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CITY AS CHANGE:
COLLABORATIONS FOR SUSTAINABLE URBAN LIFE

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Accelerating climate change, rising ocean levels, decline of fossil oil and water reserves, are all forcing us to rethink urban areas—new solutions and collaborations are needed to adapt or re-create cities in response to these challenges. Only in the last decade through new technology have scientists become able to calculate and map the global resource base and communicate those findings to an increasingly networked world. Drawing on this new scientific data, three collaborators, an architect/urban designer, a planner/community organizer and an archaeologist/environmental historian/environmental scientist began researching the past and futures of cities from a bioregional perspective. To expand our ideas through a thought-experiment, our group submitted a proposal to the Institute of Advanced Architecture of Catalonia (IaaC) for their 2009 self-sufficient city competition. As a research team, we were asking: How can human populations live sustainably with(in) ecosystems? Could the Boston population be(come) self-sufficient? The IaaC competition provided the team with an opportunity to test out ideas with each other and to collaborate across our disciplines to explore solutions. We conceived the idea of 'city as change' to represent the idea that a static plan or set of solutions will not lead to a more sustainable future, and has not historically. Instead, we felt the need to establish processes for change that could lead to the desired outcomes. The first section of this paper, looking at the evolution of Boston, the history of urban policy, planning and related environmental and social movements–informed our response. Our final section draws on our thought experiment for the IAAC as well as subsequent research to look at thoughts on the topic of bioregional urbanism.

Many definitions of bioregionalism exist. For this introduction we will use a more formal understanding of bioregionalism as it is understood today, rather than as it was expressed historically. Aberley provides a useful and apt description of the formal concept: "Bioregionalism is a body of thought and related practice that has evolved in response to the challenge of reconnecting socially-just human cultures in a sustainable manner to the region-scale ecosystems in which they are irrevocably embedded." This definition reveals shared principles between bioregionalism and environmental justice; fundamentally, they both assert that relationships between place, environmental health, and human justice are inexorably linked. Additionally, we would argue that this definition indicates that bioregionalism is, or could be, a just sustainable development model. Part two of this paper looks at this through bioregional urbanism. Bioregional Urbanism intends to bring balance between anthropocentric and biocentric concerns into standard urban design and economic practice. Before moving into bioregionalism and its history, however, let's look more at the development of Boston.

PART ONE: HISTORIES OF CHANGE AND BIOREGIONALISM

Only by understanding the past and how historical continuities set the stage for the present day can we begin to develop effective strategies and policies for change. In drawing on environmental history among other fields as part of developing policies and strategies for change, the potential

exists for disciplinary differences in what is considered the appropriate role of researchers of the past with regard to present changes. For example, the American Society for Environmental History has weighed the issue of specific knowledge in relation to advocacy and states insightfully:

> *So, for example, it might be reasonable for the Society of Herpetologists to take a position on amphibian declines, because all herpetologists share a common training that gives them expertise in amphibians. An individual ASEH member might have spent years studying the history of amphibian declines, and she too might be equally qualified professionally to take a position. But historians as a whole cannot claim such expertise and if ASEH took a position as a professional society, the general public might rightly wonder what gives historians any credibility to advocate for one position or another. (ASEH 2007)*

As this quote implies, specific knowledge is essential for making the transition from history to plans, proposals or advocacy. Following that model, this paper draws on the specific knowledge that the three researchers bring to the table and the larger picture of the environmental history of Boston to begin to look at developing sustainable bioregionally focused strategies for urban life.

Historical Continuities informing Collaborative Solutions

City as change begins with the history of the city as the historical continuities inform and underlie the present day along with the current ecological and social aspects of the city. Looking at the past also reminds us that even though in an individual's lifetime the status quo might appear to dominate, over longer spans of time, the city itself does change. Policy plans are strengthened by being considered within their historical contexts so this portion of the paper also serves to inform and ground in place and time the bioregional urbanism second portion of the paper. In his seminal essay "A Place for Stories," Cronon reminds environmental historians that how we organize and present facts impacts the messages that audiences receive (1992). Organizing any history of the evolution of the configuration of the city informed by environmental and social movements means selecting certain events and not others that may be equally important to understanding the present. This section of the paper will include three themes— the economic development of the city, changing spatial relationships between humans and ecosystems over time, and the history of bioregional thinking in Boston and beyond.

Economic Development of the City

A complete environmental history of the city of Boston, would need to begin with the last glaciation and the arrival of Massachusett, Wampanoag, Ponkapoag, and other communities of Native Americans whose descendants were eventually displaced and re-incorporated into the modern city of Boston. The history of land transfers allows us to follow the axis of land ownership from the dispossession of Native peoples and individuals' eventual incorporation into free communities of color in Boston and surrounding towns to the growth and expansion of the city of Boston. Numerous scholarly works have looked at the growth of the new town often at the expense of its former high places and low wetlands (Whitehill and Kennedy 2001 [1975]; Seasholes 2003; Penna and Wright 2009; Rawson 2009) and at the expansion of the city over time to its current extent (Warner 1978; Kennedy 1992; O'Connor 1993 among others). This section will expand briefly some of this earlier history of land use change in Boston before moving on to discuss specific moments of change related to the economic development of the city. The following section will look in greater depth at spatial relationships between humans and ecosystems including the development of park systems and urban cultivation.

The broad trajectory of land transfers in Boston begins with actions removing land from Native American traditional owners and conferring those lands to small holder colonists followed a few

centuries later by aggregation of land in downtown Boston in the hands of fewer property owners. Changing cultural values toward land and its "highest and best uses" as well as perceptions of the "value" of land underlie many of these changes. Methods of valuing land are central to the form of human settlements. These have historically been entirely anthropocentric and driven by monetary price dynamics. Seed (2001) and Cronon (1983) among other scholars contrast English "fee-simple" cultural perceptions of land ownership with Native New England "usufruct" values. Stein (2007) argues that perceptions and constructions of Native peoples as cultivators or non-cultivators also played a significant role in English attempts to dispossess Native individuals. Following dispossession and the horrors of King Philip's War, Native peoples do not entirely leave Boston but settle in free communities of color on the outskirts of the city or in marginal areas of neighboring towns like Cambridge. Former Native lands were distributed to Boston colonists who used the land for a variety of purposes, cultivation early on, with housing and businesses increasingly dominating the landscape by the 1700s onwards. Popular culture explanations often maintain that land in New England was converted to houses because it was not high quality farmland. Bell (1996) looks at crop yields among other data sources and argues in contrast that it was the high value of land and particularly urban land in the 1800s onwards that has led to residential or business development replacing what had been productive farmland in earlier generations.

The 1800s were a century of residential and business expansion in Boston with some industrial construction near the end of the century. Both in the city center and in what historian Sam Bass Warner (1972) has memorably called the "streetcar suburbs," apartments and free standing houses were built throughout the 1800s including areas that were historically separate towns like Roxbury but that are today neighborhoods of Boston. Rawson (2009:32) observes that "between 1790 and 1810 the population of Boston almost doubled to 34,000" and had reached 590,000 by 2006 (US Census). Many of the areas converted to housing had been either wetlands, underwater or the urban agricultural lands of earlier generations, leading to the fragmentation or outright destruction of earlier ecosystems within the city.

In the twentieth century, the residential expansion of the previous century, particularly housing associated with working class, immigrants, and communities of color comes to be viewed as less desirable by those in power. Not just in Boston, but across the country cities responded to the US Housing Act of 1949 and subsequent federal legislation that encouraged the destruction of so called "blighted" areas that were often the home to vibrant communities (Kennedy 1992:159). The classic example in Boston was the former West End, once a highly diverse low income community with affordable rents (Gans 1962), razed in the 1950s to build housing for the wealthy, the expensive "Charles Park" towers near North Station that were not completed until the 1990s (Kennedy 1992:166; Warner 1987). The expulsion of residents from the West End directly influenced future community protests as many activists were displaced as children with their families and inspired by those negative experiences including African- American community activist Mel King (O'Connor 1993: 124).

There is no question that class and race both played roles in decisions by those in power as to which neighborhoods to target for urban renewal. A former West End resident, Zerendow is quoted by Anderson (1987: 14ff) as saying that the area was targeted for urban renewal early on because it was composed of "unorganized, uneducated immigrants and was easy pickin's." The majority of residents displaced by the Southwest Expressway Project that will be discussed at the end of this section were again immigrants or African-American residents of Jamaica Plain. Avoiding placing additional burdens on disadvantaged communities is essential for any future urban change projects.

Of particular concern over time for both community activists and for developers seeking to consolidate urban parcels is the trend toward over-scaled developments. These are parcels previously occupied by multiple small holders often including mixed uses of a block such as stores or restaurants with apartments above and free standing residences, that are consolidated in the hands of a single land owner either through outright purchase or eminent domain. Previous mixed use

structures are destroyed and a single large new building is then put in place that although it may duplicate some of the features of the original buildings is usually not intended to serve the full range of economic users who may previously have lived or occupied the neighborhood with the focus instead shifting to the wealthy or powerful. Needless to say, community activists rarely accept the imposition of over-scaled development without a fight, and following are examples where development proceeded as well as a few where development was prevented or scaled down. Of note here as well are coalitions formed between community activists and historic preservationists to oppose the destruction of historic neighborhoods.

Some of the trend toward consolidation of property in the hands of fewer residents also may have begun after the fire of 1870 when the city of Boston was faced with rebuilding a good portion of the urban core. One of the most alarming effects of over-scale development is the transfer of wealth in terms of land and structures previously held by many small-scale owners into the hands of the property developers and from there into the hands of a few wealthy owners. In the case of the West End project begun in the 1950s, the land was sold to the new developer at below market cost. Kennedy writes "the city sold the land to Rappaport at a greatly reduced rate in accordance with the standard practice of urban renewal" and only compensated prior owners a total of "$320,000" for all of the lost property (1992:164). To look at it another way, an estimated 2,700 working class households had been displaced from the area in the 1950s (Kennedy 1992:164) with only 480 expensive apartment units replacing them (Palmer 2007) in the 1960s. Of particular note are promises by the government for affordable housing to replace the units lost early in the project that were not made available when residents had to move. "In April 11, 1953, Mayor John Hynes announced a West End project that would include low-rent housing for 1,175 families, 200 middle-income apartments, and 640 high-rent apartments" (Anderson 1987). By 2010, at least 2,590 dwelling units had been constructed in the area with only one building of specified low income housing and rents for all of the other units starting at $1400 for a studio (about the same as a studio in expensive Harvard Square).

Three twentieth century examples from downtown Boston of the consolidation of downtown properties in the hands of fewer owners supporting large-scale development projects include City Hall, the Prudential Center and a rejected proposal for Park Plaza. The first of these, the creation of City Hall plaza also known as Government Center required the destruction of the entire Scollay Square community. Scollay Square had been a mixed-use residential neighborhood whose businesses included Boston's adult entertainment sector, an easy target for developers seeking "blight." The difference in the Scollay Square project was that the end owner was the city government as opposed to a private developer. The Prudential Center meanwhile represented the transfer of privately owned former railroad yards into new private hands (O'Connor 1993:175), with upscale development including shops and expensive residences that benefited primarily the very wealthy. A rejected proposal for the Park Plaza block during the 1970s in contrast represents the power of local communities, environmentalists, and historic preservationists together to oppose over-scale development. Other factors in the eventual rejection of the proposal included the Boston Redevelopment Authority's Department of Community Affairs and the renewed controversy over using eminent domain to support private development initiatives (Kennedy 1992:202).

Another example of successful community resistance to consolidation within urban planning was the successful opposition to the proposed Southwest Expressway that resulted in the Southwest Corridor Park in Jamaica Plain and surrounding communities. In 1948, the Massachusetts Commissioner of Public Works proposed "an eight-lane highway that was to cut through Canton, Milton, and several Boston neighborhoods" (Jordan 1980:1; Bastajian 2009). Jamaica Plain residents and those of neighboring communities came together across previously dividing lines of race and class to fight the highway expansion. Spontaneous Celebrations, a community organization nearby, still holds an annual "Wake Up the Earth Festival" that serves as a reminder of that struggle to this day. The Southwest Expressway project was eventually halted, but not before an estimated 735 residents were displaced by eminent domain, half of these within the 2 miles the proposed highway

would have run through Jamaica Plain (Urban Aid Planning 1968). Today the Southwest Corridor Park includes open green space, playgrounds, fifteen separate community gardens and the Southwest Corridor Community Farm.

This brief selected history of the economic development of Boston offers insights into changes that have taken place in Boston over the last few centuries from the construction of small-scale dwellings to the over-scaled development of the late 20th century. Any bioregional design projects will have to take into account these periods of expansion and redevelopment as well as the importance of community rejection or approval to the success of projects. Economic development is not the only area of change within a city and the following section will look at a brief overview of changing spatial relationships between humans and ecosystems within the city.

Spatial relationships between humans and ecosystems.

Looking at the history of spatial relationships between humans and ecosystems in Boston, landscape architect Frederick Law Olmsted is central. Earlier and later plans are also important, particularly for moments when what we today would label 'social justice concerns' were incorporated into spatial relationships between humans and ecosystems. Mount Auburn Cemetery, as a collaboration between the proprietors of the cemetery and the Massachusetts Horticultural Society beginning in 1832 was chronologically the earliest (Linden-Ward 1989). The intention, in part, at Mount Auburn was to provide an introduction to horticulture and access to green space for working-class urban dwellers. The ring of parks around Boston that were Olmsted's implemented vision for Boston came next followed by the Metropolitan Parks Commission. Interweaving chronologically through all of these is the history of urban agriculture in Boston that both predates 1830s in terms of urban food production and again rises with the planned creation of community gardens in the early 20th century.

Mount Auburn Cemetery as the first garden cemetery in the United States represents an early attempt to mediate spatial relationships between humans and ecosystems by providing urban dwellers with access to culturally modified green spaces. Although only the cemetery remains today, the site began as a collaboration between the proprietors of the cemetery and the Massachusetts Horticultural Society, led by Henry Dearborn. Originally, the cemetery and garden were separate entities, with under half of the acreage at the site devoted to burials. Dearborn, according to Linden-Ward (1989, 205) hoped to eventually create a horticultural school at the garden, so designed and managed it with an educational bent from the beginning. The original intentions of both the cemetery and the horticultural demonstration area included public access for quiet activities (Berg 1993). As a result, public transportation came early to Mount Auburn Cemetery and remains an important part of the cemetery's public access to this day. Sachs (2010:212) writes "In 1834, the first local omnibus service started making regular runs to Mount Auburn." Gradually the omnibus was replaced by formal trolley lines, which in turn were replaced by trackless trolleys. Mount Auburn Cemetery was the model for the garden cemetery movement in which cemeteries become open space amenities for urban peoples, often supporting manicured forms of ecosystems within their walls. Sachs (2010:217) writes, "Environmental reformers of this era sought to redefine the concept of improvement. Their rhetoric stressed equality as much as orderliness: real progress would provide everyone with access to common green spaces" (Sachs 2010:217). As an early response to Mount Auburn, Boston builds its own garden cemetery in Jamaica Plain, the Forest Hills Cemetery, and it too comes to serve as retreat and cultural center for urban peoples of all classes made accessible for passive recreation and the arts by public transportation.

At about the same time period, the first urban parks in Boston began to be formally recognized. A proposal to formally name the Boston Common as "Washington Park" dates to the 1830s, a period in which the transformation of the space from an older style working common into a park was underway (Rawson 2009:67). Over a decade later, urban reformers Gourlay (1844) and Copeland

(1872) proposed the expansion of parks in Boston (Kennedy 1992:66; O'Connell 2009: 170), suggestions that would not be implemented until Olmsted's era.

Olmsted's plans for mediating spatial relationships between humans and ecosystems in contrast were more ecocentric in nature, including concerns for humans and ecosystems in his stated intentions. In many ways, Olmsted's plan for Boston can be considered a thought experiment translated into practice. The chain of parks Olmsted proposed had the effect of preserving ecosystems by promoting continuous habitat corridors for plants and animals, an effect he notes mostly in the context of improving the health of aquatic systems. Olmsted in discussing rivers in Boston writes "if uniformly filled, its banks made comely, and neatly kept, in the usual manner of public parks, and if no private property is allowed to abut upon them, any natural water-course will be attractive and wholesome" (in Sutton ed. 1971 [1881]: 231). Urban rivers carry less sediment load with vegetated and well-maintained banks so Olmsted is addressing aquatic ecosystem health in this quotation. That Olmsted had human health as well as ecosystem health in mind can be seen in a wide range of quotations from his writing including the following argument in favor of linking many of Boston's parks and green spaces together: "They would have a larger use, be more effective as appliances for public health, and every dollar expended for their maintenance would return a larger dividend" (in Sutton ed. Olmsted 1971 [1886]: 233). The larger network of connected parks would thus support human health as well as ecosystem health. Olmsted's vision for Boston was of linking parks and green-spaces together to form the Riverway and Fenway as well as the Muddy River Reservation.

Inspired by Olmsted's vision for the city, Bostonians created the Metropolitan Parks Commission in the 1890s charged with acquiring and building considerable additional parks for the city of Boston. O'Connell (2009:175) observes that regional planning was an early feature of the MPC writing "The Progressive reform ideal of regional planning constrained private-sector environmental abuse and prefigured the late-twentieth-century environmental movement." Parks protected under the influence of the MPC include those on either side of the Charles River in Cambridge and Boston, the kernel of the Boston Harbor Islands Parks, and Revere Beach among many others. Critiques of the MPC system— the ideas that the system was anthropocentric in nature and not based on social justice— are both belied by the facts that the main users of the parks were working class residents and that the commissioners preserved ecosystems well outside the then convenient reach of Bostonians.

Temporally both earlier and later than the Olmsted plans and others discussed above, the changing forms of urban food cultivation in Boston also mediated spatial relationships between humans and ecosystems. Cultivation in Boston no doubt began with the maize, beans, and squash grown by Massachusett women and continued onward with William Blackstone's famous apple trees. All urban dwellers in 1600s and 1700s Boston would have continued to cultivate some portion of their food, as would their descendants and subsequent arrivals in some cases into the 21st century. Thomas Pemberton, writing in 1794 about Boston gardens stated "Few houses are without them in which vegetables and flowers are raised, in some fruit trees are planted" (cited in Whitehill 1975:47). Rawson (2009: 29) observes that milk cows were grazed legally on Boston Common through the 1820s, with each cow providing milk for a working class family. Wilder's 1881 *The Horticulture of Boston and Vicinity* is full of reminiscences about back-yard production of fruit by elite families in the late 1700s and into the mid-1800s and implies that even less well off residents with a little yard space would have had fruit trees as well. Dudley (1734) in describing orchards of ordinary farmers in Roxbury wrote that "Our people of late years, have run so much upon Orchards, that in a village near Boston consisting of forty families, they made near three thousand barrels of cider." Wilder describes the continuity of some of those orchards of ordinary farmers into the 1880s. All of this forms a picture of subsistence food within the urban fabric of Boston.

The forms that urban food cultivation took however changed over the course of the centuries. As the quote by Pemberton implies, houses in Boston would initially have had their own associated

garden plots and perhaps fruit trees. Pressure for multifamily units on precious urban land, however combined with a desire to put in as many units as possible to make the most money meant that subsequent generations of poor urban dwellings lacked backyard gardens (Warner 1987:11). Where possible individuals committed to gardening continued to find space in urban peripheries on a small-scale basis. Not until the depression of 1893–1897 did larger-scale access to land for urban gardeners return, when inspired by recent successes in Detroit, Boston's Industrial Aid Society set up a garden near the Forest Hills Cemetery that unfortunately only lasted for a few growing seasons (Warner 1987:13ff). World War I similarly led to short-lived urban gardens within Boston (Warner 1987:18). Boston's oldest community garden, the Fenway Community Garden began as the Fenway Victory Gardens during World War II.

Other community gardens within the greater Boston metropolitan area had their origins in either planned or informal community initiatives to reuse vacant land for garden cultivation. Land tenure at many of the informal community gardens throughout the twentieth century has been tenuous. Warner (1987:16) states that "control over land has always been the rock that smashed American urban garden projects...unless they could get a lease or title to their lands, the land would soon be taken from them." Examples of this include the Morton Farm community gardens of 1896 (Warner 1987:15), the short-lived Boston area gardens of the Massachusetts Historical Society, and the Los Angles garden in the 2008 documentary *The Garden*, among many others. These cases of gardens with tenuous lend tenure are especially revealing given that "improvement" mostly through cultivation lies at the heart of English and so American concepts of land ownership: "As much land as a man tills, plants, improves and can use the product of, so much is his property. He by his labor does as it were enclose it from the common" (Locke 1986 [1690]: 32). By a direct application of Locke's standards, these laboring gardeners should unquestionably have become the owners of their garden plots. However, in a direct parallel to many early colonists' refusal to recognize Native American women's cultivation of maize beans and squash as conveying land ownership (Den Ouden 2005; Stein 2007), the labor of working class gardeners was also not recognized as conveying ownership rights. Locke's phrase "by his labor" continues to mean in this context exclusively the labor of white men with political power in traditional lands of Native peoples. As was demonstrated by the ongoing recognition of white male ownership by improvement continued through the Homestead Act in the west and then in Alaska throughout the time under discussion.

Gardens and parks were not the only aspects of spatial relationships between humans and ecosystems to change over time. We can look at the process of neighborhood evolution and how individual neighborhoods within the greater Boston area shaped and changed spatial relationships between humans and ecosystems over time. Rivers and creeks are classic focuses within environmental history of urban areas, with these often becoming conduits for waste and then undesirable and so channeled away from and out of sight of communities. Sometimes these rivers or creeks were rediscovered or brought back into view in the 1800s or 1900s. Examples include Bubbly Creek in Chicago discussed by Sylvia Hood Washington (2004), Providence's Woonasquatucket and Moshassuck Rivers, or Boston's Muddy River. Wetlands have also received attention both nationally (Vileisis 1999) and within Boston mostly for being filled in (Whitehill 1975; Seasholes 2003; Rawson 2009; Spirn 1998:160). Although we tend to think of land based ecosystems in urban areas mostly in the contexts of parks, we can also think of vacant land and less heavily developed urban fringes as supporting communities of plants and animals independent from human encouragement.

Looking at a single case study, Jamaica Plain moved from a rural agricultural community to a busy branch of an "organic city" from which food production was formally removed in the early twentieth century, only return in specific areas by the end of the century. When Joshua Loring built his elegant house in Jamaica Plain in the late 1700s, the area was still a largely rural farming community producing food for its residents and for markets in Boston. All of this changed in the 1800s when rural Jamaica Plain was transformed by subdivision and the arrival of public transportation in the form of street-rail cars into a "street-car suburb" (Warner 1962). During this time period, however Jamaica

Plain still retained some of its nature as what Steinberg (2002) has dubbed the "organic city" producing food within the newly unfolding suburban or even urban fabric in the form of fruit and vegetables (Wilder 1881). Olmsted constructed significant portions of his larger vision for Boston's Emerald Necklace within Jamaica Plain, including the area around Jamaica Pond, the Jamaica Way and the Arborway. As with other parts of Boston, Jamaica Plain underwent the local "death of the organic city" as Steinberg (2002) calls the removal of animals and other food production in the early 20th century. In the mid-20th century, the proposed Southwest Expressway was a tragedy in terms of displacement of families and loss of housing stock for the city. Community activism, however, prevented the completion of the highway and created an opportunity for the return of the "organic city" in terms of food production earlier than in many other parts of Boston. Created or inspired by the Southwest Corridor Farm activists, Jamaica Plain also had early farmer's markets and distribution centers for urban agricultural produce to reach lower income residents.

Looking at histories of spatial relationships between humans and ecosystems in a city reveals the "death" and "rebirth" of Steinberg's "organic city" in the Boston area. Although not the focus of this paper, urban wilds also persist both within and beyond human encouragement. Tracing spatial relationships between humans and ecosystems within a city, it is challenging not to focus on just one type of ecosystem but to recognize that aquatic and land-based ecosystems may exist fragmented within urban areas. The importance of social justice concerns also becomes clear through concerns ranging from access to open spaces like parks to access to land for cultivation like community gardens.

Brief History of Bioregional Thinking

Bioregionalism in some ways is not a new idea, humans have inhabited places and developed cultures and economies in response to both human history and the physical world they encountered rather than global resources for most of our species' history. Ever since the industrial revolution disrupted relationships to place, great thinkers have been drawn to aspects of bioregionalism as solutions to the challenges posed by industrialization. Kirkpatrick Sale in his book *Dwellers in the Land: The Bioregional Vision* (1985:137ff) sees elements of bioregionalism in the careers of Frederick Jackson Turner, Lewis Mumford and Howard Odum among others. To this list we could easily add many indigenous philosophers from around the world, including Thoreau's insistence upon walking and knowledge of place, Susan Fenimore Cooper's 1850 book *Rural Hours*, Julian Stewart and early anthropologists studying relationship between people and ecology, and myriad other thinkers. In the mid-to-late 20th century, Bioregionalism experienced resurgence(s) and has maintained steady followings in environmental communities without crossing over into popular culture and consciousness. This section will address briefly the history of bioregionalism, look at some of its emergences in the works of relevant scholars and at the mid-twentieth century bioregionalism movement.

Henry David Thoreau as a broad-minded thinker firmly rooted in Massachusetts natural history, archaeology and ecology belongs in any list of influential bioregional thinkers for New England. Although Thoreau himself never used the term "bioregional," his work was profoundly rooted in place and throughout his journals and other published writings he emphasized how much there was to be learned within local areas. Thoreau's contemporary and popular writer of the era was Susan Fenimore Cooper, daughter of writer James Fenimore Cooper. Her 1850 book *Rural Hours*, responding to increasing distance from nature through the industrial revolution and urbanization inspired countless middle and upper class women to be more aware of the world around them (Buell 1995; Johnson 2000.) Sale also argues that Frederick Turner of the famous "Frontier Hypothesis" contributed to bioregional thought in his later works (1985: 137ff).

Social theorist Lewis Mumford, most famous for his books on cities, was also late in his career a strong proponent of regionalism. In a 1925 essay, Mumford writes:

> *The hope of the city lies outside itself...lay aside the magnifying glass which reveals, for example, the hopelessness of Broadway and Forty-second Street, take up a reducing glass, and look at the entire region in which New York lies. The city falls into focus. Forests in the hill counties, waterpower in the mid-state valleys, farmland in Connecticut, cranberry bogs in New Jersey, enter the picture (1986 [1925]: 207)*

In this quote, Mumford is placing New York City in regional perspective firmly grounded in ecology and biology, a regionalist argument he continues in many of his later writings. Mumford both inspired and became part of a regional planning movement across the United States in the early 20th century. Of particular note is the New England Regional Planning Commission formed in 1935 "charged with addressing the economic and social conditions facing the region" (New England Regional Planning Commission 1935). The commission's areas of concern included waterways, forests, parks, green-spaces, transportation corridors and economic development. Unfortunately the commission appears to have been disbanded in the 1940s although later environmental efforts in the 1970s and 1980s returned to many of the topics covered by the commission (Foster 1984, 1995).

From the anthropological perspective, the history of regional thinking also offers cautionary tales of moments when regional ideas were paired with environmentally deterministic and at times racist theories. Acknowledging this past legacy allows modern bioregional theorists to avoid some of these problems. One of the earliest understandings of regional thinking was the idea that people had or developed regional characteristics when they move into an area (Valencius 2002; Conforti 2001: 24ff.) This understanding also underlies the early geographic environmental determinist theories of Ratzel and his American popularizers Ellen Churchill Semple and Ellsworth Huntington (Semple 1911; Huntington 1915.) Anthropologists for a number of reasons consider these theories problematic. Firstly they are environmentally deterministic meaning they attribute all changes in culture to environment, removing human agency and human history from cultural change. Second the theories are often racist, positing specific environments and associated races as "more advanced" than others. Franz Boas and his students drew on theories of cultural relativism and new understandings of race to respond strongly against these early environmental determinists. In working with regional data, we must recognize the centrality of human agency in determining human actions and culture change, celebrate all human cultures, and view environment along with culture and history as forces applying pressures but not the sole determinants of the direction of change.

The idea of regions also appears during the early twentieth century in the work of anthropologists Alfred Kroeber, Clark Wissler and Julian Steward. Kroeber and Wissler worked with the idea of culture areas divided the United States into specific environmental and cultural areas (Wissler 1926; Kroeber 1953). Steward returned to environmental thinking within anthropology and renamed it cultural ecology to avoid past negative associations. Cultural ecology according to Steward (1955:269) seeks to explain whether "the adjustments of human societies to their environments require particular modes of behavior" or allow for the emergence of a broader pattern within culture-cores. Today some anthropologists consider Stewart's work, as well as those of earlier theorists in this vein, to still give too much credit to the environment. Breaking away from the region as a determining force, later regional thinkers within anthropology, sociology, and other fields are less concerned with the region as determining human culture and more concerned with how humans can better work with the environmental advantages of a region. For bioregional urbanism we can navigate these conceptual waters by avoiding environment as a force determining human culture or characteristics of residents. Instead in bioregional design, communities can view environments along with cultures as resources to guide more locally sustainable strategies.

The other important strand and some would say the formal beginnings of bioregional thinking were in the 1960s and 1970s. Alexander describes bioregionalism as having "emerged in the 1970s as the product of an intermingling between biogeography and the California counter-culture" in which Peter Berg and Raymond Dassman as well as Gary Snyder emerge as key figures (1996:2).

Originally trained as an ecologist, Berg has continued to develop bioregional thought and action over the last 40 years, founding organizations, editing journals and other publications, and inspiring community organizations. Berg's organization Planet Drum serves an important clearinghouse for bioregional information and activism (Thayer 2003). Examples of recent bioregional thought by other scholars include models (Dettman 2006; Mulvihill et al 2006; and Donovan et al 2009 among others) and policy (McGinnis 1999, 2000; Bruckhorst 2000; Bayne 2009 among others.)

In New England during the 20th century a number of scholars turned to forms of bioregional thinking that differ in ways worth discussing from bioregionalism urbanism. In particular, worthy of mention is the career of Dr. Charles H.W. Foster, former Massachusetts secretary of environmental affairs and former dean of Yale School of Forestry and Environmental Studies among other accomplishments who has devoted much of his career to expanding bioregionalism in New England. Foster published four books of a series called "Experiments in Bioregionalism." The first of these, *Experiments in Bioregionalism: The New England River Basins Story*, focuses on the legal and political aspects of managing rivers in the region across local and state boundaries (1984). The second, *The Cape Cod National Seashore: A Landmark Alliance* (1985), focuses on the history and management of this unique national park. These works represent an important step toward compiling and recognizing strategies for managing natural resources in New England on a bioregional rather than political basis. Bioregional design would encourage us to take further steps in incorporating design and scientific advances among other strategies for achieving local sustainability.

From bioregional book series to community groups New England has bioregional scholarly and community activity. Middlebury College for example published a series of seven books called the "Bicentennial Series in Environmental Studies" each of which "adopts a bioregional approach to environmental topics" (Trombulak 2001: xi). Many of the books in the series focus on Vermont's ecosystems and culture. Dann's 2001 *Lewis Creek Lost and Found* for example focuses on the bioregional history of the Lewis Creek watershed, one of the tributaries of Lake Champlain. Another of the books in the series, *Wilderness Comes Home: Rewilding the Northeast*, is essential from the perspective of reintroducing functioning urban ecosystems. The chapter by Trombulak and Royar (2001) on species reintroduction will be particularly helpful if the ongoing community health of reintroduced species will be one of the benchmarks for project success. Overall the series is an important contribution to bioregional thinking in New England. Also worthy of mention are a number of regional histories that address some of the insights of bioregionalism including Warner (2001) and Conforti (2001). Conforti for example discusses how "weather has resided at the center of New England's identity from the beginning of the region's history" (2001: 24) and goes on to discuss changing perceptions of weather and climate. Environmental histories of the region including those by Mitchell (1984; 2009), and Ryden (2001) among others are also notable for their bioregional perspectives. Also worthy of brief mention are specific bioregional organizations. New Haven, CT, for example is currently home to the New Haven Bioregional Group whose projects to date include a garden and a mapping project (New Haven Bioregional Group 2010).

From local community groups and explorations of regional and bioregional identity, the history of bioregionalism is helpful in developing our new proposed form of bioregional urbanism. The following section will move from historical analysis of the city as change into a discussion of an ongoing interdisciplinary collaboration aimed at exploring bioregional urbanism as a possible collection of strategies to create sustainable and just urban areas. The idea of city as change will continue throughout, as we believe that human needs and ecosystems will continue to change into the foreseeable future and so we need to develop not just a single plan but processes for communities to continuously evaluate and respond to changing situations.

PART TWO: COLLABORATION

I. Establishing a Collaborative Process

To examine and propose processes and solutions to 'wicked problem' (Rittel and Webber 1973) of sustainability, we established a cross-disciplinary collaboration. Before we met, we were each looking for techniques to address sustainability and realized that we could not address the complex issues through each of our disciplines alone. Complex problems need holistic solutions with meaningful, systematic input from different sectors. As with any 'wicked problem', we had to determine where to start (Conklin 2005). Rather than starting from our traditional disciplinary processes–with their implicit assumptions and blind spots–we started by creating an intentional three-way collaboration to foster creative thinking.

The City as Change project was a valuable exercise because it gave us as practitioners and researchers, each from a different discipline, the opportunity to test out ideas in a laboratory setting using collaborative inquiry. We were able to discuss our ideas, based on theory, history and practice experience, with others who were looking at the same issues through different disciplinary lenses. Coming from different disciplines, we did not share similar work methods, for example the design lab differs from the archaeology lab. Although examples of collaborative work models exist, strategies for effective collaborations across disciplines were not as common or available as we had hoped to find. Understanding how to work with people who have different protocols and procedures as collaborators is not a large part of our training or our culture. As a result, we considered the collaborative method to be central, and so thought ourselves simultaneously engaged in two methodologies: collaborative inquiry coordinated with bioregional design and urbanism. We considered the work process to be its own inquiry. Our hypothesis: by establishing an inclusive, holistic process our product and its solutions would in turn be more holistically sustainable. We considered collaborative inquiry to be a necessary element of the bioregional urbanist methodology, which we expanded after the competition.

Bioregional urbanism itself is cross-disciplinary in nature. Those who engage in the practice and research of "urbanism" employ trans-disciplinary thinking. But a single person can only filter through a personal lens—limited by paradigm, academic disciplinary training, and experience. The archeologist/anthropologist/environmental scientist has a very different focus from the environmental educator/community organizer, and from the architect/urban designer, yet all three are "urbanists" attempting to address issues of sustainability in the urban environment. Each brings valuable perspectives: the architect/urban designer is a futurist and forward-thinker, proposing alternatives to current unsustainable practices; the archeologist/anthropologist is rooted in history and place, considering contemporary issues within their historical (social and environmental) contexts; and the educator/community worker is focused on justice issues faced by communities today and how to resolve them. To generate just sustainable solutions, these different perspectives and more are needed—which is why we focused heavily on collaborative methods (Morgan 2009).

We met iteratively to develop our principles, take turns sharing ideas, establish the range of each person's skills, and to divide tasks. In their article, "Environmental History and the Challenges of Interdisciplinarity: An Antipodean Perspective" Pawson and Dovers (2003: 61) state that "the building of mutual understanding of key conceptual intersections is of prime importance" and discuss the issues like time, distance, funding, differential scales for analysis and difficulties framing problems that can get in the way. This paper represents one of many attempts by our team to bridge the scale issue of time, both the different eras and the different ways that each collaborator engages with the past, present and future in their work. We have also wrestled with the challenges of distance and our own schedule limitations, learning to meet through skype as well as in person, and found short-term solutions for funding. None of these discussions of challenges or mediums like skype, though,

precisely gets at the actualities of collaboration, so the following few outline looks in greater detail at the methods we used to further our interdisciplinary collaboration:

A. What were the methods we used? What did we learn? Ours was an experiment in collaboration, so we iteratively tested different approaches. Throughout the competition time frame, we discovered experientially that the following methods supported our ability to explore complex problems together and test out different sustainable ideas:

1. We intentionally built an "action research" learning community (Morgan 2009: 446), beginning with establishing a shared purpose, and then shared rituals and symbolic traditions for the group. We would bring food to share, and would talk about the different things we were working on, or had previously worked on outside of the IaaC competition. We also celebrated our "origin story"—how and why we came together. By sharing, we gained a better understanding of each person at the table, as individuals and as members of varied disciplines. We made time for discovery of each other and of our respective work, widening our frames of reference and challenging our paradigms (Laszlo 2009).

2. We acknowledged our different disciplinary frameworks—attempting to understand the protocols, procedures, limitations and opportunities of each—to respect the integrity of one another. We sought to better understand each other's frames of reference, in order to relate them to each other. We began to believe that effective collaborators are more facile in understanding the parameters of each discipline and moving between them. This became a desirable skill to develop over time, requiring not only trans-disciplinary thinking, but also the recognition of each input discipline with its history and its operational mechanisms. To illustrate this, during each discussion we would consider: what does the architect need to contribute to the conversation? the scientist? the community worker? We made transparent each of our tools, techniques, assumptions, and processes.

3. We established procedures for research and the deliverables. In navigating the protocols of each discipline, we had to determine how each of us could have input on and contribute to the final product. Based on our professional and disciplinary skill sets we determined who was responsible for each final deliverable, how this would play out in the process. This last point is important, because whoever actually produces the final physical deliverable holds not only responsibility, but also power. For example, the final drawn illustrative plan was created by the architect. In creating it, he necessarily decides what relationships to emphasize, and who gets to have input and when. The process of creating the illustration is a series of miniscule decisions, and he cannot possibly engage all collaborators in each of the thousands of small decisions. If not enough time is built into the process to review the plan as it is being created, collaborators can end up feeling as though the process was 'usurped'.

4. We acknowledged the need for structure, tradition, and schedule. Although seemingly mundane, setting a feasible schedule of deliverables was crucial. We each needed to know what must be completed by when, and what we could expect of each other. By building in ample time for review and feedback from each other, across disciplines, each person felt as though they had sufficient input on the process and final product.

5. We emphasized the need for role-play, imagination, and story. We began each session with sharing more about ourselves, our stories, and our experiences. We scheduled time to explore our bioregion together, taking a day trip to Thompson's

Island (Boston Harbor) salt marshes. We also deliberately scheduled longer sessions to allow for our ideas to gestate, and our imaginations to explore different avenues. By doing this, we created an environment in which an array of solutions was examined for their applicability to solving our "wicked problems".

6. We embraced reflective practice for increased clarity. We discovered the need for reflecting on our collaboration itself, rather than only the product. We scheduled periodic meetings just to discuss our collaboration, what was working and why, and what areas we could improve. We had iterative conversations about our methods and motivations and assumptions. Along the way we learned a great deal about each other, and also learned more about ourselves as collaborators. We discovered that through work with people outside our disciplines, we could better understand ourselves. Although it is not easy to prioritize this kind of time and to reflect on the less successful aspects of the collaboration, this method is perhaps one of the most important for long-term successful collaborations.

7. We recognized the need for input from many spheres. The disciplines represented at our table included: architecture, urban design, environmental history, natural systems analysis (from landscape architecture), archeology, anthropology, environmental science and community education, community development, and park service. We recognized that disciplines and community groups missing from this "table" would limit our solutions. During the short time frame for the competition, we were only able to incorporate our own expertise into our developing collaborative model. We discussed how we might engage community groups and leaders, as well as other disciplines, but decided to expand our efforts in future projects.

8. We celebrated the importance of listening. Each person has a voice and agenda, and these need to be recognized. In our scheduled times the quality of the sharing is only as good as the quality of the listening. We did our best to practice reflective listening, saying back to each other what we thought we heard, knowing that we often 'hear' through the filter of our life experiences and disciplinary training.

II. Principles and Procedures

Through our process, we developed a set of principles that would inform our final submission. However, the self-sufficient city as change begins and ends with the design of the collaborative "table." Thus, our intentional collaboration generated the following principles:

A. Storytelling, the Ecological Bill of Rights, and Collective Paradigms

We started to explore the concept of an Ecological Bill of Rights and the importance of stories and storytelling. In their 2003 book, *Story and Sustainability: Planning, Practice and Possibility for American Cities*, editors Eckstein and Throgmorton argue persuasively that storytelling can be an essential tool for planners interested in democratic processes of transforming cities toward sustainability. Stories can convey dimensions of change and community participation that static "snapshots" of a city in an imagined future cannot. Narrative frames and stories themselves can inform world-views (Cronon 1992). Our current stories are contributing to our problems of over-consumption, waste, climate change, and inequity. If we are going to live in truly just sustainable ways within ecosystem limits, we need different cultural stories, an argument we developed in the introduction to our IaaC proposal:

> *"It was time for New Boston stories...Our old cultural stories had gotten us into a jam with polluted cities drawing upon the globe for unsustainable resources. To lay the foundations of a self-sufficient city, our citizens created new cultural stories, ones that wove us into the web of life, into the land, and into the watersheds. With challenges coming from global climate change, from rising oceans, we need flexibility and closer ties to surrounding environments to survive. Our goals: achieve water, food and energy independence." (Loheed, Howard-McHugh and Stein 2009)*

New stories can help us to consider human and natural systems equally as we make decisions in our daily lives, in our production and manufacturing processes, in our economy and in our settlement patterns (Eckstein 2003; Laszlo 2009; Quinn 1995; Agyeman 2005).

Stories can also help change how listeners and tellers perceive and construct their world. Ninian Stein, with support from Sarah Howard-McHugh and Phil Loheed, had engaged her introductory environmental science class at University of Massachusetts in an exercise of creating an "Ecological Bill of Rights." We discovered through this exercise that many of her students had a very hard time conceptualizing the rights of ecosystems in non-anthropocentric ways. We started to image what our society would be like if we had this different worldview. Despite our best intentions, we would often catch ourselves speaking in very anthropocentric ways about ecosystems. Perhaps, we realized, new narrative frames were needed here as well:

> *"With our new stories, we the residents of New Boston, understand that we need a new Bill of Rights, one that recognizes that humans are just a part of nature, and that all members of the natural world's Web of Life need protection to ensure decent quality of life and the ability to thrive." (Loheed, Howard-McHugh and Stein 2009)*

Despite a long history of tension between ecocentric sustainable and social justice movements, we believe that a non-anthropocentric approach is not inherently in opposition to justice issues. All living things have the right to thrive, including humans regardless of class, race, gender, nationality, education, etc. Better methods and policies to improve distribution of limited resources are needed, building on recent efforts such as "environmental space" (Friends of the Earth website) and "ecological footprint" calculations (Rees and Wackernagel 1998).

We also imagined that a sustainable city would need highly developed 'collaborative laboratories'—institutionalized and public–in which professionals, researchers, and community leaders work together to find and test solutions, and build more sustainable collective paradigm. Morgan writes about the need for this type of community in his "Learning Communities, Cities and Regions for Sustainable Development and Global Citizenship": "Common themes include the development and application of strategies for facilitating multi-stakeholder learning communities to engage in collaborative learning, enquiry and action concerning issues of sustainability and global citizenship" (Morgan 2009: abstract). These learning communities or collaborative laboratories could bridge and apply community, practitioner and academic knowledge and then facilitate the divide between ideas and applications, as well as creating places for review and changes to practices.

B. Resource Budgeting, a New Economy, and Just Sustainable Development

Much of Loheed, and then Howard-McHugh's, work prior to the IaaC collaboration had focused on reintroducing suitability analysis—and introducing resource budgeting as a concept—into design practice. The importance of these methods is that they have the ability to help designers, and other decision makers of the built environment, to better align land settlement and economic practices with the capacities of ecosystems. Resource budgeting is the idea that ecosystems can only produce fixed quantities of renewable resources over a given time and that communities and bioregions need to

equitably live on these renewable resources, similarly to a household living on budget.

> *"Many different kinds of resources are critical to the creation of settlements. Among these are reasonably stable climate, adequate water, energy sources, and healthy ecological context. Historically, human cultures have often failed to balance their consumption with available resources, resulting in collapse—and often in extinction of both populations and/or resources." (Loheed and Howard-McHugh (ed.) 2010)*

We now have the technological capability to measure global resources available for human consumption, and establish benchmarks for global-to-local consumption. We can also track how resources are currently being used and by whom, working toward more equal distribution of resources. Unlike prior millennia, centuries or even decades, we now have technology to monitor ecosystem and species health. We now know when we are getting close to the "last mammoth", and we have no excuse for forcing land-based species to extinction, or ecosystems to collapse. Nor can we claim that there are not enough resources for the billions that go hungry every day. For the IaaC competition, we considered this concept to underlie all operations of the future self sufficient Boston:

> *"Sustainable resource budgets enable us to align our ways of living with the planet. We achieve self-sufficiency by establishing resource consumption budgets that are based on available local resources and a 'fair share' allotment for human use. Our resource budgets ensure that we consume only what our ecosystems can renew, instead of depleting the earth's natural capital. The parameters established by the resource budgets encourage creative living solutions and new economies by citizens and practitioners, and promote restoration and maintenance of healthy ecosystems." (Loheed, Howard-McHugh and Stein 2009)*

The suitability analysis method, promoted by Ian McHarg in *Design with Nature*, had evolved into a "decision-support methodology for design purposes" within the landscape architecture program at Harvard in the 1960s and 1970s, and eventually became the conceptual basis for geographical information systems (GIS). "Suitability analysis expands on terrain analysis and has an additional series of methodologies that enable the design practitioner, engineer, naturalist or farmer to analyze land for its fit with, or constraint of, proposed uses." (Loheed and Howard-McHugh 2008) Despite its origins in landscape architecture, suitability analysis has been nearly forgotten within the design disciplines, and it is only now re-emerging as professionals seek tools for sustainable design. This research informed our response:

> *"It is time for new settlement processes...Our overall strategy—to reduce our human footprint and enable space for natural systems restoration. We do this by increasing density along transportation lines and reintroducing natural systems into the urban fabric extending environmental corridors into the city itself." (Loheed, Howard-McHugh and Stein 2009)*

In the competition proposal, suitability analysis and resource budgeting informed all land use decisions, including transportation, housing, urban node locations, and even defense against rising seas. As a way to make more room for local enterprise and manufacturing, and to create open space for humans and natural systems, we proposed creating "enhanced density zones." These would include improved public transportation lines to which all communities would have equal access, unlike current Boston transportation systems, which favor some communities over others (Agyeman 2005):

> *"Enhanced Density Zones. All primary business and residential elements of the city are within 800 meters of a transportation line. This pattern defines boundaries for the new enterprise zones, as illustrated in the policy diagram. The re-conceptualized radial Metro system promotes*

the use of trains, subway and bikes and condenses development along transportation lines. It offers a new circumferential loop–an elevated monorail–that wraps the city just outside the urban ring. It connects the outer tier of town centers–which were functionally part of the urban fabric but not linked to the inner core—to the urban zone. Wind Turbines are located along the loop creating energy for the city." (Loheed, Howard-McHugh and Stein 2009)

In considering the sustainable city (Boston) of the future, we had to decide whether or not to recommend moving Boston as sea levels rise, or to build anticipatory defense barriers. Because of the size of the city, and its ability to be defended, we chose to suggest building a defense barrier that could be built up incrementally over time as sea levels rise. In concept it is similar to the dike system in the Netherlands:

"Outer Barrier: primary purpose is to provide shelter so we can re-naturalize the area and to support ocean farming and marsh systems. Will be designed to support wind turbines. Inner barrier: Already exists–the Harbor Islands. Will begin to reinforce as necessary, and utilize them for completion of the Metro Loop. The water levels of this area will be controlled with the dike system and fitted with locks-salt water/brackish environments. To maintain brackish environment will need establish a water circulation system." (Loheed et al. 2009)

In addition to sustainable land use and settlement methods, it became clear that all economic processes need to acknowledge the limits of ecosystems for regional self-sufficiency and sustainability; and that economic, design, and settlement practices need to be considered simultaneously through the resource budgeting rubric (Hawkin 1993; Hawkin et al. 1999). Although we seek to apply global scientific data from a design perspective, there is a history of similar work by others including the ecological footprint (Rees and Wackernagel 1998) and ecological space methods (Friends of the Earth website). As part of the concept for a selfsustaining city, we suggested that the city as change build an economy based on its bioregional natural resource base:

"The economy of the future supports entrepreneurial activities which function within a sustainable resource budget. Within this economy there are two fundamental components: 1) the cradle-tocradle sector, in which those human products that are not compatible with natural systems are isolated in a closed loop production system, and 2) the sector of the economy that conforms to the rules of natural systems. By reducing toxic waste and fostering relationship with natural systems, the new economy will improve quality of life and therefore strengthen society. Many opportunities for economic prosperity can be found in the new sectors including urban agriculture, biorangers and many other possibilities." (Loheed, Howard-McHugh and Stein 2009)

This new economy, we theorized, would need to have different mechanisms for production and manufacturing and so we conceived the idea of 'new enterprise zones' (although later we discovered that this is an existing and controversial term with a very different meaning).

"The New Economy is emerging in the new enterprise zones. Natural resources are sustainably cultivated and harvested from these zones. Parcels are controlled by the people who own them and may live on them, with decisions made through consultation with Biorangers to optimize economic incentives. The intensity and type of use varies depending on proximity to urban cores, sensitive ecological systems or environmental corridors. Often formerly highly urbanized or suburbanized zones, they are "re-naturalized" for high tech and intensive urban agriculture, cradle to cradle manufacturing, livework, or open space. They are different in each community, based on needs, existing realities and available resources. Zone by zone, people work on

policies that lead to a future that includes food." (Loheed, Howard-McHugh and Stein 2009)

As mentioned before, natural systems also need space for functioning. Because of excessive human exploitation to date, they also need opportunity to restore themselves. Building on natural systems analysis and Olmsted's work, our thought experiment included mechanisms for protection of open space, forest systems, and ocean systems, in outlying and urban areas.

> *"Environmental Corridors are connected wild lands that maintain the integrity of ecosystems and biodiversity. These linked corridors exist at different scales throughout the US and the Western Hemisphere—smaller in urban areas and increasingly larger as they move into the continental interior. By supporting ecosystems at multiple scales, the self sufficient City of New Boston ensures a healthy natural resource base for future generations." (Loheed et al. 2009)*

C. Evolving policy plan as a collective, democratic process

Along with the collaborative process, the concept of an evolving "living" policy plan is fundamental to the City as Change. Ultimately, in every endeavor, something needs to be put on paper to bring people together and foster dialog. This was the purpose of the first iteration of Future Boston, a thought experiment that we submitted for the IaaC competition. Unlike the blueprints for a building or a neighborhood (Eckstein and Throgmorton 2003), which will irrevocably determine what is actually built, the idea of the policy plan is that it is simply a snapshot illustrating how the city can evolve. It is not sacred or permanent. It is intended to be shared, public and constantly changing, as different groups engage in the process.

Preservation and building of new economic value for all is also fundamental. As movements such as urban agriculture and widespread adoption of communication technologies engage all segments of the population, the City as Change concepts are easily confused with the dismal history of "urban renewal" and other similar misguided programs. In our view, policy plans must be responsive to continuous feedback and input from individuals and social groups in balanced ways. In this sense it is an effort to accommodate many of the aspects of global change identified in *Blessed Unrest* (Hawkin 2007). Through the use of incentives (tax credits, subsidies, transferable development rights and other similar techniques) that enhance the evolution of new profitable lifestyles; the arrangement of policy zones can be continuously updated and guided by its intent to serve communities and individuals equally. As a way of illustrating the 'living into the new story', we described people actually doing so in the IaaC proposal.

D. A Bioregional Approach

As discussed in the first section of this paper, bioregionalism emerged out of the idea that people are deeply connected to the local and regional ecosystems that support them, and that their social structures, technologies and ways of life are informed by them. In its broadest meaning, it is a way of thinking, being, acting, and analyzing that equally values human and ecosystem health. We can see many 'bioregional' principles expressed throughout history, particularly by Native American and other indigenous cultures. It is organic and dispersed; and is practiced formally and informally, intentionally and unintentionally by many groups and ethnicities. It is embedded in the values of many cultures. It has been generally rejected, however, by the dominant global consumer culture. In the 1970s, the contemporary concept of bioregionalism emerged. As Thomas Berry aptly points out, bioregions are "the context for reinhabiting the earth" (Berry 1990), and bioregional planning is one of the primary methods that we suggest in Future Boston IaaC submission:

"Bioregional planning...The self sufficient city of New Boston is bioregional, mimicking natural systems. We measure resource consumption and production in the bioregion, and implement policies

that support bioregional health. Our efforts include drawing suburban dwellers into the city to reestablish the forest systems as part of the environmental corridors." (2009)

E. Social and Social Justice Dimensions

Our philosophy in terms of social justice issues was three fold. First, we emphasized the importance of access to quality education by everyone to create a sustainable city. Based on Maslow's Hierarchy of needs and subsequent supportive research (Maslow 1943), we asserted that to learn, a child's basic needs had to be met in order for them to learn, so in Future Boston, we conceptualized the educational model to be the following:

> *"Our Egalitarian Educational Models...Ensure that all citizens are fully empowered in a self sufficient city through access to high quality, free education. Food, clothing, health care, and housing are guaranteed to all children from birth to 18 years to ensure that all learn to their potential." (Loheed, Howard-McHugh and Stein 2009)*

Secondly, building on Paulo Freire's concept of empowerment through praxis (Freire 1970), we also emphasized the importance of agency through scale. Each person can act on his or her direct environment, creating small-scale sustainability, and through transparent, conscious collective action, can incrementally create larger scale sustainability. The collective action is facilitated through collaborative laboratories, discussed earlier, and sustainable learning communities. Thirdly, we emphasized the importance of celebrating diversity, culture, and creativity as necessary elements to establishing a sustainable city of the future that is vibrant and healthy.

> *"Cultural Hubs. A self-sufficient city is a peaceful city. New Boston is a creative, global hub, where elements of different cultures live together and are celebrated. Neighborhoods express and showcase their cultural traditions, creating pride and drawing visitors from around the world. These hubs also engage with and learn from natural systems." (Loheed et al. 2009)*

III. Unresolved issues: community involvement, urban renewal & environmental justice

The time frame for the competition was brief, and the team found it challenging just to navigate through the different protocols, assumptions and worldviews of represented disciplines. This 'thought exercise' was valuable not only because it was an opportunity to collaborate across disciplines, but also because it surfaced numerous challenges. Perhaps the most challenging is how audiences might interpret the lines on the paper. Although the policy plan was conceptualized by the team as a 'snapshot' of a process, the artifact itself is a static image on a piece of paper and could be therefore interpreted by communities—particularly those disproportionately affected by urban renewal and environmental injustices—as a traditional plan.

Boston residents who experienced displacement historically or are aware of historic displacements may be actively concerned over how their community appears in snapshots. For example anyone who was displaced from the West End(Gans 1967) or from the neighborhoods where the Southwest Corridor Park is today (Warner 1987) brings historical reasons why they might be concerned about what zone a snapshot depicts their neighborhood in today. The challenge for the team is to find methods for communicating ideas like "New Enterprise Zones" that are intended to include existing residents in ways that engage and empower communities. In the future, interactive computer programs could be a vehicle through which to discuss these kinds of non-static concepts.

Scientists and design practitioners need 'their time', but community voice needs to systematically and iteratively inform the process. In fact, the decision-making ultimately happens at the community level, so it behooves scientists and designers to begin their process by asking the community members what they are trying to 'decide'. Environmental Justice groups in many ways are

ideal groups with which to engage: they are already organized; they are concerned about the environment and understand that its health is essential to human well-being; they have decision making frameworks that can incorporate ideas, data, suggestions, and analysis of scientists and designers; and they have similar the vision of wanting a sustainable future. Equally important is the process of supporting the evolution of "new stories" at the level of individuals in our heavily networked world culture with opportunities and creative ideas (James 2004).

IV. Evolution of Bioregional Urbanism

After the IaaC competition, we had ample time to reflect on and discuss our ideas with other practitioners, within our disciplines and outside. Our model continued to evolve after the competition, as we reflected and continued to explore and learn and discuss the work. To summarize our evolution, we began to see our bioregional approach not only as a method, but also as a model for 'just sustainable development' that could lead to global sustainability. Influences on our evolution include Agyeman's concept of just sustainability: the concept of 'environmental space' by Friends of the Earth; our work with community based practitioners; environmental justice research; and feedback at conferences and other academic forums.

This team is developing this model in an effort to integrate design (at multiple scales) and social justice methodologies into the bioregional framework. Bioregional urbanism, as distinct from bioregionalism, is grounded in the basic tenants of bioregionalism, but adds and emphasizes other principles: 1) regional self sufficiency/resiliency with 'fair share' distribution will lead to global just sustainability; 2) emerging global data and technologies are drastically improving our ability to monitor human and ecosystem health, and therefore must be used in the decision making process; 3) rapidly urbanizing populations and their activities need to be understood within the bioregional context (therefore the addition of the term urbanism); 4) we need to use regional self sufficiency and resiliency metric tools such as global-to-local resource budgeting, land use analysis, and virtual and advantageous trade analysis; 6) design professionals need to be engaged to provide more humane and desirable settlement and lifestyle alternatives. The team is working to develop methods that can help communities as well as practitioners from all disciplines better utilize and apply the bioregional framework.

Bioregional urbanism is intended to be a just sustainable development model that helps regions become more self sufficient within a global context, and it is intended to become a central part of the 'sustainability' discourse. Despite the power of design to provide lifestyle and settlement solutions, the design disciplines have been mostly absent from the bioregional discourse, along with the social justice disciplines, and yet both of these have much to offer. We are proposing that a bioregional urbanism as a model, with sophisticated design and just methods, be used by communities, designers, planners, and policy makers to create more sustainable places. We are currently attempting to integrate tools and frames of other related movements into the bioregionalist agenda. From the education and collaboration sectors we are working on participatory education, collaborative inquiry, action research, learning communities/learning organization, and public education models (models include Senge 1990; Dolezal 2008; Finn 1999; Mulvihill et al 2006 among others). Turning to systems change movements we are looking at trans- and cross-disciplinary holistic approaches to solving 'wicked problems.' Returning to our urban focus we are exploring urbanism movements and research such as landscape urbanism, ecological urbanism, and urban ecology. The placemaking movement is also important in many of our experiences. Also on the agenda are global science and climate change agenda, including ecological and carbon "footprints" and "one living planet" ideas (see for example Greene et al 1999; Cooke 2007). As we have noticed commonalities we are also looking into permaculture and urban agriculture in other cities (for example Gyoval 2009; Randall 2009). We look forward to exploring the works of Joan Fitzgerald (2010) among others in urban sustainability. Finally, we are exploring through classes and research just sustainable

development and environmental space as well as global North and South production/consumption dynamics (for example Carr 2004; Bullard 2009; Evanoff 2007).

Methods (beyond bioregional assessment and planning) that are being developed include:

1. Collaborative action research between scientists, designers, policy makers and communities
2. Understanding and applying 'nested' resource budgets and 'fair share' allocations from the global to the local
3. Understanding distribution of resources and waste for equity and justice
4. Understanding the metabolisms and dynamics of cities in relation to supporting regions. Analyzing advantageous regional trade relations (based on regional resources) to build just sustainable economic markets.
5. Incorporating design into the process to generate settlement and lifestyle alternatives that are more just and ecologically sound

Bioregional urbanism is not intended to be a prescription for action, but rather is an effort to link global to local human and natural system data and analysis–within a just sustainable framework–to decision making at multiple scales. Stated another way, it is a model designed to generate geospatial strategies for just sustainability–considering all areas of human activity relationally including economy, land use, and water use among others. A fundamental worldview of bioregionalism is that solutions need to come from communities themselves; the problems and the solutions must be generated by the community, not by the analyst, researcher, or designer. The final goal is not directives, but more informed and self-empowered decision makers.

CONCLUSION

In his 1994 book The Anti-Politics Machine, anthropologist Ferguson critiques third world development projects for not taking into account insights from the history of such projects, arguing lessons from unsuccessful attempts could be used to create future successes. Drawing on this and other arguments about the importance of history, in this paper and in our research, we have began with the history of Boston as it underlies and informs any future efforts to change the city in the direction of sustainable urbanism. We moved on to present our initial collaborative research informed by history exploring strategies for bioregional urbanism. In conclusion we call for further collaborations between practitioners, academics and communities to create, test, discuss, and implement sustainable urban life-ways. Based our experiences, we also recognize the need for new strategies to address specific barriers to effective collaboration.

In the spirit of Ferguson's call for learning from past challenges, we would suggest a number of barriers to effective collaboration that we and we hope other scholars are working on in order to solve sustainability challenges. Issues of language norms can prevent effective collaborations if participants do not identify their specific meanings of terms. Expectations as far as output, as published documents in various formats, as publicly accessible materials, as film, meanwhile can bring individual participants to the table or drive them away. Thought experiments we have found can be especially challenging for presentations and publication because they do not represent real world changes, but may be necessary in some fields before translation to real world implementation. Other challenges of presenting and publishing across disciplines include, citation methods, disciplinary values, and the different degrees to which conjecture is an acceptable activity in various disciplines. In thinking about the city as change a final barrier is how can we evolve existing urban fabric into more sustainable settlement patterns unless we are able to go into the uncomfortable places, talk about subjects like race, class, privilege, and anthropocentrism, and find common ground.

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