
DEEP ECOLOGICAL URBANISM

A framework for integrating science and ethics into the planning and design of human-dominated ecosystems

Megan Griffith





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April 2014

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planning and design of human-dominated ecosystems

by

Megan Griffith

Approved

April 2014

Professional Project Committee Approval

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Finally, I am so thankful for my dearest friends and family. Though I have regretfully neglected them in the last two years, their continued belief in me had pushed me to heights I could have never imagined!

DEDICATION

To my other half, Shane Griffith. You've been with me since high school. You were by my side throughout my undergraduate studies. Now, as my husband, you continue to remind me every day that I am able to achieve great things.

You are everything I'm not, you fill every void. You lift me up, then keep me anchored so that I can dream freely without fear of getting lost. You are my best friend and loudest cheerleader. Without you, I am absolutely certain that I would not be where I am today.

I dedicate this work to you, my champion.

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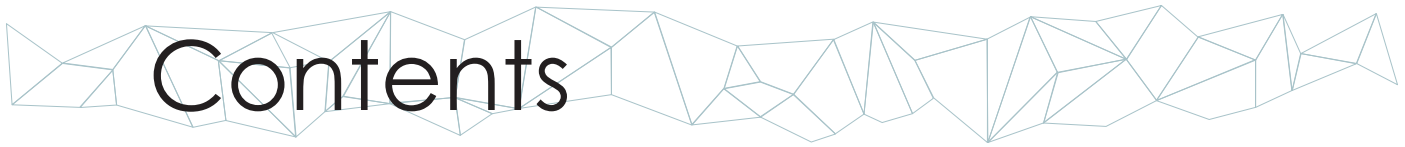
As an alternative to conventional planning, this report has developed a conceptual and operational framework for reintegrating non-human nature into human-dominated communities. Called Deep Ecological Urbanism, the framework unites progressive and valuable theories to craft a unified strategy for planning, designing, and shaping human-dominated ecosystems. These theories are pulled from literature of social science, natural science, and philosophical journals. Seeing urban planning, ecology, and environmental ethics as the foundation for all planning, and for all of the day-to-day endeavors of human-dominated ecosystems, Deep Ecological Urbanism identified 12 guiding principles and four different layers of the city: habitat, biota, society, and cycles. Within each layer there are individual systems, sectors, and components that define activities within human-dominated ecosystems.

To refine the conceptual model as an operational framework, a best practices review of three distinguished cases—including Portland, OR; San Francisco, CA; and Vancouver, BC—identified exceptional approaches and perspectives in planning for our urban ecosystems. Next, this project examined ecological health based on a planners' survey that revealed more common approaches to planning. With 135 responding planners and consultants from across the country and around the world, the survey revealed that practicing planners do indeed feel a responsibility to protect their communities as well as

those of non-human nature. The respondents believed that ecological health was important, but noted that their employers likely saw it as less so. The respondents also recognized several challenges and barriers on awareness, support, logistics, and process. Acknowledging the current challenges, 66 percent of respondents expressed interest in a locally-adaptable and comprehensive framework for synergistically implementing holistic planning across agencies and systems.

The resulting operational framework outlines a 7-step process based on a holistic strategy and its key components, including a project team, an implementation matrix, tools and resources, as well as information regarding the selection of indicators. The strategy is capable of being adapted in various municipalities through a calibration process.

Deep Ecological Urbanism is a timely piece that consolidates contemporary and relevant theory in a conceptual framework for planners and concerned citizens. This framework emphasized the many diverse reasons why we must integrate non-human nature into our human-dominated ecosystems—not the least of which are the emotional, physical, and mental benefits gained through access to nature. It also revealed that human communities have much to learn from nature in terms of sustaining efficient and resilient systems.



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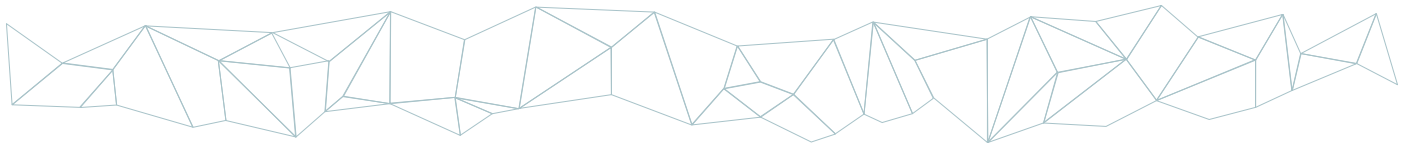
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List of Abbreviations

BPS	Bureau of Planning and Sustainability, in Portland	IPIC	Interagency Plan Implementation Committee, in San Francisco
CBD	(1) Central Business District (2) UN Convention on Biological Diversity	LAB	Local Action for Biodiversity
CBI	City Biodiversity Index	LBC	Living Building Challenge
CBO	City Biodiversity Outlook	LBSAP	Local Biodiversity Strategies and Action Plan Guidelines
CMA	Census Metropolitan Area (in Canada)	LEED	Leadership in Energy and Environmental Design
CMO	Community-Managed Open Space	LEK	Local ecological knowledge
DEU	Deep Ecological Urbanism	LRP	<i>The Livable Region 1976-1986</i> , in Vancouver
GCAP	<i>Greenest City Action Plan</i> , in Vancouver	LRSP	<i>Livable Region Strategic Plan</i> , in Vancouver
GCI	Green City Index	LTER	Long Term Ecological Research Network
GDP	Gross Domestic Product	PHIUS	Passive House Institute US
GPI	Genuine Progress Indicator	PIC	Planning Information Center, in San Francisco
GHG	Greenhouse Gas	RTC	Regional town center
GVRD	Greater Vancouver Regional District, in Vancouver, CA	SME	Small- to medium-sized enterprises
FIRE	Finance, insurance, and real estate industries	SWOT	Strengths, Weaknesses, Opportunities, and Threats Analysis
ICLEI	Local Governments for Sustainability, formerly <i>International Council for Local Environmental Initiatives</i>	UGB	Urban Growth Boundary
IFLA	International Federation of Landscape Architects	URBIO	International Network Urban Biodiversity and Design
ILC	International Landscape Convention	WCED	United Nations World Commission on Environment and Development



CHAPTER 1 //

INTRODUCTION

CHAPTER ONE | Introduction

This planet is a marvelous thing. From the winds, whirling through branches of trees high atop mountains (Figure 1), to rain falling on a vibrant street—life on this planet is nothing short of amazing. It’s difficult to grasp just how incredible our Earth truly is. Indeed, it is *awesome*—in the truest sense of the word—it is awe-inspiring. Earth is at the same time wondrous and terrifying, bewildering and startling.

Threatening the vast remarkableness of the Earth, however, are patterns of unsustainability—trends like pollution, climate change, biodiversity loss, species extinction, deforestation, and habitat loss. To protect this planet, we must cease and reverse these trends. In doing so, we would be wise to adjust our current perspectives regarding life on this planet. Additionally, those individuals who shape our communities must choose alternate paths to development—paths that respect and recognize the Earth and its many wonders. Without doubt, there is much we stand to lose if we fail to initiate this shift.

PURPOSE OF STUDY

Human communities are losing touch with nature. We’ve managed to “adapt” to “unnatural” systems and ignore (though, perhaps only for the moment) environmental and planetary limitations. As a result of this disconnect, the planet is plagued by resource depletion, habitat degradation and fragmentation, global biodiversity loss, air and water pollution, and climate change, among other symptoms. At the same time, citizens of this Earth are becoming angrier, more violent, stressed, and anxious individuals, while many communities and their residents now live devoid of contact with non-human nature outside of the control of domesticated plants and pets, manicured lawns and parks, and the occasional confrontation with invasive species or pests. As these trends continue, it should become clear that we have not succeeded in inventing ways to ignore the laws of nature, but are in fact making ourselves even more vulnerable to them.

FIGURE 1. VIEW OF THE POTOMAC FROM THE APPALACHIAN TRAIL AT HARPERS FERRY



Photo by Author

An Urban Challenge

Aggravating these patterns of unsustainability is the overwhelming rate of population growth, particularly in cities. It's a fact that we can no longer ignore: today, more than half of the planet's 7 billion inhabitants reside in urban areas; and this number is expected to grow.

It is critical to recognize that this rapid urbanization is occurring simultaneous to the drastic, global environmental changes mentioned above—many of which are caused or exacerbated by human activity. Although ancient cities made good use of their limited resources, today's cities matured during times of cheap oil and abundant resources (De Decker, 2012). Today's aging developments, furthermore, have become blind to the fundamental diseases which ail them. Losing touch with the mutual, symbiotic relationship that humans and their communities had once shared with this planet's non-human nature, urban systems have slowly become more and more harmful to precious natural life while at the same time ignoring the laws and guiding principles of nature.

Cities, while currently contributing to these growing challenges, might also be a solution. The fact that more people will be living in cities does not necessarily imply that our planet is fated to suffer. In fact, even from an environmentalist's perspective, this transition to a more urbanized world might suggest a potential recovery for the planet's natural environments. Taking action, we must address the state of cities and consider how they can be restored to become more sustainable, resilient, and ecologically healthy places.

The Urban Opportunity

While these are global challenges, individual cities might still have an enormous impact in moving toward a solution. Cities indeed offer great potential to address global sustainability challenges, albeit only if they are operating properly. While there can never be any one true solution, research of best practice strategies suggests that certain techniques are more efficient than others. Through particular strategies, cities are

meeting their current needs while bestowing upon future generations places and environments that are healthier than those which are inhabited today.

It is imperative that cities alter the current trajectories through more comprehensive, holistic planning. Scholars and designers are already exploring alternative forms of developments. In practice, incredible advancements have focused on guiding new cities, particularly in developing countries, towards sustainability and resiliency. Less attention, however, has been given to improving the existing cities of developed, industrialized nations. With the exception of a handful of leading scholars, the only sustainable or ecological development being praised and publicized are those which appear to spring up overnight (e.g. Masdar, UAE; Tianjin Eco-City, China; et al.). While these projects deserve to be commended for their conscious attention to local ecosystems, resiliency, and sustainability details, it is more important that we direct our attention toward existing cities.

We must not ignore the fact the many current cities do not operate as efficiently as possible, and we must also recognize that greenfield development—new development taking place on previously undeveloped land—has an even more harmful impact on the environment that infill development does. It is imperative that we view existing cities as a solution.

RESEARCH QUESTIONS

I propose that we can reverse the trends of global environmental degradation by reintegrating nature into our communities and our lives. To do so, we must understand which of the natural systems and processes that surround us are most sensitive and should be prioritized for protection when we develop. We should also investigate how we can improve the designs of our communities by mimicking natural processes and harnessing nature's wisdom. To do this, planners and those individuals working to shape our human developments must have, at the very least, a basic understanding natural science.

We must also work to build stronger relationships with nature on more personal levels. Doing so will prove beneficial for human health, happiness, and well-being, and will also instill an ethic of care within people, making them better stewards of the environment (to be clear, environments both cultivated and not). Growing this bond will require the recognition of environmental ethics.

Therefore, this study proposes that cities may be revitalized through an alternative planning approach that addresses the abovementioned sustainability challenges, as well as both environmental and public health concerns. The Deep Ecological Urbanism concept contends that an understanding of natural sciences and environmental ethics can help to inform how cities can be adapted in ways that restore natural systems and processes. This project intends to examine four questions:

- How can we model and mimic nature in order to comprehensively and holistically adjust the processes and functions of dominated ecosystems?
- How do we restore or initiate a mutuality between human and non-human nature?
- How can primarily human-shaped developments enhance the health, safety, and well-being of all life—both human and non-human? And,
- In the above three questions, what role do planners play?

PROJECT RELEVANCE

Cities, their leaders, and their inhabitants, in order to move beyond current inefficiencies of urban development patterns, must accept a responsibility to lessen environmental impacts (Haughton & Counsell, 2004; Keivani, 2010; Kennedy, Baker, Dhakal, & Ramaswami, 2012; Spirn, 2012; et al.). Professionals of the urban environment must accept this responsibility to address the long-term impacts of their decisions, and to proactively address new challenges before they

arise. Doing so will increase the resiliency and health of our communities and ecosystems.

As first introduced in my earlier independent research, the Deep Ecological Urbanism concept proposes a planning approach that incorporates the ethical and practical consideration of nature into urban development processes. Emphasizing the need to restore the health of urban and human-dominated environments, this theory suggests, primarily, that existing cities *can* be adapted in ways that restore natural systems, encourage biological growth, and minimize the harmful impacts of human development on the land or, in some cases, produce a net benefit and actually enhance the underlying biological fabric.

The findings presented in this report support the feasibility of the Deep Ecological Urbanism concept while offering planners a flexible framework and the early ingredients of a toolkit for initiating an ecological evolution in their own jurisdictions. The intended audience of this report, therefore, are those scholars and professionals of urban and environmental studies (e.g. planners of all specializations; architects and designers; engineers; developers; etc.), as well as those of experts of appropriate social and natural science fields (e.g. urban policy leaders; ecologists; conservation biologists; etc.). Furthermore, all other professionals who work in human-dominated communities and systems should understand the implications of this alternative approach for addressing many interrelated problems.

RESEARCH DESIGN

Mixed research methods will be used for this study. As the comprehensiveness of the Deep Ecological Urbanism concept will make it difficult to conduct extensive primary research in the limited period of time set aside for this study, a significant component of this research shall be compiled primarily through a comprehensive literature review, and supplemented through a planners' survey.

Literature Review

The Deep Ecological Urbanism literature review process began in Spring 2013. My prior research revealed the highly interdisciplinary nature of the research question. The sheer wealth of written thought on the relevant concepts should indicate that the literature review within this report is by no means exhaustive. This review, however, is the sturdy underpinning of knowledge necessary to grasp the Deep Ecological Urbanism concept.

In recent decades, a number of scholars have put forth “new” ideas for improving our cities without acknowledging the precedent. It is important to recognize that fascinating and worthwhile ideas already exist, even if only on paper. The Deep Ecological Urbanism model draws from these existing ideas, noting that their only fault is that they have not yet been implemented, or, where they have, that the approach has simply been too piecemeal.

As a first step, this study will seek to understand relevant planning theory. For this research, I will thoroughly read through collections of urban and regional planning journals. Additionally, due to the interdisciplinary nature of the concept, I will carefully research select literature in scientific and philosophical journals.

While it is important to ensure that the literature selected for review originates from credible sources, articles and books will not be discredited or excluded from this research based solely on a lack of academic or professional credentials. Indeed, some of the best conversations are started in more “casual” environments. Any relevant literature that is sourced from less-formal arenas, of course, will be reviewed with more care and caution, and steps shall be taken to verify information from these pieces so as not to damage the integrity of the overall project. For instance, all factual-based information gathered from such outlets will either be checked for accuracy or not included in this report.

Additionally, literature will not be disregarded based on the date of its publication. Indeed, it is critical to acknowledge that many of the ideas embraced by the Deep Ecological Urbanism concept were put forth some decades ago, but are nevertheless still compelling arguments.

Best Practice Research

Moving from concepts to practice, this study will also conduct research of existing best practice cases. This process shall identify the logistical and practical considerations necessary for applying the Deep Ecological Urbanism concept to practice.

CASE STUDIES

A systematic review of best practices will analyze three existing case cities and evaluated their efforts and successes with regards to ecosystem health, resiliency, and sustainability. This process will include a review of each city’s background, key informant interviews with practicing planners in the case cities’ local planning agencies, and an assessment of planning documents and current initiatives. The case study research will reveal common practice and shared strategies, as well as unique characteristics, among these three exceptional cities.

The case cities were selected based on their previous accomplishments with regards to sustainability, resiliency, and ecosystem health. A number of existing cities are setting precedents in terms of sustainable development and protection of biological phenomena in human-dominated ecosystems. For example, much progress has been made in older, European cities, as well as in newly developed Asian Eco-cities. Development patterns in North America, however, are often quite different from those witnessed overseas. Lessons learned from European or Asian cases, though often quite impressive, would not be as applicable in North America. Therefore, this study will look specifically to the precedents set by some of the most progressive cities in North America.

FIGURE 2. THE THREE CASE STUDY CITIES

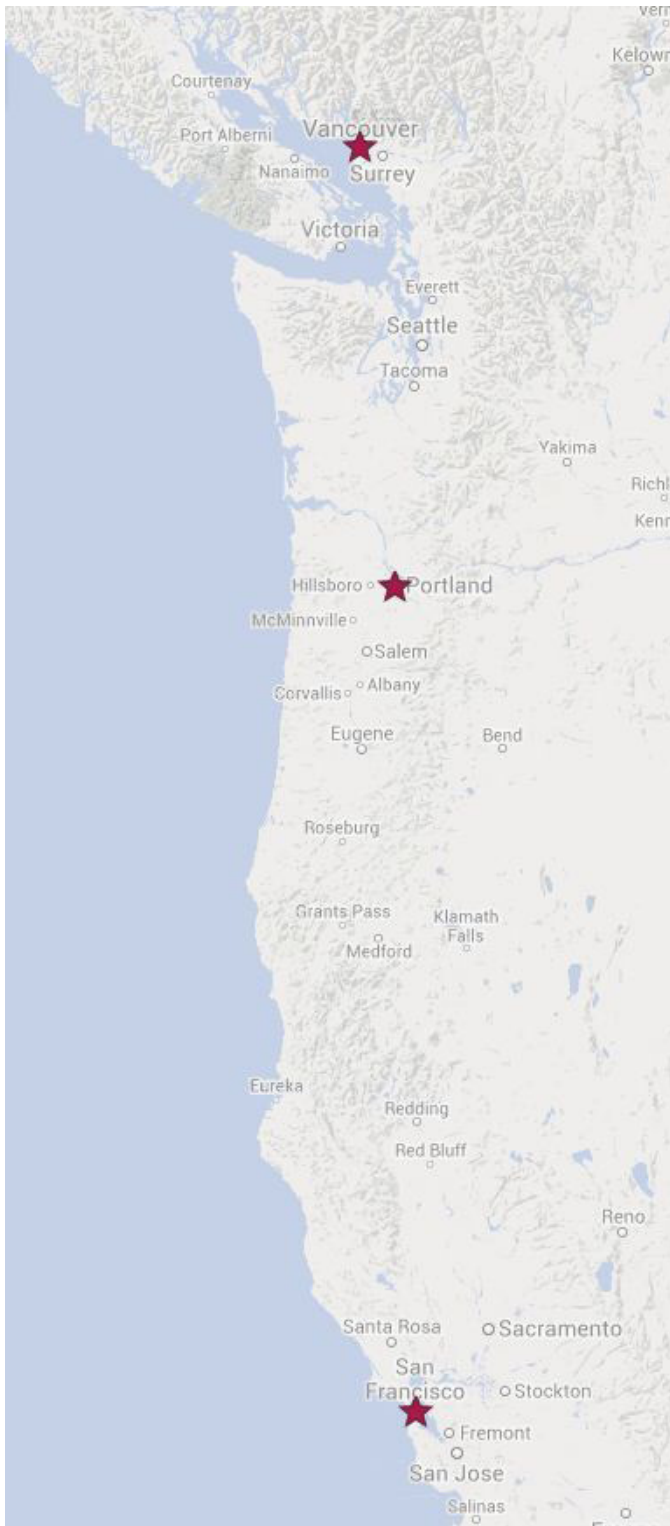


Image created by author using Google Maps

As the primary objective of the case study research is to better understand how the most progressive cities are moving forward, the selection process was deliberate. Cities were selected precisely because of their reputations for being “sustainable” or “green.” To determine case cities, I had reviewed a number of indices that rank the “greenest” or most sustainable cities in North America. When comparing the top ranking cities of each index, patterns identified those cities which consistently rank highest. The three cities with the highest average rank were selected.

While ranks and indices are important for their ability to ignite conversations about best practices, there are a number of challenges inherent in any ranking system, and I would be remiss to discount these limitations. For instance, systems can be partial, or tell an incomplete story without consideration of additional factors, providing a misleading account. Additionally, ranks may be subjective or biased.

Another major challenge is the lack of recurring publications for evaluating shifts in rank between publication years. Comparison is yet another challenge. It’s also unlikely that two indices would produce reports using the same baseline year. Therefore, for the purpose of this study, I have elected to completely disregard the publishing year of each index and compare my collection of ranks as if all indices had been produced in the same benchmark year. Some of indices used may date as far back as 2008, but no further.

Though I recognize the many challenges with comparing indices (varying criteria, inconsistent publication years, lack of credible sources, etc.), all indices were, for the purpose of this study, viewed as equal. Regardless of apparent credibility, I argue that any list’s rankings should be considered valuable for the sole fact that they confirm a city’s position in the global sustainability conversation. Furthermore, it was assumed that any arguably erroneous placing of a city at the top of a single index would have little impact on the final evaluation of the averaged ranks. At the same time, if a city is time and again ranked as

the most sustainable city—despite the validity of that claim or a lack of supporting evidence—the fact that it is consistently perceived as being the most sustainable makes it worthy of further study. Obviously, these limitations impact the results, but to ignore certain indices would have significantly limited the scope of this process.

Once the top five cities of a collection of indices were noted, average ranks were determined for each. The top three of those averaged entries would be selected for further study. Ultimately, the following cities—two from the United States and one from Canada—were selected (Figure 2):

1. Vancouver, BC, Canada
2. San Francisco, CA, United States
3. Portland, OR, United States

Much has already been written about what these case cities have achieved; but it's considerably harder to determine how they had done so. The research conducted for this project, therefore, will investigate historical practices that may have contributed to contemporary efforts. Furthermore, it will look at how these cases are integrating their efforts across sectors.

SURVEYS

To supplement the knowledge garnered through case study research, a planners' survey will collect information regarding current practices and opinions about sustainability and ecology issues from individuals across the globe. This process is intended to identify the more common practices in cities as they address sustainable development and consider local ecological health.

The survey will solicit the planners' perspectives of ecological health and the relationship(s) that they may or may not draw between ecological health and planning. It also intends to reveal current practice to see if and how planners and planning departments are working to incorporate ecological principles in their work. The survey is limited, primarily, to the ecological aspect of Deep Ecological Urbanism, and does not

include questions related to the ethical elements of the concept.

The 34-question survey will be administered online—distributed via American Planning Association chapters and through various social media channels that are frequented by professional planners (e.g. LinkedIn, APA's Facebook, Twitter, Planetizen, Cyburbia, and other planning blogs). Through the survey, I will gauge need for the Deep Ecological Urbanism framework and strategy, and identify gaps in practice which the strategy should strive to address.

DEFINITIONS

Before starting an in-depth review of the research, it is necessary to define certain terms. Below, I will provide my interpretation of key terms which help to expand the Deep Ecological Urbanism dialogue.

Deep Ecological Urbanism

Deep Ecological Urbanism is an approach to urban design and planning that incorporates the ethical consideration of nature into the development of human-dominated ecosystems, and contends that an understanding of natural sciences can inform the ways in which communities can be sustained and adapted. Deep Ecological Urbanism encourages increasing nature in our communities, and also looks to nature for inspiration and wisdom; thus, a Deep Ecological City functions much like an ecosystem. This approach aims to restore natural systems and processes to make our communities more sustainable and resilient, healthy systems. This form of planning, furthermore, advocates for a concentration on infill development; an approach which protects remaining “greenfields”—undeveloped land.

Communities

While the best solution to our environmental challenges may rest in cities, interest in Deep Ecological Urbanism should not be limited solely to urban planners. Deep Ecological Urbanism, rather, is a global solution for

many sweeping, complex challenges present in all forms and sizes of communities and that extend beyond the limits of a single city, metro-area, or region.

Though the Deep Ecological Urbanism concept views urban systems as prime opportunities to affecting change, it is not limited to applications only in urban areas but can also be applied in more rural areas. Therefore, in this report, **community** refers to any development or municipality that is largely dominated by humans. As such, the term human-dominated ecosystem and community may be used interchangeably.

Sustainability

Though I will go into greater detail regarding this term in the concept review, it's important that I'm clear about my interpretation of the definition of sustainability. Due to its inherent vagueness and extensive multiplicity of meanings, I'd rather avoid the word altogether. The term has been reinterpreted so many times that it has lost the original meaning. Unfortunately, no good alternatives exist. Without an appropriate substitute, it will continue to be used throughout this report. To be clear, I will be using the definition of **sustainable development** put forth by Haughton (1999):

Ultimately, sustainable development involves the long-term survival of the planet and its processes of dynamic evolution, including the wide range of species that currently live on it, not least humankind. (p. 234)

Nature/Natural

Currently, the meaning of **nature** is overly simplified. It underplays ecological function (focusing, instead, on utilitarian, human-derived benefits), makes commodities of certain elements (e.g. trees) but not others, and does not incorporate implications of the layers of "social practices of management and protection" (Ernstson, 2013, p. 9).

Ultimately, we must use "nature" to include both human and non-human entities. This report attempts to

demonstrate the need for restoring that true definition of the term. In this text, however, I will continue to differentiate between human and non-human nature precisely because our current mindset perceives of these two groups as being separate.

Ecological Health

To be clear, *ecology* is the scientific study of the relationships between organisms and their environments. It is not to be confused with the term *ecosystem*, which is a collection of biological organisms and the surrounding physical environment. The descriptor *ecological* will be used when referring to those elements or conditions which relate to the relationships among organisms. Therefore, **ecological health**, or ecosystem health, is the health and resiliency of the overall quality of the ecosystem and of the relationships between the organisms within it.

REPORT STRUCTURE

This report has been divided into four major chapters. The following chapter of this report provides the conceptual foundation for the Deep Ecological Urbanism theory. An understanding of key concepts and trends establishes the foundation for defining and elevating the Deep Ecological Urbanism Concept, and this review will set the stage for the Conceptual Framework (Chapter 3). The Conceptual Framework begins to shape the theoretical foundation for the Deep Ecological Urbanism planning strategy.

A review of current best practices (Chapter 4) provides the empirical research to necessary to make the Deep Ecological Urbanism model tangible. Best practice research supplements the theoretical review to serve as a means for operationalizing the preliminary Conceptual Framework. The final section of this report (Chapter 5) attempts to establish a comprehensive, guided, and Operational Framework through which the Deep Ecological Urbanism concept can be applied in existing cities.

SYNOPSIS

The global challenges mentioned above are fundamentally entwined in today's communities. If they are unaddressed, they have profound impacts for the health and well-being of both human and non-human populations, and will continue to impact Earth's communities. While adequate and progressive planning should not be mistaken for a panacea, it can be a vital step in improving the long-term health and resilience of the Earth. This report intends to demonstrate how planners are engaged and the roles they shall play while moving forward.



CHAPTER 2// CONCEPT REVIEW

CHAPTER TWO | Concept Review

The challenges which threaten the well-being of the Earth are both many and complex. The solutions, therefore, will require comprehensive and interdisciplinary, holistic strategies that are capable of simultaneously meeting multiple objectives. Fortunately, there already exists a plethora of current literature which discusses precisely this.

FIGURE 3. VIEWS FROM BROOKLYN BRIDGE PARK



Photos by Author, 2013

SHAPING HUMAN-DOMINATED ECOSYSTEMS

The future of the Earth depends largely on human perceptions of our surrounding environments. This is particularly critical for planners to understand as they play a key role in shaping our communities. In the past few decades, the sustainability movement has been increasingly significant in planning and development. The meaning of the term sustainable, however, remains largely contested. In addition to sustainability, our perception of nature influences the degree to which non-human nature is included in our communities. Our definitions of these two key terms, therefore, must be refined before we can affect positive change. Furthermore, we must view our cities as a solution.

Sustainability

Presently, a major concern of global development is that of sustainability, or the lack thereof. Much of the existing literature begins by addressing the challenges inherent in defining sustainability. Through very profound discussions, two primary concerns are revealed: one of defining the sustainability *vision*, and one of identifying *actions* toward sustainability (Williams, 2010).

IDENTIFYING VISION: A MULTIPLICITY OF MEANINGS

When talking about the future of our cities, we must first describe sustainable development. How would one describe a sustainable city? What makes it different from conventional development? Certainly, there is much disagreement, to which the literature is not quiet.

As a first step, I propose looking at the most frequently cited definition of sustainable development, the definition published in the 1987 *United Nations World Commission on Environment and Development* (WCED) report, *Our Common Future*, also known as the “Brundtland Report”:

Sustainable development is development that meets the needs of the present without compromising the

ability of future generations to meet their own needs. (Brundtland GH, & World Commission on Environment and Development, 1987, n.p.)

The Brundtland definition is not an altogether bad definition, but is indeed vague and is often misinterpreted. Main criticisms range from claiming that the term is too narrowly defined— leading to ineffective “packaged” solutions (Crinion, 2008), to criticisms of the term being excessively vague. Additionally, the many definitions are suspiciously pro-development and “anti-green” (in the ecological sense of the phrase) (Beatley, as cited in Reintegrating Urban Ecology, 2013). Therefore, yet another criticism argues is that sustainable development is an oxymoron—that it isn’t even possible considering we inhabit a planet with finite resources and a growing population (Andersson, 2006; Crinion, 2008).

My principle qualm with the term sustainability—and a fundamental drive of the Deep Ecological Urbanism concept—is similar to what Fritjof Capra (n.d.) had once explained:

Since its introduction in the early 1980s, the concept of sustainability has often been distorted, co-opted, and even trivialized by being used without the ecological context that gives it its proper meaning. (p.3)

IDENTIFYING ACTIONS: LIMITED APPROACHES TO MAKING CHANGES

In addition to the abovementioned challenges, there is a real disparity between sustainability knowledge and current practice toward achieving sustainability. In fact, on the ground, we actually appear to be regressing in many respects (Williams, 2010). Perhaps this is because there’s difficulty in understanding and agreeing upon *how* to implement sustainability. There are no accompanying instructions explaining the methods for accomplishing sustainable development (Downton et al., 2014; Yang, 2009). Without such, furthermore, we have no means to measure our progress (Williams, 2010).

In addition to the various interpretations, which are often selected or crafted to suit the individual interests or needs of the user (Haughton & Counsell, 2004; Williams, 2010), there exists a number of solutions ranging in their “greenness” from light green to dark green, and differing in their strategies. The “word ‘sustainable’ is routinely applied to projects that are ecological nonsense” (Downton in Downton et al., 2014, n.p.). This misinterpretation may be the cause of what many label as *greenwashing*; that is, the overuse (and often misuse) of the term sustainability to the point where it lacks validity or meaning.

Currently, approaches to sustainable development are limited by two split perspectives—from an approach of technocentric environmental modernization to one focused on ecocentric, ecological solutions (Diamond, 2005; Madge, 1997; Turner, Pearce, & Bateman, 1994, as cited in Haughton, 1999; Williams, 2010). Thus, approaches are placed along a spectrum that ranges from a weak to a strong interpretation. At the weaker end, a narrow policy focus of sustainable development may not even challenge current development dynamics (Antrobus, 2011; Filion, Peters, & van den Dobbelsteen, n.d.). These near-sighted, “lowest common denominator approaches (Haughton & Counsell, 2004), however, reinforce existing power structures (Brulle, 2010) and attempt “to hold onto the existing socioeconomic structure that caused the problem in the first place” (Crinion, 2008, ¶ 1). In doing so, they are only effective in that they substitute one problem for another, while continuing to protect interests of growth and development (Haughton & Counsell, 2004).

At the other end of the spectrum, approaches may pursue extremely ecological solutions (Filion et al., n.d.). Environmentalists, while in pursuit of a worthy cause, have limited their scope to a single interest and tend to ignore, for the most part, other non-environmental problems—seeing them as unrelated to the health of the environment (Nordhaus & Shellenberger, 2007). Indeed, early environmentalists and key environmental thinkers (e.g. Ralph Waldo Emerson, John Ruskin, John Muir, Aldo Leopold, J. Baird Callicott, Henry

David Thoreau, et al.) were often criticized for being misanthropic; compared to the other extreme: human chauvinistic (Gunn, 1998).

With either approach, we tend to emphasize the “green” (i.e. “eco-friendly”-ness) but forget the non-human nature (i.e. biological and geophysical elements) in the process (Beatley, 2012). A multiplicity of understandings, due to the generalness of the concept (Andersson, 2006; Yang, 2009), leaves the door open for widely varying and sometimes competing interpretations. While this might present inconsistent understandings and, thus, weak civic reception of the concept of sustainable development, this multiplicity can also lend itself to diverse and sometimes creative innovations. Indeed, there is no single answer or response to the challenges we face (Filion et al., n.d.), and we might actually benefit from a wide range of approaches.

TOWARDS A NEW UNDERSTANDING

Over the years, numerous interpretations and efforts to re-define of the word have led to a multiplicity of understandings of sustainability, which cannot simply be ignored (Hajer, 1995, Harvey, 1996, as cited in Haughton & Counsell, 2004, p. 141). To remedy this, we need a shared definition of sustainability that can act as a “conceptual anchor” (Williams, 2010). After all, how we define the problem determines what is address and how it’s solved. As a starting point, we might choose to use Haughton’s (1999) definition, as presented in Chapter 1 of this report. This, however, may still be too broad of a definition. Our shared definition should be more specific, yet flexible enough to suit the entire range of human and non-human needs and applications of the term.

In our shared definition, we need to recognize, furthermore, that sustainability is not a goal, nor a panacea, but a capacity (DeKay & O’Brien, 2001; Rotmans, van Asselt, & Vellinga, 2000). The term should be seen as serving three purposes: as a (1) resource, (2) tactic, and (3) strategy (Haughton & Counsell, 2004). As a capacity, sustainability is a means, not an end, and

the processes and outcomes of using the sustainable development tool can and should vary from place to place.

Defining “Nature”

In addition to defining sustainability, I find that it is critical to define what I mean by “nature.” Doing so, however, instigates similar challenges in that nature is a vague term and is sometimes taken to mean different things. In addition, whatever our definition, we must realize that it is entirely anthropocentric as humans ultimately define nature through a human lens—inevitably doing so based on the services that we, as humans, gain. In this section, I look at our current understanding of nature and how that has led to an intense divide between humankind and the rest of the planet.

“Nature, sentimentalized and considered as the antithesis of cities, is apparently assumed to consist of grass, fresh air and little else,” Jane Jacobs scorned, “and this ludicrous disrespect results in the devastation of nature” (as quoted in Spirn, 2012, p. 4). Today, we have separated humankind from most forms of nature. Though in some cases we are trying to reintegrate ourselves with non-human nature, we’re not shifting our perspectives quickly enough. This has led to aggravated degradation of the planet, contested economic and political actions, and deteriorating social conditions.

By viewing cities as something separate, we have ignored the laws of nature and have thus led to our own devastations and declines (Diamond, 2005; Downton et al., 2014). Yet, if cities truly are “bad”—that is, if cities contribute to the destruction and harm of the planet (and many of them certainly do)—it’s only because much of society fails to acknowledge that cities are not actually separate from nature, but that we *are* nature, and that our actions impact and are impacted by all that surrounds us. Instead, our continued ignorance of the implications of development decisions only lead to greater destruction, and can be witnessed by considering the fall of many great ancient cities

(Downton et al., 2014; Gunn, 1998; Hough, 1989), and through the growing intensity of “natural” disasters in recent decades (Alberti, 2005). Arguably, though Gaia—our Mother Earth—is fierce, there’s no such thing as a natural disaster (Spirn, 2012; Smith, 2012). Instead, many of the disasters which wreak havoc on our communities may very well have been caused or exacerbated by human activity. Urging for the cautious and thoughtful planning of cities, the 15th century architect Leon Battista Alberti, exclaimed:

We ought never to undertake any Thing that is not exactly agreeable to Nature, for so great is Nature’s strength that, although...some huge obstacle may obstruct her, or some barrier divert her, she will always overcome and destroy any opposition or impediment; and any stubbornness... displayed against her, will eventually be overthrown and destroyed by her continual and persistent onslaught. (1988, pp. 35-36, as quoted in Spirn, 2012, p.2)

As we move forward, we must abandon our current binary (nature/culture, or protected/unprotected) view of this world (Kilbane, 2013). No longer can we believe that there is a separation between managed cities and wild, “pristine” ecosystems; or between human and non-human inhabitants. Though some characteristics may be different, cities are habitats just like any other—albeit, currently ill-adapted to meet the needs of all their inhabitants (Spirn, 2012).

Recent planning for urban nature can hardly be called as much. Most urban green spaces are not created for non-human wildlife (although there’s great potential to do so), but for the benefit of human residents (Barnes & Adams, 1999). Furthermore, nature is not a thing, nor is it a place. Instead, nature is an everyday experience (Beatley, 2012). It is precisely this failure to recognize that cities are natural systems that has contributed to the significant environmental problems we face (Spirn, 2012).

IDEALIZED LANDSCAPES

Currently, our vocabulary is geared towards extreme and idealized landscapes: those landscapes with

human influence (e.g. manicured lawns, romantic parks) and those without (e.g. pristine wilderness) (Gandy, 2013). Looking forward, we must balance, as Calethorpe urged, “urbanism and naturalism” (1993, p. 44, as quoted in Banai, 2012, p. 15). The ideals must be considered along with pragmatism, and we must accept that our landscapes need not be wild or pristine to be ecologically valuable (Dearborn & Kark, 2009).

How do we *know* nature; and, in our current understanding of the concept, what constitutes an “aesthetic “ of nature, or shapes our discrimination against “inauthentic” nature (Gandy, 2013)? The thought and sight of marginal, underutilized spaces in the city makes many people feel uncomfortable; but these spaces are incredibly exciting (Gandy, 2013). Actually, the highest performing and most ecologically valuable nature in a city is not found within the urban park, but in the leftover “wastelands”; spaces that Gandy (2013) calls “terrain vague.” While these spaces are perceived to be unproductive or underperforming, they are indispensable in terms of their ecological function. Thus, marginal spaces and our misunderstanding of nature represent both an ideological (cultural) and practical problem (Downton et al., 2014).

The historic emphasis on aesthetic over ethic had undermined local environments by prioritizing pristine and wild environments (Gandy, 2013). Our natural aesthetic has been human-defined; but we fail to see that beauty exists beyond human perception—through and across dimensions of time, space, and scale (Gandy, 2013). In truth, an aesthetic has absolutely nothing to do with the need to protect non-human nature. To clarify, Nick Bertrand described the sight of a rotting carcass—which would rarely be called a beautiful sight (2011, as cited in Gandy, 2013, p. 1309). However, the ecological function provided by that carcass is undeniably significant, and so beautiful.

Today, we need an ecological (as opposed to a “scenic”) aesthetic that is based on the understanding that nature is essential to the healthy functioning of our human-dominated communities. Our new aesthetic

must still be rooted in human experience, but it must also appreciate *ecological* beauty.

On Cities

Many of the old “greats”—influential thinkers and writers like Theocritus, William Wordsworth, Thomas Jefferson, Robert Frost, William Faulkner, and Ernest Hemingway—had a strong distaste for cities (Gunn, 1998). During the Industrial Revolution, many posited that cities were terrible settings and places of filth, sin, and disease. When conservationists entered the picture in the 20th century, cities were seen as threats to nature; even described as “anti-life” (see Sukopp, 1998, as cited in McDonnell, 2011). Dissatisfied with cities, conservationists, along with many architects and early planners (see Ian McHarg, Le Corbusier, Ebenezer Howard, Frank Lloyd Wright, et al.), sought to identify alternative methods for developing human settlements. Their designs and concepts would attempt to marry nature and community (Banai, 2012); however, their proposals were often “anti-urban,” and the general understanding was still that “true” nature could not be found within city limits.

Adversity towards the city still exists today. Urban areas are continuously blamed (at times perhaps rightly so) for continued environmental destruction and for the production of harmful greenhouse gas (GHG) emissions—a factor of the Earth’s changing climate. Studies estimate that cities contribute approximately 80% of global GHG emissions (Larson, 2012; UN-Habitat, 2005, as cited in Keivani, 2010). At the same time, cities consume tremendous supplies of the Earth’s resources (often non-renewables). An estimated 75% of energy, for instance, is consumed in cities (Larson, 2012). These estimates are unbelievably high when compared to the actual geographic size of cities. For having relatively small physical footprints—only 1-6% of the planet’s surface area (Alberti et al.,

2003; Alberti, 2005)—cities often have considerable ecological footprints.¹

In addition to (and as a result, or cause of) massive emissions generation and resource consumption, cities are also held responsible for global environmental degradation—from habitat fragmentation and isolation to ecosystem simplification and the disruption and modification of ecological processes (Alberti et al., 2003, as cited in Alberti, 2005). It is estimated that more than half of all federally listed threatened and endangered species are such due to urbanization (Czech et al, 2000, as cited in Radeloff et al., 2005).

Clearly, these trends are cause for alarm. They present challenges that must be addressed, particularly considering that most of our global population growth is occurring within cities. Each year, some 50 million people are migrating into cities (SymbioCity, 2012). By 2030, it is estimated that 60% of the world’s population will be living in urban areas, and as much as 70% by the year 2050 (UN-HABITAT, 2010). Large shares of populations in developed nations are already living in cities; in the United States, for instance, about 80% of the population lives in urban areas (Kennedy, Baker, Dhakal, & Ramaswami, 2012). Actually, you would be hard pressed to find a piece of planning literature that does *not* begin by mentioning global and urban population trends within the first paragraph. Clearly, as the literature reveals, we are aware of this challenge. For the sake of our planet, our species, and the future of all life on Earth, cities cannot continue to be such forces of mass destruction.

There is urgency, yes; and real danger, too (Filion et al., n.d.; Haas, 2009). Failure to change course is a luxury that we cannot afford. If we don’t act immediately

¹ Ecological footprints measure a community’s “load” on nature that is imposed by meeting the needs of its population. It represents the actual land area necessary to sustain a community, compared to its political land area. The concept was originated by Canadian PhD student Mathis Wackernagel and his academic advisor William Rees in 1992. (Newman & Jennings, 2008, p. 80)

(with both proactive and reactive measures), the socio-ecological problems will extend beyond generations, threatening the health and well-being of humans and non-humans alike (Mueller & Dooling, 2011). To quote author Paul Hawken, our current approach is “stealing the future, selling it in the present, and calling it GDP” (Filion et al., n.d., p. 1). To address these unprecedented challenges, it will be critical to focus our attention on existing urban development.

UTOPIA & THE ADVANTAGES OF CITIES

People have evolved an affinity for rural settings (Radeloff et al., 2005), but if we continue to let development go unchecked, there will be no rural lands left for our enjoyment. Presently, there are few (if any) ecosystems that have not yet been affected by human action and influence—either directly or subtly (Berkes & Folke, 1998, Vitousek et al., 1997, as cited in McDonnell, 2011; McDonnell & Pickett, 1993, as cited in Pickett et al., 2001). We have to acknowledge, as Yang (2009) explained, that:

‘Pure’ nature no longer exists. We have observed contemporary nature as human-made, human-designed, human-planned and human-influenced. We should deal with the hybrid landscape of the city ... (p. 188, emphasis in original)

As our communities grow and we expand our “manmade” habitats, we lose space remaining for non-human nature (Palmer, 1967). In cities, we find a key opportunity to enhance ecological systems while simultaneously protecting what little undisturbed² land remains (Lovell & Johnston, 2009). The literature reveals that urban development may even have certain environmental *benefits* whereas suburban patterns (often “sprawl”) may be more harmful (Pickett et al., 2008). After all, it is not the urban form that is unsustainable, but the processes that create, and are created by the urban form which are unsustainable (Andersson, 2006).

² It’s difficult to say if any area of this planet has evaded humanity’s touch.

Marcus and Detwyler (1972) wrote, “cities are nodes of man’s greatest impact on nature” (p.3, as quoted in Gunn, 1998, p. 344). As such, the future of the Earth and all its ecological systems is now affected—negatively, but also positively—by urban patterns of growth (Alberti, 2005; Alberti et al., 2003). This may perhaps come as a surprise to some, but cities are already major ecological contributors. In U.S. Cities, for instance, an average of 33.4% of urban land area is covered by tree canopy, constituting around a quarter of the nations’ total tree cover (Young, 2011). Recognizing this, trees and other green infrastructure should be seen as wise public investments and just as fundamental to a city as its “grey” infrastructure (Young, 2011), if not more so.

Despite all that cities are presently doing inefficiently, they are vast resources with great potential. Cities, as concentrations of global activity, are increasingly relevant social systems of the Earth. Cities increase opportunities for education, knowledge exchange, and innovation. Social interaction is higher in cities, and economic opportunities grow. Furthermore, in cities, people have the option of “living richly with a smaller ecological footprint” (Beatley, 2013, as quoted in Reintegrating Urban Ecology, 2013).

Additionally, with larger percentages of populations living within urban areas, cities are becoming one of humanity’s primary interfaces with nature (Pickett et al., 2008). Eric Sanderson (n.d.), a landscape ecologist with the Wildlife Conservation Society, declared with enthusiasm, “this generation is reinventing what it means to live in cities, cities that include, not exclude, an experience of nature” (as quoted in Blaustein, 2013, p. 76). This is good news indeed, for cities are and will be one of the most important driving forces of the future (Rotmans et al., 2000)! The 21st century, the urban century, welcomes a new urban frontier (Keivani, 2010; SymbioCity, 2012) and cities matter once again (Janssen-Jansen & Hutton, 2011).

Planners like Jacobs, McHarg, and Lynch have long understood that humans are inseparable from nature; many of whom also saw the position of cities as phenomena within natural systems (Jacobs, 1961, p.

446, as quoted in Spirn, 2012, p. 4). Once we abandon the idealized, extremist dichotomy, we can see a vision of a world filled with sustainable, resilient, and ecologically healthy cities is not utopian but is actually possible. It may still be difficult to convince the dissenting opinions that an alternative future is *not* utopian, but many thinkers already believe this vision is possible. While it may seem grand, we can indeed make cities healthier, livelier, and more natural places. After all, just as Geddes (1915) once proclaimed, “here or nowhere is our Utopia” (as quoted in Spirn, 2012, p. 3).

POSITIVITY & PLANNING

In major planning and development projects, we are currently forced to prioritize our alternatives while identifying trade-offs. The problem with this approach is that it requires us to attempt separating our human communities from the natural landscapes within which we are very deeply integrated. The trade-off approach is overly simplified, does not always involve the right and necessary actors, and is typically based on economic incentives (Ernstson, 2013).

Alternatively, there may not always need to be a trade-off. A city does not have to choose between economy or ecosystem health, development or control, competitive advantages or sustainable practices, or a “people first” versus “nature first” approach (Haughton & Counsell, 2004; Janssen-Jansen & Hutton, 2011; Lovell & Johnston, 2009). As planners, we must realize that these are false choices.

Williams (2010) argued that “we will not make much progress in sustainable development with an ‘either/or’ approach” (p. 130). Alberti (2013) asked, “[h]ow can we reconcile the messages contained in the catastrophic versus optimistic views of the future of Earth?” (n.p.). Planners, and all of those who shape our environments and futures, need to maintain a positive outlook (Alberti, 2013; Brulle, 2010; Ellin, 2013; Middlemiss, 2011; Roszak, 1994). Staying optimistic, large scale change will develop out of a “combination of threats and opportunities, nightmares and dreams—

that fuels social movement mobilization and social change” (Brulle, 2010). We should explore “win-win” solutions. If we were to instead embrace the potential for multi-functionality, the landscape may be able to provide more than one service and meet the needs of more than one consumer (Lovell & Johnston, 2009).

INTEGRATING NATURAL SCIENCE INTO PLANNING

Before any progress can be made, we must adjust our current perceptions and increase our understanding—both individually and collectively—of non-human nature. In other words, we must learn to think ecologically (i.e. become “ecoliterate”) (Dekay & O’Brien, 2001). This is especially important for planners, who must begin to embrace concepts from natural sciences. Haas (2009) had once emphasized that “most of our real-world problems do not fit into the domain of just one discipline” (p. 8). Certainly, understanding the urban ecosystem requires both interdisciplinary thinking and the input from multi-disciplinary specialists (Barnes & Adams, 1999; Collins et al., 2000).

Currently, noted Gandy, there is no “scientific underpinning for a unified socio-ecological model for the study of cities” (2013, p. 1312). Yet, Pickett et al. acknowledged, “there is much opportunity to extend and integrate knowledge of the metropolis using an ecological lens” (2001, p. 129). Natural sciences should be foundational in both the study and in the practice of planning cities.

A major challenge for scientists is that of integrating human activity into current ecological theory and research (Alberti et al., 2003; Alexander Felson, as cited in Wellington, 2013). Planners, in response, must then integrate that ecological research and knowledge back into the planning of human-dominated ecosystems. They need to know about the underlying nature of their community, see their community as being a part of that nature (and, itself, a natural system), and utilize

TABLE 1. The Ecology In/Of Cities

The Ecology In/Of Cities	
<i>In Cities</i>	<i>Of Cities</i>
<ul style="list-style-type: none"> • First and more common approach • Ecological perspective; highly specialized for ecologists • Smaller scale, often focused one location • Focused on parts; view whole as the sum of parts 	<ul style="list-style-type: none"> • Newer approach • Planning perspective; multidisciplinary • Larger scale, entire systems (cities) • Focused on whole; view whole as greater than the sum of the dissociated collection of parts
Created by Author	

ecological principles in planning by understanding urban ecology and systems dynamics (Kennedy et al., 2012; Lovell & Johnston, 2009).

The sustainable, resilient, and ecologically healthy city must build upon three interrelated models, revealed Dekay and O’Brien (2001): cities are living systems, cities are an experience of nature, and cities are a particular place. Furthermore, Capra (1996) proposed that our human communities can learn from non-human ecosystems by adopting a similar set of principles of organization: interdependence, cyclical in flows of resources, cooperation, partnerships, flexibility, and diversity. This is precisely the focus of urban ecology.

Urban Ecology

In the 1920s, the Chicago School of Sociology began using ecological concepts to develop an organic analogy for understanding and describing the social structure and function of cities. This new branch of sociology, called Urban Ecology, sought to understand how humans live and interact in cities. Addressing the rising complexity and diversity in meanings of urban ecology since its inception, McDonnell (2011) proposed the following definition:

Urban ecology integrates both basic (i.e. fundamental) and applied (i.e. problem oriented), natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems. (p. 9)

Urban ecology is both a scientific understanding and a cultural appreciation of life in human-dominated ecosystems (Gandy, 2013). Urban ecology stands in contrast to conventional spatial land use planning—which is drawn to focus on the individual parts and technological efficiency of various systems while directing development onto undeveloped land. Urban ecology, on the other hand, is concerned with function and use of the city while maintaining an ecological focus (Pickett et al., 2001, p. 143).

Pickett et al. (2001) explained that urban ecology is generally interpreted from two perspectives related to the two underpinning disciplines: either from natural or social sciences (i.e. ecology or urban planning). Additionally, there are two forms of studying urban ecology. First, the ecology in/of cities (Table 1) and, second, the ecology of urbanization gradients (McDonnell, 2011). In this report, I’ll be reviewing the various approaches of the first form.

The ecology *in* cities is a small-scale study, usually focused specifically on one location and often incorporating few disciplinary specialists. This approach was the first and remains to be the most common approach to studying urban ecology (Pickett et al., 2001). It considers the parts of the system, looking at the ecological structure and function of habitats and organisms within cities (Pickett et al., 2001). The ecology *in* cities is representative of the ecological, or natural sciences perspective.

The planning-oriented perspective of urban ecology is the ecology of cities. This approach is a cross-scale, multi-disciplinary analysis that extends beyond individual layers and dimensions. This systems-oriented approach is newer and still emerging. Instead of parts, it evaluates the whole, examining entire cities or metropolitan regions through an ecological lens (Pickett et al., 2001). In the planning perspective, the whole is greater than the “dissociated collection of parts”—a perspective typical of the reductionist, mechanistic view (Capra, 1996). Deelstra (1998) described this approach as “designing the environmental amenities of cities for people, and on reducing environmental impacts of urban regions” (as cited in Pickett et al., 2001, p. 129).

Perhaps the key, as Beatley (2012) suggested, is to embrace both approaches—the ecology in, as well as the ecology of cities. “We want cities with forests in them,” Beatley had said, “but we also wanna [sic] design cities that function like natural systems (2012, n.p.).³ There has evolved the need for a “new ecological paradigm,” one that could incorporate the human, sociopolitical dimension into the study of ecosystems (Pickett, Alberti, & Marzluff, as cited in Gandy, 2013). Though it’s difficult, planners, ecologists, and other specialists who work in urban habitats must link ecology to cultural, historic, and material dimensions of urbanization (Gandy, 2013).

Cities as Ecosystems

As Beatley has explained time and again, we absolutely must understand the city as an ecosystem (Beatley, 2000; Beatley 2011; Beatley, 2012; Reintegrating Urban Ecology, 2013). Likewise, as Downton (2014) remarked:

Ecology is about the relationship of organisms with each other and with their environment, so all those that design and manipulate the environment should have a minimum level of learning about the fundamentals of ecology. Buildings and cities are constructed ecosystems even if they’re not designed as such. (Downton et al., 2014, n.p.)

Defined by British ecologist Arthur Tansley in 1935, an ecosystem is “a system which takes account both of the organisms and the entire complex of physical environmental factors” (as cited in Rebele, 1994, p. 174). Tansley’s ecosystem definition accommodated the potential of including a dimension of sociopolitical interactions (Spirn, 2012); it should be clear that cities are ecosystems.

As opposed to the reductionist, mechanistic worldview (see Descartes; Newton; et al.) which saw the city as a set of individual parts, the ecological paradigm is holistic, organismic, and systemic (Capra, 1996). This approach views ecosystems as evolving entities. Capra (1996) elaborated that the ecological perspective sees the city as a complete whole that is embedded in—and, thus, inseparable from—a natural and social environment. As such, we must see our current challenges only as different facets of the same crisis. An ecosystem approach to planning asks “what are the *reciprocal* [emphasis added] relationships between spatial patterns and socio-cultural and biophysical patterns and processes of a given area” (Grove, 1997, as cited in Pickett et al., 2001, p. 145).

If we accept that pristine, historically continuous landscapes rarely (if ever) exist in today’s world, and if we recognize that what we have in their place are complex, novel ecosystems which are sometimes radically altered landscapes, we can move beyond a focus on the human/nature dichotomy and onto an appreciation of hybrid landscapes and ecosystems (Andersson, 2006; Dekay & O’Brien, 2001; Filion et al., n.d.; Gunn, 1998; Wellington, 2013).

Within cities, you’ll find a wide variety of ecological conditions (Rebele, 1994). Many of these conditions are

³ Referencing the oft-cited quote from William McDonough, who has often described the future city as one that functions like a living thing. McDonough wrote, “We would see buildings like trees, alive to their surroundings and inhabitants, and cities like forests, in which nature and design create a living, breathing habitat.” <<http://www.mcdonough.com/speaking-writing/buildings-like-trees-cities-like-forests>>

FIGURE 4. THE SHIFT FROM EQUILIBRIUM THEORY TO RESILIENCE THEORY

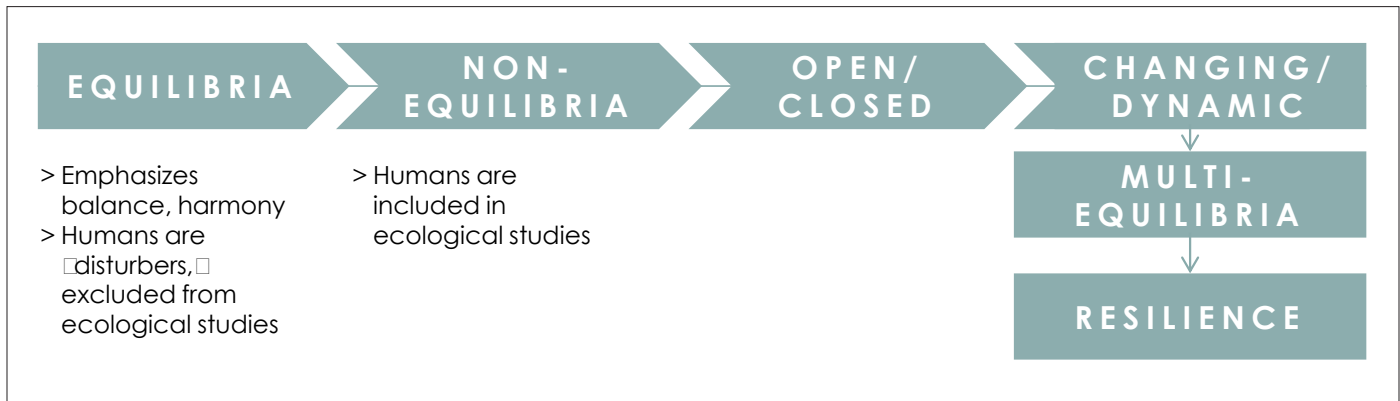


Image created by author

constantly evolving. To accommodate the dynamism and the ever-changing processes of urban habitats, planners must be comfortable embracing uncertainty and should design cities to be flexible and adaptable (Wellington, 2013).

EQUILIBRIUM THEORY

For some time, equilibrium theory (Figure 4) was a major cornerstone to the study of ecosystems. The theory stated that ecosystems exist in a state of balance (Egerton, 1993, as cited in McDonnell, 2011), or “equilibrium.” Yet, the equilibrium paradigm had reinforced the existing human/nature dichotomy by leading many scientists to believe that non-human ecosystems could only be studied away from people. Until recently, despite the significant influence of humans on biophysical processes, humans had rarely been studied as subjects of ecological thinking (Alberti et al., 2003; Berkes, Colding, & Folke, 2003, as cited in Ernston, 2013, p. 8). In fact, humans weren’t even always considered to be biological beings that were part of the ecosystem (Rees, 1997, as cited in McDonnell, 2011). Traditional ecologists, particularly in Western industrial cultures, viewed humans solely as “disturbers” (McDonnell & Pickett, 1993, as cited in Pickett et al., 2008).

Contemporary assumptions in the study of ecosystems, however, have been more inclusive (Pickett et al., 2001). Ecological studies now favorably accommodate the study of human-dominated communities within larger ecosystems, and as complete ecosystems on

their own. Furthermore, instead of seeing ecosystems as homeostatic, closed systems, ecosystems are considered to be dynamic, connected, and open (Pickett et al., 2001). As such, ecosystems are unpredictable, and they are multiequilibria (Alberti, 2005). The non-equilibrium paradigm, McDonnell affirmed, is guided by an understanding of ecological systems as open systems being driven by process and regulated by external forces, and it also includes humans as beings of the ecosystem (Egerton, 1993, Fiedler et al., 1997, Pickett et al., 1992, McDonnell & Pickett, 1993, as cited in McDonnell, 2011).

Lacking an understanding of metabolisms, the current production, consumption, and waste behaviors of cities have become a leading cause of the loss of global environmental assets due to overharvesting, deforestation, and pollution, in addition to a number of other destructive behaviors and activities (Janssen-Jansen & Hutton, 2011). Understanding the basic concepts of metabolisms, and of natural geochemical processes, we should strive to reduce the overall throughput of cities, shorten supply chains, and close loops in order to optimize efficiency (Beatley, 2012). Coupled with an understanding of the spatial relationships, or patterns, an integrated urban ecology can relate ecosystem structure to function. As a third element, we can embrace a systems perspective, allowing us to apply this knowledge to the entire habitat (Pickett et al., 2008). By evaluating ecological systems, and using nature as a mentor, it’s possible to

conceive of new ways for organizing urban processes as non-linear systems.

RESILIENCE THEORY

While sustainable development is arguably a poor term for defining our ultimate goal, alternative concepts might be used instead—including resilience theory (Andersson, 2006; Spirn, 2012). As we saw above, ecological systems are dynamic and need to be flexible, adaptive, and resilient. Resilience theory argues that, instead of an equilibrium state, systems are often in a state of transition, and that the health and well-being of those systems can be measured by their ability to resist disturbance and by how quickly the system can return to the pre-disturbance state (Gigon, 1984, p. 14, as quoted in Rebele, 1994, p. 183). Accommodating a wide scope of the challenges related to resilience theory, Ernston (2013) proposed the following definition:

Resilience is the capacity of a social–ecological system to sustain a certain set of benefits from biophysical processes, in face of uncertainty and change, for a certain set of humans. (p. 14)

Building resilience is not just an engineering problem; it is also a “socioeconomic phenomena that requires a highly interdisciplinary approach” (Kennedy et al., 2012, p. 777). Understanding the implications of our current vulnerabilities can help us to determine optimal solutions for enhancing our resilience. Mueller and Dooling clarified that vulnerability, itself, is not a condition; rather, it is a “series of relationships” (2011, p. 203). They noted that we must distinguish between

biophysically-generated vulnerabilities and those that are created by political, social, and economic conditions (Liverman, 1990, as cited in Mueller & Dooling, 2011, p. 202).

The Role of Humans in Novel Ecosystems

Considering cities, Alberti proposed that these “coupled human-natural systems are not governed only by either natural selection or human ingenuity alone, but by hybrid processes and mechanisms” (2013, ¶ 15). In a human ecosystem framework, both social and biophysical processes act as drivers of change while influencing the distribution of critical resources and the evolution of system structure (Andersson, 2006, ¶ 5; Pickett et al., 2001). Furthermore, in a human-dominated ecosystem, no single individual driver is a determining force, and the relative significance of various drivers may change or vary over time (Pickett et al., 2001). Understanding this, all of a system’s components must be examined simultaneously.

Though we need to see humans and human-dominated systems as being a part of nature, it may still be important to understand how urban habitats do indeed differ from non-human ecosystems in some respects (see Pickett et al., 2001, p. 130). Humans abide by the laws of nature; therefore, we are *natural*. Yet, humans are also capable of escaping or advancing beyond the local ecological limits by shaping ecosystems and creating “the conditions for their own flourishing” (Gunn, 1998; Kennedy et al., 2012; Pickett et al., 2001). In fact, Gunn (1998) argued that the primary and perhaps only characteristic of human-dominated ecosystems that distinguishes them from biotic communities is that human communities have intentionality. Using this intentionality as an advantage, the role of humans as a dominating force might become a valuable tool—if only we learn from natural phenomena and develop our communities according to hydrologic, productive (closed-loop), bioclimatic (using natural forces), transit, and habitat patterns (Dekay & O’Brien, 2001).

FIGURE 5. VOLUNTEERS HELP PLAN TREES



Photo by Author

ECOFEMINISM

The ecofeminism movement, for instance, relates the oppression of women to that of nature—citing patriarchal systems as the root cause of such behavior—and views the exploitation and domination of women as being prototypical of all forms of dominance (Capra, 1996).

Ecofeminists have traced these patterns centuries back; noting the ancient association (sometimes embodiment) of women (or the feminine gender) with nature (e.g. Mother Nature, Mother Earth, and Gaia [most, though not all nature deities are associated with a female entity]; poetic literature, in which nature is personified with a female gender, or compared to the characteristics of human females; gendered nouns, such as *la natura* (Latin and Italian), *la nature* (French), *la natureza* (Portuguese), *la naturaleza* (Spanish), and so on). Ecofeminists see parallels in how nature and women alike have been blamed as origins for great destruction (e.g. Eve, the cause for sin, and Mother Earth, blamed for “natural” disasters).

FOSTERING AN ETHIC OF CARE

While the concepts, theories, and principles mentioned above are extremely valuable, our solutions will not be effective until we eliminate the currently divided human/nature perspective and foster an environmental ethic. Presently, we fail to consider non-human rights, or to adequately weigh the potential environmental degradation of a project (Haughton, 1999). Even when the human benefits of a proposed development project are unknown or uncertain, acknowledged detriment to environmental assets is often still ignored (Young, 2011).

Arguably, humans have too much perceived power. This frames our efforts in “protecting” other species: we decide to protect a species because we may find it to be adorable, or we maintain a resource so that we can harm or harvest it at a later date (Gunn, 1998). In this sense, we keep our distance by holding a purely utilitarian perspective—maintaining non-human nature so long as it suits our own needs and desires, and only when it is on our own terms (Gunn, 1998).

Describing the root cause of the currently anti-ecological stance of our social and economic power structures, Capra (1996) observed Riane Eisler’s concept of a “dominator system” of social organization (p.8). The concept of a dominator system includes structures of patriarchy, imperialism, capitalism, racism, and so forth. We must restructure these notions of power and instead nurture collaborative relationships. Rather than for qualities of power, profit, or prestige, we must recognize that a successful community is a *prosperous* one (Ellin, 2013).

In evaluating current power structures, we see relationships of dominance: egocentrism (self > others), androcentrism (males > females, nature), ethnocentrism (one’s own culture > that of others), anthropocentrism (humans > nature), and even ecocentrism (nature > humans), among myriad additional relationships (Gunn, 1998; Meyer, 2008, p.6, as cited in Spirn, 2012).⁴ Alternatively, mutual relationships—such as a biocentric viewpoint that extends value to all living things—would adjust our current perspective and open our minds to see the true importance of non-human nature as organisms that are valuable in their own right.

⁴ It’s important to note that destructive power relationships are not limited to the examples noted above, but that they are so pervasive in nearly all aspects of society and create the foundation for many other -ism with which we struggle daily (e.g. racism, ageism, genderism, etc., in addition to the sexist and speciesist doctrines noted above).

FIGURE 6. TIDEMAN JOHNSON PARK, PORTLAND, OR



Image courtesy of PortlandOregon.gov

Protecting Non-Human Nature

As planners, urban designers, and individuals who play a role in shaping our communities, we must recognize the impact(s) of our human interventions on non-human nature. In order to adequately protect non-human nature in our communities, we need to make use of a set of *ecoethical standards* (Capra, 1996), or establish “grounds for a moral or aesthetic call to stewardship” (Collins et al., 2000, p. 422). Striving to protect the rights and interests of all constituents—both human and non-human—we must use these standards to evaluate all of our decisions; even those decisions that intend specifically to restore ecosystems should be considered for any unintended consequences (Capra, 1996; Wellington, 2013).

With regards to the protection of non-human systems, there are two opposing views: preservationism and pragmatism. Preservationism, explained Wellington (2013), seeks to protect “wild” and “pristine” nature (e.g. through use of a “wilderness-based conservation ethic”). Markevičienė (2012) described preservationism as an attempt to “arrest” an element in its present state. Once arrested, no longer can that entity be a living, evolving system; instead, that thing’s integrity and

authenticity is removed as it is controlled and managed by another entity (i.e. humans). On the other hand, pragmatism (or pragmatic conservation) abandons the idealized perspective and sees human interventions as means of enhancing what presently exists. Rather than restoring a system to a certain point in its history, this approach maintains the current human-use of an asset while placing responsibility for protection in the control of the human users (Wellington, 2013). A number of alternative approaches attempt to merge or redefine the two main perspectives (see Ben Minteer’s *pragmatic preservationism*; Eric Higgs; or Michael Rosenzweig’s *reconciliation ecology*; et al.).

Conservation and preservation are modern concepts; however, care and tradition-based continuity have been around for some time (Markevičienė, 2012). Ancient and primary cultures, explained Roszak, shared a “sympathetic bond between the psyche and the Earth” (1994, n.p.). Roszak went on:

Among primary people it is homely common sense that human beings must live in a state of vital reciprocity with the flora and the fauna, the rivers and the hills, the sky and the soil on which they depend for physical sustenance and spiritual instruction. (1994, n.p.)

Neglecting this bond has been the root of what is now possibly had called the most urgent issue of our time (Roszak, 1994). Even if it is not the most urgent issue, the environmental movement is certainly the “biggest political cause to be undertaken by the human race,” asserted Roszak, “It includes everybody because there is nobody this movement cannot afford to talk to” (1994, n.p.). Restoring our relationship with non-human nature, we consider how traditional communities live as part of the ecosystem. Though we must be cautious to avoid romanticizing ancient societies (Gunn, 1998), there are many lessons we might still learn from these simpler communities.

DEEP ECOLOGY

Regardless of how we choose to protect nature, we must have that desire to do so in the first place. What, then, gives us motive to protect? And how do we decide what to protect? Currently, much of society is guided by individual self-interest. The environmental crisis is indeed a moral crisis, and we must see it as our ethical obligation to conserve nature (Dearborn & Kark, 2009). Though some may not currently share a sense of environmental responsibility, a conservation ethic may be cultivated through exposure to non-human nature (Dearborn & Kark, 2009).

In environmental ethics, the philosophical school of deep ecology was founded in the 1970s by Arne Naess (Palmer, 1967, p. 29). As opposed to a *shallow*, anthropocentric ecology, the deep perspective embraces awareness—be it spiritual, religious, or otherwise—in which greater respect is given to non-human nature (Capra, 1996). “Deep ecological awareness,” explained Capra, “recognizes the fundamental interdependence of all phenomena and the fact that, as individuals and societies, we are all embedded in (and ultimately dependent on) the cyclical processes of nature” (1996, p. 6). With this awareness, we ought to be celebrating nature, and its cycles and rhythms.

Aldo Leopold is well known for his contribution as an American environmentalist; particularly, for his 1949 book *A Sand County Almanac*. Leopold’s ethics, while

at first appearing to be relevant to the concept of this report, are perhaps too romantic. Leopold focused on the collective *biotic* community, in which he largely failed to recognize human-dominated communities (Gunn, 1998). If we wish to ponder how humans fit into the puzzle, we might look to Gifford Pinchot’s conservation ethic. Pinchot “believed firmly that humans belong in their environment, as inhabitants and stewards” (Freitag, 2011, ¶ 6). As head of the US Forest Service, Pinchot codified his own ethic for dictating land use in which humans and non-human nature could co-exist. Freitag (2011) concluded by noting that Pinchot’s ethic, which is still embodied in the Forest Service’s mission today, relied deeply on the scientific understanding of the relationships and bonds between humans and non-human nature.

Biophilia and Exposure to Nature

Connecting humans to our environments are the deep “emotional and irrational forces that underlie our relations with the non-human world” (Roszak, 1994, n.p.). Biophilia is E.O. Wilson’s hypothesis that humans have an innate attraction to nature (Spirn, 2012).

Beatley (2013) and others have argued that we become better people and better individuals in the presence of nature. Demonstrated through a number of studies and elaborated upon in the literature, the emotional, social, and psychological benefits have been scientifically proven (Beatley, 2012; Dearborn & Kark, 2009; Gunn, 1998; Pickett et al., 2001; Reintegrating Urban Ecology, 2013; Spirn, 2012). Lynch (1981) believed:

. . . the mental sense of connection with nature is a basic human satisfaction, the most profound aspect of sensibility . . . The movement of sun and tides, the cycles of weeds and insects and men, can also be celebrated along the city pavements. (p. 257, as quoted in Spirn, 2012, p. 10)

Biophilia has large scale implications and is not restricted to the individual emotional or psychological benefits that humans can derive from nature. Nature can also produce secondary benefits for the community as a whole. Children, for instance, love and need to

FIGURE 8. CREATIVELY BRINGING NATURE INTO AN URBAN NEIGHBORHOOD IN BALTIMORE



Photo by Author, 2012

experience “wildlands” (Barnes & Adams, 1999). Through their experiences—of time spent making memories in non-human nature and other areas that exist with little human intervention or control—children can develop and grow up to be better decision makers (Barnes & Adams, 1999). Recognizing this impact on children, Dearborn and Kark described the need for “exposure-based wildlife education” (2009, p.4)

Berleant (2002) believed that humans not only shape their environments, but they are themselves shaped by their experiences in this universe (pp. 21-22, as quoted by Markevičienė, 2012, p. 76). In addition to the many social, cognitive, and psychological benefits that we reap, closeness (both physically and spiritually) to non-human nature might also explain an opposite phenomenon—that is, the negative behaviors and products that are created as the result of a disconnection with non-human nature. Roszak (1994) posited that the divide between humans and non-human nature

from which we now suffer may be the deepest level of repression felt by members of modern society. Roszak (1994) went on to elaborate that many people now suffer from a repressed grief due to the loss of the planet’s environments, or from environmental anxiety and the resulting materialistic disorders that evolve through attempts to fill the voids left behind by a lack of non-human nature.

NEARBY NATURE

The concept of biophilia emphasizes the importance of “nearby nature,” which was introduced by Rachel and Stephen Kaplan in the 1980s (Nilon, 2012). Nearby nature is that which we experience on a daily basis and it plays a critical role in shaping our human perceptions and values regarding all non-human nature. Even if nearby nature is not particularly ecologically valuable, it should not be ignored (Nilon, 2012). The nature which we encounter on a regular basis will frame our perspective of the larger environment. Therefore, access to non-human nature is not only critical for the

personal benefit of humans as individuals, but it is also vital for revealing why the protection of nature is so important in the first place.

With regards to pristine landscapes, Gunn (1998) explained that “people who have never experienced relatively undisturbed natural environments are unlikely to have any sense of its value and why it should be preserved” (p. 359). This is also true of everyday nature as well. By building better connections and allowing people to experience non-human nature on a daily basis,⁹ planners and urban designers can improve the quality of life in a community, foster an attachment to place and to land, and encourage social connections between citizens (Beatley, 2012). Knowing this, we should “offer opportunities for meaningful interactions with the natural world” (Miller, 2005, as cited in Andersson, 2006, n.p.). Therefore, biophilic cities are those that “steward and restore their natural and *cultivated* [emphasis added] biodiversity” (Blaustein, 2013, p. 72).

Ecology and Equitable Planning

Exposure to nature allows for equal opportunities—not only in a sense that everyone deserves equal access to nature, but also in that exposure to nature is critical for developing an awareness and understanding of the benefits of nature and the resulting connection to a specific place. In our communities, however, an often stark “geography of difference” (Ernstson, 2013, p. 9) illustrates that not everyone has access to (the same) non-human nature (Nilon, 2013). In this fragmentation of society, cities are “divided by invisible borders” (UN-Habitat, 2010, p. 52). Keivani explained that “skewed and elite decision making” generates patterns of segregation and intra-city social inequalities (2010, p. 7-8). Whereas planning should instead encourage a restored and shared power among all constituents.

Social differentiation, which is the idea that people will embrace different opinions and perspectives based on their backgrounds, begs to question how planners are to help determine “who gets what, when, how and why” (Lenski, 1996, Parker & Burch, 1992, as cited in

Pickett et al., 2001, p. 144). In fact, when challenges of ecology, sustainability, livability, resiliency, and so forth do arise, the solutions are rarely equitable and are often informed by socio-political rank hierarchies of wealth, power, status, knowledge, territory, and so on (Pickett et al., 2001).

Decision-makers like to think that they know what other people want, or even need. Planners are especially guilty of this; but the assumptions we initially make are almost never accurate. Occasionally, planners, developers, government officials, and others will enter into a community, propose a new vision, and begin to implement that vision without having sought adequate input from the receiving community. This is sometimes (though not always) corrected through the planning process, and alternative, participatory approaches of planning might avoid this problem altogether.

Most planners believe that they can make places better. We certainly can; we just need to use the right approach and tools. Planners should not just *empower* one group, as that inevitably means taking power from another. We cannot just *educate* the public; because who are we to decide that others don’t already know what’s best for them? We must instead develop a culture of collaboration (Antrobus, 2011), in which the solutions will evolve naturally through conversations between all the impacted individuals. We can do this by encouraging participation and by providing opportunities for people to experience non-human nature within cities. Social equity and capacity building are pre-requisites for good planning (Xie, 2013).

However, we cannot so swiftly prioritize planning efforts and goals in just one fell swoop; and planners should not automatically assume they know which “consumer” is the most in need of a service, or what that service is. There must be deliberation. Do we plan for *people* or for *non-human nature*? If it’s people, are we designing for a particular group over another? If so, whose needs are more important? Whose voice, if anyone’s, is and should be most influential (Mueller & Dooling, 2011)?

ENVIRONMENTAL JUSTICE

In addition to the discrimination against nature, scholars, activists, and others draw attention to patterns of development that discriminate against groups of human populations, often those in poorer communities, by providing them with little access to environmental assets and amenities, or by disproportionately affecting those populations by permitting environmental degradation and exposure to harmful pollutants/natural hazards in marginalized neighborhoods (SymbioCity, 2012). On a much larger scale, it's also believed that poorer communities across the planet will feel the impacts of climate change more immediately

and more intensely than wealthier, developed communities (Vowles, 2013; Keivani, 2010).

The environmental justice movement emerged in the 1970s “as a normative concept and a social movement” (Schlosberg, 2007, as cited in Ernston, 2013, p. 8). Indeed, we struggle to provide fairness in terms of environmental well-being (Low & Gleeson, 1998, p. 102, as quoted in Ernston, 2013, p. 8). However, environmental justice is not about serving those individuals who what *more*, but about helping those marginalized groups who simply require *some* (Gunn, 1998).

If it's for non-human nature, is it for native or non-native organisms? Do we protect a few large habitats of many smaller patches (Lovell & Johnston, 2009)? Furthermore, *where* do we put nature—where it has the greatest ecological or greatest social benefit (Ernston, 2013)? To answer this last question, Ernston (2013) proposed two models: the network model and the articulation model.

Ernston's (2013) articulation model uses a process of engagement and stakeholder participation to assign agreeable values to different forms of non-human nature. Ernston explained that identifying shared values might be possible through a social process of collective deliberation, which uses “artifacts” to give something weight (2013). By engaging in a participatory planning process, “actors” (i.e. stakeholders, constituents, etc.) bring these artifacts into the planning “arena.”

This concept demonstrates a critical nexus between planning and the protection of marginalized assets, including non-human nature. As vehicles for conveying messages, artifacts are used by actors to defend against the pressures of development. However, as Ernston (2013) noted, some people or communities have a more difficult time conveying artifacts—or may lack the

availability of useful artifacts. These groups are seen as having a low protective capacity.

PROTECTIVE & INNOVATIVE CAPACITY

Protective capacity is the ability of an entity to resist removal, replacement, or degradation (Ernston, 2013). As Ernston revealed, “knowledge is constructed, and that certain ways of knowing might be silenced” (2013, p. 14). Development tends to take advantage of those communities which have low protective capacity and, thus, higher profit value (Ernston, 2013). As a human problem, this exploitation often leads to environmental justice challenges with regards to human access to ecological assets. As an ecological problem, this might instigate detrimental impacts on the overall ecological network, particularly if exploitation leads to the removal of crucial or central habitat patches.

As it is not always (if ever) easy to determine which alternative will produce more significant results, and certain groups stand to lose more than others, a collaborative planning process that encourages the use of ecoethical standards will be invaluable in facilitating the conversation. By fostering an environmental ethic, a community could develop the protective

and innovative capacities required to defend their neighborhood and surrounding non-human nature. A critical step is encouraging a participatory process that engages people and nature.

Jennifer Wolch (1996) argued that we cannot expect to cultivate an ethic without re-naturalizing the city (as quoted in Beatley, 2012, p. 15). Experiences in non-human nature strengthen bonds with the local ecosystem. As Ernston explained, an urban civic environmentalism can produce a protective capacity via local populations who, because of a connection they have to a green space or similar asset, assume an “active and positive role as ‘stewards’ in supporting ecological function” (2013, p. 8). Therefore, we need both policy- and decision-makers to be engaged with academics, and all must have direct, positive experiences with non-human nature (Dearborn & Kark, 2009; Pickett et al., 2001).

If we also recall Ernston’s (2013) theory that knowledge is constructed, it becomes clear that exposure to nature can increase opportunities for an individual to grow, develop, and gain power of voice while also becoming a better citizen of the Earth. Essentially, the more an individual knows about local nature, the more they’ll appreciate and defend it (Dearborn & Kark, 2009; Gandy, 2013).

Local ecological knowledge (LEK), the knowledge of an ecosystem that is acquired through experiences, correlates with a sense of place. Developing LEK would encourage what Andersson, Barthel, and Ahrne (2007) called “participative co-management.” In other words, what we know of a local ecosystem will inform the activities which are and should be conducted within that system. Currently, urban “management practices,” explained Andersson, “are partly constrained or enabled by social institutions and by the level of local ecological knowledge” (Berkes & Folke, 1998, Berkes et al., 2000, as cited in Andersson, 2006, p. 1268). Adjusting those practices to be more valuable for the health of the local ecosystem will require developing an *innovative capacity*.

Alberti (2013) revealed that innovative solutions to our challenges lie in our collective imagination. She added, “humans have the intellectual and moral capacity to do even more when tuned into challenging problems and engaged in solving them “ (Alberti, 2013, n.p.; See also Vowles, 2013). A participatory process that engages people with one another as well as with the surrounding landscape develops a supportive community network that is better prepared to identify solutions to complex challenges (Ellin, 2013). In this way, innovative capacity can be grown. When included in the planning process and provided with clear information, residents will be more willing to engage in action and the identification of solutions (Jasanoff & Wynne, 1998, as cited in Brulle, 2010). If an environmental ethic becomes a civic norm, and care for the environment will become enduring, the solution may evolve through a combination of top-down strategies and the grassroots, bottom-up efforts of an active and engaged society (Young, 2011).

IMPLICATIONS & CHALLENGES FOR PLANNING

Urban developments are complex systems, so we cannot expect that solving the sustainability challenge will be a quick fix. As we embrace concepts from natural science, Begon, Harper, and Townsend (1990) argued that “no ecological system, whether individual, population or community, can be studied in isolation from the environment in which it exists” (as cited in Rebele, 1994, p. 174). This explains why we must view humans and our human-dominated systems in concert with non-human nature; and also why we must not plan our communities in a vacuum. Much like the Earth below our feet, cities are constantly changing. With this inherent uncertainty, planners must look back and plan forward (Lovell & Johnston, 2009; Whitehead, 2003, as cited in Williams, 2010).

Deep Structure

Planners must recognize and prepare for the natural phenomena found in cities, and they must be humble enough to consult with experts when needed (Downton

et al., 2014). Ecosystem conditions are constantly evolving, but there is also an enduring, underlying “deep structure” in any ecosystem that shapes the environment over the long-term (Spirn, 2012). To build a community’s resilience, Spirn emphasized the importance of planning “in agreement with the deep structure of a region, rather than counter to it” (2012, p. 17). The underlying deep structure of the Earth serves as a common, universal language that “is uniquely suited to bring us together” (Beatley, n.d., as quoted in Blaustein, 2013, p. 72). As Spirn explained:

Civilizations and governments rise and fall; traditions, values, and policies change; but the natural environment of each city remains an enduring framework within which the human community builds. A city’s natural environment and its urban form, taken together, comprise a record of the interaction between natural processes and human purpose over time. Together, they contribute to each city’s identity. (1984: 12; as quoted in Spirn, 2012, p. 17)

This is not only important from a sustainability or resiliency perspective, however; preserving ecosystem function is an important economic decision. As Andersson noted, “the farther from a ‘natural’ state the system is kept, the more resource demanding and dependent on continuous management will it be” (2006, n.p.) By matching a city’s systems and processes to the landscape, planners can help to reduce required inputs of time, resources, and capital. However, although a few regional planning and landscape architecture methods facilitate the consideration of underlying nature within planning projects (see McHarg and Geddes), no standardized methodology currently exists to instruct planners about how to apply ecological principles to everyday practice and to the entire planning process, from start to finish (Downton et al., 2014).

Interconnected Systems

Even if we utilize systems thinking, we must avoid viewing cities as discrete entities. Instead, cities should be seen as interconnected systems (Gandy, 2013). It would be advantageous to use natural features

to shape and frame the ongoing evolution of cities (Banai, 2012). In the past, planners had recommended a regional approach to planning that employed tools for surveying the environmental assets of the region (see Geddes, Mumford, et al.). We must recognize, however, the inherent challenges of scale, in that some elements of nature (e.g. watersheds, large scale topographic features, major critical habitats, etc.) go beyond the scale of the city and thus require cross-scale planning (Banai, 2012). In addition to large natural features, a city’s human-shaped infrastructure extends outward, connecting with adjacent jurisdictions (Kennedy et al., 2012). Therefore, it would be impractical to suggest that non-human nature (or much of anything, for that matter) would simply stop at the boundary of a jurisdiction.

Regional boundaries are neither purely politically defined, nor shaped solely by environmental features. In his definition, Mumford (1925) described a region as “a geographic area that possesses a certain unity of climate, soil, vegetation, industry and culture” (as quoted in Hall, 1996, p.161). To be clear, no community is a discrete entity, and it’s meaningless to implore progressive planning in a city while ignoring its neighbors (Haughton, 1999; Spirn, 2012). Therefore, the optimal scale for planning should consider much more than an individual city or community.

The impacts of a city are not confined to its surrounding region. Cities generate harmful consequences well beyond the urban limits (Alberti et al., 2003; Spirn, 2012; Ramaswami, Weible, Main, Heikkila, Siddiki, Duvall, Pattison, & Bernard, 2012). When planning, we must observe the “spill-over” effects between surrounding jurisdictions (Pickett et al., 2008). These effects swing both ways. First, one might assume that poor conditions of an urban core are detracting from the suburbs around it, while the suburbs still enjoy an inflow from the urban exodus. On the other hand, however, any efforts aimed at improving the city must consider how the adjacent communities—if they remain unchanged—will hamper progress.

At the same time, there may be problems centralized in one city that are created elsewhere, and—vice versa—distant conflicts generated by more local processes (Spirn, 2012). The growing scale and significance of cities worldwide is a major driver in cross-scale changes—from local to “global environmental change” (McDonnell, 2011, p. 8). Unfortunately, a city’s “role as a global ecological force is not yet fully appreciated” (Rees, 1992, as quoted in Alberti et al., 2003, p. 1172; see also Crinion, 2008).

While some argued that Leopold’s Land Ethic was overly romantic and said too little about humankind’s interactions with surrounding ecosystems (see the sub-section, *Sustainability*, above), Aberti (2013) had adopted Leopold’s “thinking like a mountain” concept to propose building cities that “think like planets” (n.p.). If we—humans, in general—step back and view our existence within the much larger context of the entire planet, we will see the implications of our decisions and might figure out how to develop sustainable, resilient, and ecologically healthy communities.

SYNOPSIS

Once planners have a basic understanding of ecology, they begin to learn valuable lessons from ecosystems. By also being ecoliterate, planners can grasp “the principles of organization of ecological communities (ecosystems) and [use] those principles for creating sustainable human communities” (Capra, 1996, P. 297).

Beginning to address the multifaceted dimensions of planning challenges, the literature emphasizes the significance of an interdisciplinary approach. However, while there is an enormous wealth of knowledge available, the literature is rather silent on a few subjects. First, the literature does not suggest how planners might begin to initiate an interdisciplinary approach; nor does it suggest how to best demonstrate the interrelatedness of the challenges we face, let alone the potential for mutually beneficial solutions to the general public or to key decision-makers. When it comes to identifying best practices for the application

of these progressive theories, the literature fails to address the challenges already encountered in many communities where decisions continue to be made based on misplaced priorities and false choices.

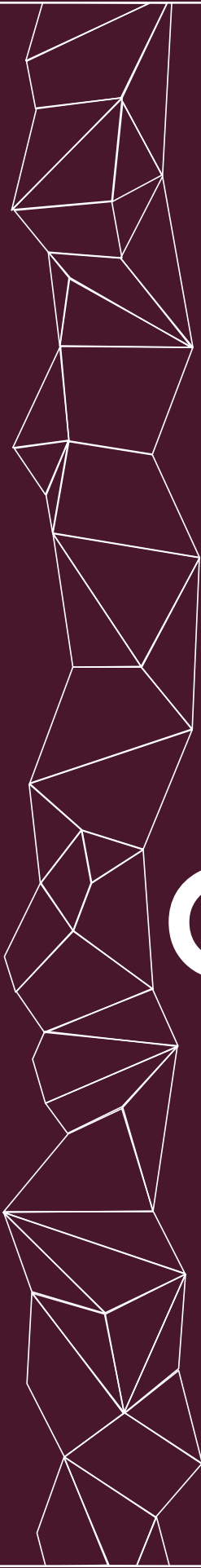
FIGURE 9. SEAWALL TOWARDS STANLEY PARK, VANCOUVER



Image courtesy Kaveh on Wikimedia

Additionally, though the literature is beginning to draw connections across disciplines, the abovementioned concepts are still primarily limited to publications of their respective disciplinary fields. In other words, though all of the abovementioned concepts have implications for planning, one would have to review scientific journals for articles on biodiversity, or to philosophical journals to read about deep ecology. Though planning journals are gradually including these topics more frequently, these concepts need to be much more commonplace in planning discussions. Likewise, the planning literature would have implications for scientific and ethical studies, but is, for the most part, absent.

Before we can make much progress, scholars and academics should discuss methods for collaboration and uniting existing theories. Practicing planners must also understand how to absorb the abovementioned theories and move from concept to practice. In need of a fresh and renewed outlook in planning, this report will use the review of relevant literature to craft the Deep Ecological Urbanism conceptual framework.



CHAPTER 3// CONCEPTUAL FRAMEWORK

CHAPTER THREE | Conceptual Framework

Although the literature review cited some examples of the environmental damages attributed to urban development, I do not necessarily agree that cities are “inherently cancerous” (Gunn, 1998, p. 359). No; contrary to what some of our great thinkers of the 19th and 20th centuries believed, the solution is not to abandon our cities, nor is it to explore and create new “utopian” developments. Rather, it is to see today’s cities for the real opportunities they possess: as potential solutions to our global challenges.

Limiting that potential, however, is society’s continued adherence to the divided human/nature perspective. Fortunately, recent literature suggests that we are gradually beginning to recognize that humans are indeed natural elements embedded within our surrounding ecosystems. Similarly, we recognize that human communities are themselves hybrid, novel ecosystems. As such, the welcomed integration of natural sciences and an ethical perspective can help move our communities beyond the limited scope of “sustainable development” to become deeply ecological, healthy, and resilient places.

While the concepts, theories, and principles mentioned in Chapter 2 are extremely valuable for planners, they remain largely underutilized in practice and in the development of our communities, many of which currently do not operate as efficiently as possible. The relevant literature is comprehensive and puts forth innovative and progressive solutions. Based on what I gathered through the concept review, I propose a conceptual model of Deep Ecological Urbanism.

With a clear rhetoric, it is possible to shape the Deep Ecological Urbanism model into a usable tool. Here, I present a set of 12 Deep Ecological Urbanism principles. As an added component of the conceptual structure, I will identify the various dimensions of human-dominated communities that serve as policy or action areas for applying the Deep Ecological Urbanism strategy. The concept is experimental and its recommendations are only tentative. The model, as it is, will continue to be revised but provides insights and identifies what’s currently missing from planning and design practice.

FIGURE 10. JAMISON SQUARE, PORTLAND



Image courtesy of PortlandOregon.gov

DEEP ECOLOGICAL URBANISM

Conceptual Definition

Deep Ecological Urbanism is an interdisciplinary urban planning and design approach that incorporates an understanding of the principles of natural sciences, as well as the ethical consideration of nature into the planning of healthy, ecological, and equitable cities.

Basic Model

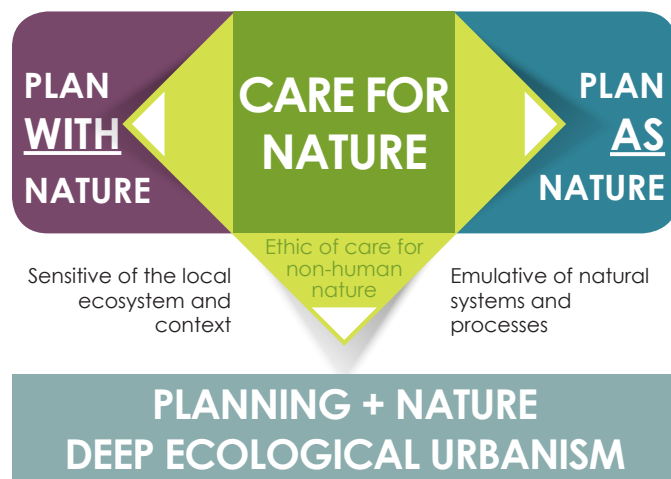
The Deep Ecological Urbanism model draws from three primary disciplines: Social Sciences (planning theory), Natural Sciences (mainly, ecology), and Philosophy (environmental ethics). These three contexts are understood to be the major areas of study that portray how living organisms thrive and interact in human-dominated environments.

What makes the Deep Ecological Urbanism model unique is in how it combines theories from each of the disciplines (Figure 11). In its emphasis on Deep Ecology, for instance, the Deep Ecological Urbanism model reframes the sustainability challenge as one that is intensely rooted in ethical perspectives. Thus, Deep Ecological Urbanism embraces philosophical concepts to understand how people develop a sense of stewardship and attachment to one another and to their surrounding environments.

Deep Ecological Urbanism also looks to nature for inspiration and wisdom, that this might inform how cities can function more like ecosystems. By integrating ecological concepts into the planning process, Deep Ecological Urbanism identifies optimal solutions for the design and function of communities.

For the most part, our current global environmental and development challenges can be understood in the context of least one of these three disciplines. However, it's becoming increasingly clear that most challenges, in fact, are split across two, or even spread through all three disciplines. These problems cannot be resolved through the individual disciplines separately, but must be addressed through multidisciplinary communication and a highly interdisciplinary approach to planning.

FIGURE 11. CONCEPT SCHEMA



Created by Author

DETAILED CONCEPT STRUCTURE

To further clarify how the three disciplines shape Deep Ecological Urbanism, a set of 12 guiding principles are established to serve as ecoethical standards. These principles can be achieved individually, but it's important to acknowledge that each principle is but one component characteristic of Deep Ecological planning and design, and it is better if they are achieved in concert rather than *à la carte*. Guided by social sciences, natural sciences, and philosophy, human-dominated ecosystems should strive to be sustainable, ecological, and equitable; these are the three primary aims that help to categorize the guiding principles.

Principles of Deep Ecological Urbanism¹

SUSTAINABLE

1. **Sensitive** | Recognize the value of all natural resources and be mindful of the impact of every action on those resources.
2. **Cyclical** | Adjust resource and nutrient flows to become a closed-loop system and strive to be self-sufficient, net-zero, and zero-waste.

¹ Modified from the 12 Characteristics of Deep Ecological Urbanism, from Spring 2013 studies on the concept.

3. **Adaptable** | Ensure that the system is flexible and resilient and reduce vulnerabilities.
4. **Compact** | Encourage compact, infill development and adaptive reuse near the urban center.

ECOLOGICAL

5. **Biomimetic** | Look to nature as model, mentor, and measure to design communities that are sustainable and resilient.
6. **Local** | Adapt to the local geography.
7. **Restorative** | Maintain and restore the health and viability of the city and all organisms within it.
8. **Holistic** | Use a systemic approach to design cities and promote synergistic processes.

EQUITABLE

9. **Democratic** | Ensure equality for all living organisms, both human and non-human.
10. **Biophilic** | Foster stewardship and cultivate relationships and between individuals and their communities, wildlife, and the land.
11. **Diverse** | Encourage a healthy mix of organisms and habitats and land uses in every community and architectural experience.
12. **Spirited** | Create places that foster attachment, welcome a variety of new opportunities, and celebrate the community.

Sustainability Principles

SENSITIVE

Planning that is *sensitive* is mindful of the diverse phenomena that permeate the habitats of this planet. Every action that we take must be assessed with regards to the potential consequences it might generate. We must be cautious to avoid wasteful consumption and further environmental degradation and of the Earth’s remaining resources. Incorporating a rain garden or

bioswale (Figure 12) into a project, for example reduces the impact on stormwater runoff.

At the same time, with regards to environmental justice and the impact of planning on humankind, sensitivity refers to the careful consideration of existing social and human capital.

CYCLICAL

Conventional planning produces communities that rely heavily on intense resource importation and that produce significant outputs as “waste.” The Deep Ecological Urbanism model emphasizes planning systems that are more *cyclical*. Closing the loop, or planning for cycles instead of linear throughputs, will reduce resource dependence and waste generation.

In the process of closing the loop, communities can also become more self-sufficient. Modern society is strongly tethered to global forces and our current cities can hardly be seen as self-contained systems. However, ensuring that internal, intra-city processes are, to the highest possible extent, self-sufficient will increase resiliency to global crises and will allow the community to prioritize the efficient use of resources. Essentially, the city becomes more competitive on a global scale and its viability as one of Earth’s ecosystems can be sustained indefinitely.

FIGURE 12. A BIOSWALE IN DC FOR COLLECTING RAINWATER



Photo by Author

FIGURE 13. THE BALTIMORE HARBOR INSTALLS FLOATING WETLANDS, 2012



Photos by Author

ADAPTABLE

Communities absolutely must be designed to be **adaptable** and resilient. Scientists no longer agree that ecosystems exist in a state of equilibrium. Instead, we embrace the dynamic complexity and susceptibility of ecosystems to disturbances. An adaptable system is able to quickly return to pre-disturbance conditions, reducing vulnerability of the community as a whole, and for all organisms within.

COMPACT

Compact planning is that which refuses to forfeit even the smallest patch of land to inefficient design. To be compact, communities don't have to succumb to "manhattanization." Rather, density targets should be set relative to current local characteristics.

The goal of compact development is to reduce automobile-dependent and resource-inefficient patterns of sprawl in favor of development that is prioritized in central nodes. Together, a collection of nodes create a polycentric form of development.

Planning for compact communities also protects currently undeveloped lands from encroaching growth. We must recognize that greenfield development—that which occurs on undeveloped land—has a more harmful impact on the environment than infill development. So as to protect undeveloped land from encroaching growth, the Deep Ecological Urbanism model advocates for a focus on infill development within dense, compact communities.

Principles of Ecology

BIOMIMETIC

Planning that is **biomimetic** views nature as model, mentor, and measure. As a model, geometries and structures commonly found in non-human nature can be emulated through building and urban form. Nature as a mentor serves to teach planners how urban systems can function more like ecosystems. Additionally, nature serves as a benchmark, or measure, against which we can evaluate our progress and our efficiency at optimizing human-dominated ecosystems. The concept of biomimicry, furthermore, is critical for facilitating the integration of many of the other 12 guiding principles of Deep Ecological Urbanism.

Deep Ecological Urbanism looks to nature for inspiration and knowledge, and so a Deep Ecological City functions much like an ecosystem. With its individual elements resembling phenomena that are found and observed in non-human nature, a city benefits from an enhanced quality of life, near or complete self-sufficiency, a more efficient and thus more productive local economy, and a reduction in pollution generation, just to name a few of many advantages. Principles of biomimicry can be applied at any scale—from an entire district to a site-based green infrastructure project. For example, floating wetlands in Baltimore's Inner Harbor (Figure 13) mimic natural wetlands to absorb pollution in the water.

LOCAL

Planning needs to be informed by *local*, contextual conditions. Because of the significant complexity and individual uniqueness of cities, there can be no single solution (Filion et al., n.d.; Mack, 2013). Additionally, in order to give a strategy the most relevance, it should be framed in a way that is most meaningful for a particular audience, time, and place (Brulle, 2010). Challenges are grounded in place and can only be understood through the narrative told by the context.

The Deep Ecological Urbanism model is not a one-size-fits-all framework but, through application of the strategy, it is transferable between communities in that it can be modified based on locale. The purpose of implementing the Deep Ecological Urbanism strategy should be specific to meeting challenges that are

present in the community where it's being employed. Its solutions, likewise, should be tailored to those same needs. Citywide goals cannot be applied throughout the community without consideration of the individual context of each project (Mueller & Dooling, 2011). Even best practice strategies should always be adapted to suit local needs and address local or site-specific challenges. Therefore, planners and other urban actors need to understand the historical context, or legacy, of cities by employing a background study from the very first stages of the planning process (Beatley, 2000, p. 328).

RESTORATIVE

A community that is *restorative* strives to adopt plans and engage in activities which improve the health of the ecosystem and its inhabitants. A restorative

FIGURE 14. A BLOCK PARTY ON A VACANT LOT IN BALTIMORE'S GREENMOUNT WEST



Photo by the Author

community rebuilds the non-human nature that has been lost, and maintains the overall health of the entire system. In doing so, a Deep Ecological city offers an attractive living environment that is healthier for all inhabitants—both human and non-human.

HOLISTIC

A **holistic** community utilizes systems thinking and an ecological approach when planning for its future. All processes, short-term and ongoing, should be integrated with one another. Projects should be integrated across contexts and throughout every layer of activity, requiring cross-sector coordination.

By planning holistically, a community can eliminate unnecessary redundancies that produce wasted energy. Furthermore, thinking holistically allows planners to view the big picture and identify critical relationships and connections from which the community's systems might benefit.

Principles of Equity

DEMOCRATIC

Planning should always be equitable and **democratic**. An democratic planning process is one that encourages and facilitates participation and seeks input from all individuals. This can be top-down, with government agencies leading the discussion; or the process can evolve through more bottom-up, grassroots efforts.

The product of the planning process, additionally, must also be democratic. It's important to understand that, with regards to human well-being, sustainability and the resilience of an ecosystem might still be achieved through unjust or even oppressive measures (Ernstson, 2013). In these instances, explained Gunn (1998):

The problem is not urbanization as such, but the destruction of successful urban communities, and this situation is just as sad, and just as avoidable, as the destruction of woodland or wetland communities. Heritage is also often lost as historic buildings are torn down to make room for new ones. (p. 350)

Each decision should evaluate the needs and interests of all who are impacted, and strive to produce results through recommendation and action plans that are equitable for all residents—both human and non-human—of the community.

Additionally, participatory planning processes, and the use of shared spaces (Figure 14) can be leveraged to foster bonds between people and the local landscape. Strengthening relationships among the community can establish and enhance an area's protective and innovative capacities.

FIGURE 15. BRIDGE OVER A CREEK AT A TRANSIT STOP

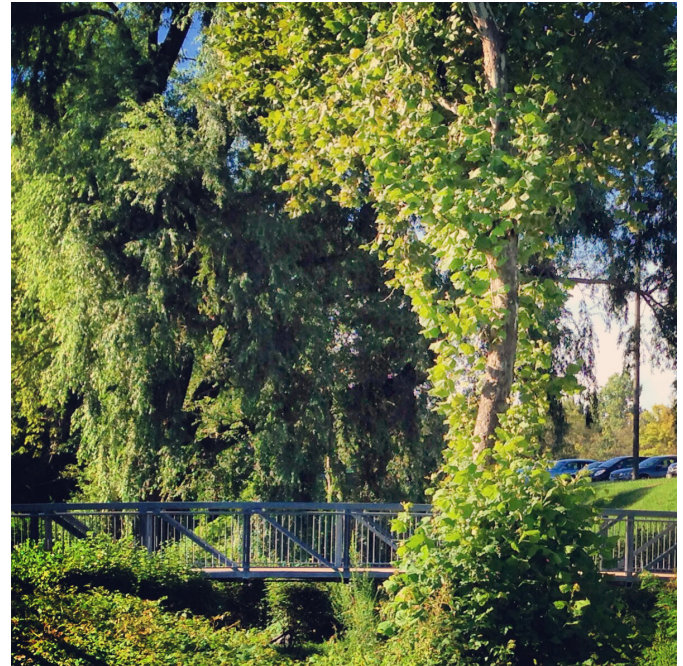


Photo by Author, 2013

BIOPHILIC

Biophilia describes the inherent affinity that humans have for non-human nature. In fact, humans need a sort of sensory immersion in nature (Beatley, 2012; Gandy, 2013). Planning should aim to foster connections with non-human nature through the inclusion of biological assets in every community. Each individual should have access to these assets, and should also have the opportunity to be engaged in local ecological education programs.

Recognizing humankind’s existence as part of nature, as well as our innate affinity for non-human nature, we should be planning and designing cities that foster celebration of, and co-existence with non-human nature (Beatley, 2012). Planning for biophilic communities is a critical step towards growing stewardship and fostering an ethic of care among residents for the local environment. A biophilic community fosters bonds between individuals—with one another, as well as with the surrounding biodiversity and landscape. Planning should recognize these relationships—protecting them where they exist and fostering them when they are absent.

At every opportunity, a community should strive to integrate non-human natural elements. For instance, utilizing leftover spaces or buffer areas (Figure 15), even the smallest patch of natural features can have an enormous impact.

FIGURE 16. A STUMP IN BALTIMORE’S DRUID HILL PARK BECOMES A WORK OF ART



Sculpture by Mark Acton; Photo by Author, 2013

DIVERSE

A community should strive to be as *diverse* as possible. Planning should maintain and increase biological phenomena within a community. Biodiversity describes the abundance and variety of life in an area, which can be increased through the creation and protection of critical habitats, or through provisions for maintaining and increasing biological assets within a development.

In addition to encouraging a significant increase in biological organisms within our human-dominated ecosystems, planning should accommodate a diverse range of human needs, and also diversify land uses (including habitat types) within a community. Diverse uses increases the accessibility of everyday needs and helps to root residents within their communities.

SPIRITED

The final principle may seem broad, but it is perhaps one of the most fundamental characteristics of the Deep Ecological Urbanism model. Planning for communities to be *spirited* has advantages for public health, social capital, livability, viability, environmental stewardship, and so much more. As individuals who shape the landscapes of the community, planners must recognize the impact and potential inherent within those landscapes.

Landscape, explained Martha Fajardo,² is a universal language—without boundaries—that connects people and communities from across the world. She exclaimed that “the world is what we make of it!” With the International Federation of Landscape Architects (IFLA), Fajardo is working on an International Landscape Convention (ILC), a framework that embraces the duality and multiplicity of the landscape—seeing it as both a cultural and a natural concept; a physical as well as an abstract entity; and as having economic, in addition to social values. Importantly, this framework shapes a new way of thinking about the landscape by focusing on the relationships between people and their environments. Recognizing that different cultures surely have different perceptions and

² Personal communication, January 9, 2014.

values, the ILC framework intends to be flexible and context-dependent.

A collaborative process (see *democratic*, above) identifies key characteristics which the community should highlight. Celebrating these assets encourages a positive connection to place (Xie, 2013), which is generally a good predictor of a community’s environmental ethic (Andersson et al., 2007). Generating a deep and emotional bond, our attachment to place and to this Earth has been called many things: spirit of place (Markevičienė, 2012), sense of place (Lynch, 1960), life force (Gandy, 2013; see also Henri Bergson, John Ruskin), genus loci (Markevičienė, 2012), anima mundi (Roszak, 1994), the soul of the world (Roszak, 1994), etc. Fostering this connection, planning should facilitate active engagement in the community planning process and help individuals participate on a spiritual level (Markevičienė, 2012).

Spirited planning celebrates natural cycles, highlights local nature (Figure 16), develops pride in local charm and history (Figure 17), nurtures an ethic of care and stewardship among residents, and enhances the overall quality of life. It is one of the least tangible principles, but absolutely necessary nonetheless.

FIGURE 17. SAILABRATION CELEBRATES BALTIMORE’S INNER HARBOR & HISTORY



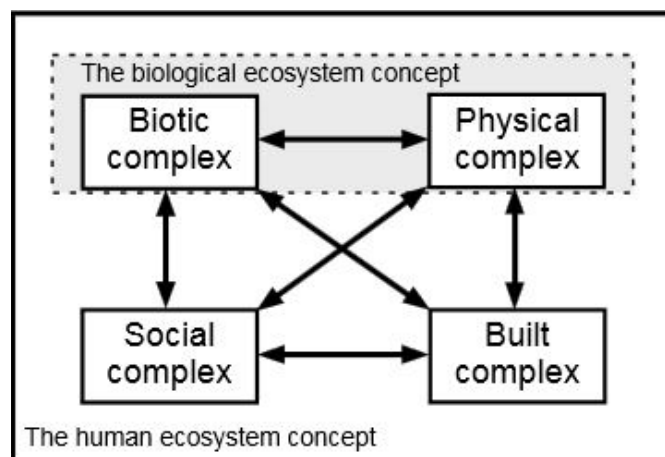
Photo by Author, 2012

DIMENSIONS OF THE CITY

The guiding principles above begin to define *why*, but not necessarily the *what* (*how* will be discussed in Chapter 5). I will ultimately identify criteria for implementing and then measuring the Deep Ecological Urbanism strategy, but must first identify the different dimensions within communities. This will outline a blueprint for identifying Deep Ecological Urbanism recommendations and actions. Inspired by elements of ecological studies, the Deep Ecological Urbanism model identifies four *layers* of the city: habitat, biota, society, and cycles. These four layers are the broadest dimensions of a community; a combination of tangible and intangible components. Narrower in scope, there are *sectors* and then *systems*.

The rationale behind this composition is grounded in concepts from natural sciences. It is a modification of the combined human-biological ecosystem concept (see Cadensasso & Pickett, 2013, pp. 41-42; Figure 18) which identifies components of the four urban system as biological, built, social, and physical. In the Deep Ecological Urbanism model, built and physical components comprise the habitat and cycles layer, while the “cycles” layer also distinguishes stocks and flows.

FIGURE 18. ECOLOGY OF AN URBAN AREA



Source: Cadensasso & Pickett, 2013, Fig. 2.7 on p. 42

Habitat

The habitat layer includes the built, physical, and biological structures associated with the immediate tangible surroundings in a community. Habitat refers to the shelters and the specific environments that are created to accommodate the extended residence of both humans and non-humans. The two sectors of this layer are the *Built Environment* and the *Natural Environment* of the ecosystem.

BUILT ENVIRONMENT

The built environment sector describes the human-created aspects of the physical environment. In some instances, natural phenomena may be human-shaped (e.g. parks and gardens), and so this sector includes public spaces as a component system. Additionally, land use designations, zoning, and similar policies that shape our built environment are included in this sector. While the built environment includes physical structures (i.e. buildings), infrastructure systems, as well as the operation and use of those systems, are categorized as “cycles.”

NATURAL ENVIRONMENT

The natural environment includes all geophysical, hydrological, and atmospheric phenomena in an area, in addition to any processes associated with those phenomena—including the generation of ecosystem services. This sector is composed of the basic spheres of the ecosystem: the atmosphere, hydrosphere, and lithosphere. These are the large-scale, non-human spheres that shape our environment.

Biota

This layer includes all human and non-human life forms that inhabit a city; as well as the health, well-being, and safety of those organisms. It's sectors are defined as wildlife and humankind.

HUMANKIND

The humankind sector is concerned with the health, safety, well-being and fair treatment of individual people. This sector should include areas such as food and nutrition, public safety, as well as human capital.

FIGURE 19. BIKE PATH IN PORTLAND



Image courtesy of PortlandOregon.gov

Human capital describes the skills and knowledge that are cultivated through educational opportunities, workforce training, and interactions among members of the community (systems within the society layer). This sector would also include indicators for households (e.g. household income, home value, etc.).

WILDLIFE

The wildlife sector is concerned with the health, well-being, and individual interests of all non-human biotic entities in a community, including flora, fauna, fungi, insects, microbes, and any other living system. Wildlife also contributes to an area's natural capital by playing a part in the creation of ecosystem services (see also the Natural Environment sector of the Habitat layer).

Society

The society layer considers the combination of (primarily human) populations within a city, as well as the social and institutional norms that govern those groups. It moves beyond the health and well-being of the individual to consider the health of the whole and the relationships between individuals.

COMMUNITY

The community sector look at the impacts of populations at-large (i.e. “communities”), and the overall, collective actions that lead to advanced social capital, and to strong cultural identities. Social capital evolves through meaningful relationships among residents and their communities, and facilitates the growth and utilization of human capital (see also Humankind in the Biota layer).

INSTITUTIONS

Institutions are the mechanisms and social orders that either influence or regulate customs and behavioral patterns. This includes educational institutions, public and private agencies and organizations, governance structures, and the local economic or financial system.

Cycles

The cycles layer contains the movement of capital, goods, and services within and between cities, as well as the channels through which they are conveyed. Cycles also includes management of the by-products of those exchanges. The cycles layer includes the exploitation of physical and biological components (Biota, both human and non-human) by way of, or for the purpose of, anthropogenic structures, patterns, and processes of the Habitat or Society layers. In other words, resources generated in the other three layers are modified and altered by way of cycles to serve additional purposes.

FLOWS

Flows are the exchanges and economic behaviors, and the resulting products created by those interactions. Flows include the inter-city generation, production, fabrication, or alteration of capital, goods, and services.

Additionally, flows include the imported and exported exchange of those same goods and services. Inputs, from resources and materials that are extracted, are components of flows. Furthermore, flows comprise anthropogenic outputs, or emissions and wastes, including pollution and greenhouse gas emissions.

STOCKS

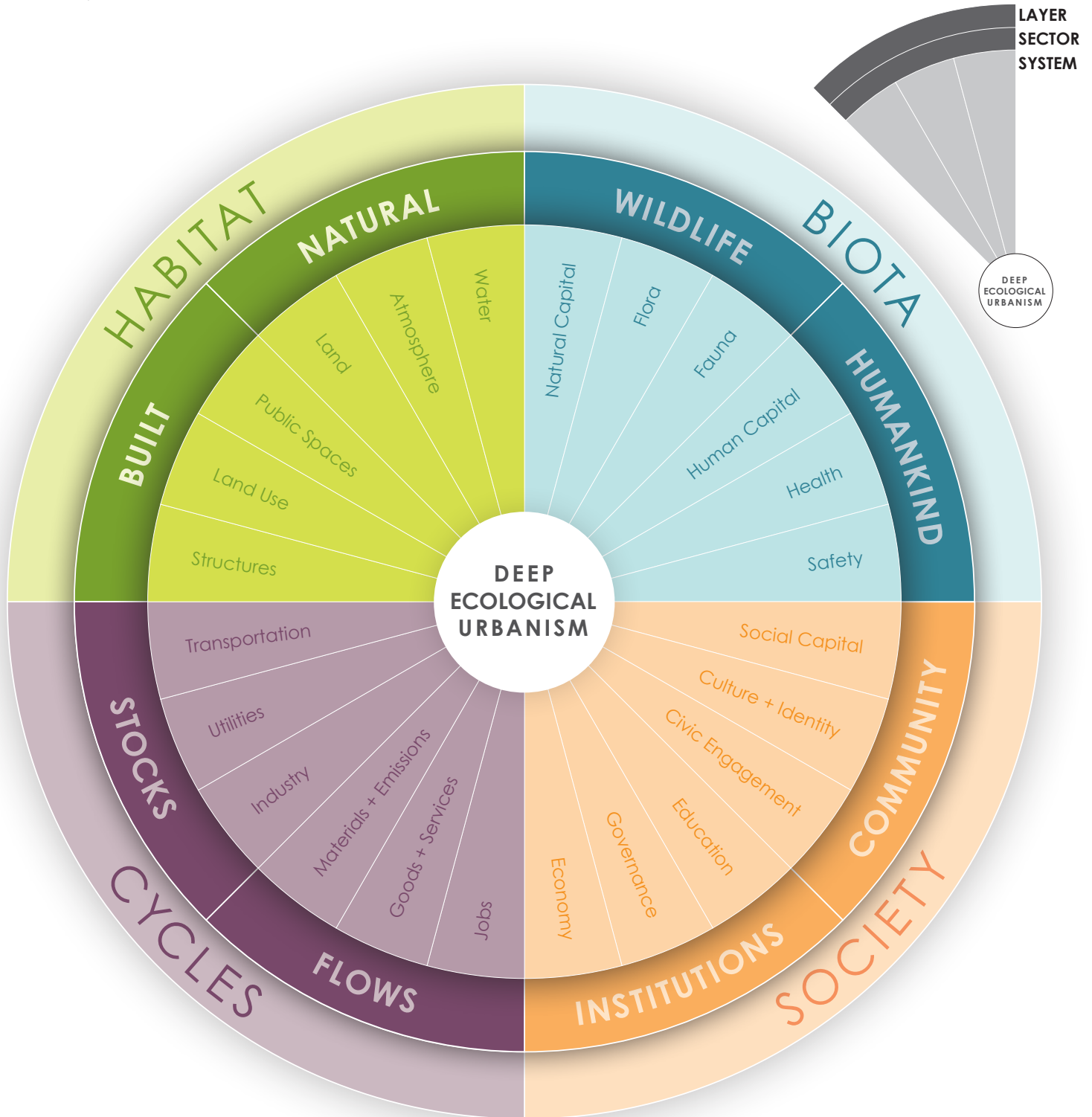
Stocks are the enduring, physical systems and channels for conveying people, goods, and services. In human-dominated ecosystems, stocks are the inter- and intra-city physical infrastructure for transportation and utilities, as well as major systems for managing the production and manufacturing of goods and services (i.e. industries).

MANDALA

Illustrating how these layers and their sectors are connected, the Deep Ecological Urbanism mandala (Figure 20) represents a conceptual blueprint of the various components of a community. The mandala intends to illustrate how all phenomena within a human-dominated ecosystem are interrelated and fall within one of the four layers described above.

The outermost layer divides the mandala into four quadrants, corresponding with the four layers: habitat, biota, society, and cycles. Working from the outside inward, we can first use the four layers to identify key actors. The second ring identifies the eight basic sectors within human-dominated communities; they are: built environment, natural environment, wildlife, humankind, community, institutions, flows, and stocks. These eight sectors identify key policy areas. The central ring identifies the 24 systems. The systems are indicator areas for further identifying and considering measures for action. They describe conditions or elements that are essential to the quality of life in a community.

FIGURE 20. DEEP ECOLOGICAL URBANISM MANDALA
 Created by author, 2014.



SUPPLEMENTING EXISTING SUSTAINABILITY MOVEMENTS

Most definitions of sustainable development stress the need to balance three different pillars: society, economy, and environment. While it is true that a sustainable city is one that balances these three pillars, the Deep Ecological Urbanism framework places significant emphasis on the environment—seeing it as the realm in which the other two pillars operate, as well as the underlying foundation upon which human-dominated communities are built and all other facets of sustainability evolve. Thus, nature plays a critical role as the web that unites all three pillars together. To be clear, the Deep Ecological Urbanism concept sees ecological health as a precondition for sustainability.

This report intends to demonstrate the need to reunite non-human nature with the society, economy, and environment of human-dominated systems. Additionally, it intends to prevent further segregation of the three pillars, recognizing that “progress” with regards to social and economic sustainability can sometimes undermine environmental, or the overall sustainability. Instead, restoring ecological processes is the most basic, cost-effective solution for producing the widest range of benefits within all three pillars—both immediately as well as in the near- and long-term futures.

The Deep Ecological Urbanism framework views issues of sustainability, ecological health, and environmental ethics as a single, multifaceted challenge. Recognizing that sustainability is an all-encompassing concept that must be tied to every community-wide objective, Deep Ecological Urbanism attempts to coordinate and complement, rather than replace, existing efforts through an integrated planning approach.

Deep Ecological Urbanism is multi-functional and complementary, and should be fundamentally integrated into a community’s comprehensive plan and overarching vision. It should also facilitate the implementation and coordination of existing and ongoing planning work (Symbiocity, 2012). Likewise,

Deep Ecological Urbanism is not a sustainability plan, but a systems-based, holistic strategy for framing decision-making, recommendations, and actions.

Compared to sustainability plans, which have already been produced by a number of North American cities, the Deep Ecological Urbanism strategy is heavily focused on the systematic and comprehensive inclusion of environmental ethics and principles of ecology, relating social and economic sustainability challenges back to basic environmental health challenges.

SYNOPSIS

Setting the foundation for sustainable, resilient, and ecologically healthy urban planning and design, Deep Ecological Urbanism envisions a future of communities where the wisdom of natural science has been joined with guiding ethical philosophies. Through recognizing principles of ecology and environmental ethics, a planner, urban designer, or any other individual who is engaged in the shaping of our environments can create more vibrant communities by establishing and protecting the intricate relationships between organisms and the ecosystem.

Deep Ecological Urbanism is a highly interdisciplinary approach to urban planning and design. Pulling from studies of natural sciences, environmental ethics, and sustainable development, I have crafted a theoretical framework for guiding the consideration of Deep Ecological Urbanism as a strategy for sustaining our communities without placing unnecessary stresses on the underlying natural landscape.

The conceptual framework within this chapter serves as a tentative rationalization of the Deep Ecological Urbanism research objective, and will be modified and made operational later in this report. In the following chapter, I will demonstrate how my interactions with practitioners (through interviews, case study research, and surveys) supplement the conceptual framework to make it operational.



CHAPTER 4//

BEST PRACTICES

CHAPTER FOUR | Best Practices

The conceptual foundation identified in the previous chapter is limited to broad, visionary theories. To make the Deep Ecological Urbanism framework more concrete would require a clear understanding of current best practices (based on interactions with practitioners, case research, key informant interviews, surveys, etc.). Upon comparing the Deep Ecological Urbanism concept against real world practices, I will revise the conceptual framework in order to ultimately shape an operational framework which can be more easily transferred to practice. First, I will evaluate three exceptional case studies to identify similarities and patterns. (For a list of major ecological planning efforts from each of the three case studies, refer to Table 12 in Appendix C.) I will then use input gathered through a planners' survey to identify gaps and trends in planning practice which the framework will need to address.

PORTLAND CASE STUDY

First settled in 1843, the City of Portland, Oregon, was named in 1845 and incorporated in 1851 (City of Portland, n.d.; Gibson & Abbott, 2002). Portland has been a model for sustainability for decades, and has inspired cities—both nationwide and across the globe—to protect and restore their natural amenities. The city is best known for having progressive policies and initiatives related to growth containment, waste reduction, green building, energy efficiency, and bike safety (Economist Intelligence Unit, 2011).

Not long after being established, in the 30 years between 1880 and 1910, Portland's population grew more than tenfold—from 17,000 residents to more than 200,000 residents (Gibson & Abbott, 2002). Today, the Portland-Vancouver-Hillsboro, OR-WA Metropolitan Statistical Area—the larger consolidated Metropolitan area, which includes portions of the state of Washington—is the largest community statistical area in Oregon. In 2010, the metropolitan area had a population of 2,226,009, making it the 24th largest among U.S. metro areas.

FIGURE 21. PORTLAND EARNED THE NICKNAME “STUMPTOWN”



Image courtesy of Oregon History Project

Background

In the Pacific Northwest, less than 100 miles from the Pacific Ocean, the City of Portland is located at the confluence of the Columbia and Willamette Rivers (Gibson & Abbott, 2002). The decision to develop Portland in that location is significant and is tied to the rich resources of the surrounding landscape. Logging operations (Figure 21) would sell lumber to surrounding communities, and the river allowed for the transport of goods produced by the enduring resource-based economy.

Portland's early growth was largely driven by its position as a regional metropolis and port city in the Pacific Northwest. With excellent transportation, Portland established a competitive advantage within the larger region (Gibson & Abbott, 2002). During the California Gold Rush of the 1850s, Portland was a key supplier of food and lumber to the California miners. It did the same for later gold rushes in Idaho and Montana in the 1860s, and in the Alaska and Klondike Gold Rush after that (Gibson & Abbott, 2002).

Portland's riverfronts were once at the center of the city's economy (Gibson & Abbott, 2002; Hagerman, 2007). Originally serving as a shipment center for regional resource extraction, the riverfront would later become an area for shipyards and industrial uses, such as producing cargo ships and small naval vessels

FIGURE 22. PORTLAND'S NEW CURBSIDE COMPOSTING PROGRAM



Image courtesy of PortlandOregon.gov

during the first and second World Wars (Robbins, 1997, Robbins, 2004, as cited in Hagerman, 2007). Today, employment in Portland remains closely tied to its two rivers,¹ with a significant riverside employment corridor housing half of Tri-County jobs in finance, insurance, and real estate (FIRE) sectors, as well as in transportation and public utilities (Gibson & Abbott, 2002). The city's role as a transportation hub and trading post has now extended into the surrounding states.

While the resources of the landscape provided opportunities, the landscape had also created some challenges. Flooding, for example, has been a recurring problem—so devastating to have swept an entire residential complex down the Columbia River in 1948 (Gibson & Abbott, 2002). Additionally, the heavy reliance on the landscape and the rapid growth of industry and development in the early 20th century

¹ With modernization of transportation and technology, however, economic activities moved downstream to more accommodating river dimensions.

led to the pollution, channelization, and blockage of Portland's rivers and streams (Hagerman, 2007).

Governance and the Region

In the 1970s, Oregon had taken a unique approach to development by establishing progressive, statewide land use goals. Created under the administration of Governor Tom McCall, the 1973 Oregon Senate Bill 10 (SB10) created the institutional structure for statewide land use planning (Steffan, 2008; Adler, n.d.). The legislation required every jurisdiction in the state to have a growth management plan, and that each local government comply with 14 statewide goals.

Below state-level policies, the City of Portland is regulated by the nation's only elected metropolitan governance structure (Gibson & Abbott, 2002). In 1978, Metro was established "by merging a regional planning agency and a weak metropolitan service district" (Gibson & Abbott, 2002, p. 430). Unlike most forms of local government, which have a conventional council for an individual municipality, Metro was comprised of 24 cities from parts of three different counties (Steffan, 2008). Originally, Metro was directly governed by an

elected executive and council, but voters eliminated the executive branch in 2002 (Gibson & Abbott, 2002).

With a home rule charter adopted in 1992 (Gibson & Abbott, 2002), Metro has sufficient power to govern and structure regional planning (Gibson & Abbott, 2002; Newman & Jennings, 2008; Steffan, 2008). Metro's structure is stronger than that of other regional governments, which often resemble a "sort of united nations for a region," but rarely have centralized power to make large-scale decisions (Steffan, 2008). Whereas the scale of regional challenges usually exceed the scope of local governmental authority, Metro is able to address these challenges as a single, autonomous entity.

In addition to its "authority to make key bioregional-scale decisions" (Newman & Jennings, 2008, p. 220), Metro functions as the region's land use and transportation agency, with regional authority to adopt plans and require local compliance and integration (Gibson & Abbott, 2002). To comply with Oregon SB10, Metro created the Portland Urban Growth Boundary (UGB) in 1979. The UGB was both a means and an end to controlling growth (Gibson & Abbott, 2002). While the region experienced sprawl between the 1950s and 1970s, the Urban Growth Boundary effectively controlled later development. From 1980—a year after the UGB's creation—to 1994, Portland's metropolitan population increased by 25% even while urbanized land only increased by 16% (Gibson & Abbott, 2002).

Governing actions at the city level, Portland's commission system was adopted in 1913. Portland's four commissioners and the mayor—together constituting the City Council—are chosen in an at-large election. This body has both legislative and executive responsibilities. Interestingly, the mayor has only a single vote in Council decisions and no veto power (Gibson & Abbott, 2002).

Planning and Sustainability

The City of Portland is renowned for its innovative policies regarding planning, growth management, revitalization, and regionalism; but it was not always so

visionary and progressive. In fact, a status quo mindset and a slow, un-reactive government had limited the appeal of the area until as late as the 1970s (Gibson & Abbott, 2002).

Though once described by journalist Neal Peirce as "a town of quiet wealth, discrete culture, and cautious politics," Portland is today quite different (Peirce, 1972, as quoted in Gibson & Abbott, 2002, p. 425). A great deal of what has contributed to Portland's unique state of mind and culture developed in the 1970s onward, when the city "earned a reputation for livability" and both public and political priorities focused on preservation, restoration and reinvestment, transit, and growth containment (Gibson & Abbott, 2002, p. 425). Achieving these aspirations, however, has been challenging at times.

The City of Portland must not only operate under the umbrella of Oregon state land use goals, it must also comply with regional policies. Metro has identified "Titles," region-wide goals with which the City of Portland must comply. They're generally broad, flexible, and easy to integrate; but the city must also coordinate its own sets of goals. All planning in Portland must comply with the Comprehensive Plan and its established local land use policies.

The challenge is that the broad, statewide goals don't necessarily come with instructions that would suggest *how* a city is to meet each goal. Without guidance, it's also challenging to balance the objectives of each goal, which sometimes seem contradictory. Goal 9, for instance, is Oregon's economic development goal, which requires Portland to adequately supply land to meet expected employment needs. On the other hand, Goal 5, which is the Natural Resources, Scenic and Historic Areas, and Open Spaces goal, requires the city to protect all significant resources. It's up to Portland's Bureau of Planning and Sustainability (BPS) to determine how to resolve these conflicts. According to Jesse², a planner in Portland, the BPS avoids prioritizing

² Not their real name. Personal communication, February 27, 2014.

FIGURE 23. KILLDEER ON BANKS OF COLUMBIA SLOUGH



Image courtesy of City of Portland

one objective over any other as much as possible, and avoids solutions that would require trade-offs.

Generally, city officials acknowledge key environmental benefits of ecological projects, as well as benefits to mental and physical health—recognizing the wealth of scientific and academic literature supporting this case. Therefore, the BPS makes a concerted effort to meet multiple goals simultaneously—recognizing that all goals, even when conflicting, are critical for the overall health of the city.

On a site-by-site basis, there may indeed be a trade-off. At times, the city struggles with balancing environmental priorities with residential projects, and too much public input can sometimes restrict the success of environmental (Hagerman, 2007). In Portland, most people agree that projects that protect the environment are necessary. However, when it comes down to a person's own property, Jesse noted, a resident might express different opinions.

Citizens of Portland enjoy the things about their city that make it sustainable. Still, there isn't automatic support for every big project. For that particular challenge, Jesse recommended trying to raise awareness among residents, working with them to demonstrate the multifaceted benefits of a project. The more that an action can be tied to the protection of public health, safety, and property, the easier it will be

for residents to accept a proposed project or regulation. Recognizing this, the city has initiated an assortment of educational initiatives, including programs that offer elementary and middle-school aged kids opportunities to experience nature. However, when support for a project cannot be fostered, Jesse emphasized the responsibility of the planner to explore alternatives.

Civic engagement in environmental efforts has a long tradition in Portland. In the 1970s, Portland saw a rise in civic and environmental activism. Responding to the urban crisis of the 1960s and 1970s, grassroots initiatives worked together to holistically address issues which were previously seen as being isolated challenges (Gibson & Abbott, 2002). Planning, by including community input, would address concerns of liability and environmental protection, and recast “understandings of the city and nature” (City of Portland, 1996, PDC, 1999, as cited in Hagerman, 2007, p. 286).

When asked about integrating protection for non-human nature into planning efforts, Jesse noted that Portland is in the process of updating its *Comprehensive Plan Goals and Policies*. Though the city is not writing any new regulations, the process will update city goals that are related to natural resources, something that hasn't been done for 35 years. For example, this process weaves concepts of resiliency—related to both climate change and natural hazards—into the Comprehensive Plan. Jesse was hopeful that this step would pave the way for updating more of Portland's area-specific environmental regulations, which is also long overdue.

Another major project in Portland is *the Central City 2035* plan. Central City 2035 is a re-look at the downtown area, including the Willamette River and its banks. This is an active part of the city, where there aren't many natural banks. Taking steps to enhance the river and protect local endangered species, the Central City 2035 plan is also maintaining human access and use of the Willamette so that Portlanders can continue to love and embrace the river. Central City 2035, explained Jesse, is still in the policy development stage.

Today, planning in Portland is significantly concerned with the ecological health of the larger community. In contemporary planning efforts, the BPS pulls in key staff and consults with experts when a project requires specialized knowledge (e.g. for input regarding biological systems and processes). The BPS also employs “environmental techs” for the purpose of evaluating the impacts of proposed projects on Portland’s environment. The environmental techs determine, among other things, what needs to be protected, what may not be protected, and, when mitigation would be needed, what kind of mitigation that might be.

One of the reasons why Portland has been so successful when implementing sustainability projects and initiatives is that they have leaders who support their efforts. In every project, explained Jesse, there needs to be a strong leadership that includes people the community can respect.

Leaders can be political decision-makers and representatives, or strong neighborhood champions who are willing to take on a key role. Having influential community leaders who are articulate about a project can help sustain momentum, even if political leadership changes drastically (e.g. because of an election). Similarly, as Jesse suggested, a key formula for successful planning is a healthy mix of both bottom-up and top-down initiatives, with a handful of champions from every angle. If a project starts from the bottom-up, there must be support from the public leaders. When started from the top-downward, there must be buy-in from the community.

In the commission system, local priorities can change immediately—even drastically—with a transition of leadership. For a number of years now, Portland has been fortunate to have a government that has been supportive of sustainability and of staying ahead of the curve, particularly in terms of energy efficiency and technological innovations.

Lessons Learned from Portland

The City of Portland is not necessarily doing things perfectly, but it’s ahead of the curve, addressing certain issues that other cities haven’t yet tackled. For other cities looking to be more proactive in caring for the environment, Portland demonstrates the potential to help residents understand the value of protecting nature by tying it to issues already being experienced locally. As Jesse suggested, look for “catalyst moments” that are unique to the community at hand. In this regard, every solution will be different, depending on the community.

Similarly, when planners help residents to have ownership over a place, or feel a physical or emotional tie to that place, they create citizen stewards. Allowing people to experience nature helps them foster a love of that place. This is especially important in bigger cities that are devoid of nature. There, apathy might be a more common attitude among residents who see no reason to consider nature.

FIGURE 24. CHILDREN PLANTING TREES IN PORTLAND



Image courtesy of City of Portland

FIGURE 25. SAN FRANCISCO SKYLINE



Image courtesy of SFgov.org

SAN FRANCISCO CASE STUDY

The oldest of the three case studies, the City of San Francisco was founded in 1776 and incorporated in 1850. San Francisco's population has exploded despite a string of severe devastations which include a plague epidemic, earthquakes, and fires. Today, the city is well known for its environmental milestones, including the founding of the Sierra Club; as the birthplace of Earth Day in 1970; its creation of one of the first curbside recycling programs; and the recent redevelopment of the nearby 1,500 acre Presidio, a former Sixth Army headquarters, into a major recreation center at the entrance of Golden Gate Park in 1995 (Godfrey, 1997); and its 2008 Green Building Ordinance (Flores, 2009).

Covering only 47 square miles, San Francisco is the densest of the three case studies, and one of the densest cities in all of the United States. In 2010, with a population of 805,235 residents, San Francisco packed nearly 17,200 residents per square mile. The San Jose-Sunnyvale-Santa Clara Metropolitan Statistical Area, with a population of 1,836,911 residents in 2010, was ranked the 34th largest in the U.S.

Background

San Francisco is a coastal seaport, like Portland, in the Pacific Northwest of the United States. Located on the San Francisco peninsula, the city is surrounded by water on three sides and a large portion of the city's land is comprised of ancient sand dunes (Beatley, 2011). Expansion had been limited in San Francisco due to irregular topography and the presence of major water features. As a result, dense development became a necessity (Godfrey, 1997).

Resting atop nearly 50 hills, a characteristic for which the city is famous, San Francisco's streets were laid out in a grid. This pattern facilitated access throughout the city, affording efficient travel to and from work. The hills and other geographic features create a unique climate for the city, with a variety of micro climates found throughout the region contributing to cool winds and frequent fog, for which San Francisco is known.

The city is susceptible to seismic activity. In the Bay Area, earthquakes are attributed to the nearby San

Andreas and Hayward faults. Further increasing vulnerability, the city has developed considerably over reclaimed land. Therefore, the influence people have had in shaping, filling, and altering San Francisco's natural features plays a major role in understanding the city today (Beatley, 2011).

San Francisco has gone through successive periods of growth and development. First, with the California Gold Rush in 1849; then, through rapid redevelopment following the 1906 earthquake and fire, followed by a period of high-rise development in the 1960s (Godfrey, 1997). Census data suggest that the California Gold Rush of 1849 launched a massive in-migration, and the prior year's population grew more than 25 times (U.S. Census Bureau).

In addition to mining, San Francisco found success in a number of other resource-based activities. The port became critical, as San Francisco was, at the time, the largest city on the West Coast. Following the Gold Rush, wholesale and retail industries were established in the city's financial district, and the central business district (CBD) was densely built up in less than 25 years (Godfrey, 1997). San Francisco later evolved from its industrial, resource-based commercial economy to a post industrial corporate center, establishing itself as a principal banking and finance hub of the West Coast, known as the "Wall Street of the West" (Godfrey, 1997).

In the 1960s, San Francisco established itself as a world-class city, finding the designation favorable in many respects (Godfrey, 1997). As the city endured and third major cycle of development, planners faced new challenges. The growing number and size of high-rise buildings frustrated the public, who criticized the rapid new development patterns for blocking views of the waterfront and for being out of scale with the surrounding communities (Godfrey, 1997). Preservationists and neighborhood activist reacted in opposition, criticizing the "manhattanization" of the city for "escalating rents and property values, traffic congestion, disruption of scenic views, and displacement of poor and even middle-class residents" (Godfrey, 1997, p. 317). After repeatedly lost anti-

high-rise ballot measures, the San Francisco Planning Department finally reacted in 1983 with the completion and approval of the *Downtown Plan*. This plan included key preservation elements, such as height and bulk allowances, for the Downtown area.

Governance and the Region

The City and County of San Francisco is California's only consolidated city-county. Defined by the "Charter of the City and County of San Francisco," San Francisco is governed by two coequal branches of executive and legislative authority. The area is governed by the mayor (who also acts as the County executive) and the 11-member Board of Supervisors, or city Council.

Though it's a struggle, San Francisco strives to integrate strategies across departments and at different scales. Each city department, for example, is required to establish and track its own energy budget (Flores, 2009). Additionally, San Francisco's Interagency Plan Implementation Committee (IPIC) focuses on turning plan visions into realities, and the IPIC produces monitoring reports for tracking the implementation of the city's plans.

In addition to internal coordination, the city is concerned with outreach. The Public Outreach and Engagement Team of the city's Planning Department is an internal advisory group that ensures staff are provided the resources and assistance needed to facilitate public engagement. Similarly, the Department's Planning Information Center (PIC) and progressive online tools facilitate citizen awareness and information access.

Planning and Sustainability

The State of California has a reputation for being "green." Beginning with initiatives in the early 1960s, California became known for its environmentally conscious actions. The state continues to take legislative action to reduce environmental impacts and prevent further changes to the climate. In 1960, the publication of *California Going, Going*, followed by *The Phantom Cities of California* (1963), increased statewide awareness of the risks associated with inadequate planning and the

FIGURE 26. SAN FRANCISCO'S FAMOUS GOLDEN GATE BRIDGE



Image courtesy of SFgov.org

consequential environmental degradation (Calavita, 1995). Interestingly, and contrary to what one might expect, it was a minority Republican Speaker of the Assembly, Bill Monagan, who helped the environmental movement in California gain recognition (Calavita, 1995). Monagan (1982) recognized the unique complexity of environmental issues which “cut across so many different legislative disciplines,” and, in 1970, he established a “Select Committee on Environmental Quality” (as quoted in Calavita, 1995, pp. 9-10). In its first year, the Committee published an *Environmental Bill of Rights* with 34 recommendations “to preserve and enhance the quality of the California environment” (Calavita, 1995, p. 11).

The statewide sustainability movement had roots in San Francisco, which played a major role in developing the environmentalist mindset (Walker, 2007). As the birth place of a leading environmentalist, John Muir, San Francisco boasts a long tradition of respect and appreciation for nature. Muir, a San Francisco native, is well known for his conservation work, and his values contributed to the general conservation ethic in San Francisco (Iverson, 2007). In the 1960s, San Francisco provided a home for new environmental groups, like the Sierra Club and the Save San Francisco Bay Association. Since then, environmentalists have established vast networks of influential conservation and environmental protection organizations in San Francisco (Iverson, 2007; Walker, 2007).

Today, the San Francisco Charter has its own “Environment Code.” Developed in 2003, this

ordinance governs the protection of San Francisco’s environment and natural resources. Additionally, San Francisco became the first city in the nation to adopt a “Precautionary Principle Policy,” also in 2003.

The Sustainable Development Program in the San Francisco Planning Department, which manages and coordinates citywide sustainability and land use activities, is a new program to facilitate implementation of the long-range planning vision. The purpose of the program is to identify strategies for meeting the city’s environmental goals while at the same time accommodating planned growth. Prior to its creation, many city departments had already established their own sets of environmental goals, but most required support from other agencies to facilitate implementation. However, in some cases, explained Erin,³ a planner for the Sustainable Development Program, those other agencies may not have been aware of their role, or had found coordination somewhat challenging.

To address this disjointedness, the Sustainable Development Program engaged representatives from nine different agencies as they launched the Inter-Departmental Eco-District working group to look at existing environmental plans and recommendations. Staff from each agency came together to state their environmental goals and identify how, and from whom, they would require assistance. Although the Program’s two-year working group recently ended and no longer meets on a regular basis, Erin explained that the interagency coordination continues as it pertains to project development.

Currently, the focus of the Sustainable Development Program is on completing the *Sustainable Systems Framework* (a draft was released in January 2014).⁴ The *Sustainable Systems Framework* is a compilation of citywide environmental goals and the metrics used to measure environmental projects in the city. The

3 Not their real name. Personal Communication, March 10, 2014.

4 The memo can be found online at <http://commissions.sfplanning.org/cpcpackets/EcoDistrictUpdate.pdf>

FIGURE 27. SAN FRANCISCO URBAN FORESTRY PLAN



Image courtesy of SFGov.org

Framework identifies four guiding district principles—prosperous, efficient, biophilic, and connected—across eight performance areas (City of San Francisco, 2014). The different performance areas include a mixture of some more common “greening” goals (i.e. energy, water, habitat and ecosystem function, and waste (materials management)) along with other performance areas that are perhaps less frequently associated with sustainability—such as health and well being, access and mobility, economic development, and community identity. While moving forward, certain performance areas are more complex and require additional coordination. Fortunately, as a result of the earlier meetings, city agencies in San Francisco now know who within the “city family” needs to be engaged in a project.

FIGURE 28. URBAN BIRD REFUGE MAP OF SAN FRANCISCO

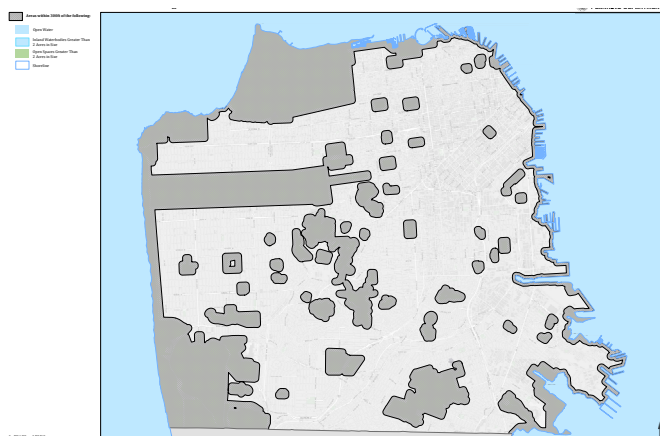


Image courtesy of SFGov.org

Though not always perceived as an asset, biodiversity in San Francisco adds character and charm. Located along the Pacific flyway, nearly half of all bird species in North America can be found within San Francisco’s limits (Beatley, 2011). Additionally, home to nearly 400 species of birds, San Francisco was ranked second in the “America’s Birdiest City Competition” (Beatley, 2011). This has led the city to develop a program for protecting birds within the city by establishing a number of bird refuges (Figure 28). Today, the City of San Francisco views its non-human nature as significantly important, recognizing the potential of biodiversity as a cultural and educational asset and a tourist attraction.

To overcome barriers, San Francisco tries to use legislation as an incentive for getting the public to think about key issues. As an integral aspect of this strategy, the city has to consider and convey how proposed projects areas are measured. A recent initiative of the Sustainable Development Program, then has been collecting and aggregating various data sets. The information is then placed online through an open source platform from which the community can measure the effectiveness of a project.

Considering why San Francisco might be so successful, Erin suggested that the city benefits from its strong leadership and climate innovation. This is largely driven by the city’s and the larger state of California’s

FIGURE 29. VANCOUVER'S POINT GREY NEIGHBORHOOD



Image courtesy of City of Vancouver

ambition to be at the cutting edge of the sustainability movement. Erin also attributed success and progress to San Francisco's residents who are actively vested in the city. San Francisco demonstrates another example of the potential for drawing on the capacity of the community, using a combination of both little and big moves together in order to advance a project or goal.

Lessons Learned from San Francisco

San Francisco has benefited from visionary planners who adhere to their published plans and regulations (Iverson, 2007; Savitch, 2009). Additionally, the city has enjoyed periods of strong mayoral support for sustainability initiatives. This allowed the city to make both big and little moves, balancing top-down projects with grassroots efforts.

Author Richard Walker praised the good work that San Francisco has accomplished, but emphasized the importance of bridging divides and working together across neighborhoods and across departments, institutions, and regional boundaries (Iverson, 2007). He warned that victories are always temporary, whereas defeats can be permanent (Iverson, 2007). While it's important to recognize success, it's even more important to recognize that this is an ongoing fight. Walker remained positive, however, that progress can be made as challenges are reconciled through good planning, democracy, policy, and efficiency (Iverson, 2007).

VANCOUVER CASE STUDY

Growing out of an early logging settlement and sea port located at a rail terminus, Vancouver was officially incorporated as a city in 1886 (Hutton, 2011). The City of Vancouver, Canada, may be the youngest of the three case studies, but its achievements have been no less impressive. In fact, Vancouver has been so enthusiastic about becoming more sustainable that the city has been nicknamed "the crown jewel of North American sustainable urban planning" (Steffan, 2008, p. 231). Vancouver has been the backdrop for a number of progressive environmental milestones, including the development of the environmental organization Greenpeace in the late 1960s, as well as the ecological footprint concept, developed by William Rees and Mathis Wackernagel in the 1990s. Furthermore, Vancouver, particularly in recent years, has become known for its dense, livable neighborhoods.

Vancouver is often ranked high on sustainability indices. In 2011, the city ranked second overall in the Green Cities Index (GCI), despite being the least populous city in the report. Nevertheless, by Canadian standards, Vancouver is actually a fairly large city. Covering a total of 44.39 square miles, Vancouver is the largest city in the province of British Columbia, and the third largest metropolitan area in the country. Home to a total of 603,502 residents in 2011, with more than 2 million residents in the larger Vancouver metropolitan area, Vancouver, like San Francisco, is a dense city. As of 2011, Vancouver was the densest city

in Canada, and among the top five densest cities in all of North America.

Background

Also in the Pacific Northwest, Vancouver is another coastal port city and the largest port city in Canada (Economist Intelligence Unit, 2011). The city developed over rich land along the Frazer River (Hutton, 2011). Surrounded by water on three sides, and with mountains in the distance, growth of the city has been physically limited. Additionally, with such beautiful vistas, the City of Vancouver has been careful to preserve opportunities to appreciate the surrounding landscapes. Development regulations—such as those which restrict the form and girth of high-rise structures—are used to preserve these aesthetic assets (Beatley, 2011; Register, 2006).

With major shipping, logging, and mining industries, Vancouver retained its importance with regards to its predominantly resource-based economy even as the city became more globalized. Growing from a resource economy, the city has moved through phases of industrial expansion, of economic downturn and declining industry, and phases of revitalization and new growth. In the past decade, while it has been one of the fastest growing cities in North America (Register, 2006), Vancouver turns its growth inward.

Governance and the Region

Since 1953, the City of Vancouver has been regulated by a provincial statute called the Vancouver Charter (City of Vancouver, 2013). The Charter is unique to municipalities in British Columbia as it governs how the city operates, establishes bylaws, and sets the city's budget. Vancouver is governed by a mayor and a 10-member council, serving three year terms.

At any given time in history, the political views of Vancouver's leaders and officials have played a major role in the City's overall development priorities, initiatives, and achievements (Hutton, 2011). Shifting views of political leaders mirror shifts in city policies, and the pendulum of priorities had regularly swung

from business-oriented toward a focus on livability, then back again with the next administration.

The area surrounding Vancouver is “linked by shared values, liberal social attitudes and lifestyles, and bioregional setting” (Hutton, 2011, p. 239). In 1967, the Greater Vancouver Regional District (GVRD)—now called “Metro Vancouver,” or just “Metro”—was formed. Coordinating activities between the 21 member municipalities, Metro established a distinctive form of governance. This confederated entity of appointed representatives, however, lacked executive authority (Hutton, 2011), and each member municipality actually retained stronger land used powers than Metro.

Although the larger region saw the City of Vancouver as a threat throughout most of the 20th century—citing a growing region-hinterland division between the city and the surrounding areas—Metro began to embrace the opportunities afforded by Vancouver's position in the global market at the beginning of the 21st century (Hutton, 2011).

Planning and Sustainability

In addition to sustainability, Vancouver is often recognized for its outstanding performance with regards to quality of life and infrastructure. Throughout its history, the City of Vancouver would transition between alternate phases—focusing first on industry and economy, then on livability, once more on economic development, and back to livability (Hutton, 2011).

In the 1960s, growth focused on development in the Central Business District (CBD); while priorities in the 1970s, when Vancouver emerged as a global leader of sustainability, were focused heavily on livability. With the 1976 release of *The Livable Region 1976-1986* (LRP) plan, the City of Vancouver would make their first attempt to address economic and development challenges by diverting attention away from the CBD and simultaneously containing growth. The LRP identified four regional town centers (RTCs) in which to redirect commercial growth that would otherwise be destined for the CBD. Though a step in the right

direction, this plan was only a partial success. It was criticized for demonstrating a naïve understanding of how commercial property markets operate (Hutton, 2011), and for lacking complementary programs which would support its recommendations. During the economic downturn of the 1980s, despite a renewed business-oriented perspective, Vancouver maintained values of preservation and ecology as public interest remained focused on livability and regional concerns—concepts that were by then part of the local planners' lexicon (Hutton, 2011).

Eventually, political priorities became more balanced as the city saw livability as an economic strategy. Vancouver's sustainability efforts flourished in the 1990s. Recognizing the benefits of urban density, the city released the Central Area Plan in 1991, allowing higher densities outside of the CBD. Planning became much more inclusive and initiatives had strong provisions for social housing and public amenities.

In 1996, Vancouver released its *Livable Region Strategic Plan* (LRSP), reinforcing a commitment to environmental health. While both the 1976 and 1996 livability plans focused on controlling growth, the new plan took an alternative approach: rather than containing growth, the 1996 plan sought to manage it. Whereas the earlier plan saw Vancouver as a threat, the latest plan embraced the city as a crucial

asset for regional health. Identifying supplementary RTCs, the plan aimed to make each area a compact and complete neighborhood (Hutton, 2011). Instead of directing growth with regards solely to the creation of office centers, the new plan looked to create complete communities.

In recent years, Vancouver's successes in moving closer to its goal of becoming a sustainable leader have been impressive. One exciting initiative, noted Alex,⁵ a planner at the Vancouver Parks Board, is Vancouver's in-progress biodiversity strategy for the city, which the city has never before had. Some cities may have large, remnant patches of land that have evaded the impacts of development. In Vancouver, however, though greenspaces are not that far away, there is no undeveloped land within the city's boundaries. This initiative is just one example of work that has been initiated since the *Greenest City 2020 Action Plan* was released.

Published in 2012, *Greenest City 2020 Action Plan* (GCAP) began as a key election commitment of Mayor Robertson in 2009. Engaging a wide range of stakeholders, the mayor initiated a multidisciplinary taskforce, called the Greenest City Action Team, to consider what it means and what it would take to be the greenest city. In developing the GCAP, the Greenest City Action Team had investigated best practices from other leading cities—setting goals and targets, as well as early actions.

Though coordinated planning is not new for Vancouver, Alex suggested that the scope of the GCAP, as such an intensely collaborative process between departments and with stakeholders, was more unique for Vancouver. Bringing so many stakeholders to the table, Vancouver's consultation process was valuable and successful in providing a productive experience where input was directly applied to the project.

FIGURE 30. THE JERICHO BEACH RESTORATION PROJECT



Image courtesy of City of Vancouver

⁵ Not their real name. Personal communication, February 21, 2014.

INCOME AND ENVIRONMENTAL VALUES

While a link can generally be drawn between income and environmental priorities of a city, it's interesting to note the unique trends seen in Vancouver. Often, a population's income is argued to have an influence on their environmental values, regardless of whether or not the two variables actually demonstrate causality. Though a weaker relationship than was demonstrated in the Green Cities Indices for European and Asian cities, those in the US and Canada Green City Index (GCI), for the most part, reinforced the perceived correlation between income and environmental values. Vancouver, however, proved an exception.

The 2012 per capita GDP of Vancouver's metropolitan area was just over \$41,084—the lowest of the three case studies. Despite having a relatively low-income population, Vancouver was still ranked second overall in the GCI. The GCI suggested that this departure might be attributed to different priorities among Canadians—who are often more willing to invest in sustainability initiatives. Environmental policies are complemented by cultural attitudes that favor sustainability. At the same time, the report noted that cities are increasingly viewing sustainability and environmental initiatives and policies as means to address other urban issues—including, for instance, income. This trend appears common for Canadian cities, which typically have lower GDPs but robust environmental policies, nevertheless.

Internal collaboration can still be a challenge. In Vancouver, capital planning has shifted to a project-based process, as opposed to a departmental process. Every three years, the various departments come together to set their plan for major capital expenditures. As an example, Alex explained local food projects, noting that as many as three departments are currently working on food projects. Rather than three individual capital budget items, the three departments come together to propose one line item in the capital budget.

Even with internal collaboration, accountability is critical for ensuring that projects get completed. In Vancouver, high level policy pieces and visions help encourage partners to follow through by providing clear direction. Though noting that it is becoming harder and harder to do anything that's outside of that direction, Alex suggested that high level direction helps to keep the city on course, bringing everyone along. With every government action (e.g. requesting funding, or approaching city council or commissioners), the policy context has to be provided. This maintains collaboration and ensures integration of projects that are aligned with those higher level visions.

Certainly, as Alex added, the GCAP effort and any interdepartmental initiative must respect, but should also leverage existing workloads. Broad and holistic plans reach into every level of city operations, and so it's important to make connections back to the overall vision at every level and to every employee, making a practical argument for a project tailored on a case-by-case basis.

As Vancouver encourages people to work more closely to implement the GCAP, it becomes necessary to maintain accountability. Rather than goals, the GCAP set 15 targets with metrics attached. Progress must be reported back to the council annually, as well as released to the public, to demonstrate progress. Additionally, explained Alex, there are internal check-ins—either monthly, bi-monthly, or quarterly—on various projects and milestones. Defining hard targets and putting responsibilities in place, this system makes sure the city stays on track.

Nevertheless, there are some remaining barriers, such as limited capacity. Though Vancouver has a number of great ideas, and often the support for those projects, the city has been limited in its ability to deliver. Therefore, with limited staff and budget resources, the city has had to be strategic about high priority projects. They've also had to get creative about leveraging partnerships.

Recently, the city has partnered with local community associations to provide funding for community projects. Alex noted that cities must learn how to step back and be enablers, rather than get in the way of a project. Governments are inherently bureaucratic, and difficult processes can sometimes limit the ability of public-initiated projects. This places the burden of action almost entirely on the city. But Vancouver has been more proactive in helping community organizations, giving them the permission or access to carry out their projects.

Like the other planners I had interviewed, Alex believed that success was the result of a combination of top-down and bottom-up initiatives, and was dependent upon a good mix of both large and small projects. The big projects take longer, and require spending more time in the internal process, but are worth the effort because they're often high-impact. Smaller projects, on the other hand, are extremely valuable because they connect people with their neighborhoods, and residents will suddenly have ownership over that place.

Though some common metrics are useful in that they allow cities to compare themselves against each other, Alex advised against relying too heavily on standardized metrics that aren't designed to be flexible. Instead, metrics and targets need to be based in place, and cities should be measuring things that are relevant locally. To determine what metrics would be most important in Vancouver, the Greenest City Action Team utilized a backcasting technique, asking themselves what would it have taken to be the greenest city? Using a combination of best practice research, layered with the identification of local gaps, they had identified locally constructive metrics.

Lessons Learned from Vancouver

Most recently, the city has begun to recognize the many benefits, both locally and globally, of protecting ecological health and of being more efficient. At the local level, Vancouver aims to improve the quality of life for its residents, as the city also benefits—economically and politically—by eliminating dependency on fossil fuels. Regionally and globally, Vancouver recognizes the competitive advantages afforded by its reputation as a leader of sustainable development.

Vancouver intends to set an example by becoming a “One Planet City.” It embraces its own brand of living—“Vancouverism”⁶—which has deep respect for nature and an enthusiasm for dynamic streets and urban life (City of Vancouver, 2013). Indeed, it has become Canada's model city for renewable energy.

Today, Vancouver continues to struggle to accommodate growth without compromising ecological health (Hutton, 2011). The city recognizes the importance of regional planning and coordination. In the last few decades, the City of Vancouver and its surrounding region have embraced strategies which are proven to work well. While there still remain challenges (e.g., balancing economic development and accommodating social housing), the city continues to demonstrate its ability to identify creative solutions.

COMPARATIVE ANALYSIS

In reviewing the case studies, a number of trends were observed. These were both positive and negative. Here, I will review some of the more significant parallels.

Similarities

All three of the case studies share a number of similar characteristics which are often beyond their control. These similarities beg to question whether their becoming “green” cities had been in any way influenced by these factors; or, rather, to what degree

⁶ The online, openly editable encyclopedia Wikipedia even has a specific entry for *Vancouverism*.

they had been influenced by these factors. While these similarities are evident, it's unclear whether they actually represent a causal relationship with regards to the case cities' successes. Therefore, due to the many similarities, it's uncertain if a city that does not share these characteristics would fair the same, better, or worse in their efforts to achieve sustainable development.

GEOGRAPHY

The first and most obvious similarity between the three cases is related to their location. Portland, San Francisco, and Vancouver are all West Coast cities situated near the Pacific Ocean in an area described as “Ecotopia.” Defined in Joel Garreau’s 1981 book, *Nine Nations of North America*, Ecotopia is a region of cities all along the West Coast that are marked, among other characteristics, by their shared ecological consciousness. In this regard, as related to their sustainability achievements, these case studies are simply the best among an already vast number of regional “green” cities. Though still exceptional for Ecotopia, these cases are only truly unique to cities outside of this region.

The region is also characterized by prominent natural features and rich land. Natural features played two critical roles in shaping the three case cities. First, massive and imposing features—mountains, undulating topography, and water elements—had, at least initially, limited the outward growth of the case cities (Figure 31). Secondly, scenic and aesthetic appreciation for these geographic and hydrologic features led to the creation of policies and guides that would preserve views of the surrounding landscape. For instance, San Francisco’s *Downtown Plan* (1983) would preserve views with building height and bulk allowances; and Vancouver’s 1989 adoption of the *View Protection Guidelines* established building height limits to maintain visibility of the neighboring mountains.

Similarly, located near the coast, each of the case cities have been significant port cities. Through boom and bust, each case had experienced periods of rapid

FIGURE 31. NATURAL TOPOGRAPHY AND WATER FEATURES SURROUND THE THREE CASES



(Top) San Francisco and the surrounding Bay. Courtesy of SF-planning.gov; (Center) Portland Topography. Courtesy of PortlandOregon.gov; (Bottom) Vancouver waterfront and mountains. Photo by Solstag, courtesy of Wikimedia

population growth and uncontrolled development, increasing congestion and environmental damage, followed by an urban exodus (this was most prominent in San Francisco). Today, the cases have transitioned from industrial cities to regional corporate cores, often with strong FIRE economies. As in other cities where once thriving industries had declined during the latter half of the 20th century, priorities have begun to focus on generating ‘creative’ or ‘knowledge-based’ economies (Hagerman, 2007, p. 289), including tech industries.

ECONOMIC TRENDS

Though both Portland and San Francisco had lost a significant number of local corporate headquarters to the surrounding cities due to decentralization, and had experienced an overall decline in their roles as regional centers as a result, they now profit from a fast growing technology sector (Gibson & Abbott, 2002; Godfrey, 1997). Though not directly in San Francisco, major tech and computer industries flourish in the nearby Silicon

Valley. Similarly, with more technology-focused firms concentrated in Washington County (nicknamed “Silicon Forest” in the 1980s), Portland is beginning to be recognized for its software and multimedia firms (Gibson & Abbott, 2002). Likewise, Vancouver has a growing-high technology sector (Economist Intelligence Unit, 2011).

Both Vancouver and San Francisco became economic hubs in the 1990s. San Francisco, as a major regional business center and community destination, began to enjoy a new period of expansion—one that capitalized on civic strengths while consciously directing development into key areas (Godfrey, 1997). After a decrease in major private sector offices due to globalization, Vancouver had become a post-corporate city (Hutton, 2011), dominated by small- to medium-sized enterprises (SMEs). In Vancouver, economic priorities are now shifting as the city is increasingly being recognized as a new “green economy hub” (City of Vancouver, 2012, p. 5). The city sees this role as an opportunity, recognizing that risks of the climate crisis threaten the global economy and, therefore, threaten Vancouver. In the 2012 GCAP, Green Economy is the first among 10 goals, all of which are noted to be interrelated.

IMMIGRATION

Another major similarity is that the three cases had endured significant inflow of immigrant populations, mainly of Asian descent. The resulting cross-continental ties are credited for connecting the cities to the larger global market.

In the 19th century, Portland attracted large immigrant populations from China and Scandinavian countries, with smaller populations emigrating from Eastern and Southern Europe. By the 1880s, Portland “had the second-largest Chinese community on the West Coast, after San Francisco” (Gibson & Abbott, 2002, p. 427). In San Francisco, large Asian populations make up about a third of the city’s current population. Likewise, Vancouver, originally home to populations primarily of European descent, experienced an increase of

immigration in the 20th century welcomed inflows of largely Chinese ethnic groups. Benefiting from strong networks established across the Pacific Ocean, it was perhaps the transnational connections that were established through these immigrant populations that has contributed to each of the case cities’ role as global, world class cities (Hutton, 2011).

Patterns

In addition to the above variables, the cases demonstrate a number of patterns in their recent and current planning efforts. These trends might recount how the cases have been successful thus far, and how other jurisdictions might begin to produce similar results.

ROLE OF THE PUBLIC

One of the major patterns among the three cases is the role of residents and impact of progressive public activism. The cases have been different from most cities due to the significant impact that progressive activists and neighborhoods have had in shaping development and growth.

The success of planning depends on public involvement (Figure 32) and support, and that’s certainly the case in Portland (Steffan, 2008). In Portland, collaboration has been crucial. Non-profit organizations have developed proactively, as well as in response to planning concerns (Steffan, 2008). Going beyond the legal requirement, which doesn’t compel a project to engage the public until the final stages, the Portland

FIGURE 32. PUBLIC ENGAGEMENT IN PORTLAND



Image courtesy of City of Portland

BPS works with committees to engage citizens from the very beginning. While this can sometimes extend the duration of the planning process or may require a bit more of an investment up front, it affords the opportunity to proactively address and work through public concerns at the start of the project rather than reactively attempt to correct those same problems at the last minute. Furthermore, this approach tends to help the project move forward and ultimately be adopted, and often encourages the community to embrace the plan once it's finished. Even if someone doesn't particularly agree with the outcome, residents generally feel open to projects because they recognize that they were given the opportunity to voice their opinion and that the final product was the result of an engaging process.

Similarly, the role of progressive activists and neighborhood coalitions are crucial for understanding San Francisco's urban power structures (Dumhoff, 2011). These groups had halted and fought off a number of projects since the middle of the 20th century. San Francisco's "contrarian spirit" (Godfrey, 1997) and political culture have allowed the city's environment to be protected (Iverson, 2007).

Likewise, even with frequently shifting political views, Vancouver managed to retain values of livability, ecological health, and preservation. This can largely be attributed to strong public engagement, which led to deep-rooted public interest in sustainability and has endured and grown over the years. Conversely, Vancouver has also experienced backlash due to a lack of, or inadequate, public collaboration. The *EcoDensity Policy*, for instance, has been criticized for being overly top-down. Learning from this previous project, however, the *Greenest City Action Plan* has been more supportive of collaboration. In Vancouver, consultation with experts and with the public is about getting feedback, but also about getting people excited about sharing responsibility for a project. As Alex explained, collaboration is about getting individuals invested in a project long-term.

LIVABILITY

In addition to sustainability, the three cases have had significant interest in making their cities more livable. Livability, however, much like "sustainability," has become a broad term under which planners, policymakers, and developers tend to lump any number of strategies—everything from historic preservation and environmental remediation to new residential and commercial development. Arguably, the a "highly mutable term" is perhaps used as an alternative (or mask) to the word "gentrification" (Hagerman, 2007, p. 288).

The term can be seen as a tool, or marketing mechanism for encouraging residents to stay within the central city (Buchwald, 2003, as cited in Hagerman, 2007, p. 289). In the 1990s, the term embraced its meaning as a counter to sprawl, which might explain how these three cases, with a prioritization of livability, have for the most part become dense and sustainable destinations. Additionally, an ecological interpretation of livability sees such the characteristic as a means to establish authenticity of development while simultaneously reassuring the preservation of local nature and community (Hagerman, 2007). As such, Hagerman explained, the term livability was a legitimization strategy, and was used to establish a city's reputation (Hall & Hubbard, 1996, Zukin, 1995, Florida, 2002, as cited in Hagerman, 2007).

GOVERNANCE

The three cases demonstrate key strategies related to governance. Particularly, they have benefited from broad, regional planning, and they emphasize the importance of interagency coordination. Both Portland and Vancouver have powerful regional planning agencies (both called "Metro") that have guided and even regulated growth and development. While San Francisco does not have a regional planning agency with significant power to influence land use, it has a number of regional agencies that monitor everything from transportation to air and water quality.

Portland's Metro is a well known regional governance system, and has contributed to the successful adoption of a number of policies and strategies for the region, demonstrating the crucial value of a regional governance structure. Though weaker than Portland's regional government, Vancouver's regional system, also called Metro, coordinates planning and activities across 21 municipalities. A similar organization does not exist in San Francisco, however, activities are largely coordinated through a number of different region-wide agencies, and the city has strong ties to the surrounding jurisdictions. Establishing a regional government, particularly one as powerful as Portland's Metro, would indeed be a challenge as it's difficult to resolve the issues of ceding power of the local government to the larger region (Neal Peirce, as cited in Newman & Jennings, 2008).

CHALLENGES

One pattern among the case studies, however, is worrisome. The three cases share a common challenge: they are beginning to (if they have not already done so) price out certain income cohorts as they struggle with affordability and a rising cost of living. Despite their ongoing efforts to increase and ensure affordability, these cities are becoming exclusive. In Portland, the Urban Growth Boundary, by limiting developable land, was criticized and blamed for impacting housing affordability and land values (Gibson & Abbott, 2002).⁷ Some defend, however, that price increases witnessed in Portland had been comparable to nationwide urban trends (Gibson & Abbott, 2002).

Everyone tends to blame the UGB, but affordability isn't simply a boundary issue, explained Jesse. In most cases, the UGB abuts more developed land, so expanding the boundary wouldn't prove very advantageous. Actually, the challenge inside Portland is with gentrification occurring in certain places, and the BPS is working very hard to determine the cause as well as the solution. They recognize that a major

challenge isn't a lack of affordable housing, which can certainly be found within the city. Instead, it's the location of the affordable housing that presents a challenge. Affordable housing tends to be located in areas that lack basic services, like sidewalks or bus stops. As soon as the city adds new amenities, the values of the properties in the area increase. BPS is constantly trying to minimize this cycle of pricing people out of the market.

Similarly, in San Francisco, affordability is a major challenge as housing and property prices rise. This can perhaps be attributed to density and a shortage of land supply, but may even be related to historic class divisions (Iverson, 2007). With a history of class struggles, today's population is seen as being increasingly elite. As the city's demographic divide grows, San Francisco is at risk of becoming "the Norway of America"; that is to say, it's in danger of becoming an exclusive area of the world (Walker, 2007, quoted in Iverson, 2007). At the same time, it's important to note the role that San Francisco's elite have played in land conservation and nature protection (Walker, 2007, p. 10).

Meanwhile, Vancouver is among the least affordable cities in the entire world. As a response, the Mayor's Task Force on Housing Affordability is responsible for identifying recommendations for making the city more affordable. Still, Alex warned against assuming a direct connection between affordability and sustainability work.

FIGURE 33. THE THREE CASES FACE CHALLENGES WITH AFFORDABILITY



Image courtesy of PortlandOregon.gov

⁷ We'll see similar affordability trends in the other two case studies.

FIGURE 34. MAP OF SURVEY RESPONDENT LOCATIONS

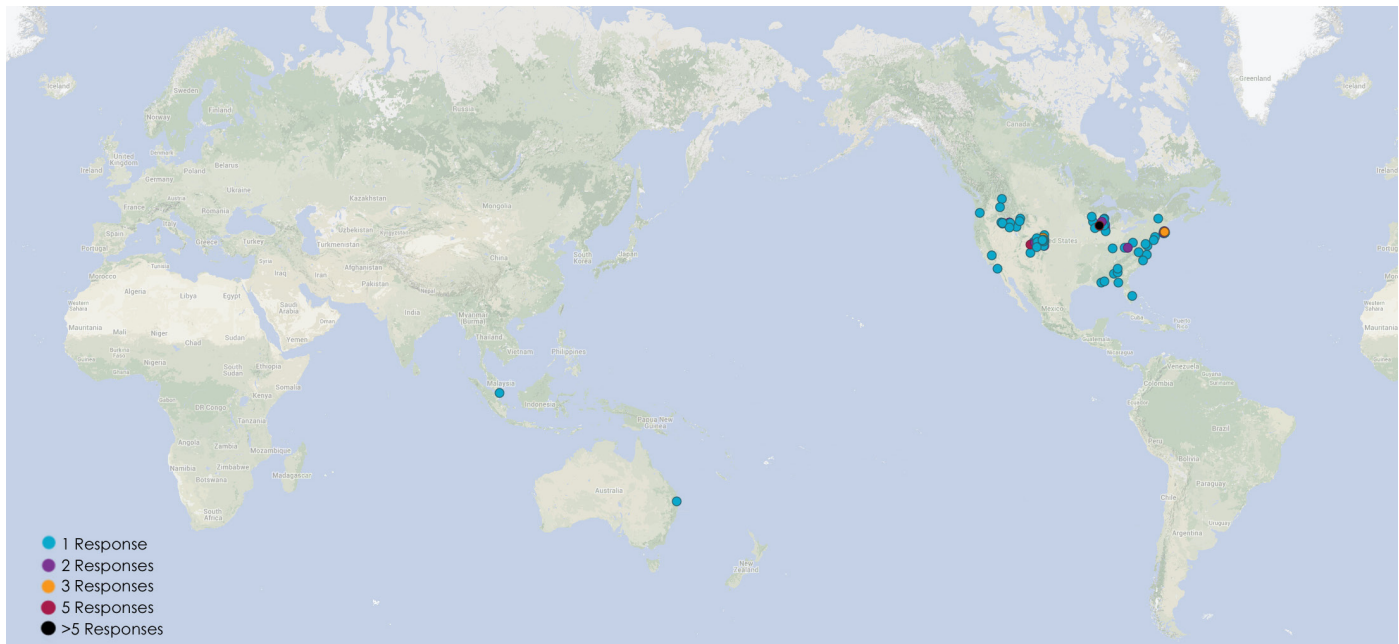


Image created by author using Google Maps

SURVEYS

The study cities are exemplary cases of best practices in sustainable development. While much can be learned from researching the three cases, it's important to also have an understanding of more common practice. For this, I had conducted a planners' survey. A total of 135 respondents had participated in the survey, from cities across North America, in addition to a respondent from Singapore, and an individual from Australia (Figure 34). A compilation of survey data can be found in Appendix D.

The survey responses helped me understand major challenges, not only through participant testimonials, but also through the rigorous resistance that some had either reported or had demonstrated themselves through their comments. They revealed the extent to which people and planners do not recognize the interrelatedness of issues; thus, failing to observe the far reaching complexity of ecosystems that encompass all aspects of the city.

Respondent Demographics

A little more than half of the respondents indicated that they held advanced positions in planning, either as a planning director, principal planner, or similar role. When asked about the scope of their firm's work, most (77%) had indicated working in the public sector. A majority of respondents (68%) work in local planning, with the other 32% were relatively balanced across regional, state/provincial, federal, or other areas. About 4% of the respondents indicated that they worked across all jurisdiction levels. Those who chose "other" noted working for multi-state regional areas, nationwide work in North America and the United Kingdom, tribal jurisdictions, and a single student respondent. Their professional specializations were primarily community development (50%) and land use and code enforcement (46%). When asked, 76% of the respondents indicated that the opinions expressed in this survey would be similar to those of their peers and colleagues. Thus, I am comfortable when applying the lessons learned through this survey to general planning practice.

General Findings

The survey responses provided valuable advice regarding the Deep Ecological Urbanism concept. In particular, the surveys were most helpful in identifying key barriers and opportunities.

KEY BARRIERS

When asked why the understanding, acceptance, or application of ecological principles in planning might be limited, respondents explained major challenges, most frequently citing political barriers, a lack of awareness, and logistical barriers to implementation. Political views may prevent the concept from being embraced by certain political parties or in entire regions. Many respondents felt that the comprehensive plans weren't comprehensive enough. When respondents indicated that ecological health was not safeguarded, they cited reasons including different priorities, public pushback, staff lacking the power or resources, politics, lack of policy integration, etc. They explained that if the local environment were being protected, it was only because of state and federal policy. Even then, it appeared that the respondents' interpretation of safeguarding ecological health was limited to mean the health of waterways and the regulation of polluting land uses.

KEY OPPORTUNITIES

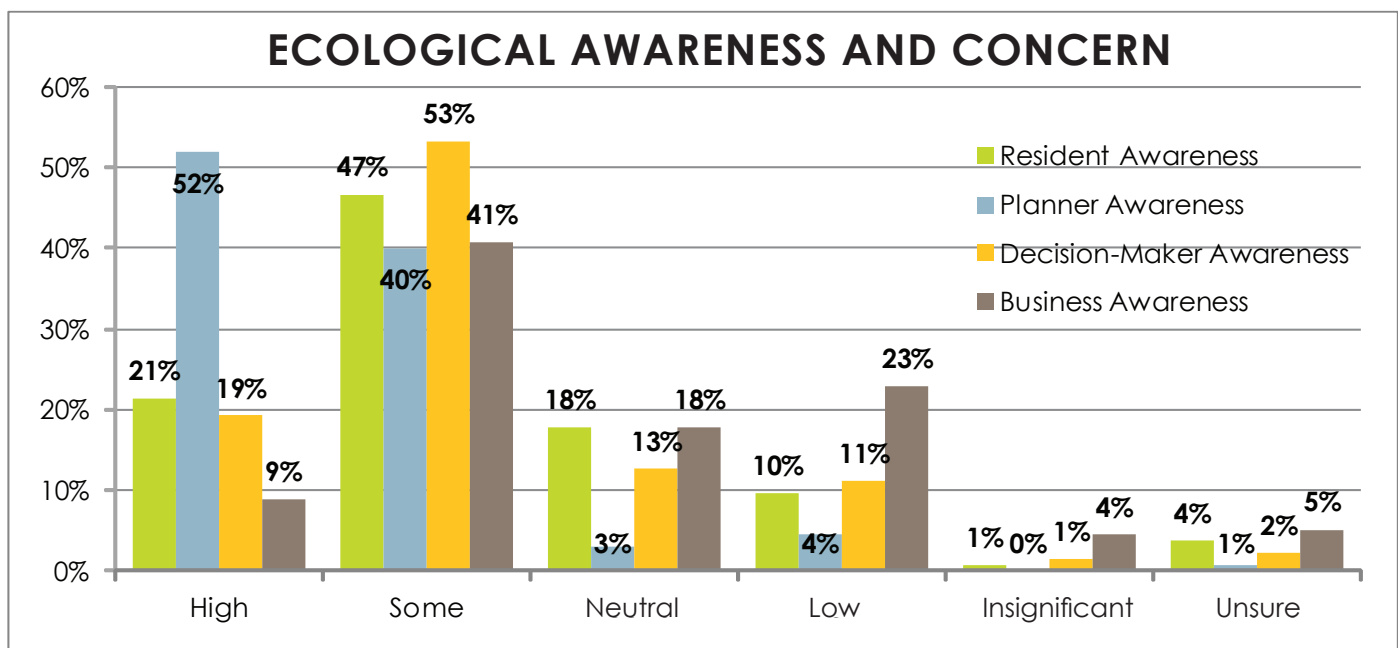
As a direct counter to key barriers, the survey responses highlighted great potential in raising public and political awareness and knowledge regarding ecological health. Doing so, it was suggested, would facilitate project implementation and reveal overlaps among the many benefit.

Though respondents did suggest that coordination currently exists, they also mentioned the challenge of working with excessive government fragmentation. However, respondents suggested that these and other barrier could be addressed if the planning profession had a comprehensive framework for implementing ecological planning principles across agencies and systems.

Sustainability Planning

The survey had asked participants to indicate whether or not their jurisdiction had a dedicated sustainability office or department, to which only 20 respondents (eight percent) indicated that their jurisdiction did have such an office. Those individuals were located in Singapore; Auburn, AL; somewhere in the state of Virginia; somewhere in the state of Rhode Island; Bristol, RI; somewhere in the state of Wisconsin;

FIGURE 35. ECOLOGICAL AWARENESS AND CONCERN



Compiled by author, 2014

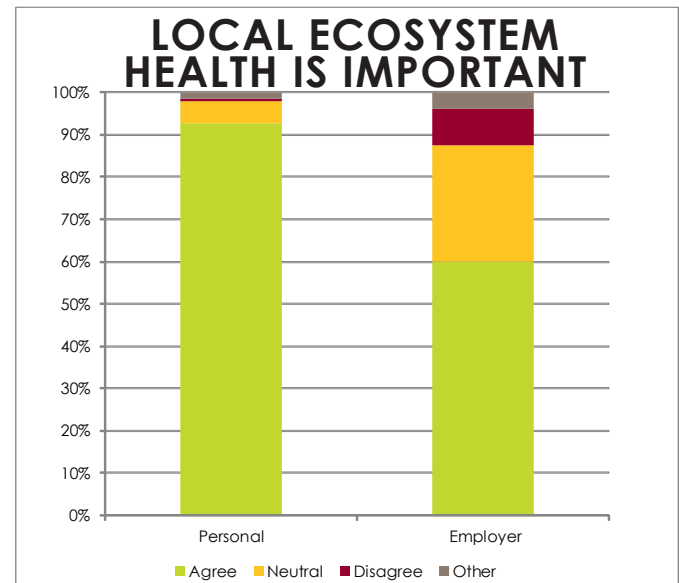
Madison, WI; Tallahassee, FL; Brighton, CO; Colorado Springs, CO; Denver, CO (3 respondents); Fort Collins, CO (2 respondents); Golden, CO; Grand Junction, CO (2 respondents); and Lakewood, CO (2 respondents). However, when I remove duplicate locations, the respondents account only for 13 unique locations *at most*. It's possible that this number could be reduced to only 11 jurisdictions if I were to assume that respondents who provided their state but not their city (i.e. the Rhode Island and Wisconsin respondents) might actually be located in one of the cities already noted to have a sustainability office (i.e. Bristol, RI or Madison, WI).

PERSPECTIVES REGARDING ECOLOGICAL HEALTH

Respondents were asked to rate levels of awareness and concern regarding ecological health and its implications for the overall health of their jurisdiction (Figure 35). They were asked to do so for the business community, for decision-makers, for local planners, and for the community's residents.

When asked about the level of awareness or concern among businesses and industry leaders, 41% of respondents indicated this community held some level of awareness. Most respondents indicated that decision-makers held some (53%) or high (19%) levels of awareness or concern. This reveals the perspective among leadership, or the individuals who will shape the immediate future. Levels of awareness and concern among planners might be representative of the perspective of the larger planning profession. With 92% of respondents indicating that planners had either some (40%) or high (52%) levels of awareness or concern, it's clear that this profession is poised to embrace a new planning strategy that would facilitate the integration of ecological health and natural science principles into practice. Finally, asking participants to note the same concern among residents, they indicated that a majority of residents had either some (47%) or high (21%) levels of awareness. Furthermore, fewer residents, as compared to decision-makers and businesses, had low or insignificant concern, but were instead neutral (indicated by 18% of respondents).

FIGURE 36. IMPORTANCE OF LOCAL ECOSYSTEM HEALTH



Compiled by author, 2014

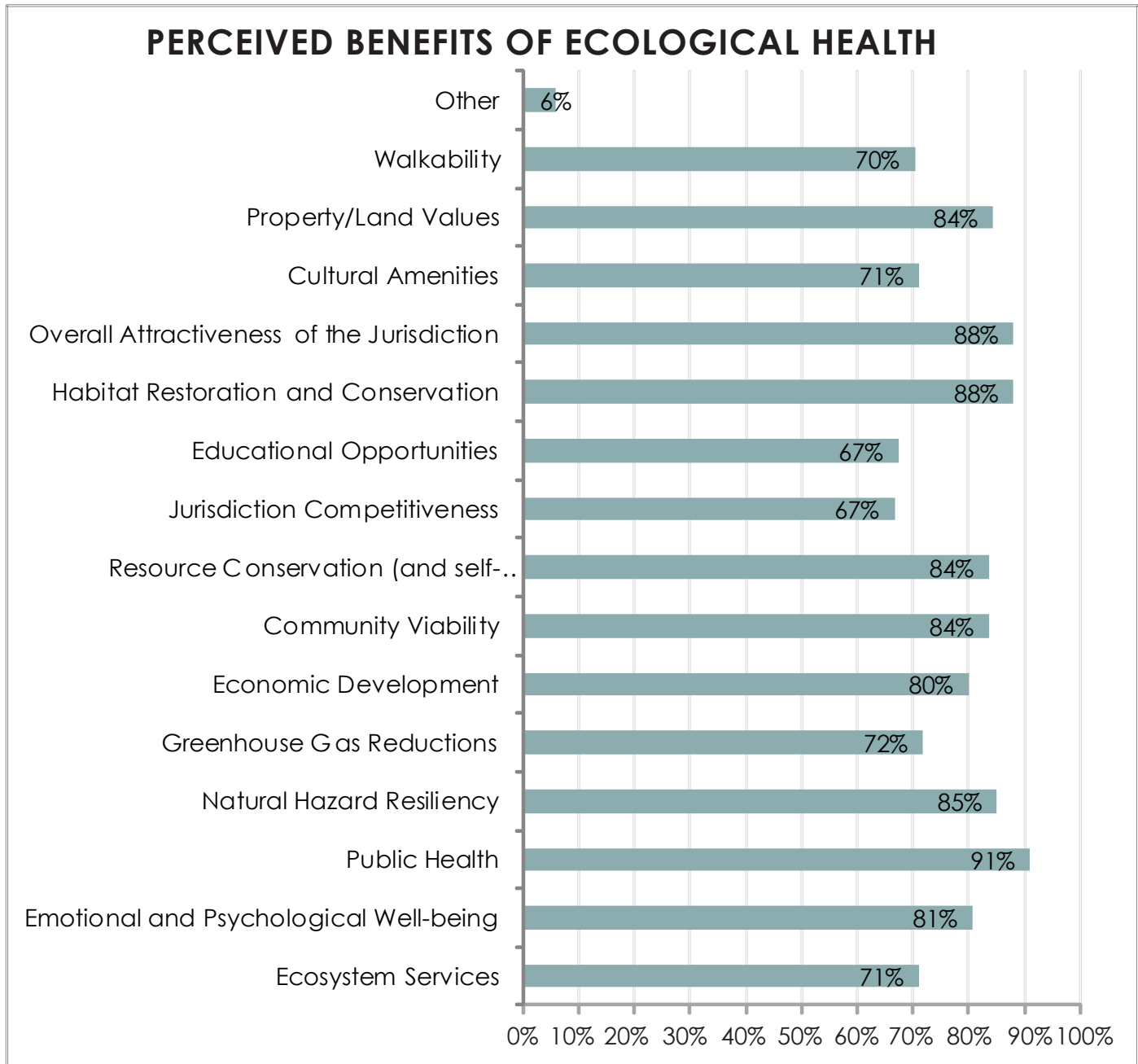
Overall, the greatest awareness and concern, by far, was suggested to exist among planners, where more than half of the respondents indicated high awareness. Lowest concern was found among businesses and industries.

Participants were asked to note whether or not they believed the health of the local ecosystem plays a fundamental role in the overall economic, social, and environmental sustainability of the entire jurisdiction (Question 11; Figure 36). A total of 93% of respondents personally agreed, with only a single individual disagreeing. Fewer respondents had believed that their employer held similar views. Though a majority still believed their employer saw a connection, more believed that their agency's stance was either neutral (27%) or that they disagreed (9%) with the statement.

When asked to indicate why ecological health was seen as important to their community (Question 14; Figure 37), the answers were interesting and occasionally surprising.⁸ The most consistently given

⁸ The reason I believe these responses are intriguing is due to the fact that some of the less frequently perceived benefits are those which I would strongly associate with ecological health (e.g. ecosystem services, natural hazard resiliency, greenhouse gas reductions).

FIGURE 37. PERCEIVED BENEFITS OF COMMUNITY ECOLOGICAL HEALTH



Compiled by author, 2014

response, as indicated by 91% of respondents, was that ecological health is important for its connection to public health. The highest 5 ranks of perceived benefits of ecological health were public health (91%), habitat restoration and conservation (88%), overall attractiveness of the jurisdiction (88%), natural hazard resiliency (85%), and both community viability (84%)

and resource conservation (84%). The lowest perceived benefits were jurisdiction competitiveness and educational opportunities, both indicated by only 67% of respondents. Providing comments in the “other” category, respondents listed viewsheds, wildlife health, recreation, tourism, and religious benefits.

RELATIONSHIP BETWEEN ECOLOGICAL HEALTH & THE THREE PILLARS OF SUSTAINABILITY

When asked about overlapping issues, most respondents (79%) did not agree that economy, environment, and society are separate goals with conflicting strategies that require trade-offs. Answering in text, respondents related ecological health specifically to social sustainability, some believing that the two were mutually reinforcing. With a single phrase, one respondent explained that “ecological health *enables* [emphasis added] sustainability.” Most respondents made connections between the importance of ecosystem health and social health, frequently relating it to concerns of public health (e.g. air quality, water quality). Many also recognized the emotional and psychological benefits. Respondents believed that ecological health should be central to efforts advancing social sustainability, citing a need to engage residents in order to foster an ethic of care.

Similarly, with regards to economic sustainability, much of the discussion focused on the differences between short- and long-term benefits, and how failure to use both targets has led to diverging solutions. Respondents suggested that the benefits of improved ecological health aren’t always immediately apparent, which leads to the prioritization of economic development over ecological health. Others believed that it was not always possible to avoid prioritization of one goal over another, perhaps due to the conditions in a specific community. As such, the two interests (economy and ecological health) often get decoupled, at which point the local ecosystem would play an adversarial role in economic sustainability.

When respondents were given the opportunity to consider how ecological health and economic sustainability were related, the strongest correlation was demonstrated by respondents who also indicated their community’s strong economic reliance on the immediate natural environment (either for resources, ecosystem services that facilitate industry, or due to an area’s highly nature-, heritage-, or culture-based economy). Others related ecological health

to a community’s appeal, and thus attractiveness to businesses and property investors. Others, still, saw ecological health as necessary to offset, or mitigate, the impacts of economic activity (particularly industry and manufacturing). Providing another perspective, two respondents talked about the need for a healthy economy before ecological health could be addressed. Referencing a similar two-way street, one individual emphasized the need for a “happy medium.”

Many respondents shared a similar perspective with myself and the Deep Ecological Urbanism strategy, seeing all three pillars of sustainability as interlinked. They saw sustainability objectives as being supported by strongly interwoven aspects of ecological health, going so far as to suggest that sustainability is actually impossible without ecosystem health. They recognized a need to balance all three but at the same time saw ecosystem health as being central.

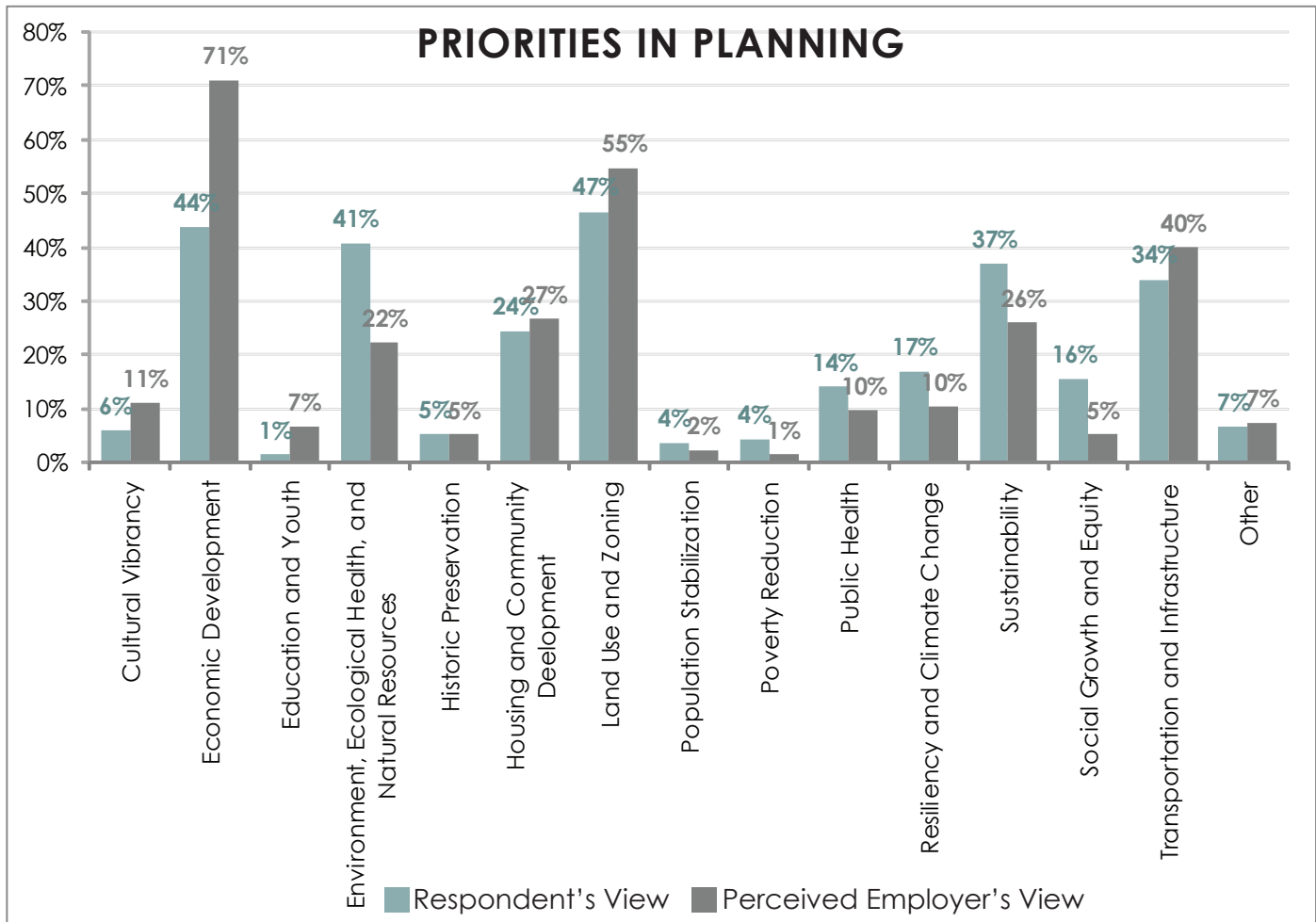
However, a major challenge of sustainability, and likewise of Deep Ecological Urbanism, is that of balancing the many different needs. More than half (61%) of the respondents noted that their jurisdiction had trouble balancing their social, economic, and environmental needs.

In the next question, when asked if they lacked an approach that would facilitate integrating and coordinating planning across agencies, departments, sectors, and systems, more than half of the respondents (53%) indicated that they either disagreed or had a neutral perspective. Though coordination does not necessarily imply an ease of balancing needs, it would have been my first assumption. Their responses to this question, however, suggest that communities are still struggling to balance needs even when coordination is happening. Thus, answers to this question have made me reconsider how planners might facilitate the balancing of various needs, if not primarily through coordinated planning.

Local Planning Priorities

Participants were also asked to indicate the top three priorities of local planning; based first on their personal

FIGURE 38. TOP 3 PRIORITIES IN PLANNING



Compiled by author, 2014

opinions, then on those of their employer (Figure 38). Responses would help to identify trends in current practice as well as potential future trends. It would also identify any gaps or disparities among planners' beliefs and what is being implemented.

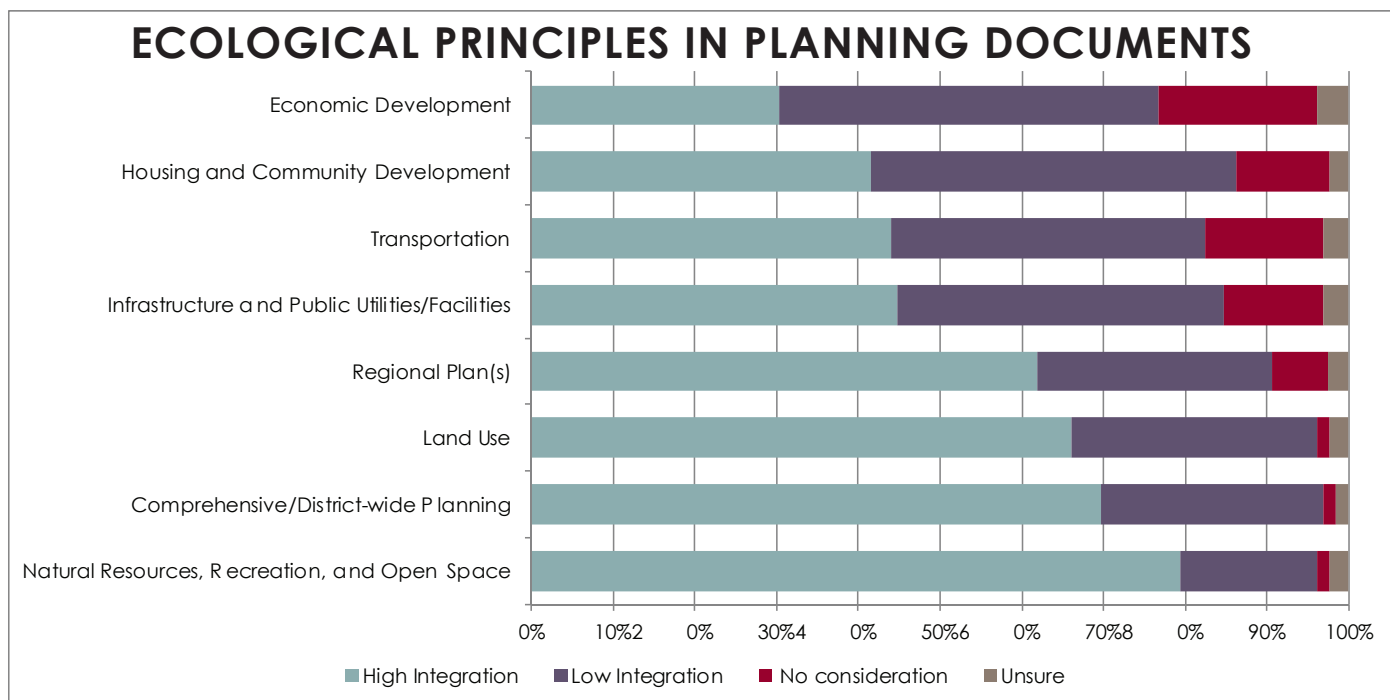
For respondents, the top three priorities had been land use and zoning (47%); economic development (44%); and environment, ecological health, and natural resources (41%). When asked about the priorities of their employers, the priorities shifted to economic development (71%); land use and zoning (55%); and transportation and infrastructure (40%). Transportation and infrastructure took a lead while environment, ecological health, and natural resources fell to the 6th priority. While all of the priorities that

were indicated to be the opinions of the respondents had been relatively evenly distributed—with no one area of focus indicated to be a priority by more than 47% of the respondents—the priorities of the employers were more heavily concentrated in certain areas. With more than half of the selected priorities split between the three focus areas of economic development, land use and zoning, and transportation and infrastructure.

INTEGRATION OF ECOLOGICAL PRINCIPLES IN PLANNING DOCUMENTS

Respondents were asked to indicate if (and where) ecological principles were being recognized in their local planning documents (Question 23; Figure 39). The documents with the highest indicated incorporation (of any degree, even if only implied incorporation)

FIGURE 39. INCORPORATION OF ECOLOGICAL PRINCIPLES IN PLANNING DOCUMENTS



Compiled by author, 2014

of ecological principles were comprehensive plans (95%), natural resource plans (93%), and land use plans (93%). The remaining documents were perceived to have less integration, though about three quarters of the respondents perceived there to be at least some integration within each.

Participants were then given the opportunity to elaborate on local planning (Question 24). This was to see if any communities or jurisdictions, or the agencies that work within them, were incorporating ecological principles in ways that might not have been considered within this survey. Areas where principles are already being considered include zoning (including environmental zoning overlays), climate change (Climate Action Plans) and resiliency planning, urban renewal plans, small area plans, green building requirements, budgeting, energy generation projects, project planning (environmental regulation compliance), individual projects and grant writing (but only when it's a requirement), waste divisions, agency/corporate standards for sustainability (some that must be met regardless of client's agenda), critical

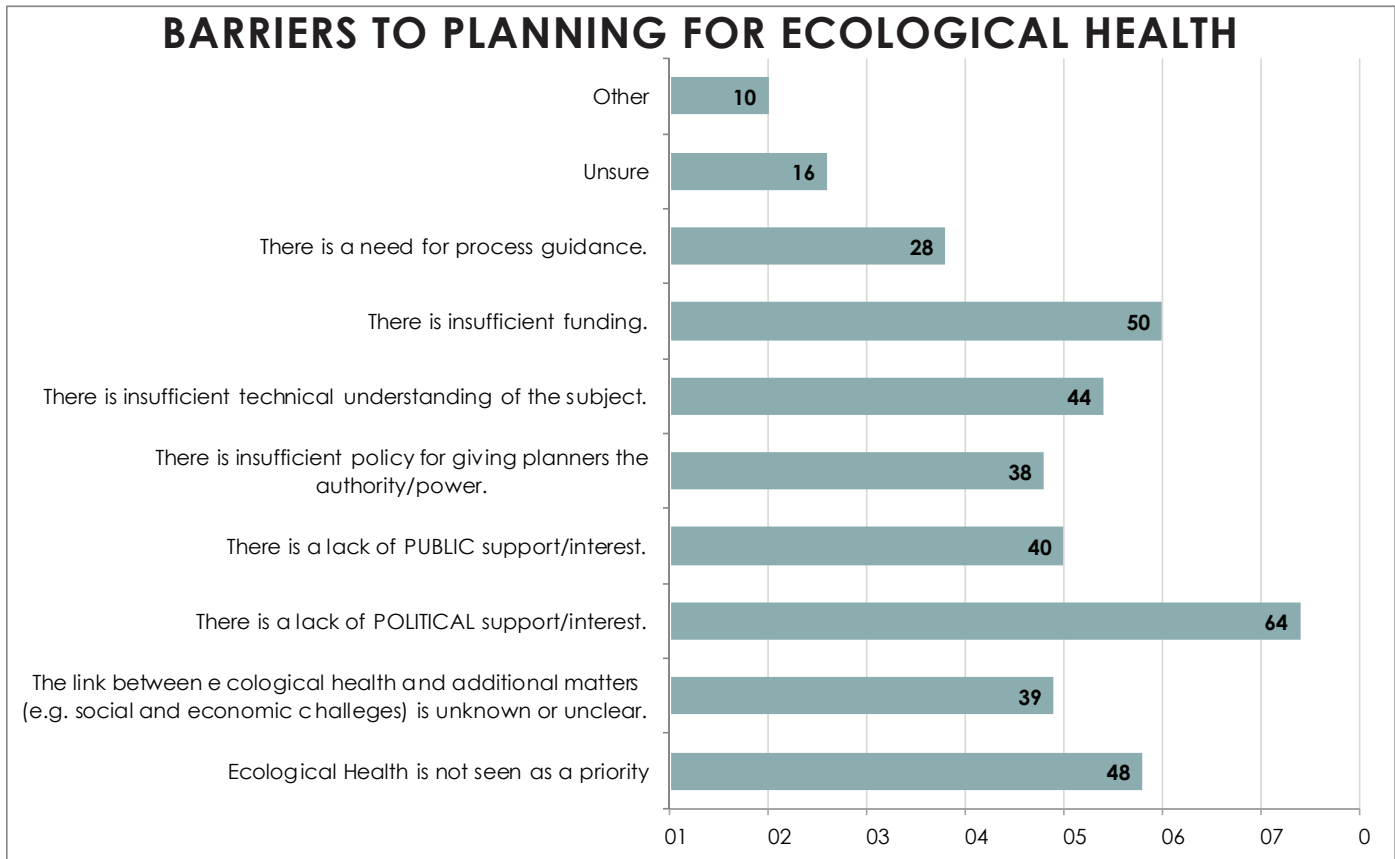
area regulations, and sustainability codes, in addition to day-to-day functions.

LOCAL ECOLOGICAL KNOWLEDGE

The survey also sought to understand local ecological knowledge among planners. In Question 13a, most respondents (86%) agreed that a higher understanding and appreciation for ecological assets and their health is crucial to encouraging sustainable, resilient, and ecological planning. In Question 13c, most respondents (82%) also believed they had some responsibility to grow and protect the community, which included planning for ecological health. Of the respondents that disagreed, 75% nevertheless stated earlier that they believed planners required additional training or understanding in order to encourage sustainable, healthy, and ecological development.

In a later question, Question 20, respondents indicated that less than a quarter of employees had specific ecological knowledge or scientific training, demonstrating the need for either specialized training among planners to increase internal understanding of ecological principles, or a potential need to evaluate

FIGURE 40. BARRIERS TO CONSIDERING ECOLOGICAL HEALTH



Compiled by author, 2014

and perhaps improve communication and collaboration with specialists and experts of that knowledge. A little more than half (52%) of the respondents indicated that their agencies had employed contractors to provide scientific expertise (Question 25). Of those respondents, 40% had indicated that consultation occurs only occasionally (one to three times in a year), while outside contractors were said to have been employed consistently (on a daily, weekly, or monthly basis) by 27% of the respondents.

In Question 29a, nearly half (49.6%) of the participants again indicated that planners lacked sufficient resources and technical knowledge regarding local ecology and how it relates to the overall health, sustainability, and resiliency of the jurisdiction (Question 29a).

Barriers and Challenges in Planning for Ecological Health

A total of 21% of respondents indicated that their jurisdiction had already adequately incorporated ecological principles into planning (Question 22). The remaining 106 respondents had selected reasons why they believed their jurisdiction had not yet done so (Figure 40). The largest barrier, noted by 60% of the respondents, had been a lack of political support. A total of 47% of the respondents also indicated that insufficient funding was a challenge.

Overall, respondents selected awareness and support-related barriers (i.e. it is not seen as a priority, the link is unclear, or there is a lack of political or public support) 50% of the time, and logistical barriers (i.e. insufficient policy, lack of resources or funding, or a need for a better process) 42% of the time.

AWARENESS & SUPPORT-RELATED BARRIERS

Toward the end of the survey, respondents were given more opportunities to elaborate on their answers in paragraph responses (Question 30). With regards to political barriers, respondents cited challenges with decision-makers and a general lack of political will, lack of awareness or knowledge, and a lack of support (or even resistance) among politicians. Similarly, respondents talked about the limitations of existing policies (a few described what they called a “stuck in their ways” barrier), or the perceived complexity or burden of new regulations which would be tedious or otherwise limiting.

Aside from the awareness among leaders and politicians, respondents noted a lack of awareness in general. They described barriers such as citizens lacking access to knowledge, or even the overwhelming presence of inaccurate information, citing poor communication and conveyance of data through the media and other channels. Oftentimes, this lack of awareness contributes to apathetic community members and negative perceptions and misunderstandings of the perceived (as opposed to the actual) relevance and benefit of using ecological principles. This resulted in low public support, negative cultural perspectives, and the absence of any ethic that would morally drive action. Again, these perspectives ultimately direct where priorities are placed.

PROCESS BARRIERS

When asked if they felt planners would benefit from a locally-adaptable, holistic framework for implementing ecological planning principles across agencies and systems (Question 29c), 66% of respondents agreed. Respondents identified a need for specialized planner training as well as a trusted framework or set of tools that could be utilized in-house.

Elaborating on logistical, process-based barriers (in Question 30), respondents noted a strong lack of resources—time, staff, or other—and a lack of funds. Money also became a barrier in terms of both the perceived and actual costs associated with

incorporating heightened concern and protection for ecological health into planning processes.

With a shortage of resources like these, focus shifts to alternative priorities that are higher on the planning pyramid. Often, one such priority is economic development. Resistance from the business community, the current economic climate, a higher prioritization of economic development, and the perceived negative impact(s) of ecological protection on economic development was noted to be a significant barrier. Furthermore, the scope of any proposed increase in the integration of ecological principles became a barrier as an uncertainty or lack of clarity with regards to short-term and long-term benefits contributed to the prioritization of one issue over another. And a lack of a market argument for valuing ecological assets prevented prioritization favoring their protection. Finally, respondents noted that additional barriers include the excessive fragmentation among divisions and departments.

Opportunities in Planning for Ecological Health

When asked about opportunities, or how we might move forward so that planners and designers can increase our understanding, acceptance, and application of ecological principles (Question 31), respondents gave a diverse range of answers. After recognizing that awareness is one of the major barriers, respondents had also seen awareness as an opportunity. Respondents recommended increasing educational opportunities (for all members of the community, as well as specifically for youth) and increasing outreach efforts to elevate the awareness and understanding of ecological issues among residents. Related to awareness, respondents noted the positive impact this would have on public support, an overall outlook, and a desire for a high quality of life.

CHAMPIONS & ADVOCATES

Respondents also emphasized the role of key advocates, whether they are community champions, non-profits and environmental agencies, or key leaders and

decision-makers, advocates can help advance the Deep Ecological Urbanism goals, raise awareness, and push for change among policy-makers. Public engagement was encouraged.

KNOWLEDGE & RESOURCE DEVELOPMENT


Respondents believed that there may be some opportunities in leveraging the planning profession by utilizing expertise; embracing technological modernization; encouraging planners' education and training; and providing planners with tools, resources, and funds. Rather than viewing individual interests as conflicting, efforts should emphasize and demonstrate the interrelatedness of strategies while revealing actual value and benefit. Respondents recommended demonstrating or clarify that there would be no interference or added cost of incorporating ecological principles. Alternatively, the cost, or risk of inaction should also be made clear. Others recommended using incentives.

This positive approach was a common theme among responses. As opposed to environmental degradation, the scenic and aesthetic beauty of nature might also be cause enough for change. The identification of sensitive resources, recognition of the competitive advantages, and the introduction of new perspectives from fresh faces and younger generations left respondents hopeful.

However, while I was hopeful that the responses to this question would be light and optimistic, I was actually extremely discouraged by the second-most cited "opportunity." More than a dozen respondents noted that opportunities might be found in (and perhaps only in) the increasing frequency and intensity of natural disasters or other crises (e.g. economic recessions). Respondents noted that it is often only after a major shift or event that people will begin to change their perspectives. Citing everything from water shortage and contamination, major Hurricanes Sandy and Katrina, tornadoes, floods, earthquakes, etc., respondents felt that this might be one of our best "hopes" for any change.

SYNOPSIS

The case studies identified some of the current best practices and how those practices had helped those three cities become leaders in sustainability, resiliency, and ecological health. The cases identified a number of lessons that might be garnered for other cities. Supplemented by the planners' survey, which emphasized the need for revised perspectives in planning, the best practice review paints a clearer picture of current gaps in practice. Understanding these conditions, the conceptual Deep Ecological Urbanism framework can now be set against a practical background and revised to make it operational.



CHAPTER 5// OPERATIONAL FRAMEWORK

CHAPTER FIVE | Operational Framework

The Conceptual Framework (Chapter 3) provided the theoretical foundation for the Deep Ecological Urbanism model. The review of current Best Practices (Chapter 4) revealed a number of gaps or weaknesses in planning where Deep Ecological Urbanism can be utilized to strengthen the planning profession and optimize the overall growth and management of human-dominated ecosystems.

The Best Practices review demonstrated a significant need and the potential for employing planners with more specialized training and expertise with regards to natural sciences. Employing planners with this knowledge has the potential to reduce the need for consultants, sparing the agency or employer the added expense of hiring outside specialists. Certainly, consultation will still be necessary for gaining the most accurate understanding of a community. Where consulting does continue, there should be a robust model in place for optimizing that service. As current practice also reveals, planning and design solutions are much more efficient when tailored to local conditions. Thus, prescribed standards can be too rigid. Planners should instead embrace flexible frameworks.

Supplemented by the empirical research that was collected and evaluated in the Best Practices review, I refine the conceptual model by identifying methods for applying the Deep Ecological Urbanism strategy to practice. I consider the role of planners and urban designers, as well as the roles of additional key players. I also distinguish the basic components of a Deep Ecological Urbanism strategy, discuss the identification of outcomes and indicators, and craft a guided implementation process while providing insight regarding the calibration of the framework to suit local challenges, opportunities, and constraints.

OPERATIONAL DEFINITION

The Deep Ecological Urbanism model contends that an understanding of natural sciences and environmental ethics can inform the ways in which communities can be sustained and adapted to restore natural systems

and processes. This study proposes that planners will play a central role in the revitalization of communities, large and small, through the use of an alternative planning approach. As a strategy for planning and designing human-dominated ecosystems, Deep Ecological Urbanism aids in the application of 12 key principles across four defined layers of a community.

ACTORS & THEIR ROLES

As a highly interdisciplinary and holistic strategy, Deep Ecological Urbanism requires coordination and input from many different actors (Figure 41). Key players in the process include a project team, lead by a project coordinator and the members of an advisory committee, and supported by the contributions from a number of engaged experts, consultants, and representatives who make up a stakeholder coalition.

Project Coordinator

The Deep Ecological Urbanism strategy should be organized by a single lead project coordinator who will be responsible for managing the entire process. As the primary audience of this report, planners are encouraged to be deeply engaged in the Deep Ecological Urbanism process, facilitating and leading the effort from start to finish.

Though a planner is not required to be the coordinator (one alternative, for instance, might be the chief elected official), a planners' position and existing responsibilities, combined with their intimate relationship with the community, make them a favorable candidate for this role. Planners, furthermore, can ensure that the strategy is successfully integrated into existing plans and visioning documents.

The project coordinator is the chief project manager and primary contact for the project. They should engage stakeholders both internally and externally by assembling the advisory committee and calling together a stakeholder coalition. The coordinator ensures that the strategy is moving forward, and coordinates each step of the process.

Advisory Committee

Directly beneath the project coordinator, a team of internal stakeholders serve as an interdepartmental advisory committee. The advisory committee facilitates development of the strategy and provides assistance during each step of the process. Ideally, the advisory committee should include at least one individual from each of the community’s various government agencies and departments. Being mindful of current programs, a community may consider leveraging existing entities (e.g. a sustainability commission) when forming an advisory committee.

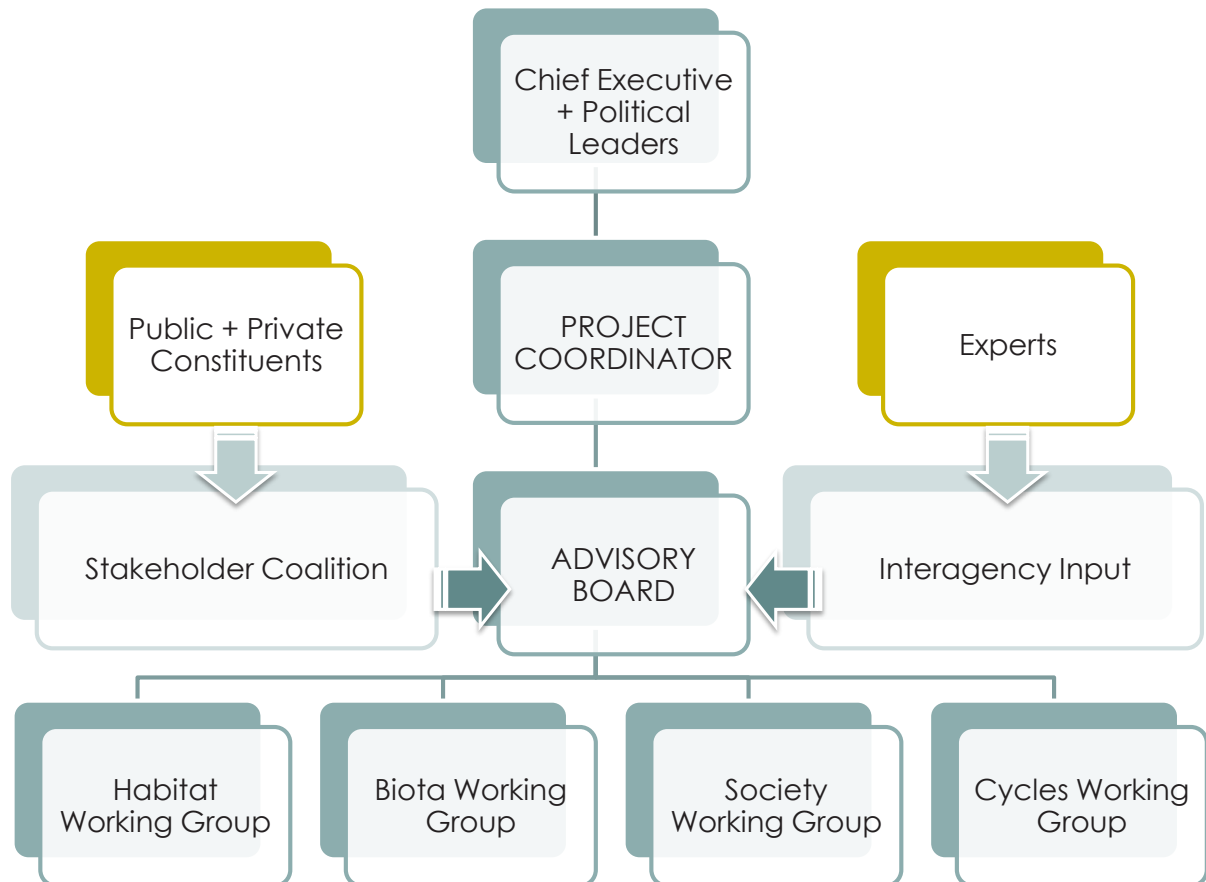
The advisory committee should feature members with diverse backgrounds, and each of the four layers of the city should be represented by a relatively balanced number of members. Positions on the advisory

committee are not limited to government employees, and might also include:

- Political officials
- Community leaders
- Representatives from the business community
- Non-profits and foundations
- Other interest groups

Together, the committee should include at least 20 individuals. Members of the committee will be assigned roles in one or more of four working groups—of which there is one working group for each layer of the city. These working groups, which should consist of 5 or more individuals, will provide key input and expertise, facilitate background assessments, and collect research

FIGURE 41. KEY ACTORS ON THE DEEP ECOLOGICAL URBANISM STRATEGY



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on relevant best practices before presenting final recommendations.

As the project coordinator works with the advisory committee, it is important to recognize that committee members will likely still have their previous responsibilities and workloads. Deep Ecological Urbanism should never be a burden, but should be viewed as an opportunity enhancing everyday operations. Advantages of participation in the Deep Ecological Urbanism strategy (which include optimized procedures, combined budgets, and mutually beneficial programs) should be highlighted and marketed to potential advisory committee members.

Stakeholder Coalition

Implementing the Deep Ecological Urbanism strategy will need ongoing public engagement and buy-in. Additionally, key leaders from local and regional agencies, corporations, institutions, and community groups will need to be actively engaged in the process.

While the advisory committee is intensely engaged in the internal processes of Deep Ecological Urbanism strategy development, an external stakeholder coalition will pull together a diverse range of constituents (see Table 9 in Appendix B) to provide the project team with periodic input and feedback regarding the Deep Ecological Urbanism strategy, its visions, and its recommendations. Though not necessary, it would be advantageous for an advisory committee member to serve as a facilitator for the coalition.

Engaging a wide range of stakeholders, the Deep Ecological Urbanism strategy distributes leadership and responsibilities among both public and private constituents, aiding in implementation by capitalizing on a diverse collections of resources.

COMPONENTS OF THE DEEP ECOLOGICAL URBANISM STRATEGY

A Deep Ecological Urbanism strategy includes a number of key ingredients. In addition to the *project team* described above, many steps of the Deep Ecological Urbanism strategy will establish a series of products, including *definitions* of specific, locally-defined values, actions, measures, and outcomes (Table 2). The strategy might produce an *Assessment Report* (see Step Three: Discovery); and the final *Action Plan* will include *implementation matrices* for each tactic. Lastly, publicly released *annual updates* will include *progress matrices* for each tactic.

As additional components, a number of tools and resources are expected to be used to facilitate strategy development. Many tools are already well-established in professional planning practice, including baseline assessment methods, inventorying processes, and the use of third-party project and development certifications. When relevant, these recognized tools, as well as any established local methods for planning, should be continued—only revised to accommodate the Deep Ecological Urbanism strategy, if necessary. A list of sample instruments and tools, categorized by each step of the strategy, can be found in Table 10 in Appendix B.

TABLE 2. STRATEGY ELEMENTS, DEFINED

	Broad	Specific
Values	Vision	Mission
	Goal	Objective
Methods/ Actions	Strategy	Tactic
Measure	Indicator	Metric
Outcome	Standard	Target

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CRITERIA AND INDICATORS

As the Deep Ecological Urbanism strategy is integrated throughout a human-dominated ecosystem, its impact will need to be monitored (see *Step Seven: Monitoring*, below). The 12 Principles of Deep Ecological Urbanism, as outlined in Chapter 3, serve as guiding aspirations for the integration of Deep Ecological Urbanism into a community's overall vision. Those principles are cross-dimensional and often all-encompassing. To translate the principles into measurable criterion for the active planning of a community, the principles must be woven into the layers, sectors, and systems of the Deep Ecological Urbanism mandala. Against those dimensions, key indicators and metrics may be identified.

A **metric** is the measure of a value. Though not always, a metric can also be an indicator. **Indicators** are defined as the performance measures that signal the condition or function of a tactic. Indicators may be identified through one or more observed metrics.

Key indicators will vary by community, based on current conditions and identified values. They should correspond with defined targets or standards which the community expects to achieve. These targets and standards move a community closer to realizing the identified vision and adhering to the 12 principles of Deep Ecological Urbanism. A preliminary list of sample indicators can be found in Table 11, Appendix B.

POLICY AND PROTOCOL

Deep Ecological Urbanism is not an end product, but is the long-term process towards sustainable, resilient, and ecologically healthy development.

Below is a clear protocol for implementing and then quantitatively measuring and monitoring the success of the Deep Ecological Urbanism strategy. Based on the rational, comprehensive planning model, the procedure follows a basic process that includes a set of seven sequential steps (Table 3). Significant attention must be

given to the key steps of the planning process—which include making the initial commitment, identifying available resources and setting goals, conducting baseline assessments, identifying actions and their alternatives, as well as ongoing monitoring of strategy implementation.

Step One: Preliminary Actions

Purpose: *To prepare a community for the Deep Ecological Urbanism process by understanding what will be involved and by evaluating local capacities before making the final commitment.*

Description: The first phase begins with the initial interest in optimizing and improving a community through use of the Deep Ecological Urbanism strategy. This interest might be spearheaded, initially, by a single individual, or collectively by an entire planning department. Alternatively, interest may be initiated from within a different agency or department, or organized by a community champion or political leader.

Prior to beginning the Deep Ecological Urbanism strategy, there must be an appointed project coordinator, as well as a guiding advisory board to serve as the primary team for facilitating the development and implementation of ongoing efforts (see *Actors and their Roles*, above). The Deep Ecological Urbanism organizational structure and project team creates strong relationships throughout the community. In addition to identifying a work plan for moving the strategy forward, the leadership should craft a communication plan. The communication plan serves two purposes: first, to conduct a public outreach campaign. During this stage, it is critical to convey the overall tone for the processes, which is that the Deep Ecological Urbanism strategy will be engaging, positive, and an invaluable opportunity for the community as a whole. Secondly, there should also be an internal communication plan and meeting schedule for the project team.

As part of the strategy, it's important to be clear about what Deep Ecological Urbanism means in the

TABLE 3. THE GUIDED DEEP ECOLOGICAL URBANISM STRATEGY PROCESS

Deep Ecological Urbanism Strategy Steps
<p>Step One: Preliminary Actions</p> <ul style="list-style-type: none"> • Appoint Project Coordinator • Assemble project team, including Advisory Committee • Define terms; Identify need/purpose, as well as priority topics and outcomes • Begin outreach and receive public and political buy-in • Evaluate capacity and inventory existing efforts and resources; identify potential challenges and limitations; determine a coordination strategy • Set a work plan and time frame for project completion • Brainstorm scope and values
<p>Step Two: Visioning</p> <ul style="list-style-type: none"> • Create a shared vision and definition of the Deep Ecological Urbanism city • Form Stakeholder Coalition • Continue public engagement; Initiate regional coordination • Divide Advisory Committee members into working groups • Identify indicators
<p>Step Three: Discovery</p> <ul style="list-style-type: none"> • Conduct SWOT analyses for each layer and for the community as a whole • Have each agency conduct internal assessments • Initiate best practice research • Determine if the community will take a quick action or comprehensive approach • Engage experts, specialists, and/or consultants
<p>Step Four: Reflection</p> <ul style="list-style-type: none"> • Present research findings to the public and solicit feedback/input • Match weaknesses and threats to strengths and opportunities • Evaluate best practice solutions • Brainstorm and evaluate measures and tactics
<p>Step Five: Recommendation</p> <ul style="list-style-type: none"> • Review original goals and values for consistency • Identify the action plan • Identify the implementation variables for each tactic

CONTD. FROM “TABLE 3. THE GUIDED DEEP ECOLOGICAL URBANISM STRATEGY PROCESS” ON PAGE 78

Deep Ecological Urbanism Strategy Steps

Step Six: Implementation

- Institutionalize the Deep Ecological Urbanism strategy
- Have agency and department heads sign a Deep Ecological Urbanism strategy declaration
- Enact new regulations
- Maintain ongoing outreach and coordination through stakeholder groups, coalition, and advisory committee

Step Seven: Monitoring & Revision

- Consider new indicators and measures
- Review the strategy for relevancy
- Periodically review for barriers to implementation; Remove any such barriers
- Produce annual progress reports
- Identify current priority action items
- Revise and update the strategy every 10 years

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context of the local community. The team should also set out to identify particular local challenges which the strategy is expected to address. This step should provide insight into how a community will adjust and calibrate the Deep Ecological Urbanism strategy to suit local challenges, opportunities, and constraints. Additionally, the preliminary stage will begin to identify available resources and any existing capacity.

CALIBRATION

Deep Ecological Urbanism is a process-based strategy that can be easily utilized and adopted in nearly any community. Not all of the recommendations and indicators described in this report will be appropriate in every community, however; so the strategy must be calibrated for local conditions. This will be done in the early stages of strategy development by completing an in-depth background assessment (see *Step Three: Discovery*).

Step Two: Visioning

Purpose: *To set expectations and identify core values in order to shape a long-term Deep Ecological Urbanism vision for the community.*

Description: After taking the preliminary steps, and with agreement that the Deep Ecological Urbanism strategy is both worthwhile and necessary, a shared plan for the scope of the strategy should be drafted. The Visioning step involves setting the overall vision and the goals for implementing the Deep Ecological Urbanism strategy. At this time, a stakeholder coalition should begin to form. Strategy development should always include stakeholders and engage the community—using input received through a public visioning process and through the stakeholder coalition to identify needs and current priority concerns.

Mission and vision statements (Table 4) outline the community’s long-term values, and identify the decision to utilize the Deep Ecological Urbanism strategy. At this point in the process, goals and objectives should be identified. Rather than reinvent the wheel, however, goals should align and coordinate with existing programs and policies (taking note any policies which may need to be revised through use of the Deep Ecological Urbanism strategy). During this step, the project team will also begin to identify key indicators.

TABLE 4. SAMPLE MISSION AND VISION STATEMENTS

Sample Vision and Mission Statements	
Example Vision	Example Mission
The Deep Ecological Urbanism strategy envisions human-dominated communities across the globe to be ecologically healthy environments that offer exceptional habitats in which all of Earth’s inhabitants—both human and non-human—may live contently.	The mission of Deep Ecological Urbanism is to offer citizens of the Earth quality environments in which to live by promoting the Deep Ecological Urbanism concept as a cornerstone of community development, planning, and urban design in human-dominated ecosystems.
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Step Three: Discovery

Purpose: *To collect and analyze information and discover the current conditions in order to reveal the underlying narrative.*

Description: Discovery provides the background and contextual information needed in order to effectively identify appropriate measures and tactics. A baseline assessment involves collecting data about the community and compiling an inventory of existing programs. Some indicators should have been identified in the previous phase. This step will begin to collect information on any of those indicators which are not already being reported regularly.

Cities—as they developed and as many of them still function today—become major forces for shaping the underlying biogeophysical systems of the Earth (Ernstson, 2013). The Deep Ecological Urbanism strategy should attempt to provide the historical context for understanding current land use and environmental conditions. In doing so, a city’s ecological memory, or its environmental legacy, might become a key to planning and designing a more resilient and ecologically healthy community (Nyström & Folke, 2001, as cited in Andersson, 2006). It is important, therefore, to understand and recognize the environmental history of a city, and to evaluate the position of humans in the evolution of the entire Earth (Alberti, 2013; Spirn, 2012).

Depending on existing initiatives and the scope of the Deep Ecological Urbanism strategy, communities can either choose to pursue a quick-action approach, or they may conduct a more comprehensive assessment. A quick-action approach is a snapshot and broad analysis of the community, whereas a comprehensive assessment would detail a complete narrative through a fine grain analysis of the community and its individual systems. For example, in a comprehensive assessment, each government agency should conduct internal evaluations and initiate best practice research with relation to their agency’s area of focus.

In either approach, a valuable tool for assessing current conditions is a Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis. A SWOT analysis may be done for the community as a whole or can be conducted at a finer scale for each of the four individual layers of the city. For comparison, a project team may choose to evaluate their community against regional, state, national, or other existing standards.

The process should continue to gather stakeholder and public input and solicit feedback in order to consider, evaluate, and determine all recommendation options and their alternatives. At the end of the discovery step, a community may decide to publish a complete *Assessment Report* to provide residents and stakeholders with the aggregated information.

TABLE 5. IMPLEMENTATION MATRIX

Implementation Matrix	
Tactic	Name or brief description of the tactic
Measure Type	Policy, Program, or Project
Relevance + Influence	Demonstrate how core values/goals are being met and describe impacts
Tactic Coordinator	Identify the name of the individual who will oversee implementation
Partners	Identify key agencies, stakeholders, and others who will be implementation partners
Target or Standard	Set a target or standard for the tactic which is achievable and quantifiable
Indicator	Include milestones (short- and long-term), deliverables
Timeline [or Priority]	Short-Term (<5 Yrs.), Near-Term (5-10 Yrs.), Long-Term (10-20 Yrs.); Include year
Funding	Identify existing funding mechanisms, as well as funding opportunities to explore

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Step Four: Reflection

Purpose: To clearly understand what the data convey and to consider methods for enhancing and optimizing the community.

Description: As data is collected and analyzed, a narrative unfolds and the local scenario is more clearly understood. The Deep Ecological Urbanism Strategy team should take some time to understand what the data convey and how the strategy should proceed.

Reflecting on the background analyses, the strategy should begin to identify possible tactics. This is the time to consider how any of the challenges that were identified in earlier steps may be approached and resolved. Consider, for instance, how the weaknesses and threats identified through the SWOT analysis might be resolved by capitalizing on noted strengths and opportunities. Always be sure that any proposed recommendation addresses the root cause of the identified challenge, not just the symptoms. The potential actions and alternatives identified in step three should now be vetted before the ultimate recommendations are selected.

Step Five: Recommendation

Purpose: To define the Deep Ecological Urbanism strategy by establishing a plan of action with achievable measures.

Description: Equipped with information about the community, this step sets to define a clear and realistic approach for implementing the Deep Ecological Urbanism strategy.

The final recommendations will be compiled as elements of an *Action Plan* that outlines the course for integrating the Deep Ecological Urbanism strategy. The action plan should set clear parameters for each tactic, including measure type, relevance and influence, a tactic implementation coordinator, additional partners, targets and indicators, implementation timeline, priority, and funding information.

In order to keep the plan achievable, strive for a small handful of high quality, thoughtful recommendations rather than many, fragmented tactics. Again, recommendations should get to the root of the problem at hand, and should be comprehensive and holistic. Identify a combination of “quick wins” and some long-term actions.

As we re-tool and re-scale planning processes, it is critical to think long-term. As revealed in the best practice review, it can be difficult to get support for initiatives that don't immediately produce significant, noticeable returns. Therefore, strategies should be framed as a series of short-term actions that will ultimately lead to long-term changes.

TACTICS

The recommendation step should craft an action plan, identifying implementation variables for each tactic. Tactics are the actions that facilitate implementation of the Deep Ecological Urbanism strategy and aim to make the community more sustainable, resilient, and ecologically healthy. They can be internal tactics intended to modify governance processes and management through policy revisions; or they may be external, intended to affect the overall conditions within the community. When identifying recommended tactics, the implementation matrix (Table 5) should be used to guide the identification of key variables. First, consider the tactic details. Identify the **type of measure**, of which there are three: *policies*, *programs*, and *projects*.

Policy measures are intended to revise existing policy or to inform future policy decisions. Revisions should be very clear about the current policy and what should be revised. Recommendations should advise authorities by providing guidelines for making policy decisions. Measures may also be programs; these are institutions and initiatives that establish some structure for ongoing actions. Finally, project measures are developments or one time efforts that advance an objective of the Deep Ecological Urbanism strategy.

It will also be important to identify the **relevance and influence** of each tactic by demonstrating how the community's core values are being met and describing the impact(s) the tactic will have on layers of the community. This will be valuable when looking for areas where tactics overlap.

Next, focus on implementation details. Identify a **tactic coordinator**, noting the name of the individual

who will oversee implementation. Also consider the agencies, stakeholders, constituents, and other **partners** to be engaged. Set an achievable, realistic **target or standard** for the tactic, and identify how progress will be measured by selecting a key **indicator** and including information about how the necessary data will be collected. The implementation plan may also note potential milestones and deliverables. Next, looking ahead, identify the tactic **timeline** by indicating if its implementation is short-term (<5 years), near-term (5-10 years), or long-term (10-20 years); include the anticipated implementation year. Alternatively, you can identify the tactic's priority (high, medium, or low). Finally, identify any existing **funding** mechanisms and how additional funding might be secured—identify opportunities for grants, in-kind support, and other forms of funding.

Step Six: Implementation

Purpose: *To institutionalize and initiate the Deep Ecological Urbanism strategy.*

Description: Once the *Action Plan* is compiled, it must be institutionalized by the community and integrated into all future work. To encourage participation and support, a project team might consider having each department director sign a declaration or agreement and integrate a Deep Ecological Urbanism policy into their departmental values. Be sure to have developed a plan for continuing project team coordination. The advisory committee should continue to meet regularly or, if that's not possible, maintain ongoing communication. Ongoing coordination among the project team will further facilitate strategy implementation and progress.

Implementation should begin immediately. Using a 6-month timeline or milestone checklist will outline current priority action items. Prioritize enacting key policies or regulations that will facilitate additional implementation measures.

Step Seven: Monitoring

Purpose: *To monitor progress of Deep Ecological Urbanism strategy implementation and revisit any recommendations as needed. To periodically update and revise the overall strategy.*

Description: Monitoring and project evaluation will begin shortly after implementation has commenced and will occur alongside ongoing implementation efforts. Monitoring implementation will require data collection, which is to be compared with identified indicators.

To facilitate data management, consider using a shared, master database that maintains any updated data and tracks progress in real-time. Progress reports should be published annually. These reports can identify tactic progress (Table 6), highlight any success stories, identify any barriers encountered, and outline priorities for the coming year. The entire strategy should be revisited and updated every 10 years.

TIPS FOR SUCCESSFUL COORDINATION

Deep Ecological Urbanism is a comprehensive planning and design strategy for uniting urban systems and processes. Restoring collaborative planning processes may be challenging at first, but coordination will be improved by establishing new partnerships (Dekay & O’Brien, 2001), initiating policy adjustments, and utilizing an alternative organizational or governance system.

In addition to a collaborative process, implementation efforts should likewise be coordinated. Rather than inefficient, fragmented, and piecemeal recommendations, tactics should be far-reaching and holistic. Implementation, then, should be multidisciplinary and engage a variety of constituents. Working with limited resources, recommendations should capitalize on embedded capacity by using existing resources and leveraging existing planned projects.

TABLE 6. PROGRESS MATRIX

Progress Matrix	
Tactic	Reiteration of the original tactic
Begin/End Dates	Year number, month
Funding	Funding secured and/or needed
Target or Standard	Reiteration of initial target for comparison to progress
Progress/Status	Steps and actions already taken
Barriers	Challenges that prevent implementation
Next Steps	Actions toward completion of tactic or removing barriers
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CONCLUSION

The impact of the world's human-dominated ecosystems reach far beyond the limits of cities. Though the Earth is in many ways plagued by humanity, it might be possible to readjust humankind's relationship with the Earth—from one that resembles parasitism to one of mutuality.

The Deep Ecological Urbanism concept defends that global trends of environmental degradation can be reversed by reintegrating nature into our communities. The concept proposes that human-dominated communities may be revitalized and adapted in ways that restore natural systems and processes through a planning approach that embraces an understanding of natural sciences and an adherence to environmental ethics.

In this report, I argue that because “ecology” is the study of the relationships of organism and their environment, planning is ecology in practice. The health of the ecosystem, therefore, is not purely an environmental, non-human concept, but it describes the health of the entire community—both human and non-human populations—and its environs.

The primary audiences of this report are individuals who play a role in the shaping of our human-dominated ecosystems; particularly, the Deep Ecological Urbanism strategy is intended to be a resource for the professional planner. Therefore, this report serves, first and foremost, as a theoretical background for introducing relevant concepts. It is a foundation to be used by planning professionals as a starting point for gaining an understanding the Deep Ecological Urbanism model. As an operational framework, the Deep Ecological Urbanism strategy provides insight, guidance, information, and a collection of resources and preliminary tools necessary for the implementation of the Deep Ecological Urbanism strategy. The Deep Ecological Urbanism strategy outlines a step-by-step process for calibrating, adapting, and integrating the concept in any community.

DISCOVERIES

My research analyzed relevant literature and used a review of best practices to support the framework and to outline a strategy for applying Deep Ecological Urbanism to planning practice. Findings presented in this report demonstrate that human-dominated communities are natural ecosystems; similarly, human beings are natural phenomena.

The conceptual framework highlighted relevant theories and identified key trends before proposing a set of 12 guiding principles and a structure for addressing communities. Coupled with real world examples of current perspectives and actions in planning, a method for moving concept into practice was defined as the operational framework.

NOTED CHALLENGES

Currently, a number of challenges must be addressed before the Deep Ecological Urbanism strategy can be fully embraced. First, priorities in decision making are currently misplaced, leading to false choices between perceived trade-offs. Fragmentation exacerbates this, and integration will require comprehensive coordination. In a world where all of the individual parts are gradually becoming more and more fragmented as operations are increasingly bureaucratic, planners, designers, and those individuals who shape our human-dominated ecosystems are in needed of guidance. As identified through the Best Practices review, global leaders and planners lack a method for transforming existing ecological theories from concept to practice. Re-tooling and re-scaling efforts, while working with existing resources, will be key to setting the stage for progress and innovation.

Noting these complex challenges, planning must be a highly interdisciplinary practice that engages a large number of stakeholders. Thus, the planner's role is critical in initiating change and matching strategies to local context.

RELEVANCE AND NEED

To be clear, Deep Ecological Urbanism has largely evolved out of existing theories and research, and embraces many relevant concepts which are progressive and which emphasize the need for an alternative planning approach. Where the Deep Ecological Urbanism concept and framework truly stands out is in its ability to merge existing concepts from differing fields—which are presently applied only disjointedly—to pull from the existing rhetoric and push these critical messages beyond concept and into practice.

Deep Ecological Urbanism is unlike most current approaches to planning and design because it is holistically views the entire community as a complete ecosystem in which no decision can be made in a vacuum. Current planning, however, has difficulty relating ecology directly to community planning outside the frame of environmental planning.

FIGURE 42. PORTLAND, OR, WITH MT. HOOD IN THE DISTANCE



Image courtesy of AmericanForests.org

FINAL RECOMMENDATIONS

In conclusion, this report is a timely piece that consolidates contemporary theory into a comprehensive framework. My contribution in developing the Deep Ecological Urbanism strategy is a shifted perspective in planning—away from technocentric, piecemeal, and interim actions toward biocentric, holistic, and integrated solutions. As a result, a community benefits from an enhanced quality of life, complete self-sufficiency, a reduction in emissions, and a more efficient and thus more productive local economy, just to name a few of many advantages. Essentially, a community becomes more sustainable, resilient, and ecologically healthy and its viability can be sustained indefinitely; more importantly, this approach does so without placing unnecessary stress on the natural landscape.

Deep Ecological Urbanism requires interdisciplinary thinking, and is a concept that will be ever evolving and recalibrated as more information is gathered. The interdisciplinary nature of the concept, furthermore, will ultimately require further input, review, and guidance from professional experts in relevant fields before it is finalized. There's much more to be understood, and the research required to validate and finalize the Deep Ecological Urbanism concept has only just scratched the surface. Nevertheless, the findings presented in this report establish a sturdy framework for the Deep Ecological Urbanism concept.

FIGURE 43. URBAN TREE CANOPY IN PORTLAND, OR



Image courtesy of OregonLive.com

FIGURE 44. VOLUNTEERS PLANT TREES ON A PREVIOUSLY DEVELOPED LOT IN BALTIMORE



FIGURE 45. A COMMUNITY GARDEN IN BALTIMORE GROWS FLOWERS AND FOOD



Photos by Author



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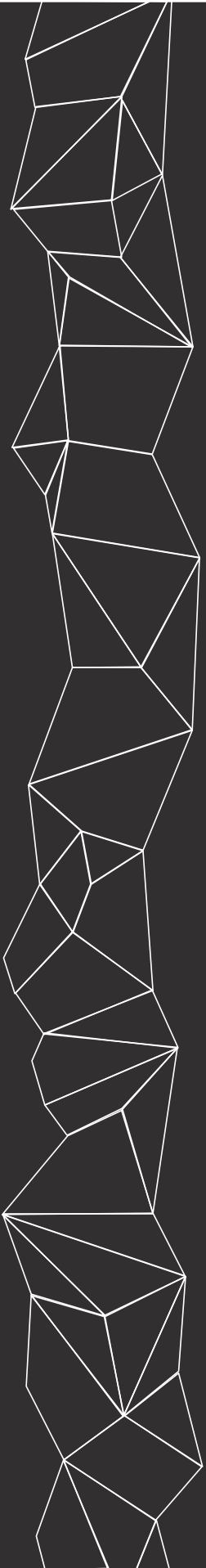
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APPENDIX



APPENDIX A. CONCEPT DEVELOPMENT

TABLE 7. 12 PRINCIPLES OF DEEP ECOLOGICAL URBANISM AND THEIR OUTCOMES

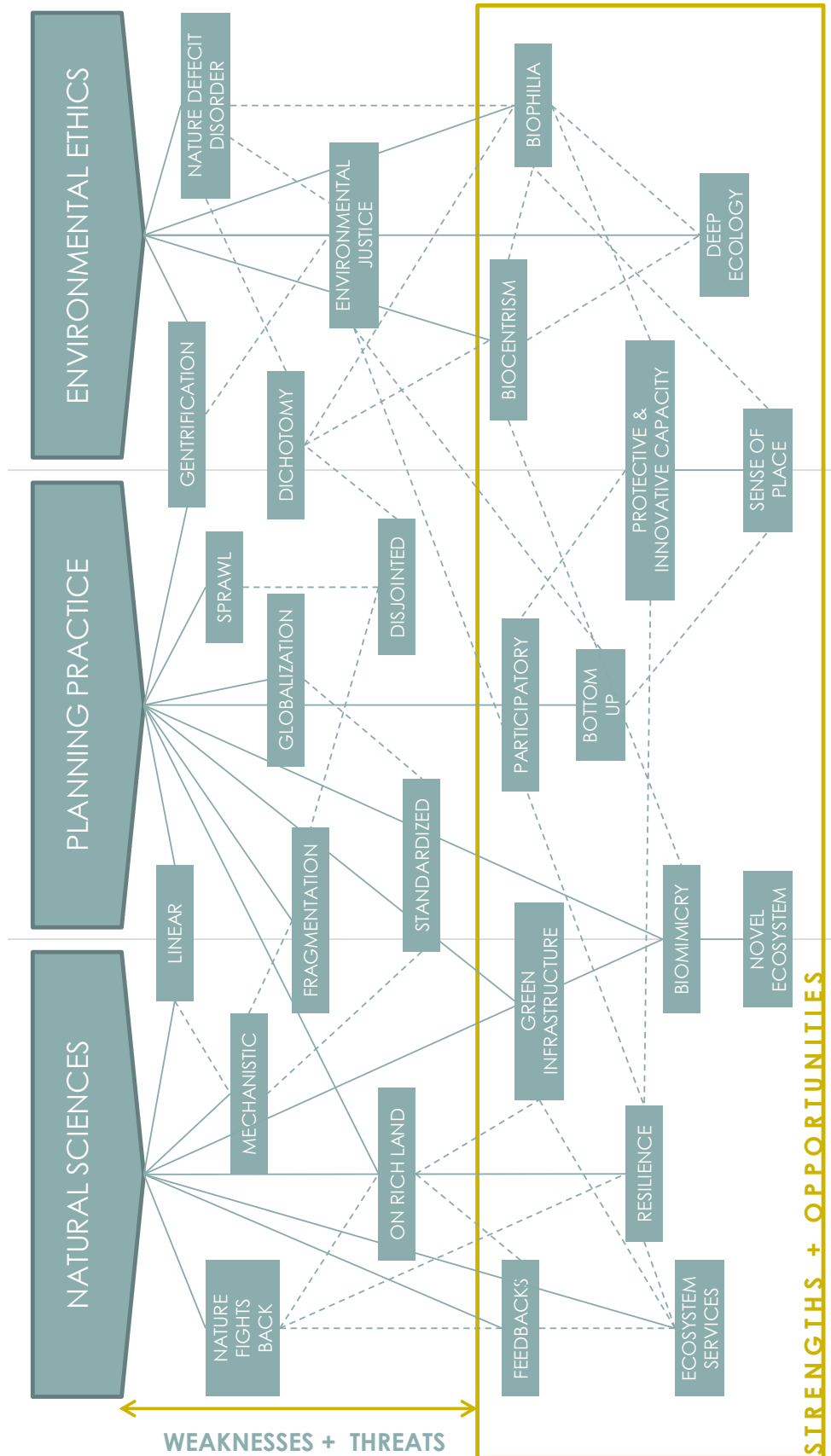
Principle	Outcome
Sensitive	Respect the vitality of the local ecosystem and all its biota
	<ul style="list-style-type: none"> • Establish protections for critical habitats • Evaluate environmental impact of all projects
Cyclical	Strive to be self-sufficient, net-zero, and zero-waste.
	<ul style="list-style-type: none"> • Waste reduction through recycling, composting, and waste-to-energy systems • Mutualism and coordinated industrial ecologies
Adaptable	Reduce or eliminate vulnerabilities through system resilience
	<ul style="list-style-type: none"> • Incorporate adaptation and mitigation into all planning and development • Adopt precautionary principle
Compact	Prioritize compact, infill development and adaptive reuse in existing nodes
	<ul style="list-style-type: none"> • Prioritize infill and adaptive reuse in existing communities • Adopt eco-density policy
Biomimetic	Look to nature as model, mentor, and measure
	<ul style="list-style-type: none"> • Use natural geometry in architecture and urban design • Increase efficiency by mimicking nature and set targets based on natural processes
Local	Adapt to the local geography and conditions
	<ul style="list-style-type: none"> • Frame sustainability, resiliency, and deep ecological goals within the local context • Adapt strategies to meet local needs
Restorative	Maintain and restore the health of the entire ecosystem
	<ul style="list-style-type: none"> • Design projects that improve ecosystem health
Holistic	Use a systemic approach and promote synergy
	<ul style="list-style-type: none"> • Integrate the Deep Ecological Urbanism framework into all community plans, policy documents, programs, and initiatives • Utilize in inter-agency and inter-departmental working groups
Democratic	Ensure equality for all biota, both human and non-human
	<ul style="list-style-type: none"> • Consider the needs of all life in planning and design projects • Engage the public through robust participatory opportunities
Biophilic	Increase accessibility and cultivate relationships
	<ul style="list-style-type: none"> • Foster stewardship • Provide opportunities for developing local ecological knowledge (LEK)
Diverse	Encourage a healthy mix of organisms, habitats, and land uses
	<ul style="list-style-type: none"> • Increase biodiversity • Encourage mixed-use developments
Spirited	Celebrate the community and foster attachment to place
	<ul style="list-style-type: none"> • Encourage character in planning and design • Host annual heritage festivals to celebrate local biogeophysical features and cultural heritage

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FIGURE 46. CONCEPT SCHEMA

This concept schema (Figure 46) demonstrates the connection between some of the key issues related to planning for ecology. The three tabs represent the three disciplines of Deep Ecological Urbanism. Directly beneath the tabs are weaknesses and threats, and strengths and opportunities are bound in the golden box.

Solid lines indicate a direct tie to a topic, while dashed lines show the relationships between topics. These relationships often link weaknesses to strengths, and threats to opportunities.



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APPENDIX B. STRATEGY IMPLEMENTATION RESOURCES

This project matrix (Table 8) is modeled after the EcoDistricts Institute's Performance + Feasibility Matrix on pg. 8 of the EcoDistrict Toolkit. Adopted to include the 12 principles of Deep Ecological Urbanism as key performance areas, the matrix can be used to evaluate and prioritize alternatives. To evaluate a project's potential, assign a value between 1 and 3 (1 signifying low capacity, 3 meaning high capacity) in each cell. Then, find the sum of all principles, and the sum of all feasibility areas. Combine to identify the overall rank. This matrix might also seek to identify project overlaps.

TABLE 8. PROJECT FEASIBILITY MATRIX

Overall Rank	Habitat Projects					Biota Projects					Society Projects					Cycles Projects				
Feasibility Total Score																				
Importance to Stakeholders																				
Importance to Leadership																				
Management Capacity																				
Cost Effectiveness																				
Financial Feasibility																				
Technical Feasibility																				
Principles Total Score																				
Spirited																				
Diverse																				
Biophilic																				
Democratic																				
Holistic																				
Restorative																				
Local																				
Biomimetic																				
Compact																				
Adaptable																				
Cyclical																				
Sensitive																				

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TABLE 9. TYPICAL CONSTITUENTS BY LAYER

Typical Constituents by Layer		
Layer	Agencies and Departments	Stakeholders
Habitat	<ul style="list-style-type: none"> » Department of Natural Resources » Department of Public Works » Department of the Environment » Housing and Community Development » Planning » Recreation & Parks » Watershed Agencies 	<ul style="list-style-type: none"> » Architectural organizations » “Friends of” park groups » Developers » Watershed groups » Environmentalist groups
Biota	<ul style="list-style-type: none"> » Department of Natural Resources » Health and Mental Hygiene » Police Department » Fire Department » Emergency Management » Department of Agriculture » Department of Aging » Department of Disabilities » Housing and Community Development » Housing Authorities 	<ul style="list-style-type: none"> » Wildlife Groups » Healthcare institutions » Urban Agriculture » Homeless Associations
Society	<ul style="list-style-type: none"> » Community Affairs » Housing and Community Development » Budget and Management » Businesses and Economic Development » Department of Education » Workforce Investment » Department of Labor, Licensing, and Revenue Services » Office of Arts » Heritage and Preservation Divisions 	<ul style="list-style-type: none"> » Main Street Programs » Schools and Higher Education Institutions » Cultural Institutions » Arts Groups » Volunteer Groups » Non-Profits » Businesses and Business Associations » Community Associations » Service Corps
Cycles	<ul style="list-style-type: none"> » Department of Transportation » Department of Energy » Department of Public Works » Businesses and Economic Development 	<ul style="list-style-type: none"> » Energy and Utilities » Industries » Bike and pedestrian advocacy groups » Service Corps

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TABLE 10. LIST OF POTENTIAL INSTRUMENTS BY STEP

Step	Tool
Preliminary	Outreach and Engagement
	Charrettes and Workshops
	Arnstein's Ladder of Participation; Davidson's Wheel of Participation
	Active Listening
Visioning	SWOT Analysis
	Citizen's Survey
	Backcasting
Discovery	Environmental Policy Review and Assessment
	Greenhouse Gas Inventory
	Footprint Analyses (Ecological; Carbon; Other)
	Material Flow Analysis
	Metabolism Study
	Asset Mapping (e.g. Community Green Mapping)
	<i>eco</i> Budgeting
	ICLEI's Local Authorities Self Assessment of Local Agenda 21
	City Biodiversity Index (CBI)
	Environmental/Regional Survey
Reflection	Visualization
Recommendation	Traditional Neighborhood Development
	Bioclimatic, Passive-Solar Designs
	Industrial Ecology
	ICLEI's Local Action for Biodiversity (LAB)
Implementation	Environmental Policy and Code Revisions
	Growth Strategy
	Heritage Strategy
	Local Biodiversity Strategies and Action Plan (LBSAP) Guidelines
	Design Code and Guidelines; Patternbook
	Third Party Certifications: Leadership in Energy and Environmental Design (LEED), Living Building Challenge (LBC), Passive House Institute US (PHIUS)
	Green Infrastructure
Monitoring	Genuine Progress Indicators (GPI)

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TABLE 11. PRELIMINARY LIST OF INDICATORS

Sector	System	Indicator
Habitat		
Natural Environment	Land	Topsoil Loss
		Filled land
		Topography and grading
	Water	Visibility/Cleanliness—"Wade-Ins"; The Sneaker Index
		Water Bacteria Levels
		Local area flooding
		Miles of buried/daylighting streams
		Percent of impervious surfaces
		Miles of restored streams
		Drinking water quality
		Atmosphere
	Climate adaptation and action plans	
	Air quality	
	Built Environment	Land Use
Proximity to local services		
Average commute distance		
Structures		Percent of development projects that are infill or adaptive reuse
		Intensity of building use
		Certified LEED, LBC, PHIUS, or other structures
		Green retrofits
		Building form, height
Public Spaces		Parkscore
		Public space and green areas, number and use
		Vacant lot permits
		Connectivity of public spaces
		Acreage of public spaces

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TABLE 11, CONTD.

Sector	System	Indicator
Biota		
Humankind	Safety	Crime
	Human Capital	Access to nature
		Education rates
	Well-being	Housing and transportation costs
		Farmers Markets per capita
		Households earning living wage or higher
		Community affordability
		Food deserts
		Number of urban farms
Wildlife	Natural Capital	City Biodiversity Index
		Presence of Biological Indicator Species
		Patch Dynamics
		Biosurvey
	Flora	Vegetation density
		Tree Canopy
		Net loss of forest cover
		Street Trees
	Fauna	Species loss
		Invasives

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TABLE 11, CONTD.

Sector	System	Indicator
Society		
Community	Social Capital	Registered and participating voters
		Neighborhood cohesion
		Citizens' surveys
	Culture + Identity	Attendance at cultural and arts events/attractions
		Number of historic sites/districts
	Civic Engagement	Volunteerism/Volunteer activities
		Number of Community Managed Open Spaces (CMOs)
		Number of Community Associations
	Institutions	Education
"Green" Schools		
Governance		Regional coordination
		Interagency coordination
		Public private partnerships
Economy		Diverse representation of community
		"Green" Businesses
		Living wage policy
		Local financial institutions
		Number of businesses

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TABLE 11, CONTD.

Sector	System	Indicator
Cycles		
Stocks	Transportation	Trips taken on foot/bike
		Number or miles of Bike Lanes
		Percentage of population using public transit
		Commute to Work
		Trips using public transit
		Proximity to public transit
		Matching jobs and homes
		Matching local services and homes
		Walkability
		Congestion
		Travel Time Index
		Number of fuel efficient, hybrid, electric vehicles
		Bike Infrastructure
	Utilities	Transport energy use
		Residential energy use
		Energy inflows/outflows
		Percent of power from renewable sources
	Industry	Community self-reliance
		Non-Renewable Resource Depletion
	Flows	Materials & Emissions
Resource inflows/outflows		
Waste generation		
Jobs		Local businesses
		Green jobs training
Goods and Services		

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APPENDIX C. SUPPLEMENTARY CASE INFORMATION

TABLE 12. SIGNIFICANT CASE CITY PLANS, NON-EXHAUSTIVE LIST

Layer	Habitat	Biota
Portland	<ul style="list-style-type: none"> » Urban Growth Boundary (1979, modified multiple times since) » Scenic Views, Sites, and Drive Inventory (1989) » Vacant Land Inventory Methodology Report (1989) » Metropolitan Greenspaces Master Plan (1992) » Metro 2040 Growth Concept (1995) » Green Building Resolution, Policy for City facilities (2001, 2005, 2009) » Portland Watershed Management Plan (2005) » Infill Design Toolkit (2008) » Citywide Natural Resource Inventory (a Portland Plan Background Report) (2010) 	<ul style="list-style-type: none"> » Willamette Greenway Plan (1987); » Greenway Overlay Zones (2001) » Food Policy Council (2002) » Urban Forestry Management Plan [Set goals] (2004) » Urban Forest Action Plan [Strategies to meet 2004 goals](2007) » Citywide Tree Policy Review and Regulatory Improvement Project (2010) » Invasive Plant Policy (2010, 2011) » The River Plan (2010) » Urban Food Zoning Code Update (2012) » Resource Guide for Bird-Friendly Building Design (2012) » Portland's Heritage Trees (2013)
San Francisco	<ul style="list-style-type: none"> » Green Building Ordinance (2008) » SB 375 and the Bay Area's Sustainable Communities Strategy (SCS) (2008) » Stormwater Design Guidelines (2009) » Green Landscaping, Ordinance (2010) » Revisions to CEQA Legislation (2012) » Pavement to Parks; San Francisco Parklet Manual (Dating Back to 2010, Manual published in 2013) » Eco-District Program (underway) 	<ul style="list-style-type: none"> » Health Services Master Plan (Amendment to Planning Code, 2010) » Bird-Safe Building Legislation & Standards; [Building requirements and design standards amendment to planning code] (2011) » Street Tree Census (2013) » Street Tree Financing Study (2013) » Roadmap for City Food Sector Innovation and Investment Report [Report for National Use] (2013) » Urban Forest Plan (Forthcoming, Draft in 2014)
Vancouver	<ul style="list-style-type: none"> » View Protection Guidelines (1989) » Greenways Plan (1995) » Regional Parks and Greenways Plan (2005) » EcoDensity Charter and Initial Actions (2008) » 2008 Pedestrian Volume and Opinion Survey—Commercial Streets (2009) » Green Building Policy for Rezoning Update (2010) » Regional Growth Strategy: Metro Vancouver 2040 (2011) » Vancouver's Housing and Homelessness Strategy 2012-2021 (2011) » Metro Vancouver Regional Parks Plan (2011) » Climate Adaptation Strategy (2012) » Rezoning Policy for Sustainable Large Developments (2013) 	<ul style="list-style-type: none"> » Street Tree Bylaw 5985 (1992) » Regional Homelessness Plan (2003) » Vancouver Food Charter (2007) » Metro Vancouver Affordable Housing Strategy (2007) » Protection of Trees Bylaw 9958 (2010**) » Regional Food System Strategy (2011) » Healthy Communities Practice Guides (2012) » Vancouver's Urban Forest Strategy (Forthcoming, Draft in 2014) » Healthy City Strategy (Forthcoming, Draft in 2014)

*For some entries, the years of subsequent revisions/updates may also listed.

**Unconfirmed

Compiled by Author

CONTD. FROM "TABLE 12. SIGNIFICANT CASE CITY PLANS, NON-EXHAUSTIVE LIST" ON PAGE 102

Society	Cycles	Cross-Layer
<ul style="list-style-type: none"> » Youth Planning Program (2007) » Youth Planning Manual (unknown) » Historic Resources Inventories (ongoing) 	<ul style="list-style-type: none"> » Energy Policy (1979, 1990) » City Energy Challenge (1991) » Global Warming Reduction Strategy (1993) » Local Action Plan on Global Warming (2001) » Portland Composts! Program (2005) » Portland Recycles! Plan (2006) » Peak Oil Task Force (2006) » Renewable Fuel Standard (2006) » 1.5% for Solar [HB2620] (2007) » 2008-2018 Regional Solid Waste Management Plan (2008) » Climate Action Plan (2009, 2013) » Solarize Guidebook (2011) » Climate Change Preparation Strategy (forthcoming) » Portland Climate Action Now! (outreach website) 	<ul style="list-style-type: none"> » Sustainable City Principles (1994) » Regional Framework Plan (1997, 2005) » Six Desired Outcomes for the Portland Region (2008) » Portland 2030 [Visioning] (2008) » Environmental Sustainability Goals (2009)
<ul style="list-style-type: none"> » 1% for Art (1985, in the Downtown Plan) » Public Outreach and Engagement Report (2012) » Historic Resources Survey Program (ongoing) » Invest in Neighborhoods (ongoing) 	<ul style="list-style-type: none"> » Better Streets Policy (2006) » High Speed Rail (California Proposition 1A, 2008) » Transportation Sustainability Program (TSP) (Transit First Policy, 2003; TSP ordinance introduced 2012) » WalkFirst Existing Conditions Report (2011) » Bike Parking Requirements Added (2012) » Pedestrian Strategy (2013) » Green Connections Plan [2-year project, 2011-2013](March 2014) 	<ul style="list-style-type: none"> » Precautionary Principle Resolution (2002); Ordinance (2003) » Environment Code (2003) » Interagency Plan Implementation Committee (IPIC) Annual Report (Annually since 2010) » Sustainable Systems Framework (Draft, 2014)
<ul style="list-style-type: none"> » Greenest City Fund (Created to support implementation of Greenest City Action Plan efforts, continues until 2015) 	<ul style="list-style-type: none"> » Bicycle Plan (1999) » TransLink: Transport 2040 (2008) » Integrated Solid Waste and Resource Management (2010) » Integrated Liquid Waste and Resource Management (2010) » Integrated Air Quality and Greenhouse Gas Management Plan (IAQGGMP) (2011) » Neighbourhood Energy in Vancouver – Strategic Approach and Guidelines (2012) » Transportation 2040 Plan (2012) 	<ul style="list-style-type: none"> » The Livable Region 1976-1986 (1976) » Livable Region Strategic Plan (1996) » Ecological Health Action Plan (2011) » Greenest City 2020 Action Plan (2012)

TABLE 13. CASE CITY FACTS AND FIGURES

City	Location	Geography	Region	Year Founded, Incorporated	2010 Land Area (sq mi)	2010 Population	Calculated Density	World Class City
Vancouver (CMA)	BC, Canada	Coastal, Seaport	Pacific Northwest, Ecotopia	1867, 1886	44.39	603,502	13,595.45	Beta
San Francisco (City)	CA, USA	Coastal, Seaport	Pacific Northwest, Ecotopia	1776, 1850	46.87	805,235	17,180.18	Alpha -
Portland (City)	OR, USA	Coastal, Seaport	Pacific Northwest, Ecotopia	1845, 1851	133.43	583,776	4,375.15	Gamma -
<i>Source & Notes:</i>					Data according to national census profiles.	Data according to national census profiles. (2011 counts in Vancouver)	Data according to national census profiles.	

Compiled by Author

TABLE 14. CASE CITY INDEX SCORES

City	Bohemian Index	High Tech Tank	Melting Pot Index	Creative Class Rank	Gay Index Rank, 2000	Innovation Index	Diversity
Vancouver (CMA)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Francisco (City)	5.00	1.00	4.00	5.00	1.00	5.00	1.00
Portland (City)	6	10	24	30	20	32	31

Source & Notes: Florida, R. (2009). Entrepreneurship, creativity, and regional economic growth. In Hart, D (ed.). (2009). The Emergence of entrepreneurship policy: Governance, start-Ups, and growth in the U.S. knowledge economy. NY: Cambridge University Press.

Compiled by Author

CONTD. FROM "TABLE 13. CASE CITY FACTS AND FIGURES" ON PAGE 104

Climate	Sustainability Plan	Sustainability Office	Signatory of U.S. Mayors Climate Protection Agreement	2012 GDP (in Billions), Metro Area	2012 GDP Per Capita, Metro Area
Oceanic (Cfb)	Greenest City 2020 Action Plan	No Dedicated Office	N/A	\$101.20	\$41,084
Mediterranean (Csb)	Sustainable Systems Framework (Draft, 2014)	The Sustainable Development Program , Department of Planning	Original 9, Mayor Gavin Newsom	\$306.60	\$68,974
Temperate/Mediterranean (Csb)	Sustainable City Principles (1994; Environmental Sustainability Goals (2009)	Bureau of Planning and Sustainability	Original 9, Mayor Tom Potter	\$139.30	\$60,684
Koppen Classification				Brookings Institute	

CONTD. FROM "TABLE 14. CASE CITY INDEX SCORES" ON PAGE 104

Walkscore (Higher is Better)	Transit Score	Bike Score	Parkscore (rank) (Lower is Better)	2012 Quality of Living Survey	Mercer City Infrastructure Ranking, 2012	2013 Price To Income Ratio
78	N/A	N/A	N/A	5th	9th	10.74
84	80	70	3	29th	N/A	7.18
63	50	70	7	N/A	N/A	2.77

APPENDIX D. PLANNERS' OPINION SURVEY

Administered Online from February to March 2014

Q3. Which of the following best describes your job title:		Q6. The sector and/or scope of your agency can best be described as:		Q10b. What level of awareness and concern exists among decision-makers regarding ecological health and its implications for the overall health of the jurisdiction.	
Director/Executive Director	26%	Public Agency	79%	High	19%
Principal Planner	24%	Consulting	12%	Some	53%
Planner III	11%	Non-Profit	4%	Neutral	13%
Planner II	7%	Development Firm	1%	Low	11%
Planner I	5%	Other	4%	Insignificant	1%
Planning Technician	1%	Q7. Please note the size of this agency:		Unsure	2%
Planning Intern	1%	Unsure	0%	Q10c. What level of awareness and concern exists among planners regarding ecological health and its implications for the overall health of the jurisdiction.	
Other	25%	1-10 Employees	27%	High	52%
Q4. How long have you held this role?		10-50 Employees	18%	Some	40%
Less than 3 years	31%	50+ Employees	53%	Neutral	3%
3-4 Years	12%	Other	3%	Low	4%
5-9 Years	25%	Q8. What is the jurisdiction of your agency's work?		Insignificant	0%
10-19 Years	22%	Local	68%	Unsure	1%
20+ Years	10%	Metro/Regional	12%	Q11. Do you AGREE or DISAGREE with the following statement:	
Q5. Which of the following specializations reflect the focus of your professional work?		State/Provincial	8%	Agree	93%
Community (Re)Development	50%	State/Provincial	8%	Neutral	5%
Comprehensive Planning	3%	Federal	4%	Disagree	1%
Economic Planning	15%	All	4%	Other	1%
Environment/Natural Resources,	29%	Other	4%	Q12. AGREE or DISAGREE?	
GIS	1%	Q9. Does your jurisdiction have a dedicated sustainability planning office?		Agree	60%
Housing	4%	Yes	15%	Neutral	27%
Infrastructure	4%	No	74%	Disagree	9%
Land Use/Code Enforcement	46%	Unsure	7%	Other	4%
Management/Budgeting	8%	Other	100%	Q13a. A higher understanding and appreciation for ecological assets and their health is crucial to encouraging sustainable, resilient, and ecological planning.	
Parks and Recreation	8%	Q10a. What level of awareness and concern exists among businesses and industries regarding ecological health and its implications for the overall health of the jurisdiction.		Agree	86%
Preservation	11%	High	9%	Neutral/Unsure	10%
Resiliency	4%	Some	41%	Disagree	4%
Sustainability	13%	Neutral	18%		
Transportation	19%	Low	23%		
Urban Design, Architecture, Landscape Architecture or Similar	15%	Insignificant	4%		
Other	12%	Unsure	5%		

Q13b. Please indicate whether you AGREE or DISAGREE. [Economy, environment, and society are separate goals with little overlap and the conflicting strategies often require trade-offs.]	
Agree	8%
Neutral/Unsure	13%
Disagree	79%
Q13c. Please indicate whether you AGREE or DISAGREE. [As a planner, it is my duty to advance strategies that grow and protect the community, and this includes planning for ecological health.]	
Agree	82%
Neutral/Unsure	12%
Disagree	6%
Q14. Do you believe ecological health is important for any of the following reasons?	
Ecosystem Services	71%
Emotional and Psychological Well-being	81%
Public Health	91%
Natural Hazard Resiliency	85%
Greenhouse Gas Reductions	72%
Economic Development	80%
Community Viability	84%
Resource Conservation (and self-sufficiency)	84%
Jurisdiction Competitiveness	67%
Educational Opportunities	67%
Habitat Restoration and Conservation	88%
Overall Attractiveness of the Jurisdiction	88%
Cultural Amenities	71%
Property/Land Values	84%
Walkability	70%
Other	6%
All of the Above	48%

Q18. What DO YOU currently consider to be the top three priorities of planning?	
Cultural Vibrancy	6%
Economic Development	44%
Education and Youth	1%
Environment, Ecological Health, and Natural Resources	41%
Historic Preservation	5%
Housing and Community Development	24%
Land Use and Zoning	47%
Population Stabilization	4%
Poverty Reduction	4%
Public Health	14%
Resiliency and Climate Change	17%
Sustainability	37%
Social Growth and Equity	16%
Transportation and Infrastructure	34%
Other	7%
Q19. What would YOUR AGENCY currently consider to be the top three priorities of planning?	
Cultural Vibrancy	11%
Economic Development	71%
Education and Youth	7%
Environment, Ecological Health, and Natural Resources	22%
Historic Preservation	5%
Housing and Community Development	27%
Land Use and Zoning	55%
Population Stabilization	2%
Poverty Reduction	1%
Public Health	10%
Resiliency and Climate Change	10%
Sustainability	26%
Social Growth and Equity	5%
Transportation and Infrastructure	40%
Other	7%

Q20. Including yourself, what percentage of employees at your agency would you estimate have any specific ecological or natural science training, (and/or) are able to provide quality ecological knowledge and skills?	
0%	13%
1-24%	58%
25-49%	10%
50-74%	8%
75-99%	7%
Unsure	0%
Q21a. Please indicate whether you AGREE or DISAGREE. [Senior management/decision-makers strongly support the understanding and recognition of ecological principles.]	
Agree	33%
Neutral	30%
Disagree	30%
Unsure	7%
Q21b. Please indicate whether you AGREE or DISAGREE. [My jurisdiction works closely with surrounding jurisdictions and/or the wider region.]	
Agree	55%
Neutral	30%
Disagree	13%
Unsure	2%
Q21c. Please indicate whether you AGREE or DISAGREE. [My jurisdiction struggles to balance the needs of society, economy, and environment.]	
Agree	61%
Neutral	23%
Disagree	14%
Unsure	2%

See page 110 for Questions 15-17

Q21d. Please indicate whether you AGREE or DISAGREE. [My jurisdiction lacks a comprehensive, holistic approach that coordinates planning across agencies, departments, sectors, and systems.]	
Agree	42%
Neutral	27%
Disagree	26%
Unsure	5%
Q22. If your jurisdiction has not yet incorporated ecological principles into planning processes, please state the reasons.	
N/A (My jurisdiction adequately incorporates ecological principles into planning.)	21%
Ecological Health is not seen as a priority	45%
The link between ecological health and additional matters (e.g. social and economic challenges) is unknown or unclear.	37%
There is a lack of POLITICAL support/interest.	60%
There is a lack of PUBLIC support/interest.	38%
There is insufficient policy for giving planners the authority/ power.	36%
There is insufficient technical understanding of the subject.	42%
There is insufficient funding.	47%
There is a need for process guidance.	26%
Unsure	15%
Other	9%

Q23a. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Comprehensive/District-wide Planning]	
Fundamentally Integrated	31%
Moderately Referenced	37%
Minimally referenced	22%
Implied but not literally referenced	4%
No consideration	1%
Unsure	1%
N/A	2%
Q23b. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Regional Plan(s)]	
Fundamentally Integrated	21%
Moderately Referenced	33%
Minimally referenced	19%
Implied but not literally referenced	6%
No consideration	6%
Unsure	2%
N/A	13%
Q23c. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Transportation]	
Fundamentally Integrated	18%
Moderately Referenced	23%
Minimally referenced	24%
Implied but not literally referenced	12%
No consideration	13%
Unsure	3%
N/A	7%

Q23d. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Economic Development]	
Fundamentally Integrated	10%
Moderately Referenced	19%
Minimally referenced	32%
Implied but not literally referenced	13%
No consideration	19%
Unsure	4%
N/A	4%
Q23e. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Natural Resources, Recreation, and Open Space]	
Fundamentally Integrated	43%
Moderately Referenced	34%
Minimally referenced	14%
Implied but not literally referenced	2%
No consideration	1%
Unsure	2%
N/A	3%
Q23f. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Housing and Community Development]	
Fundamentally Integrated	11%
Moderately Referenced	27%
Minimally referenced	30%
Implied but not literally referenced	10%
No consideration	10%
Unsure	2%
N/A	9%

Q23g. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Land Use]	
Fundamentally Integrated	28%
Moderately Referenced	36%
Minimally referenced	21%
Implied but not literally referenced	8%
No consideration	1%
Unsure	2%
N/A	4%
Q23h. Considering the work produced by your agency. In which of the following areas are ecological principles recognized and/or incorporated? [Infrastructure and Public Utilities/Facilities]	
Fundamentally Integrated	13%
Moderately Referenced	28%
Minimally referenced	25%
Implied but not literally referenced	12%
No consideration	11%
Unsure	3%
N/A	7%

See page 110 for Question 24

Q25. Has your agency ever employed outside consultants or contractors to provide advice related to natural science?	
Unsure	19%
Yes	52%
No	29%

Q26. How often are outside consultants or contractors employed by your agency?	
Consistently	27%
Frequently	6%
Occasionally	40%
Rarely	21%
Almost Never	1%
Unsure	4%
Other	0%
Q27. For which of the following reasons has your agency employed outside consultants?	
Pre-Development Analysis	36%
Public/Community Engagement	36%
Technical Expertise and Support During Planning (including data analysis)	80%
Project Implementation	30%
Project Evaluation and Monitoring	29%
Unsure	3%
Other	10%
Q28. Where are offices of the outside consultants most often located?	
Within the Jurisdiction	11%
Region	47%
State/Province	31%
Outside State	3%
Outside Country	0%
Other	3%
Unsure	4%
Q29a. Do you AGREE or DISAGREE? [Planners lack sufficient resources and technical knowledge regarding local ecology and how it relates to the overall health, sustainability, and resiliency or your jurisdiction?]	
Agree	50%
Neutral	27%
Disagree	24%

Q29b. Do you AGREE or DISAGREE? [My jurisdiction could better incorporate ecological principles into planning if we had access to a planners' toolkit, framework, and/or additional resources.]	
Agree	59%
Neutral	27%
Disagree	13%
Q29c. Do you AGREE or DISAGREE? [Planners would benefit from a locally-adaptable, comprehensive framework for synergistically implementing holistic planning principles across agencies and systems.]	
Agree	66%
Neutral	24%
Disagree	10%

See page 111 for Questions 30-31

Q32. Compared to the beliefs and opinions expressed in my survey responses, I believe the perspectives of my coworkers and colleagues would be...	
Very Similar	14%
Similar	62%
Neither Similar nor Unique	16%
Unique	7%
Very Unique	0%

See page 112 for Questions 33-34

Q15. Compared to SOCIAL SUSTAINABILITY, what role do you believe ecological health plays?

Some believed that ecological health specifically to social sustainability were mutually reinforcing. Respondents believed that ecological health should be central to our efforts in advancing social sustainability, citing a need to engage residents in order to foster their ethic of care. Most respondents would make connections between the importance of ecosystem health and social health, frequently relating it to concerns of public health (e.g. air quality, water quality). Many also recognized the emotional and psychological benefits. There was fear that people were failing to see the two as being interrelated. On this point, one respondent mentioned concern that our leaders and decision makers were not seeing the importance of either ecological health OR social sustainability, and another believed that too many individuals go through their day-to-day motions with blinders on, too focused on a single interest. Some saw occasional conflicts between the two interests (social sustainability and ecological health). For instance, two respondents tied ecological health and sustainability to increasing challenges of affordability. One respondent noted how a recent disaster had caused water contamination and was significantly threatening the health of their community. As such, ecological health had abruptly become a central concern for the community, at the forefront and taking priority over all else. Similarly, other respondents warned of devastation or collapse (either citing experience or making personal predictions) due to poor ecological health.

Q16. Compared to ECONOMIC SUSTAINABILITY, what role do you believe ecological health plays?

When respondents were given the opportunity to consider how ecological health and economic sustainability were related, the strongest correlation was demonstrated by respondents who also indicated their community's strong economic reliance on the immediate natural environment, either for resources, ecosystem services that facilitate industry, or due to an area's economy being highly nature-, heritage-, or culture-based. A lot of the discussion focused on the differences between short- and long-term benefits, and how a failure to accept both has led to diverging solutions. Although ecological health is crucial for the long-term sustainability of the economy, the benefits of improved ecological health aren't always immediately apparent, which leads to the prioritization of economic development over ecological health.

Some respondents related ecological health to a community's appeal. Others saw parallels but at the same time believed it was not always possible to avoid prioritization of one goal over another. As such, the two (economy and ecology) often get de-coupled, at which point the local ecosystem would play an adversarial role in economic sustainability. Two respondents talked about the need for a healthy economy before ecological health could be addressed. Referencing a two-way street, one emphasized the need for a "happy medium." Others, still, saw ecological health as necessary to offset, or mitigate, the impacts of economic activity (particularly industry and manufacturing).

Q17. Compared to ENVIRONMENTAL SUSTAINABILITY, what role do you believe ecological health plays?

Most respondents viewed ecological health and environmental sustainability as synonymous. However, one respondent noted that it is only to the layperson that these two terms are confused. Though the two are closely intertwined, respondents saw ecological health is more local, whereas environmental sustainability is more global. Ecological health is more short-term, a "snapshot," whereas environmental sustainability is the long-term condition. As such, ecological health is both an indicator and a goal of environmental sustainability. One concern/criticism was that our current view of sustainability tends to be overly limited, focused too narrowly on big issues like climate change. We need, instead, to focus on the more finer scale phenomena, particularly creatures. In doing so, we must not exclude humans.

However, understanding responses this question requires understanding the very nuanced differences in the terminology being, which the survey failed to convey.

Q24. In reference to the above question, are there any other ways that ecological principles are incorporated into your agency's work?

This question was to see if any communities or jurisdictions, or the agencies that work within them, were incorporating ecological principles in ways that might not have been considered within this survey. Some respondents were hopeful that ecological principles would be incorporated more frequently (particularly related to flooding, water crises, aquifer protection, and stormwater management), but indicated that a lack of interdepartmental coordination presented a primary barrier.

Other areas where principles are already being considered include zoning (including environmental zoning overlays), climate change (Climate Action Plans) and resiliency planning, urban renewal plans, small area plans, green building requirements, budgeting, energy generation projects, project planning (environmental regulation compliance), individual projects and grant writing (but only when it's a requirement), waste divisions, agency/corporate standards for sustainability (some that must be met regardless of client's agenda), critical area regulations, and sustainability codes, in addition to day-to-day functions.

Q30. In your opinion, what are the MAIN BARRIERS THAT LIMIT OR PREVENT the understanding, acceptance, and application of ecological principles in planning throughout your jurisdiction?

When asked why the understanding, acceptance, and application of ecological principles in planning might be limited, respondents explained major challenges, most frequently citing political barriers, a lack of awareness, and logistical barriers to implementation. With regards to political barriers respondents cited the challenge with decision-makers and a general lack of political will, lack of awareness or knowledge, and a lack of support (or even resistance) among politicians. Similarly, respondents talked about the limitations of existing policies (a few describing the trend of a "stuck in their ways" barrier), or the perceived complexity or burden of new regulations which would be tedious or otherwise limiting. Key, non-political leadership was also noted to be a barrier, either due to the current lack of support (one individual even noted that APA had little emphasis on ecological principles), or the absence of champions. Instead of critical leaders of sustainable development and ecological health, there were special interests and private entities (often developers) who played the dominant role in how concerns for ecological health are received and managed. Within corporations and government agencies, respondents noted a strong lack of resources—time, staff, or other—and a lack of funds. Money also became a barrier in terms of both the perceived and actual costs associated with incorporating heightened concern and protection for ecological health. With a shortage of resources like these, focus shifts to alternative priorities that are higher on the food chain. Often, one such priority is economic development. Resistance from the business community, the current economic climate, a higher prioritization of economic development, and the perceived negative impact(s) of ecological protection on economic development was noted to be a significant barrier. Furthermore, the scope of any proposed increase in the integration of ecological principles became a barrier as an uncertainty or lack of clarity in terms of short-term and long-term benefits contributes to the prioritization of one issue over another. And a lack of a market argument for valuing ecological assets prevented prioritization favoring their protection.

Education and awareness had also been a major challenge. Aside from the awareness among leaders and politicians, respondents noted a lack of awareness in general. They described barriers related to a lack of access to knowledge, or even the overwhelming presence of inaccurate information, citing poor communication and conveyance of data through the media, etc. Oftentimes, this lack of awareness contributes to apathetic community members and a negative perceptions and misunderstandings of the perceived (as opposed to the actual) relevance and benefit. This contributed to low public support and cultural perspectives, and the absence of any ethic that would morally drive action. Again, these perspectives ultimately direct where priorities are placed.

Finally, respondents noted process and internal barriers. In addition to the lack of resources noted above, additional barriers exist internally within corporations and agencies, including the excessive fragmentation among divisions and departments. Respondents identified a need for a trusted framework or set of tools that could be utilized in-house. Similarly, there was expressed a need for planner training.

Political support, will, understanding, resistance: 36

Lack of knowledge, access to, inaccurate information: 36

Budget constraints, perceived costs, funding availability: 25

Other priorities: 22

Resources, time, staff: 20

Perception, awareness, media, relevance and need: 19

Business Community, economic development, economic climate: 18

Existing policies, limited, stuck in modus operandi, perceived challenge of additional regulations: 14

Public Support, NIMBYism, and Culture: 12

Fragmentation, silos, disconnect, special interest/narrow: 10

Lack of a trusted framework, simple process guidance, tools, in-house expertise, planners' training: 7

Developers, private interests: 7

Opinions or lack of top-tier, executive leadership, champions (both community and in corporations): 4

Short-term/Long-term disparities and scope: 4

Lack of ethic: 2

Lack of market argument for valuing ecological assets: 2

Unknown: 2

Q31. In your opinion, what are the MAIN ELEMENTS OR OPPORTUNITIES ENCOURAGING the understanding, acceptance, and application of ecological principles in planning throughout your jurisdiction?

When asked about opportunities, or how we might move forward so that we can increase our understanding, acceptance, and application of ecological principles, respondents gave a diverse range of answers. Again, after recognizing that awareness is one of the major barriers, it should also be seen as an opportunity. Respondents recommended increasing educational opportunities (for all members of the community, as well as specifically for youth) and increasing outreach efforts to elevate the awareness and understanding of ecological issues among residents. Related to awareness, respondents noted the positive impact this would have on public support and overall perspective and a desire for a high quality of life. Respondents also emphasized the role of key advocates, whether they are community champions, non-profits and environmental agencies, or key leaders and decision-makers, advocates can help advance the DEU goals, raise awareness, and push for change among policy-makers. Public engagement was encouraged.

Similarly, and with regards to the political barriers mentioned earlier, many respondents emphasized a need for changed perspectives among, as well as the support of politicians and policy-makers. It should be critical to think long-term and to take a broad, comprehensive approach that would not be confined to a single division within one department or agency. However, as it can be difficult to get support for long-term action, one respondent recommended framing strategies as short-term actions that will ultimately lead to long-term change. Respondents recognized that a new perspective that is fostered through awareness would help to adjust priorities.

Respondents believed that there may be some opportunities in leveraging the planning profession. Seen as opportunities: utilizing expertise; embracing technological modernization; encouraging planners' education and training; and providing planners with tools, resources.

Rather than viewing individual interests as conflicting, efforts should emphasize and demonstrate the interrelatedness of strategies while revealing the actual value and benefit. It was recommended that we must demonstrate that there would be no interference or added cost of incorporating ecological principles. Alternatively, the cost, or risk of inaction should also be made clear. Respondents noted, in some instances, where visible resource depreciation would help people to see the importance of ecological protection. Some respondents suggested the opportunity of using policy and regulation to force action and care. Others, though not as many, recommended using incentives instead. This positive approach, however, was a common theme among responses. As opposed to environmental degradation, the scenic and aesthetic beauty of nature might also be cause enough for change. The identification of sensitive resources, recognition of the competitive advantages, and the introduction of new perspectives from fresh faces and younger generations left respondents hopeful.

However, while I was hopeful that the responses to this question would be light and encouraging, I was actually extremely discouraged by the second-most cited "opportunity." More than a dozen respondents noted that opportunities might be found in (and perhaps ONLY in) the increasing frequency and intensity of natural disasters or other crises (e.g. economic recession). Respondents noted that it is often only after a major shift or event takes place that people will begin to change their perspectives. Citing everything from water shortages and contamination, major Hurricanes Sandy and Katrina, tornadoes, floods, earthquakes, etc., respondents felt that this might be one of our best "hopes" for any change.

Q33. Overall, is the ecological health of the jurisdiction safeguarded through planning efforts and/or policies? Please explain your answer.

The responses to the question were fairly balanced, with an almost equal amount of respondents answering yes as those who answered no. The majority of respondents, however, fell somewhere in between.

Many felt that the comprehensive plans weren't comprehensive enough. When respondents indicated that ecological health was not safeguarded, they cited reasons including different priorities, public pushback, staff lacking the power or resources, politics, lack of policy integration, etc. They explained that if the local environment were being protected, it was only because of state and federal policy. Even then, it appeared that the respondents' interpretation of "safeguarding ecological health" was limited to mean the health of waterways and the regulation of polluting land uses.

Q34. Finally, are there additional comments you wish to share regarding the subject of this survey?

This question proved most helpful in showing me where my survey had failed. Some of the most important or repeated comments were as follows:

The survey was longer than 10 minutes, and too wordy. Some of the questions, despite my attempt to avoid this, had been very one-sided. I failed to identify key terms at the start, which led one individual to criticize my use of the term ecology (which appeared only once throughout the entire survey; though, they were correct to point out my error, if I might point out that this same respondent seemed to misunderstand the term ecological, which is a characteristic, and not a science as they insisted). This comment emphasized the need to be clear about the disciplines I'm discussing and demonstrate that clarity in my writing so it is conveyed to the reader. Other phrases should have also been defined.

One individual pointed out that this was not necessarily a new approach. From what any participant could have gathered from the survey, it is not. However, there are additional dimensions to the DEU model that were not illustrated in the survey. I just have to be sure I demonstrate that in the report.

But I also got some valuable advice regarding my concept and moving forward. The way I word my concept is critical for positive reception. Political views may prevent the concept from being embraced by certain political parties or in entire regions. Another individual expressed frustration to planning's emphasis, in general, on urban areas. I should investigate how my concept, which is intended to be an urban concept, can also be utilized in different developments. One participant was concerned that this would just be an added layer of regulation, and I should be cautious to prevent the DEU concept from becoming a burden, and frame it as a valuable tool instead. One solution to the above challenges might be, as I have always believed and as one respondent supported, to emphasize the interdependence of all things.

