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Perspectives

Exploring Urban Bioregionalism: a synthesis of literature on urban nature and sustainable patterns of urban living

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Abstract *Urban residents in the developed world do not encounter and are not faced with decisions regarding the relationship between human action and human effect on the environment; they do not have to see the source of their comfort or the consequences of that comfort, downstream. This in turn has contributed to societal attitudes that have led to over consumption of natural resources and environmental degradation. This paper proposes an alternate path for sustainable urban development and retrofit, which takes into account human-environment connections. It is argued that utilizing bioregional ideals in urban areas can contribute to an epistemological shift in the human relationship to the environment and natural resources from the current condition.*



A synthesis of bioregional philosophy, ecological planning, and behavior change literatures is presented. These literatures, each within their own disciplinary boundaries, point toward similar conclusions regarding “sustainable” living. This synthesis of literature is presented as a model proposed to have potential to help move societal attitudes toward environmental understanding and environmentally responsible behaviors: urban bioregionalism. It is posited that retrofitting urban areas through the integration of nature and natural systems, while concurrently fostering active citizen participation through stewardship and community engagement, might deepen human-environment connections. This thereby might influence individual and society actions and consumption patterns.

This paper provides an overview of the literatures reviewed, including early regional planning, bioregional philosophy, ecological planning, and behavior change literatures. A graphical representation and description of this synthesis of literature is then introduced: a model of urban bioregionalism. The paper concludes with a discussion of the model, and potentials for integrating bioregional ideals into cities.

Simply adding nature to the city will not make all urban residents “environmentalists”. However, whether or not implementing urban bioregionalism influences a shift in society to a new epistemology and a new way of living and connecting with nature, utilizing this model could influence the livability of cities and their connectedness to the larger global ecosystem. In the face of crumbling infrastructure and regulatory obligations in cities in growth or decline, implementing bioregional ideals in urban areas has the potential to address human-environment connections in urban areas, that may ultimately lead to far more sustainable and resilient practices and patterns of urban living than the current condition.

Key words: Urban Design, Nature, Behavior Change, Sustainable Development, Bioregionalism, Policy Framework

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1. INTRODUCTION

Urban residents in the developed world have become both physically and cognitively disconnected from the environment and natural processes, partly as a result of issues of urban form and lifestyle choice (Hester, 2006; Orr, 1992; Shove, 2003). This physical separation of human and natural systems has sheltered urban residents from the consequences of their behavior for the environment, with a subsequent lack of general environmental knowledge and understanding of Earth's life-sustaining processes (Hester, 2006; Hough, 2004; Orr, 1992). This disconnection has been suggested to contribute to societal attitudes that have led to overconsumption of natural resources and degradation of the Earth (Carr, 2004; Nisbet & Zelenski, 2013; Rees & Wackernagel, 1996). The very form of the built environment has contributed to this separation. City development is embedded in infrastructures of concrete and pavement (Hough, 2004; Shove, 2003). In these environments, little attention is paid to smaller scale integration of nature and nature activities at the neighborhood and community level that might allow for frequent contact between humans and other species, and subsequent environmental learning and community building (Beatley, 2011; Hough, 2004; Newman & Dale, 2009).

Today, whether in growth or decline, cities are faced with regulatory obligations and crumbling infrastructure. These issues are compounded by the pressing need to address sustainable development and resilience in the face of uncertainty around climate change and the need for reduced oil use. Incremental urban restructuring of neighborhoods through planning and designing to the specifics of local ecology has the potential to restore a balance between urban areas and natural systems. Such planning and design would reconsider current patterns of neighborhood development and the public's relationship to urban greenspace that perpetuate the separation of human and natural systems.

Integrating nature and natural systems into the built environment while concurrently fostering active citizen participation in those and other natural systems has the

potential to bring about environmental awareness and community identity. This in turn might contribute to an overall environmental ethic, whereby people would understand local ecology and behave in ways that do not contribute to environmental degradation. Such an ethic might ultimately lead to sustainable and resilient patterns of urban living. A number of theoretical constructs provide frameworks for cultivating such an environmental ethic, including environmental education (Orr, 1992; Wals, 2007), experience in nature (Barlett, 2005; Gobster & Hull, 2000), active community engagement (Brulle, 2000; Light, 2003), ecological urban design (Hester, 2006; Newman & Jennings, 2008), and bioregional philosophy (Carr, 2004; Thayer, 2003).

Bioregional philosophy addresses both social and physical aspects of the human relationship to the environment, and as such is complemented by the literature related to behavioral change and ecological planning. This paper presents a synthesis of bioregional philosophy and supporting literature. These ideas are then assembled into a place-specific model of urban bioregionalism, which proposes an alternate path for sustainable urban development: *an incremental transition to a new way for people to live and connect with nature*. In the subsequent sections I first present an overview of the literature reviewed. I then introduce a graphical representation and description of this synthesis of literature: a model of urban bioregionalism. I conclude with a discussion of the model, and the potential for integrating bioregional ideals into cities.

2. A SHIFT IN WORLDVIEW – BIOREGIONAL PHILOSOPHY, ECOLOGICAL PLANNING, AND ACTIVITY IN NATURE

Bioregional philosophy of today is, in part, a reaction against globalization and capitalism, which are thought to contribute to the creation of generic, highly consumptive human settlements, with poor regard for environmental consequences. Industrialization and rapid urban growth caused similar concerns in the early 1900s, giving rise to forerunners to bioregional philosophy that sought to alleviate the ills perceived to be caused by industrialization: overcrowded cities cut off from the natural world and working landscapes, due to rapid urbanization of the countryside (Geddes, 1915; Luccarelli, 1995; MacKaye, 1928; Mumford, 1938, 1961; Weaver, 1984; Welter, 2002). Many of the ideas put forth by Geddes, Mumford, MacKaye, and then advocated by the Regional Planning Association of America, can be seen in aspects of bioregional thinking today.

Regionalist visionaries of this time sought replanning primarily through decentralized and self-sufficient Garden Cities. Decentralization was seen as a means to increase quality of life for the entire region, while preserving natural resources and farmland both to contain the spread of cities and to provide urban residents opportunities to connect with nature (Anderson 2002; MacKaye, 1928; Mumford, 1961). Regionalist solutions to industrial urban expansion also entailed civic education. Through Geddes' and Mumford's proposed regional surveys, citizens would learn about the region's history, culture, en-

vironment, natural resources, jobs, and people (Geddes, 1915; Mumford, 1938). It was posited that such surveys could cultivate deep personal knowledge of one's local environment that would develop into a "regional consciousness" (Weaver 1984), equipping the citizenry to plan for the renewal of urban areas, in connection with their regions, in an ecologically sound manner (Mumford, 1938; Weaver, 1984).

Despite the efforts of voices like Mumford and the Regional Planning Association of America, urban sprawl did not end in the 1920s. Technologies that had been seen as a way to slow urban growth through decentralization of cities, such as automobiles and the electricity grid, actually enabled further urban growth into the countryside with little regard to regional or environmental context (Sheller & Urry, 2000; Yaro, 2011). As a reaction to the perceived ill effects of globalization and urbanization, bioregionalism emerged in the 1970s in Northern California as a grassroots social change movement.

With its foundation rooted in ideas of political decentralization (Dodge, 1981; Taylor, 2000), bioregional philosophy propounds that people should live in balance with the environment, other people, and non-human life, within the carrying capacity of naturally or culturally bounded regions (bioregions) (Dodge, 1981; Sale, 2001; Taylor, 2000). It seeks to create and sustain communities of stewards that are intrinsically part of their local land; entails a holistic view of complex systems that include aspects of social, political, economic, ecological, environmental, physical, spatial, and spiritual realms; and suggests that sustainability can be achieved through promoting active participation and collaboration in creating a sense of place, an understanding of place, and a culture and politics of place. This would be accomplished through changes in urban form that responds to, restores, and maintains local ecology, and through local residents committing holistically to the local environment and community (Carr, 2004; Thayer, 2003).

At its core, bioregional philosophy attempts to strengthen the human relationship to nature and the environment. An urban rendition of this philosophy includes the visible and functional celebration of human interactions with nature. Ecological planning strategies such as food production, energy production, rainwater harvesting, waste water filtration, waste assimilation, and nutrient recycling would be integrated into local urban infrastructure. In a bioregional sense, this is place-based planning, whereby communities are planned and designed to the specifics of local ecology. Issues related to local ecological processes would be brought to the forefront of community design priorities (e.g. daylighting creeks, utilizing stormwater bioswales¹, integrating renewable energy in a visible manner), and the underlying ecology, geography, and geology of a community would be studied prior to design and planning. The results would be integrated into all subsequent

plans and designs that reflect the city as part of larger ecosystems (Hough, 2004; McHarg, 1969; Newman & Jennings, 2008).

The integration of natural systems into the built environment (e.g. stormwater bioswales, urban tree canopy), or "greening", is generally seen as being both ecologically beneficial (De Ridder *et al.*, 2004; Foster *et al.*, 2011) and beneficial to human health (Kaplan, 1995; Louv, 2005). An additional benefit could be in its potential to cultivate human connection to nature. Some scholars contend that nature as part of daily life has the potential to build awareness of nature and natural processes, which might eventually translate to a love of nature and a desire to protect both the local and global environment (Jordan III, 2000; Platt, 2004; Spirn, 1988).

Such local environmental awareness is one aspect of bioregionalist tenet that people should "reinhabit" their bioregions. In bioregional philosophy, citizens would have knowledge of the surrounding region's culture, people, the environment, and non-human life (Aberley, 1993; Sale, 1985a; Thayer, 2003). Moreover, residents would know where resources such as drinking water, food, and electricity originate (Hester, 2006; Orr, 1994). McGinnis *et al.* (1999), like others, write of restoring awareness of human-environment connectedness (Jordan III, 2000; Laird *et al.*, 2014; Light, 2010). McGinnis *et al.* emphasize the importance of being actively involved in environmental restoration toward restoring this cognitive connection. Indeed, hands-on activity as a means for gaining local environmental knowledge has been shown to be important in the development of an environmental ethic (Glasser, 2007; Orr, 1994; Thayer, 2003), environmental understanding, and opportunities for social learning (and social cohesion) (Krasny & Tidball, 2012; Andersson *et al.*, 2014).

Research on environmentally responsible behavior change also suggests that hands-on involvement can influence attitudes and behaviors. For example, repeated experience in nature, preferably through active engagement in nature activities, can foster a sense of place and environmental understanding (Chawla, 1998; Vaske & Kobrin, 2001). This finding is consistent with some learning theorists' contention that direct and repeated experience is transformative (Jarvis, 2009; Kolb, 1984; Mezirow, 1997). Moreover, there is a group of behavior change theorists and researchers that view a method of changing behavior as a process of empowerment, motivation, and satisfaction. This is a people-centered approach to behavior change in which the intrinsic wellbeing of the whole person is considered. Models like Kaplan's *Reasonable Person Model* (Kaplan, 2000) and De Young's (2000) model based on "*intrinsic satisfaction*" suggest that progress toward environmentally responsible behavior can be achieved through policies that focus on personal motivation rather than targeting individual behaviors. Their models tell us that humans want to learn, understand, and contribute to their community in meaningful ways.

Overall, there are similarities within the literature of these fields of study that point to opportunities for experiences

¹ Stormwater bioswales as defined by the U.S. Environmental Protection Agency are vegetated planters deliberately designed to gather, filter and percolate stormwater runoff. See http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm#bioswales. Creek daylighting entails uncovering and restoring previously buried waterways like streams or rivers. See http://www.rmi.org/Knowledge-Center/Library/W00-32_DaylightingNewLifeBuriedStreams.

in nature as a way to cultivate place attachment and local environmental learning. Retrofitting cities through the integration of natural systems could be a way to restore a balance between the urban and natural environment, with the potential to shape the broader public's perceptions of nature, natural systems, and individual and societal consumption patterns (Hester, 2006; Thayer, 2003).

Bioregional thinking necessitates a shift in worldview and values, constituting a transformation of the norms of society and the policies and institutions that shape daily life. Therefore, the application of bioregional philosophy to planning and city building faces philosophical and practical challenges. Philosophically, bioregionalism applied to cities would be a compromise to the full bioregional vision. Moreover, natural systems and ecological cycles cannot sustain the population densities typical of urban areas. Practically, urban bioregionalism would require a transformation in the way planners design, build, and use urban infrastructure such as roads, sewers, power production, and the distribution of open spaces and trees. Professional and bureaucratic inertia make change difficult. In Section 4, I propose a framework under which urban bioregionalism has the potential to work through these difficulties through incremental change. In Section 3, I first discuss variants and critiques of this type of urban planning and design.

3. VARIANTS AND CRITIQUES

Urban bioregionalism is only one community and regional vision among many. Currently, the dominant planning model perpetuates the status quo of building housing subdivisions on farmland or forestland, thereby increasing the land area of a given jurisdiction as well as perceived housing choice and affordability. Even this type of urban form can be built in a more ecological manner (Milder, 2007; Odell *et al.*, 2003), regardless of whether ecologically sensitive design built on the periphery of a city is an appropriate use of land. Beyond the status quo, within the realm of "sustainability", the planning and design of some cities has shifted toward a conversation that speaks to livability while simultaneously reducing greenhouse gas emissions, and planning for change in existing cities within existing infrastructures. This more progressive, yet mainstream, means of planning is put forth as "sustainability planning". It focuses primarily upon reducing automobile use through land use and transportation changes utilizing a higher density and compact development approach (Ewing *et al.*, 2007; Newman and Kenworthy, 1999; Senbel *et al.*, 2014).

The greening of cities, already discussed as being part of bioregional philosophy, has long been a part of different utopian visions of the city, such as the integration of large parks like New York's Central Park in the heart of the city, Corbusier's "Towers in the Park", or Howard's Garden City which would have developed new towns surrounded by a hinterland of agriculture, forest, and waterways. Some scholars still advocate such development; that is,

communities surrounded by swaths of green corridors (Hester, 2006; Register, 2006). Other approaches, such as urban ecological design and landscape urbanism, emphasize the need to consider the particular local ecology within a city infrastructure modeled on natural systems (McHarg, 1969; Mostafavi, 2010; Newman & Jennings, 2008; Steiner, 2011). However, there is some concern that in this type of planning the environment takes precedence over the social aspects of the city (Beatley & Manning, 1997; Talen, 2010). This concern could also be attributed to bioregional philosophy due to its emphasis on carrying capacity, designing with nature, and bioregionalists' belief in the intrinsic value of nature. Although the environment and natural systems may be the foundation for urban planning and design, one does not need to be a barrier to the other if both are taken into consideration. Indeed, social equity and empowerment is a concern of bioregional philosophy (Aberley, 1993; Dodge, 1981).

In general, critiques of bioregional philosophy revolve around its all-encompassing and radical vision for societal transformation, which ignores power dynamics, equitable distribution of natural resources within bioregions, and the reality of globalization as an economic and powerful contemporary force (Hahnel, 2007; McGinnis, 1999; Taylor, 2000). Of further concern is the assumption that decentralized, self-ruled communities would be altruistic (*e.g.* collaborative rather than competitive, or living within a bioregion's carrying capacity rather than degrading the local environment) (Alexander, 1990; Taylor, 2000). My model of urban bioregionalism, on the other hand, focuses upon a subset of the full bioregional vision and accepts the viability of "bioregional" policy from above in addition to policy conceived by citizens themselves. Therefore, the model is intended to be flexible and to adapt to the unpredictable outcomes of democratic processes and human relationships.

4. URBAN BIOREGIONALISM – AN ALTERNATIVE FRAMEWORK FOR SUSTAINABLE URBAN DEVELOPMENT AND RETROFIT

I developed the model of urban bioregionalism as a conceptual framework for my synthesis of bioregional philosophy and supporting literature. It is a model of incremental change toward sustainable urban development and retrofit intended to introduce elements of bioregionalism into existing cities (Figure 1). The model integrates three overarching realms: 1—the democratic process, 2—public discourse, and 3—the physical environment of the city; as well as three factors that influence incremental change toward urban bioregionalism: 1—municipal policies, 2—neighborhood-oriented stewardship, and 3—individual actions.

The model proposes an iterative process for incremental change toward a transformed relationship between humans and nature through new ways of living and connecting with nature. Through changes to the physical environment of

the city, through social practices of neighborhood-oriented stewardship that take place in the physical realm, and through the actions of individuals, urban bioregionalism implements and fosters bioregional ideals of sense of place and community, ecological awareness, active participation, stewardship, visible natural systems, and nature in cities.

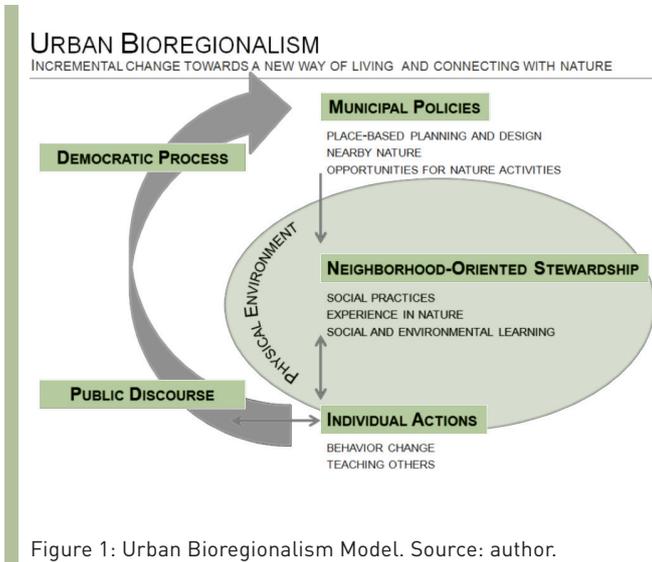


Figure 1: Urban Bioregionalism Model. Source: author.

4.1 MUNICIPAL POLICIES

Municipal policies, plans, and programs are put in place in order to apply principles of urban bioregionalism; and also to ensure allocation of resources for further bioregional policies, plans, and programs, thus enabling continued legislation and implementation of bioregional urbanism over time. These policies shape the incremental changes necessary for creating sustainable and resilient cities. In this model, specific policies are centered on urban planning and design applications and interventions consistent with local ecology and climate (e.g. creek daylighting).

Policies that reflect urban bioregionalism would provide opportunities for nature activities through the support or implementation of municipal programs and partnerships (community gardens, backyard habitats, tree planting, ongoing nature maintenance and restoration). Municipal policies may be those that implement specific bioregional-like projects, but would also influence the internal workings and planning goals of the municipality as a whole (e.g. integrating watershed health goals into city-wide decision making).

4.2 PHYSICAL ENVIRONMENT (URBAN FORM)

Policies, plans, and programs that incorporate ecological design principles influence the physical environment and form of the city. For example, programs that daylight creeks or implement bioswale technology within the infrastructure of streets shape the form of the city by uncovering natural processes previously hidden by engineering-based solutions. In another example, the implementation

of habitat connections, greenways, and neighborhood proximity to parks and natural areas could shift the function and perception of the city to one shaped by networks of nature. Building codes would also require architectural responses that substitute mechanical systems with more passive systems (e.g. solar orientation) and ecologically driven wastewater treatment and rainwater harvesting. Everything from composting food and yard waste, water conservation, harvesting, filtration, and the creation of micro-climates and habitat corridors can be prioritized to heighten residents' connection to local and regional nature and natural systems. Over time, such incremental changes have the potential for a cumulative impact on the physical shape of the city, regional and ecological connections, and urban residents' perceptions of how their own personal choices influence the broader environment and ecosystem.

4.3 NEIGHBORHOOD-ORIENTED STEWARDSHIP

The importance of daily activities in shaping people's experiences requires that urban bioregionalism be focused on the local scale of the neighborhood, the community. The physical realm of the local environment is the backdrop for lived experiences. This is where neighborhood-oriented stewardship takes place; that is, opportunities for stewardship and experience in nature could occur in the spaces and places of everyday life.

Neighborhood-oriented stewardship can vary, for example, from the restoration of a beloved park by a group of people, to people stewarding their own backyards through the cultivation of wildlife habitat or food for personal consumption. It could occur through community gardening, or the maintenance of a rain garden. It is through the social practices of *neighborhood-oriented stewardship* that community identity and place and community attachment can be fostered. The physical environment at the local scale is where active participation and stewardship occurs, daily experience in nature occurs, and regular experience with others occurs. Through these experiences, it is also where social and environmental learning occurs.

4.4 INDIVIDUAL ACTIONS

Individual actions can be influenced through reflective and transformative learning processes during or following neighborhood-oriented stewardship activities, or by public discourse. Community members can then themselves influence public discourse by sharing information learned through personal activity (e.g. teaching others how to grow their own food). The bioregional urbanism model is not linear. For example, it includes a two-way arrow to show a relationship between neighborhood-oriented stewardship and individual actions. It could be that through listening to others speak about (or reading about) declining biodiversity, for example, a person might decide to cultivate a backyard habitat for birds. In another example, someone

who volunteered to pull invasive ivy in a park due to a work obligation might then return to help on their own time; might tell others about the value of pulling ivy for the health of the park; or might pull ivy in their own backyard. Such actions contribute to the environmental learning of others while influencing personal behaviors within their own daily lives.

Table 2, derived from original research by the author², is one example of how the model might be used to understand the influence of municipal policies, programs, urban form, dialogue, and stewardship activities on community members' sense of place, local environmental knowledge, and connection to nature.

² (Church, 2013)

Table 2: Research analysis matrix using the urban bioregionalism model.

Urban Bioregionalism Model - analysis results	
Model Components	Outcomes
Municipal Policies	
Programs that emphasize important and special natural landmarks within urban boundaries.	Place identity; stewardship opportunities; place-based urban design; learning opportunities.
Sustainable stormwater management policies (bioswales, rain gardens, tree canopy).	Access to nature; experience in nature; learning opportunities
Planning policies that emphasize the integration of and access to nature in urban areas.	Access to nature; experience in nature.
Stewardship programs (restoration groups, Backyard Habitat certification).	Stewardship opportunities.
Physical Environment	
Multiple scales of nature (from rain gardens and street trees, to regional parks).	Place attachment; connection to nature.
Nature integrated into the built environment.	Place attachment; access to nature; connection to nature; place identity; place-based urban design.
Passive learning through informational signs.	Local environmental learning.
Neighborhood-oriented Stewardship	
Stewardship.	Place-specific understanding; local environmental learning; place attachment; connection to nature; social practices.
Experience in nature of multiple scales.	Access to nature; experience in nature; place attachment; connection to nature.
Individual Actions	
Observation and reflection.	Local environmental learning; connection to nature.
Stewardship.	Local environmental ethic; social practices.
Teaching others.	Local environmental ethic; social practices.
Public Discourse	
Passive learning through reading or conversation.	Local environmental learning; place identity.

5. POSITIONING URBAN BIOREGIONALISM WITHIN BIOREGIONAL PHILOSOPHY

The urban bioregionalism model presented in Section 4 proposes an alternate path for sustainable urban development that addresses human-environment connections, with the aim of achieving a gradual transition to bioregional ideals in urban areas. The model breaks from the traditional view of bioregional philosophy, which envisions a grand scheme

that would culminate in a holistic transformation of society, reinventing political borders and governance structures to those that are localized and governed through local control. Rather, the proposed model builds upon a core concern of bioregional philosophy: an epistemological shift in the human relationship to the environment. Bioregionalists contend that human settlements should be built to respond to and reflect the local environment, and that community members should understand their local ecology, history, and culture.



This model reflects these contentions through incremental implementation of bioregional principles into existing urban areas, with concurrent efforts toward environmental education and stewardship opportunities.

Bioregional philosophy posits that communities should be decentralized, governed by self-rule, and distributed within the natural boundaries of a region. A consequence of this emphasis on a holistic shift in governance structure and spatial distribution is that there has been less attention to the implementation of bioregional principles in urban areas. There is, however, general sentiment amongst bioregionalists, and others, that cities cannot be ignored, as the majority of the world's population lives in urban areas, and are large consumers of local and global resources (Berg, 1991; Carr, 2004; McGinnis *et al.*, 1999; Rees & Wackernagel, 1996; Register, 2006; Sale, 1985b; Sassen, 2009). For example, Register advocates for efforts that would transition existing cities into "ecocities", or "city-islands in a sea of biodiversity" (Register, 2006: 37). Register is an incrementalist who advocates for change within the existing system through the use of planning tools like ecocity zoning, transfer of development rights, and ecological general plans. He also encourages urban residents to involve themselves in activities that would encourage such a transformation. Berg *et al.* (1989) offer a similar approach through their Green City Program. This program introduced nine elements of a "green city": *urban planting, sustainable planning, renewable energy, neighborhood character and empowerment, recycling and reuse, celebrating life-place vitality, urban wild habitat, and socially responsible small business cooperatives*. Each element includes policy and program recommendations intended to be implemented immediately through existing systems (*e.g.* allowing for native vegetation in mow strips through zoning code changes), as well as over the long term (*e.g.* daylighting piped creeks, creating wildlife habitat corridors). In another example, Todd and Tukul (Todd & Tukul, 1981; Tukul, 1982) propose that bioregional changes occur through retrofit cities, utilizing principles of ecological design such as solar orientation, soil rebuilding, and urban agriculture, within a long-term comprehensive vision (Carr, 2004: 196-7). Further, like most bioregionalists, they recognize that cultural identity must also change to one where humans are part of, rather than separate from, nature.

Indeed, Carr states, "*Reinhabitation in cities confronts the daunting triple challenge of transforming the consciousness and behaviour of large numbers of urban residents, the necessity of implementing institutional/structural change, and the need for physical transformation of built environments*" (Carr, 2004: 196). The urban bioregionalism model engages each of these challenges and complements practical efforts, like Register's, Berg's, Tukul's, and Todd's, toward the implementation of bioregional principles into urban areas. The strength of the model is that it shows potential interrelations between public discourse, the democratic process, municipal policies, urban form, and urban residents. Register's ecocity zoning, Berg's Green City Program, or Todd and Tukul's ecological design principles, are policy actions that would fit neatly into the

municipal policy realm of the model. A benefit of the model, however, is that it then shows how such policies might intersect with neighborhoods and neighborhood residents. The model illustrates how ecological design principles, for example, might influence the shape of the city and how they might influence the people who reside there. This model is intended as a means of conceptualizing how urban form, policy, and dialogue work together to influence a shift in the human relationship to the environment.

6. CONCLUSION

Urban residents in the developed world are disconnected from the environment and natural processes, which has been posited as a driver for overconsumption of natural resources and environmental degradation. Bioregional philosophy provides one way in which to address new ways of living and connecting with nature; however, this philosophy has been too uncompromising in its ideals to be implemented holistically, particularly in urban areas. The framework of urban bioregionalism proposed in this paper seeks to address a reconnection between urban dwellers and natural processes.

Urban bioregionalism draws on catalytic principles of change to create a pragmatic framework for implementing bioregionalism into existing cities, and underscores the importance of designing to the specifics of local environmental conditions. It also encourages human access to nature and natural systems and opportunities for engagement with nature both individually and within the community. Furthermore, it offers a framework for policy analysis and implementation of bioregional ideals in urban areas that addresses relationships between the built environment, nature, and urban residents. Although the model may seem simplistic in terms of the realities of municipal planning, politics, and economics, it can provide an avenue for planners and decision makers to consider human-environment connections as part of policy-making and program development. The potential of incremental changes to urban areas can be seen through the cumulative impact of bioregional projects such as ecological restoration, nature as an infrastructural backbone, and other bioregional policies, together with the commitment toward an open dialogue and an informed and active populace.

There are some limitations to urban bioregionalism, including the social and political realities of retrofitting the existing built environment. However, the integration of small-scale nature could be achieved through increasing the tree canopy, increasing access to urban nature, or through the integration of sustainable stormwater infrastructure. Other opportunities to incorporate urban nature might include infill development or de-development, the incorporation of native vegetation in planting strips or yards, the naturalization of institutional spaces such as churches or schools, restoration of waterways, or changing the form of streets and alleyways into greenways. These sorts of interventions could be implemented in any context – urban, rural, industrialized, and industrializing – and are important components of sustainable and resilient systems, and livability of urban areas (Newman & Jennings,

2008; Novotny *et al.*, 2010; Standish *et al.*, 2013). Encouraging or developing urban ecological stewardship programs, from backyards to large urban natural areas, is another way to engage urban residents in nature activities. Moreover, the development of key messages and educational programs surrounding special natural attributes in the local urban environment might create a dialogue of pride, understanding, and ownership.

Simply adding nature to the city will not make all urban residents “environmentalists”. There are subtle interconnections, of which education and open dialogue are important. Whether or not implementing urban bioregionalism influences a shift in society to a new epistemology and a new way of living and connecting with nature, utilizing this model could influence the livability of cities and their connectedness to the larger global ecosystem. Planners and policy makers have a responsibility to improve the lives of all people and all communities, and to influence the betterment of the environment as a whole. This can be done incrementally within the existing economic and political system if there is the will to do so. There are many publications that outline the benefits of a place-based, ecological city, including ecological health and the well-being of urban residents. There is much to gain from a shift in policy that embraces, rather than ignores, nature.

Box 1: Municipal Policies – examples in Portland, Oregon

While not conceived within a framework of bioregionalism, Portland, Oregon has implemented multiple policies and programs that, in essence, incorporate bioregional ideals as represented in the urban bioregionalism model. Three examples that relate to the “Municipal Policies” realm of the model are outlined below. These policies and programs enable changes to the physical environment, and provide opportunities for neighborhood-oriented stewardship and subsequent possibilities for individual actions such as changes in behavior or teaching others.

Tabor to the River program

Portland’s Tabor to the River (T2R) program (City of Portland, 2009; Shandas *et al.*, 2010) is a localized, multi-faceted solution to better management of stormwater runoff. It entailed the repair and replacement of 81,000 feet of aging sewer pipes in conjunction with increased vegetation solutions, within a framework of community engagement and education. T2R relies primarily on incorporating “Green Street” facilities into existing streets and sidewalks. Essentially, these are “bioswales”¹: they are vegetated planters deliberately designed to gather, filter and percolate stormwater runoff. T2R subprograms focus on the incorporation and reintegration of vegetation

1 See http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm#bioswales

and natural habitat into the urban environment, through private property rain gardens and ecoroofs, increased urban tree canopy, and the restoration of existing natural areas such as Mount Tabor Park. The projects administered through T2R incorporate both social and physical elements of the urban bioregionalism model, *e.g.* the retrofit of urban neighborhoods that integrate natural systems, the restoration of existing natural systems and habitat, and the emphasis on community involvement in such programs, combined with opportunities for environmental learning. T2R incorporates multiple scales and types of nature, which subsequently enables multiple ways for residents to be actively involved in stewardship and nature activities. Such activities include those explicit to the program (sustainable stormwater infrastructure, natural area restoration) and those that might occur in any neighborhood (tree planting, gardening, spending time in a park).

Portland Plan

The City of Portland’s comprehensive plan² structures all policy strategies and goals through an equity framework. Goals related to urban bioregionalism are found within the Healthy Connected City strategy, including linking “complete neighborhood centers by a network of city greenways” and integrating “nature into neighborhoods”. Specific goals include ensuring that, by 2035, 100% of Portland residents live within a half-mile, or ten minute walk, to a park or natural area. This would be achieved through the expansion of networked greenspaces of habitat corridors and neighborhood greenways. Further objectives include improvements to the Willamette River watershed, increased and evenly distributed tree canopy, protection and connection of a diversity of critical habitats, and preservation of “high quality trees”.

Metropolitan Greenspaces Master Plan and Portland Parks Plan

Metro’s 1992 *Metropolitan Greenspaces Master Plan*³ aims to protect and restore natural areas and wildlife habitat in their tri-county governance area located in the Portland region. It also seeks to provide natural recreation within the region in order for residents to enjoy natural areas locally rather than traveling to do so. The City of Portland’s Parks 2020 Vision Plan⁴, adopted in 2001, echoes some of the goals set out in Metro’s plan such as protecting and restoring urban nature, creating an interconnected trail system within the city and into the region, and ensuring access to nature for all Portland residents.

2 See <http://www.portlandonline.com/portlandplan/>

3 See <http://www.oregonmetro.gov/metropolitan-greenspaces-master-plan>

4 See <http://www.portlandoregon.gov/parks/40182>

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