little batch of old growth in a neighborhood, the last hawthorne bush planted by your grandmother, the crazy lady with the chickens next door, the homeless encampment down the way, or colorful mural. Untold and forgotten histories of discrimination, genocide or earlier strategies of resistance more important than ever to tell now . Or maybe it's the type of birds or fish that migrate with each season. The rivers that carry the fish, or the bushes that provide unique nesting for native bird species. Stories of the places that make living here special, that define what we think of as home.



“Where will our research live?”

Great question. Before you even start your mapping process, it is helpful to develop a robust organizational system to host your research. Preserve and share your mapping outputs through platforms that keep the information dynamic, accessible, and evolving rather than static.

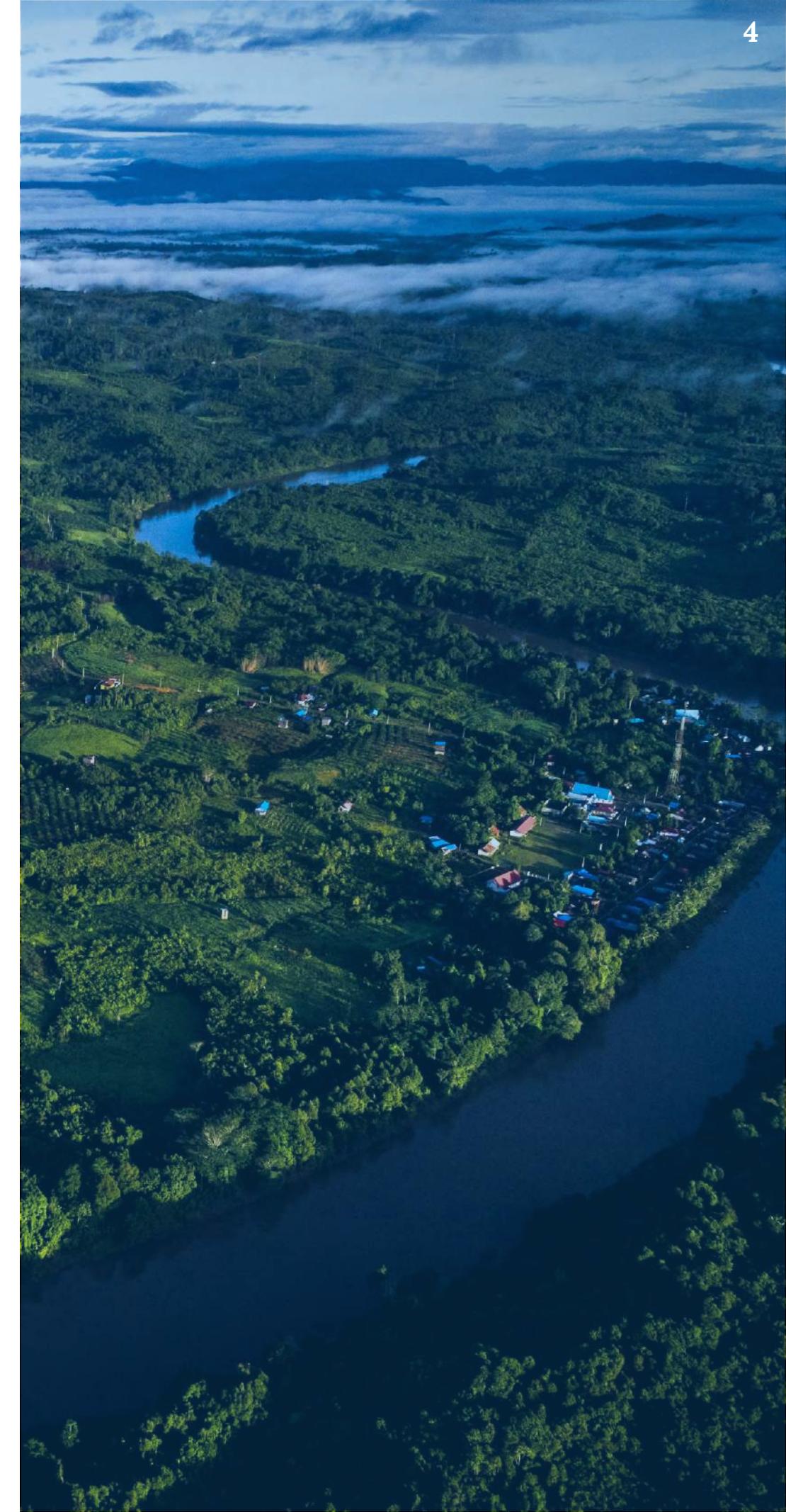
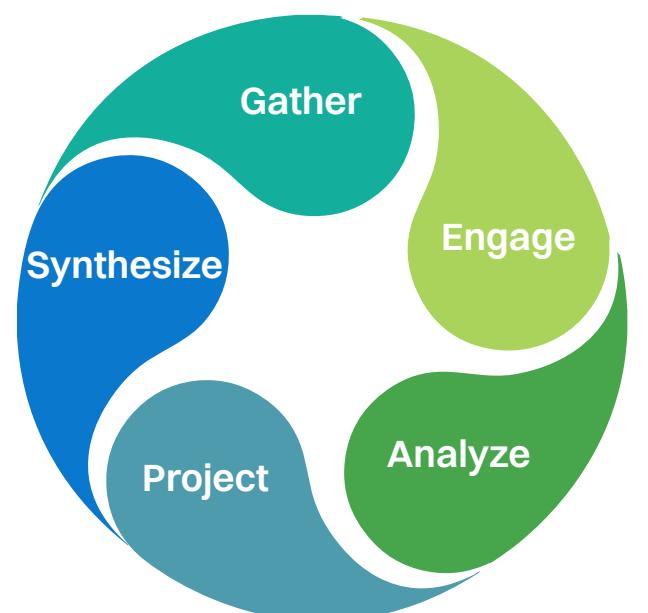
- For file and document organization, start with simple options such as a shared cloud-based folders (e.g. Google Drive).
- Consider creating a dedicated section of your website with downloadable resources, establishing a community wiki that allows stakeholders to contribute updates, or using project management tools with visual mapping capabilities like Miro, Notion, or AirTable to organize findings.
- Geospatial information can be managed through open-source tools like [QGIS](#) or collaborative platforms like [Terraso](#) and [Explorer.Land](#) which specifically support landscape and bioregional organizing teams (see "Useful Software and Data" on the next page).
- Physical repositories in community spaces like libraries or Bioregional Hubs create tangible access points.
- Most importantly, establish protocols for regular updates, clear ownership of information maintenance, and accessibility considerations so your bioregional knowledge remains a living resource, not a one-time report gathering digital dust.

Steps of Bioregional Mapping

Mapping is an iterative, non-linear process that prioritizes understanding over technical perfection. While digital tools and software can support the work, the most crucial element is choosing approaches that align with community capabilities and reveal the deeper stories of a place. Whether using sophisticated Geographic Information Systems (GIS), participatory hand-drawn maps, or a combination of methods, successful mapping emphasizes relationship-building and local knowledge. The goal is to develop a nuanced understanding that can inform regenerative action, recognizing that the most valuable insights come from the lived experiences of those who know the landscape intimately.

We share the following five-step mapping process, as one effective working model among many. Although steps are presented as sequential, they are in practice cyclical and ongoing.

1. **Gather** relevant data
2. **Engage** community to enrich data
3. **Analyze** data for patterns and potential
4. **Project** how the bioregion can evolve
5. **Synthesize** the data into a holistic assessment



1. GATHER data collaboratively from diverse sources like scientific studies, government reports, historical maps, and public databases. The key is not just to collect information, but to build living relationships with the people and institutions that hold this data. Engage directly with local universities, environmental agencies, watershed authorities, and land trusts already working with the land and its communities. This approach transforms data gathering into a collective effort, weaving information into a shared understanding and creating a living network of relationships. By involving all stakeholders, we enable a more holistic and dynamic approach to ecological design that captures the bioregion's integrated essence.



Useful Software & Data

- [ArcGIS](#) is the paid, industry-standard GIS platform for mapping, analysis, & managing geographic data.
- [Atlas](#) is a paid software for teams to make maps and perform geospatial analysis.
- [Felt](#) is a paid online mapping tool designed for collaboration, allowing users to create, edit, and share interactive maps.
- [qGIS](#) is the open source version of arcGIS.
- [Restor](#) is a free, online platform connecting restoration and conservation projects with tools, data, and a global network to track and showcase their impact.
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- [Aqueduct Floods](#) for riparian and coastal flood risks under current and future scenarios
- [Nature Map Explorer](#), an integrated global map on biodiversity and ecosystems services
- [Open Land Map](#) for global environmental layers focused on land use and surface
- [Resolve Ecoregions Map](#) for terrestrial ecoregions and their conservation status
- [Soils Revealed](#) for soil carbon losses and storage potential
- The [UCSD Bioregional Center](#) empowers university-community partnerships for bioregional initiatives.

2. ENGAGE the community to validate and enrich the mapped information by conducting interviews and structured workshops with stakeholders. Where data is weak or missing, hold focus groups with individuals knowledgeable of the bioregion, ensuring that historically marginalized voices are included. Facilitate communication between various stakeholders, so that each can learn about the perspectives of others, especially what holds significance for others in the bioregion.



Useful Engagement Tools

- Additional ways to engage: collaborate with school teachers, museums, and artists; organize [bioregional cycling tours](#) and intergenerational storytelling circles; partner with faith communities; consult utility workers who observe infrastructure impacts on ecosystems.
- Social mapping tools:
 - [Kumu](#), visualization platform for mapping relationships
 - [Mapping Social Landscapes](#)
 - [Theory U](#) practices, including
 - [Stakeholder Interviews](#)
 - [4D Mapping](#)
 - [Dialogue Interviews](#)
 - [Listening Exercises](#)

3. ANALYZE the data to look for patterns and trends, highlighting areas of concern (e.g. habitat fragmentation) and areas of opportunity (e.g. wildlife corridors), as well as areas where more information is needed. For spatial data, this can be done by overlaying different data types to identify areas of overlap or differences. Investigate data from different periods of time to identify trends, such as shifts in land use driving changes in biodiversity, or changes in groundwater tables. Many of the digital tools used for gathering data are also useful for analysis.

4. PROJECT how a bioregion will evolve in the future under different scenarios and identify where the ecological integrity of the bioregion is most vulnerable and/or promising. Explore the impacts of climate deregulation, population change, and resource availability, while also considering how planned economic developments (especially infrastructure like roads) might reshape land use patterns and economic incentives. Begin with the bioregion's unique essence and potential, asking what it's seeking to become, rather than solely extrapolating from current trends. Identify both energy flows and constraints within the system, seeking nodal intervention points that could redirect these flows positively. Note that stakeholders may share a wide variety of views on and emotions about future scenarios. These should be welcomed with sensitivity and empathy as part of the mapping process.

5. SYNTHESIZE the data into an assessment of the priorities, challenges, and opportunities for the bioregion. Gather feedback from stakeholders, especially from disadvantaged communities, to finetune the assessment, which can take a variety of forms: a map, a report, a landscape scorecard, a video. Develop a system where users can update data, track changes, and give feedback, keeping the mapping process alive and active.



Useful Synthesis Tools

- Free generalist digital storytelling tools:
 - [Storymaps](#)
 - [Notion](#)
 - [Google Earth Story](#)
- [Terraso](#) is a free tool for data management, land visualization, and communicating impact, developed by [1000 Landscapes](#)
- [Explorer.land](#) is a platform for the communication, funding, and monitoring of environmental projects through interactive maps (paid but with a free basic plan)

What Gets Mapped?

There are many ways to organize information. Mapping methods should be tailored to each bioregion's unique context and initial objectives. The process requires careful consideration of scale, granularity, and the dynamic nature of mapped elements. We want to highlight four distinct but complementary approaches to bioregional mapping:

1. Geospatial/Physical Mapping: Visual representation of physical features and boundaries using GIS tools, satellite imagery, or traditional cartography. This includes mapping watersheds, ecosystems, wildlife corridors, infrastructure, and jurisdictional boundaries.

2. Asset and Risk Mapping: A comprehensive inventory of a bioregion's assets and risks, which may or may not be spatially represented. Because this approach identifies what makes a bioregion valuable and what endangers those values, it is an important tool to use when developing a Bioregional Regeneration Strategy and designing BFF project portfolios. The table to the right highlights different categories of assets and risks across seven dimensions. Note how these dimensions inform each other: e.g. geology impacts local flora which in turn impacts human culture and economy.

3. Social Network Mapping: Visualizing connections between stakeholders, organizations, and initiatives, revealing patterns of collaboration, influence, and knowledge exchange within the bioregion.

4. Systems Mapping: Representation of interconnected systems and feedback loops within a bioregion, such as resource flows, economic dependencies, or cultural relationships. For an example of a robust systems map, see [Financing the Regenerative Agriculture Transition in the Midwest](#) by the TransCap Initiative.

	Assets	Risks
Geological & Physical	<ul style="list-style-type: none"> - Geology, soil types - Waterways, watersheds - Climate, weather - Topography, mountains 	<ul style="list-style-type: none"> - Hazards and disasters, such as floods, earthquakes, fires - Climate change risks, such as rising temperature, changing precipitation, sea level rise, and extreme weather
Biological	<ul style="list-style-type: none"> - Ecosystems - Flora, fauna, fungal networks - Biodiversity hotspots, Invasive species 	<ul style="list-style-type: none"> - Risks to ecological systems, such as loss of keystone species, soil erosion, and habitat fragmentation
Cultural	<ul style="list-style-type: none"> - Indigenous communities (past and present) - Mythology and lore - Sacred and historical sites - Traditional knowledge, including languages - Cultural practices, including food and arts - Recurring events (e.g. festivals) - Governance structures 	<ul style="list-style-type: none"> - Loss of capacity for governance structures and institutions - Damage to cultural sites - Loss of traditional knowledge and Indigenous languages - Loss of intergenerational transmission - Loss of historic sites
Social	<ul style="list-style-type: none"> - Community and volunteer organizations - Public and private institutions - Key stakeholders and networks - Community resource hubs - Past and present bioregional interventions - Key individuals and potential allies - Individual skill sets 	<ul style="list-style-type: none"> - Risks due to socioeconomic factors, including poverty, inequality, and access to basic services - Social and political conflict - Decreased coordination - Risks to public health, such as infection diseases, pollution, and addiction
Economic	<ul style="list-style-type: none"> - Businesses and industries - Cooperative and social enterprises - Agricultural practices - Economic flows and leaks - Economic inequality - Possible sources of bioregional investment - Sources of pollution 	<ul style="list-style-type: none"> - Economic instability and supply chain vulnerabilities - Ecosystem degradation including soil degradation, water scarcity, and overharvesting - Increasing economic inequality - Climate change impacts on agriculture, tourism, and resource-dependent industries - Workforce skill mismatches with evolving economic needs and emergent AI technologies
Infrastructure	<ul style="list-style-type: none"> - Transportation systems - Energy networks, waste facilities, water utilities - Built environment (e.g., land use zoning) - Parks, greenways, conservation zones - Communication systems, digital databases - Universities, hospitals - Nurseries and seed banks 	<ul style="list-style-type: none"> - Risks to critical infrastructure (transportation, energy, water, and communication networks) - Dependence on energy supply from outside the bioregion - Increased cost of energy and water
Political	<ul style="list-style-type: none"> - Local, national, and international laws, policies, and government institutions (e.g. land rights, taxes, subsidies) - Regulatory frameworks - Power structures within the bioregion and beyond - Jurisdictional boundaries 	<ul style="list-style-type: none"> - Political conflict; antagonistic groups - Political opposition to regeneration - Political manipulation - Unequal power structures - War



Maps as Tools for Indigenous Sovereignty and Bioregional Stewardship in Cascadia

In bioregional mapping, the focus on representing the intertwined ecological, cultural, and social realities of a bioregion draws heavily from indigenous understandings of land as an interconnected whole and of humans as ecosystem stewards. Although contemporary mapping technologies like GIS emerged in the 20th century, mapping has been an integral part of Indigenous cultures for millennia, with some of the world's earliest maps appearing in cave paintings or preserved in oral traditions passed down through generations.

In the 20th century, indigenous communities started reclaiming contemporary mapping technologies as tools for resistance, resurgence, and education. Maps have served as colonial tools to erase indigenous presence from the land and justify the occupation of land. By combining historical memory and ancestral knowledge with GIS data and Western science, indigenous communities have re-asserted their territorial rights and articulated their visions for the future. Indigenous-led mapping projects span a wide spectrum, from low-tech community approaches to cutting-edge online web [databases](#).

The Cascadia bioregion - which stretches from British Columbia and southeast Alaska to Washington State, Oregon, Idaho, and Northern California - has been a particular hotbed for indigenous-led bioregional mapping. In 1997 the Tsleil-Waututh First Nation, with a 720 square mile traditional territory in British Columbia, pioneered the use of bioregional mapping to defend their land rights. The Tsleil-Waututh people created a forty-sheet bioregional atlas that describes a collectively-held vision of their culture's past, present, and future. The bioregional atlas format allowed a vast amount of often complex information to be presented in a relatively

inexpensive and accessible format. It was also used as a primary document in several legal cases recognizing their authority over their territory, and taken all the way to the Canadian Supreme Court. Despite being created more than 20 years ago, this atlas have created a legal framework very much still in contest today, with ongoing direct confrontations against corporations and the Canadian military - who are attempting to build gas and oil pipelines through Indigenous lands.

A series of bioregional mapping workshops involving 3,000 participants across 17 islands in Cascadia led to publication, in 2005, of *Islands in the Salish Sea: A Community Atlas*, which highlight cherished aspects of the islands, such as heritage orchards, fishing spots, endangered wild orchids, bird colonies, and ancient First Nations sites. Each island community decided what to include, and local artists crafted uniquely styled maps to reflect their values. An interactive version of the maps can be viewed [here](#).



Food for Thought

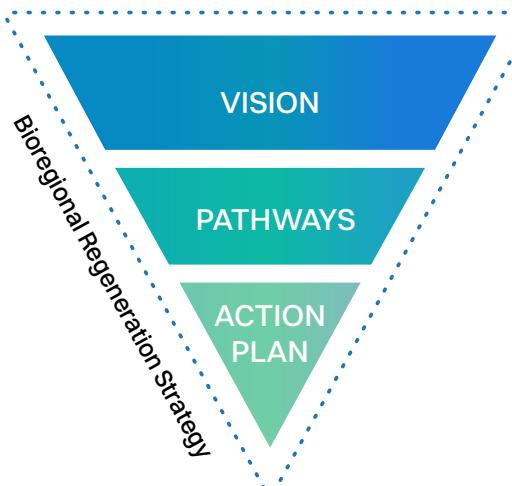
1. What forms of mapping feel appropriate for your bioregional endeavor at this current time?
2. How might your mapping process itself become a tool for community dialogue and collective imagination rather than just documentation?
3. What would it take for your bioregional map to breathe, grow, and evolve alongside the place it represents, rather than becoming a static artifact?

3. Planning

How do we use the insights from mapping to define actionable priorities for our bioregion? How can we ensure this remains a participatory, multigenerational, and multispecies process aligned with living systems principles and Indigenous wisdom?

Bioregional planning builds off the collective intelligence of the mapping process to develop a Bioregional Regeneration Strategy. The process can be broken down into three core parts that move from broad and intangible to specific and tangible:

- The **vision** is the big-picture, long-term aspiration for a bioregion, informed by the mapping process and the dreams of community stakeholders.
 - **Pathways** outline how to achieve the vision by identifying high-level principles and approaches.
 - The **action plan** is the practical, detailed roadmap for implementing the strategy. It consists of specific projects, timelines, stakeholders, and resources required to bring the strategy to life, such as portfolios of synergistic projects and BFFs to fund them.



Together, vision, pathways, and action plan help constitute the Bioregional Regeneration Strategy, which serves as the short, medium, and long-term plan for regeneration in a bioregion and is outlined in section 3.1 of the book [Bioregional Financing Facilities](#).

Like the mapping process, planning is deeply collaborative, requiring stakeholders to work together to address systemic challenges in the landscape. Conflict and tensions can easily rise during the planning process: as planning gets increasingly practical, stakeholders move out of the realm of abstraction and may face tough decisions about resource allocation, property boundaries, and competing interests. Short-term, impulsive decision-making must give way to multigeneration thinking, and other species must be represented in that process. Trained facilitators, perceived as impartial, can be immensely valuable in creating healthy collective dialogue and decision-making processes that generate support for the Strategy.

1. Vision

The mapping assessment builds a shared understanding of a bioregion's assets, challenges, and opportunities. It forms the foundation for a long-term vision spanning 20+ years, helping stakeholders move beyond short-term political and economic cycles that often breed rivalries and scarcity mindsets. A long-term perspective takes a multigenerational approach to reach consensus around visions for a thriving bioregion. These visions highlight the most valued features and functions of the bioregion, while mobilizing diverse stakeholders, including other species.

For example, the [Amazon Sacred Headwaters Alliance](#) united 30 Indigenous peoples across Ecuador and Peru with the vision “to curb extractive industries and accelerate an ecological transition towards a regenerative bioeconomy, rooted in Indigenous worldviews and traditional knowledge” as well as to “permanently protect the Sacred Headwaters as a space for all life to thrive.” And in Spain’s arid southeast, the [AlVelAl Territory](#), supported by Commonland, articulated a vision uniting the interests of ecology, industry, and citizens. Like the mapping assessment, these visions can take various forms—text, illustration, video—but their power lies in fostering a shared, long-term commitment to regeneration.

Since 2014, the AlVelAl Association has been using the 4 Returns Framework to bring together local farmers, conservationists, government, and entrepreneurs to create a common vision for their territory in Spain's semi-arid southeastern steppe.



2. Pathways

Set Specific Goals

If the vision articulates the “what” – the desired future of a bioregion – the pathways start answering the “how”. It can be helpful to think of these simply as a series of high level paths representing distinct systems or domains within the bioregion, such as agriculture, biodiversity, infrastructure, and governance. The various paths should be “win-win,” mutually reinforcing each other rather than working separately. For example, supporting regenerative practices on local farms works in synergy with investing in riparian conservation: regenerative practices reduce runoff into creeks, and riparian conservation prevents flooding for farms downstream. Another example of synergy is the combination of renewable energy investments with governance reforms: decentralized solar energy systems reduce dependence on centralized grids, while governance interventions that promote local decision-making and community ownership ensure the energy transition aligns with local needs.

In order to avoid staying stuck in abstraction, the development of pathways begins by identifying clearly defined goals for the bioregion. What specific results do stakeholders want to see for the bioregion? Where, and by when? For example, questions could include: “How can we compost 100% of our organic waste in the next 5 years?” “How can we transition to 100% renewables whilst reducing our overall energy use?” “How can we increase access to land for farming?” Making these targets spatially and quantitatively explicit—such as setting limits on carbon emissions or determining high-priority conservation areas—helps create clear indicators to track progress. The more specific the questions and goals, the clearer the path toward tangible outcomes.

Developing pathways can be particularly challenging because of the complex nature of social and ecological systems. When decision making is challenging – because of missing information, unclear priorities, or disagreements – stakeholders can make use of decision making frameworks such as [Cynefin](#). Cynefin categorizes situations into five domains – clear, complicated, complex, chaotic, and confusion – where each requires a different approach, such as experimenting and adapting in complex contexts, or applying best practices when the context is clear.

Many other decision-making frameworks exist. Increasingly, artificial intelligence is being used to automate decision making in ecological design. Whilst we believe this can be useful in the right circumstances, it should always be in service to a participatory, deliberative approach to decision making.

Create a Roadmap

Next, the pathway should outline a clear roadmap for achieving the targets and realizing the specific long-term goals. Different approaches need to be designed, compared, and assessed for their feasibility, as well as their benefits and risks for each stakeholder. Keep in mind that some actions, such as community-building efforts, may not “deliver” immediate benefits or revenue but do provide essential public goods. Short, medium, and long term actions will interact in ways that cannot always be predicted, especially in a rapidly changing geopolitical, technological, and climatic context.

The pathways can be summarized in a table or diagram with a timeline of specific pathways towards desired targets, supplemented by detailed explanations of the chosen pathway elements.



Working Back from the Future

A powerful shift in perspective for developing the roadmap is *backcasting*. While forecasting predicts which futures are likely, it often unknowingly projects unjust present-day biases into the future. In contrast, backcasting starts with the desired long-term future and works backward, creating a transition pathway that brings new paradigms into focus. Backcasting is concerned not with what futures are likely to manifest but with how particular desirable futures can be attained. For a template on how to backcast, see the [4 Returns Theory of Change template](#).

Navigating Multiple Time Horizons

To better navigate the tension between present realities and future goals, the [3 Horizons Framework](#) divides the future into three horizons. Horizon 1 represents the present system and its dominant paradigms of extraction. Horizon 3 embodies the long-term vision of a future system built on regenerative, bioregional paradigms. Horizon 2 is the zone of transition, where innovative ideas and practices start to create shifts toward new paradigms. The model not only helps articulate the tensions and interactions between the decline of old systems and the emergence of new ones. By highlighting the interplay between each horizon, it can also prevent unnecessary polarization between stakeholders working at different stages of the transition. It fosters understanding and appreciation of diverse roles, whether participants are maintaining current systems, driving innovation, or working toward long-term systemic change. This approach encourages better communication and coordination, ensuring all stakeholders feel valued and will be more likely to contribute to future collective efforts.

3. The Action Plan

Once the roadmap has been developed, stakeholders need to identify the short-term (less than 5 years) actions in service to the long term (20+ years) vision through an action plan that includes a portfolio of projects to be implemented in stages. This process starts with an assessment and mapping of the existing initiatives that are aligned with the BRS. The action plan can connect these projects together, amplify them, or adapt them. By engaging the collective intelligence of the bioregion through participatory processes, stakeholders can identify which practices and methodologies are most appropriate. To explore best practices for effective ecological regeneration, two options include consulting the [Conservation Standards](#) by Conservation Measures Partners, and looking to Indigenous communities that currently steward or historically stewarded a given place. The action plan can also explore innovative approaches and investment practices that aren't common in the bioregion by connecting with outside initiatives and inviting experts to share their knowledge.

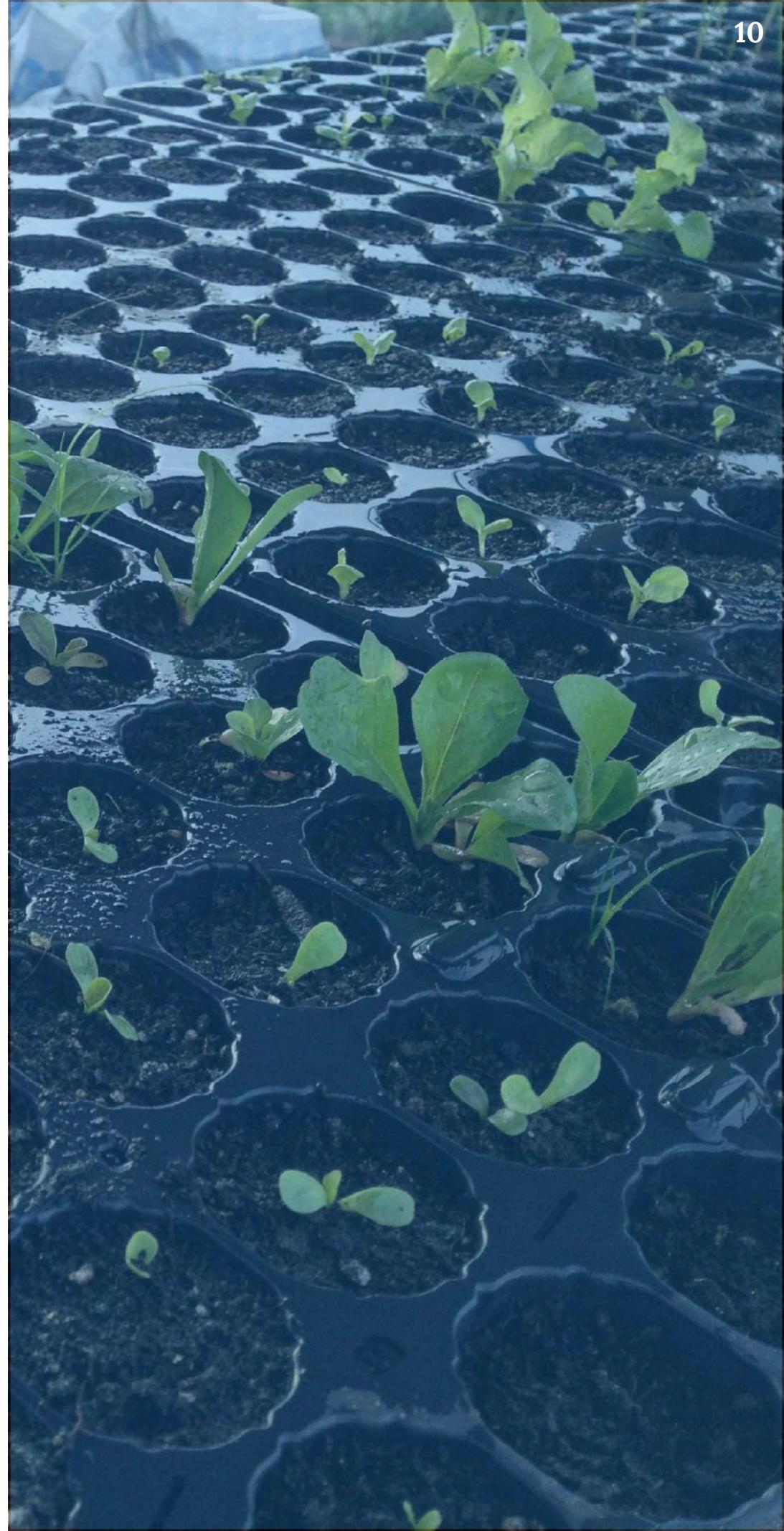
Each action needs to be evaluated holistically for its costs and benefits, its impact on stakeholders, and how it aligns with the vision and pathways. When considering benefits, frameworks like the [4 Returns Framework](#) can provide a comprehensive lens for assessment. This process, as always, must be collaborative: developing an action plan requires challenging negotiations on how to align the interests of various stakeholders. It can be helpful to set up working groups to address specific actions and pathways, such as integrating the interests of farmers and conservationists, or getting local businesses to invest in an action. The completed plan communicates which activities will take place, where, when, and who will be responsible for them. This can take various forms, such as a timeline, a video, or a report. Because landscapes are dynamic, stakeholders should agree to meet a few times per year to adjust the plan, and every few years to fully revise it.

An action plan is not just a list of steps to follow; it should also integrate coordination protocols that allow stakeholders to adapt as situations change. [Emergent Strategy](#), for example, suggests that groups don't focus on the specific actions necessary to get to a destination. Instead, it recommends that they make a shared commitment to work collaboratively and use agreed-upon protocols, so that emergent decisions guide them toward the desired outcome. This approach acknowledges the inherent uncertainty in complex systems, and helps ensure flexibility and responsiveness.



Planning a Fair, Sustainable Food System for Pittsburgh, Pennsylvania

The [Greater Pittsburgh Food Action Plan](#) (GPFAP) is a community-centered initiative with a vision, strategy and roadmap for a healthier, more sustainable regional food system for the Pittsburgh area. The Pittsburgh Food Policy Council collaborated with dozens of council member organizations and community partners to develop the plan. The document, published in 2020, is the culmination of two years of research, planning, and community engagement. While not an explicitly bioregional initiative, its vision focuses on a collaborative, community-based approach that prioritizes equity and supports the health of people, natural resources, and the economy. Its five goals are to enhance coordination among food system resources; center equity and sustainable agriculture; support a robust regional food economy; improve food security and public health; and build community power through food sovereignty. For each goal, the Plan provides high-level recommendations and specific pathways. Each pathway, in turn, includes information on the relevant stakeholders, the current status of relevant initiatives, next steps, and potential evaluation measures.



Action Category*	Examples of specific actions	
Ecosystem Regeneration	<ul style="list-style-type: none"> - Protect habitat and establish pollinator corridors - Reintroduce native species - Implement assisted migration programs for animals and plants - Practice rotational grazing for grassland regeneration 	<ul style="list-style-type: none"> - Establish bioregionally focused plant nurseries and seed banks - Develop biochar production facilities - Implement regenerative soil practices for farms - Organize citizen science programs for ecological monitoring
Water Systems	<ul style="list-style-type: none"> - Restore river flow regimes, including riparian flood zones - Implement rainwater harvesting systems - Daylight creeks and covered water bodies - Install check dams in drought prone areas 	<ul style="list-style-type: none"> - Develop water recycling (e.g. greywater systems) - Revive culturally significant water sources - Establish constructed wetlands for wastewater treatment - Establish water and ocean governance frameworks
Food Systems	<ul style="list-style-type: none"> - Promote climate-adapted agriculture - Develop agroforestry and rotational polycultures - Organize community seed-saving programs - Create urban farms and school gardens - Design fishery management systems 	<ul style="list-style-type: none"> - Introduce halophytic agriculture for coastal areas - Reintroduce Indigenous food varieties - Provide agroecology education programs - Ban or limit the use of industrial agro-chemicals
Education & Culture	<ul style="list-style-type: none"> - Develop cultural heritage trails - Organize seasonal festivals - Promote traditional crafts - Document oral histories - Rebuild sacred sites 	<ul style="list-style-type: none"> - Document and revitalize Indigenous language - Create bioregional learning centers - Promote intergenerational living and learning - Offer nature-based education for children - Offer training in governance and dialogue
Business & Economics	<ul style="list-style-type: none"> - Establish bioregional innovation incubators - Promote regenerative ecotourism - Provide professional training in regenerative and circular economy - Design bioregional financing facilities 	<ul style="list-style-type: none"> - Launch regenerative enterprises - Develop cooperative models of ownership - Promote farm to table initiatives
Governance & Community	<ul style="list-style-type: none"> - Develop a network of bioregional hubs - Design community participation programs - Create governance frameworks across the scale of the bioregion - Establish community land trusts 	<ul style="list-style-type: none"> - Facilitate participatory land-use planning - Create village and neighborhood assemblies and councils - Promote cross-industry partnerships - Implement supportive taxes, regulations, and incentives
Infrastructure & Technology	<ul style="list-style-type: none"> - Promote open source technologies and databases - Invest in public transport, including rail and boat - Decentralize wastewater treatment systems - Decentralize internet provision (e.g. mesh networks) 	<ul style="list-style-type: none"> - Promote bioregional material use in construction - Promote traditional building techniques - Deploy wildlife tracking technology - Create digital platforms for real-time data
Energy & Waste	<ul style="list-style-type: none"> - Reduce absolute resource consumption and transition to renewables - Develop waste valorization initiatives such as compost, biogas and recycling - Establish community-owned clean energy cooperatives 	<ul style="list-style-type: none"> - Implement greywater recycling systems - Create community reuse centers - Provide subsidies for cleaner energy sources, including decentralized microgrid systems

* While presented as distinct, these categories are interconnected and overlapping.



The Amazon Sacred Headwaters Alliance

The [Amazon Sacred Headwaters Alliance](#) (ASHA) is a collaborative effort founded in 2017 by an alliance of over 30 Indigenous nations that live in the headwaters of the Amazon River in Ecuador and Peru, along with several NGOs, that share a vision to protect the bioregion's ecological and cultural integrity. In 2021, the Alliance published their comprehensive [Bioregional Plan 2030](#) that outlines the strategies and actions to realize their ultimate vision of permanently protecting and restoring the 86-million-acre bioregion.

To develop this plan, ASHA conducted a comprehensive mapping of the bioregion using a multi-faceted approach. This began with data collection and the mapping of various environmental, social, and economic factors, such as deforestation, forest degradation, extractive industries (oil and mining), infrastructure projects (roads and waterways), and the well-being of Indigenous populations. The initiative utilized existing research, including data from the [Amazonian Georeferenced Socio-Environmental Information Network](#) and governmental sources from Peru and Ecuador. The analysis employed a pressure-state-response (PSR) framework, a method used by the Convention on Biological Diversity, to understand the causes and consequences of environmental changes. A multi-criteria analysis (MCA) was conducted to identify priority areas for conservation, regeneration, and intervention, incorporating economic, social, and biophysical information. Factors considered included areas of high conservation value; regions facing significant threats; areas needing regeneration; gaps in health, education, and services; the vulnerability of Indigenous populations; cultural factors; and the conditions experienced by women in society.

The diagnosis also involved active engagement with Indigenous communities and organizations. Workshops were held with territorial and regional organizations, along with their technical teams, to discuss findings and gather feedback. This multi-pronged approach allowed the initiative to integrate diverse perspectives and data sources, resulting in a thorough and nuanced understanding of the critical issues facing the Amazon Sacred Headwaters.

Building on its mapping efforts, ASHA developed a bioregional plan grounded in the cosmologies of Amazonian Indigenous peoples and the principle of *buen vivir** that seeks to uphold Indigenous peoples' collective rights and the Rights of Nature. The plan identifies nine key thematic areas where intervention is needed:

- Technology, transportation, and connectivity
- Territorial governance & Indigenous self determination
- Renewable energy
- Regenerative socio-economies
- Education and ecological consciousness
- Intercultural healthcare
- Smart planning, right to the city and social housing
- Forest economy and regenerative entrepreneurship
- Conservation and restoration

For each of these thematic areas, specialists in the relevant fields prepared policy documents, gathered information on past and present projects, and proposed new projects where needed. These policy documents were then reviewed and reformulated in workshops held with the territorial and regional organizations and their technical teams who had participated in the mapping phase. This ensured that the proposed actions were grounded in the realities of the region and reflected the priorities of the Indigenous communities.

Each thematic area also included specific quantifiable goals to be implemented, such as keeping all oil in the ground, adoption of universal basic income, and building 80 health centers and 6 hospitals by 2030. The plan, which includes a high level budget, calls for the development of a Bioregional Fund and identifies possible funding and investment sources to support implementation, including national and international climate and biodiversity frameworks, regenerative finance mechanisms, and private-sector partnerships.

* Defined as "collective wellbeing", *buen vivir* aims to ensure the material, social and spiritual fulfillment of a community, but not at the expense of others or to the detriment of nature.





A Plan for Bioregional Coordination in Aotearoa New Zealand

The [Kotahitanga mō te Taiao Alliance](#) (KMTT) is a partnership of 17 organizations, co-led by iwi (Māori Indigenous tribes), in partnership with local regional government, communities, businesses and Aotearoa – New Zealand’s national government, covering two regions based in the top of New Zealand’s South Island, Te Waka a Maui. Its mission is to restore and enhance nature across 3.4 million hectares of land and sea.

Drawing its name from the Māori words “Collective Action for Our Nature,” KMTT operates under the Māori principle of *kaitiakitanga*—a cultural system of guardianship rooted in Te Ao Māori (the Māori worldview), which recognizes and centres the interconnectedness of all nature, including people. Traditionally, Māori have managed lands and waters sustainably, guided by this holistic approach. KMTT builds on these principles with the belief that conservation efforts can go “faster alone but further together”.

In June 2019, the KMTT [Strategy](#) was published to align the efforts of the Alliance in achieving its shared vision, mission, and outcomes through collective action. The strategy focuses on five high-level outcomes: thriving native species (including endemic ones); protection and restoration of naturally functioning ecosystems; sustained wilderness; harmony between people and nature; and enhanced ecological connections and resilience. The strategy underscores the importance of collaboration (*kotahitanga*), recognizing that no single entity can achieve these goals alone. It outlines what success looks like for the region as a whole and each of its subregions, providing a high-level plan to reach those goals. Progress is tracked through [annual impact reports](#), ensuring transparency and accountability in this transformative conservation journey. A web tool showcases some of the Alliance’s wide-ranging projects.

Food for Thought

1. Imagine you could time travel 30 years into the future. What does a thriving version of your bioregion look, feel, and sound like? Now backcast, what fundamental shifts had to occur to create this transformation?
2. What are the most significant barriers preventing your bioregion from realizing its regenerative potential right now? How might these barriers be interconnected, and what innovative approaches could help dissolve them?
3. If your bioregion could speak, what would it ask of the human communities living within its boundaries? What needs or wisdom might it be trying to communicate?
4. How do the cultures, economies, and ecosystems in your bioregion currently interact? What symbiotic relationships could be cultivated to create more mutually supportive systems?
5. Whose voices and perspectives are most critical to include in this planning process, but are currently marginalized or overlooked? What specific steps can you take to ensure genuine, meaningful participation?

Planning for Bioregional Finance

Identifying the funding opportunities available for the implementation of the action plan is an important part of the planning process. Although it may make sense for some projects within the action plan to be funded individually, bioregional regeneration at scale requires that we develop synergistic portfolios of projects. This coordinated approach maximizes both ecological and financial benefits, reduces financial risk for funders, and ensures more equitable distribution of funding across the bioregion, avoiding concentration in specific areas.

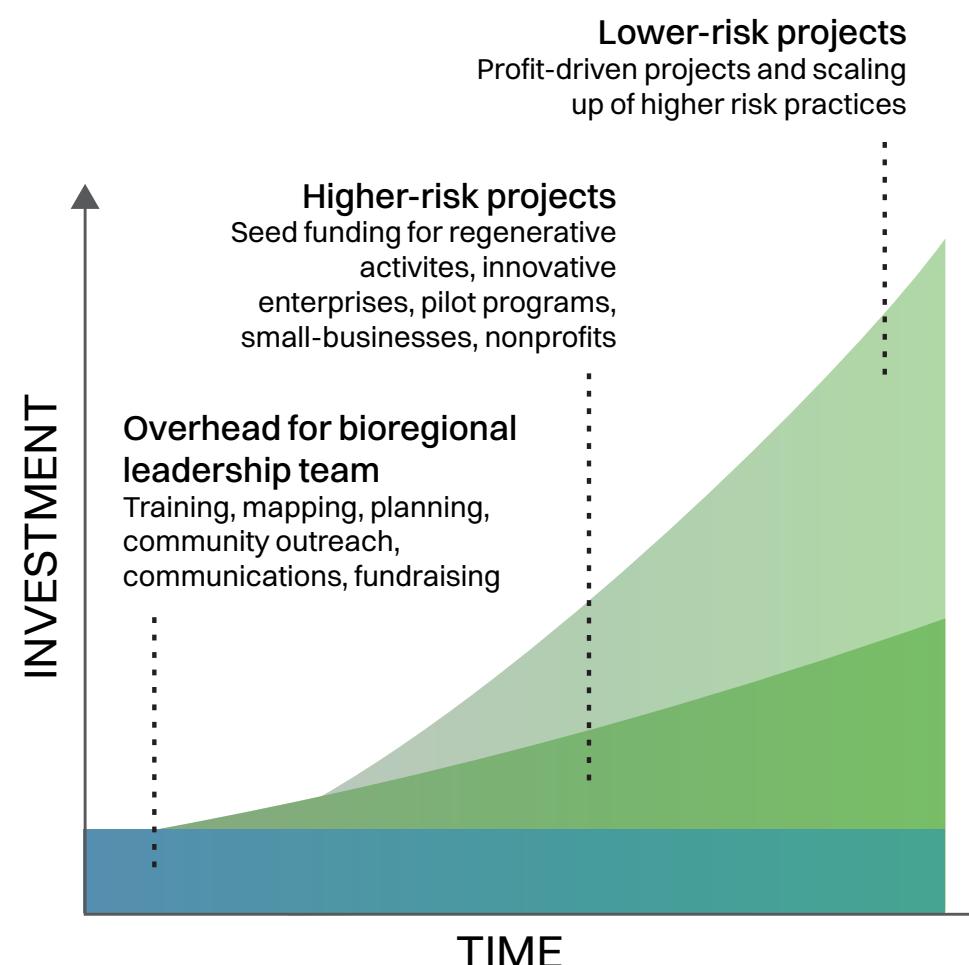
Bioregional finance goes beyond traditional investing approaches that focus on financial returns and instead focuses on generating four returns: inspiration, ecological, social, and financial/economic (see Commonland's [Four Returns](#) framework). It takes a multicapital approach that leverages various types of capitals to invest in regeneration. The initial phases of bioregional development require patient capital, where returns are measured over decades rather than quarterly, allowing for the development of a resilient and integrated system.

To attract funding for project implementation, bioregional organizing teams require stable and dignified support, particularly in the early stages. These organizers, weavers, and mappers play a critical role in navigating the complex landscape of opportunities and challenges, and creating a cohesive portfolio of investments.

It may be advisable to have a specific working group within the bioregional organizing team dedicated to developing a bioregional finance strategy to serve the realization of the Bioregional Regeneration Strategy. This can include the creation of [Bioregional Financing Facilities](#). For bioregions with the

means, many paid services, such as the [LandScale Assessment](#), [Hyphen.Earth](#), and [Landler](#) exist to generate credible ecological data, monitor progress, and identify priority areas for funding.

This is just a taste of a much vaster subject. Although mapping, planning, and financing can exist as a linear process, they should also be considered as an interactive cycle, with each process happening simultaneously, and the learnings constantly informing each other.



Reading on Bioregional Finance

- [Bioregional Financing Facilities: Reimagining Finance to Regenerate Our Planet](#) (Samantha Power & Leon Seefeld)
- The BioFi Project [website](#)
- [Financing Holistic Landscape Restoration in Europe](#) (Commonland)
- [Financing Holistic Landscape Restoration in LATAM & Caribbean](#) (Commonland)
- [Mobilizing finance across sectors and projects to achieve sustainable landscapes](#) (EcoAgriculture Partners)
- [Lessons Learned from Integrated Landscape Finance to advance the Global Biodiversity Framework](#) (EcoAgriculture Partners)
- [BioFin Catalog of Finance Solutions & Land Use Finance Tool](#) (BIOFIN)
- [Attracting Private Investments for Sustainable Landscapes: A Guide](#) (IDH)

4. Generative Frameworks

Several generative frameworks are of particular use for mapping and planning. These can also help to spark questions to inspire exploratory pathways for bioregional initiatives.

Complex Systems Thinking considers the dynamic interplay of relationships and influences that shape complex systems such as an ecosystem or human organizations. Rather than imposing fixed solutions, it emphasizes how humans can adapt to and co-evolve with these systems. Instead of examining components of a system in isolation, we can recognize that each component interacts with other components to create changing, emergent patterns. Rather than aiming to control or predict outcomes, complex systems thinking invites a participatory and iterative engagement with the living, changing nature of systems, recognizing that actions in one area can resonate across the whole. As an example, the [TransCap Initiative's Systemic Investing Model](#) uses systems thinking to drive deep, structural change by targeting financial leverage points within complex human and natural systems.

Multi-Capital Frameworks recognize and value different forms of capital beyond traditional financial capital. In recent years, a variety of multi-capital frameworks—often rooted in Indigenous worldviews—have emerged to challenge the view that money is the only form of value flowing through and around us. These frameworks offer new language to understand the diverse nature of value itself. While this guide doesn't endorse a specific framework, we draw inspiration from [Commonland's 4 Returns Framework](#) for its accessibility and proven success.

Participatory Design | For a mapping initiative to succeed, participants must feel welcomed, empowered and invested in the outcome. Tools, frameworks, and digital technologies should support a deeper social and participatory process that invites listening, collaboration, and trust building. Mapping efforts must go beyond merely inviting marginalized voices, and address barriers to participation for Indigenous and disadvantaged communities; allocating resources, such as through stipends or by covering costs, can support accessibility. Political and ideological diversity should be prioritized early, engaging voices across the spectrum to build broad support and avoid perceived biases. Historical maps, including those documenting injustices, offer valuable context for designing equitable, regenerative processes. Mapping can foster equity, trust, and collective vision when these elements are integrated. A trained, impartial facilitator is recommended for multi-stakeholder efforts.



Resources for Participatory Design

- The [Multi-Stakeholder Partnership MSP Tool Guide](#), a collection of tools and frameworks for navigating multi-stakeholder processes
- Frameworks for governing complex social processes: [Nonviolent Communication](#), [sociocracy](#), [holacracy](#), and [Convergent Facilitation](#)
- [Hylo](#), a “community-led, open-source coordination tool for purpose-driven groups.”
- [Polis](#), “a real-time system for gathering, analyzing and understanding what large groups of people think in their own words”.
- [RadicalxChange](#), a platform for participatory and pluralistic funding, voting and ownership

Living design | Ecological design is an adaptive, collaborative, and nonlinear process. Although planning typically follows mapping, it may reveal information gaps that require more mapping. Likewise, implementing a bioregional plan in the field can yield new information that will require modifying the plan. A map and plan should not be seen as fixed or final; rather, they are living resources informed by a participatory process that must be regularly updated - part of an ongoing process of bioregional regeneration that requires patience and commitment to align with ecological timelines: Commonland, a Dutch landscape regeneration nonprofit, works with 20-year timeframes!

Data scoping involves identifying key questions, determining relevant data, and understanding how it will be used. A common challenge in mapping is the overabundance of data—how do you decide what to prioritize? Not all questions can be effectively mapped with available data. To focus efforts, it is worth prioritizing which questions are worth mapping, which are feasible, what data layers are available, and which institutions may already have this data. Governments and universities, in particular, can be valuable collaborators in this process.

Granularity refers to the level of detail or scale of an approach. A bioregion’s size influences the degree of detail that can be mapped and the scope of interventions necessary. For instance, mapping for a large bioregion may focus on broader ecological patterns and large-scale land use practices. In a smaller bioregion, such as the Klamath River Basin in California, specific actions like dam removal and restoring salmon habitats are localized efforts within a clearly defined geographic boundary. Understanding the appropriate scale and granularity is key to ensuring that mapping and planning efforts are both relevant and effective.

The BioFi Project is a collective supporting bioregions to design, create, capitalize, implement, and evolve Bioregional Financing Facilities (BFFs) that connect financial resources with regenerators. We partner with bioregional organizing teams and Indigenous communities across North and South America and around the world to apply the BFF templates and capital raising and allocation approaches, as laid out in the book [Bioregional Financing Facilities: Reimagining Finance to Regenerate Our Planet](#) published in June 2024.

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