

Motivational Goals of Seattle Homeowners Related to Their Yards: Implications for Ecosystem Service Assessments and Behavioral Appeals

Nick Neverisky

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Committee:

Stanley Asah

Anne Guerry

Marc Miller

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Nick Neverisky

Abstract

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Nick Neverisky

Chair of the Supervisory Committee:
Associate Professor Dr. Stanley Asah
School of Environmental and Forest Sciences

Nearly half of the land areas of many U.S. cities is zoned for single family residences (e.g., 49% of Seattle). These are fragmented management landscapes -- large numbers of parcels are individually managed yet collectively comprise substantial portions of local ecosystems. Promoting the health of urban ecosystems therefore requires engagement with owners of these properties. I conducted 17 semi-structured interviews with Seattle homeowners to understand the benefits for which they manage their properties. What motivates their engagement with ecosystem services derived from their properties? What are some of the salient values homeowners attribute to their properties that can be leveraged to promote pro-environmental management? To answer these questions, I analyzed these interviews using an ecosystem services framework and Schwartz' basic individual values. I discovered that these homeowners have a range of motivations for engaging with the ecosystem services derived from their properties, not all of which are obviously a part of the basic nature of the service itself. Motivations appearing most consistently included those associated with in-group well-being (e.g., providing a healthy environment for one's own children, or building relationships through collaborative gardening), personal stability and security (e.g., feeling a sense of place, or perceiving neighborhood safety), and connection with nature (e.g., feeling at home in the landscape, or creating habitat for other organisms). The fact that any given ecosystem service may be used to address multiple motivational goals suggests that service assessments may be more robust when these goals are considered. Furthermore, urban homeowners may be more responsive to behavioral appeals that highlight opportunities to care for in-group members, to feel secure in one's immediate environment, and to personally connect with nature.

Table of Contents

Introduction	1
Review of literature	2
Urban ecosystem services assessment.....	2
Overview	2
Variations in assessment of services.....	3
Methods of assessment	3
Basic individual values	4
Overview and definition.....	4
The functions that values perform	6
Values influence on behavior.....	7
Acquisition and modification of values.....	8
Applications in environmental conservation	9
Opportunities for novel research.....	11
Objectives.....	12
Methods	13
Study Area and Sampling	13
Data collection	15
Analysis	17
Results.....	20
Values.....	20
Ecosystem services and interactions with values	21
Acquisition	24
Challenges	25
Solutions	28
Discussion.....	30
Relevance for promoting urban conservation behaviors	31
Conclusion	32
Acknowledgements.....	34
References.....	35
Appendix A: Recruitment documents	40
Appendix B: Research instruments	43
Appendix C: Selected values quotations	45
Appendix D: Selected ecosystem services quotations	55

Introduction

There is great need to include more diverse understandings of ecosystem value in planning processes, and a growing imperative to consider novel conservation strategies in urban areas of increasing size and population. Researchers are demonstrating the value of incorporating more broad metrics of the services ecosystems provide into decision-making processes. On the one hand, this allows decision makers to more effectively align conservation actions with stakeholders' priorities and, through this alignment and effective communication, improve stakeholders' perception of salience (i.e., perceived relevance) related to planning processes and outcomes. A high level of this type of salience is predictive of positive environmental outcomes and the integration of scientific knowledge in decision making processes (Cash et al., 2003; Posner, McKenzie, & Ricketts, 2016). On the other hand, developing in-depth understanding of the specific ways in which stakeholders value ecosystems and the services derived from them can inform the development of behavioral appeals related to these topics. This can be accomplished by developing environmentally-related behavioral appeals that make it obvious how the desired behaviors satisfy people's specific motivational goals (Asah & Blahna, 2012)

Incorporating more broad understanding of the benefits people derive from natural systems is particularly relevant in heavily populated areas like cities. Cities have a high density of potential beneficiaries, contain enough people that individual actions may accrue to meaningful levels of impact collectively, and are highly-managed landscapes where many ecosystem functions are likely to be displaced by grey infrastructure if not actively managed for. Further, these urban spaces are growing. More than 54% of the global population lived in cities as of 2014 (*World Urbanization Prospects: The 2014 Revision, Highlights*, 2014), a number that is projected to continue rising. This increasing urbanization poses unique challenges for conservation. The built environment and dense population of cities can impact ecosystem function over a disproportionately large area (Grimm, Grove, Pickett, & Redman, 2000; Seto et al., 2012). Humans living in urban areas may miss opportunities for the physical and psychological well-being that green spaces provide (Bratman, Hamilton, Hahn, Daily, & Gross, 2015; Gomez-Baggethun et al., 2013; Russell et al., 2013), and urban dwellers may be less likely to hold pro-environmental attitudes (Nisbet, Zelenski, & Murphy, 2008) or feel as connected with nature (as measured by the Connectedness to Nature Scale) (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009) than similar individuals with greater exposure to nature-based experiences.

Home owners in urban settings are in a unique position to affect change in the management of urban ecosystems. Significant portions of many cities are used by single-family residences and yards (roughly half of Seattle's land area is zoned for single-family residences) (Office of Planning & Community Development, n.d.). This privately-owned land comprises an important piece of the urban ecosystem and yet, due to attitudes in the United States related to personal property and freedom of action, can be difficult to affect via the command and control policies that may be effective for commercial or publicly-owned parcels. To affect the management of these lands homeowners must not only be knowledgeable about environmentally favorable options but must also be persuaded to undertake them.

I investigated Seattle homeowners' motivations for engaging with the biophysical aspects of their properties. I conducted 17 semi-structured interviews with Seattle homeowners to identify the motivations and values they hold in relation their home and yard, and which ecosystem services are among the most salient. Using this information, I build on a traditional ecosystem services framework to construct a more complete understanding of the benefit homeowners derive from their yards, and make recommendations for persuasion strategies to promote pro-environmental management of these parcels.

In the following sections, I present a review of relevant literature focusing on basic human individual values and their relationships to motivation and behavior, applications of this values structure in environmental conservation, and ecosystem service assessment frameworks. I follow this by outlining my research objectives and methods in greater detail. I then provide a summary of findings and make recommendations for how to leverage these findings to develop more complete ecosystem service assessments and more targeted appeals for homeowners to engage in urban conservation. Appendices include text from interviewee recruitment documents, interview prompts and a demographic survey instrument, and a collection of quotations from interviews sorted by the basic individual values and ecosystem services they represent.

Review of literature

Urban ecosystem services assessment

Overview

Ecosystem services are the ecosystem processes that generate benefits for humans (Guerry et al., 2015). They provide a framework to understand the benefits humans derive from natural systems. This approach has been useful as a means to discuss and understand the benefits of ecosystem conservation when weighing environmental management options. As defined in the Millennium Ecosystem Assessment report, services derived from ecosystems can be described using the following service categories.

Cultural services: cultural diversity, spiritual and religious values, knowledge systems, education, inspiration, aesthetic, social relations, sense of place, cultural heritage, recreation, ecotourism

Provisioning services: food, fiber, fuel, genetic resources, biochemical, ornamental, fresh water

Regulating services: air quality regulation, climate regulation, water regulation, erosion regulation, water purification and waste treatment, human disease regulation, biological control (pests), pollination, natural hazard regulation

Supporting services: soil formation, nutrient cycling, primary production

(Island Press, 2005)

The benefits stakeholders derive from ecosystems are often researched using quantitative approaches, and sometimes described in economic terms (Gómez-Baggethun & Barton, 2013) in which they may be used to “demonstrate current gaps in economic accounting” (Busch, La Notte, Laporte, & Erhard, 2012). While quantitative and economic frameworks for assessing value are of tremendous use in some applications, they may be less relevant for understanding the specific mechanisms through which individuals value ecosystem services. There is, for example, evidence that economic valuations alone are insufficient to represent the totality of value stakeholders perceive themselves to receive from ecosystems (Kumar & Kumar, 2008; Metz & Weigel, 2010), and that qualitative methods of ecosystem service assessment may better allow for the inclusion of interpretations of data related to the provisioning of ecosystem services (Busch et al., 2012).

Researchers have documented a wide range of services that may be provided by urban ecosystems. These include biophysical services such as air quality improvement (Nowak, Crane, &

Stevens, 2006), coastal protection (McPhearson, Hamstead, & Kremer, 2014), and reduction of urban heat island effect (Phelan et al., 2015), as well as cultural services such as fostering community cohesion (Armstrong, 2000; Coley, Kuo, & Sullivan, 1997; Glover, 2003), providing space for recreation (Bertram & Rehdanz, 2015; Bolund & Hunhammar, 1999; Chiesura, 2004), and creating opportunities for education (Alagona & Simon, 2010; Barthel, Folke, & Colding, 2010). The ecosystem services reported as most salient in studies of beneficiaries in urban systems skew toward cultural services (Bertram & Rehdanz, 2015; Lindland, Fond, Haydon, & Kendall-Taylor, 2015; Metz & Weigel, 2010). This may be because these are the services that are most directly experienced and most easily understood (Andersson, Tengö, McPhearson, & Kremer, 2015). This category of services, however, is one which has received the least research emphasis in many social-ecological settings (Gomez-Baggethun et al., 2013; Satz et al., 2013).

Variations in assessment of services

Due to the subjectivity of service provisioning (Bertram & Rehdanz, 2015), the value of any given service is not uniform - variations in the perceived value of services may exist between individuals (Satz et al., 2013) and within a single individual in different contexts (Duraiappah et al., 2014). Despite this inter- and intra-personal variation in the perceived value of ecosystem services, some trends do exist. These include a general preference for ecosystem services which address immediate and local needs (Duraiappah, Asah, Brondizio, & Prieur-Richard, 2013). They also include a perception among some stakeholders that nature is luxurious, rather than essential (Lindland et al., 2015). In contrast to this perception is the argument that regular access to natural spaces can have psychological and physical well-being benefits (Bratman, Daily, Levy, & Gross, 2015; Bratman, Hamilton, et al., 2015; Chiesura, 2004; Russell et al., 2013). Further, these benefits have the potential to accrue such that cities might be able to avoid costs for social services by investing in natural capital (Lindland et al., 2015).

People's understanding of urban ecosystems sometimes features a dichotomy between what is perceived as natural and what is perceived as urban or manmade. According to some individuals, nature is not found in cities and is reduced in value by human manipulation. However, experts find little difference in the well-being effects bestowed by green spaces which have received some degree of cultivation versus those that have been left completely untended (Lindland et al., 2015). Indeed, the feedback from participants in one study suggested that ratings of "scenic beauty" relied at least as heavily on cleanliness (a human-induced trait in urban parks prone to leaf litter, overgrown grass, etc.) as they did on natural features (Bertram & Rehdanz, 2015).

Methods of assessment

Much of the research into stakeholders' motivations and preferences related to urban ecosystems has ranked the stated or revealed preferences of users within predetermined categories. For example, Bertram and Rehdanz administered a survey in which urban residents were asked to rate how important urban parks are for providing a specific list of services (Bertram & Rehdanz, 2015). While this method allows for easy ranking of preferences for preconceived ecosystem service categories, it is problematic in several ways. Ratings of preconceived questions about importance of nature do not provide the respondent with the opportunity to identify what is important to them that may not be present in the set of survey questions. Also, such surveys do not make clear how stakeholders understand their use of these resources. In other words, this research strategy explains which activities survey respondents engage with, but overlooks the motivations behind these behaviors and the nature of the satisfaction individuals derive from engaging in them. Few studies have used more open-ended research methods like interviews to involve communities in identifying the benefits they derive from

local ecosystems (Asah, Blahna, & Ryan, 2012). Such a technique, however, which can feature data expressed in people's own frames of reference (Asah, Lenentine, & Blahna, 2014), may be required to understand the reasons and ways in which people value the ecosystem services that they do.

Basic individual values

Overview and definition

Basic individual values can be used to understand people's motivations for their behaviors. Values manifest as motivational goals which are attained through value-expressive behaviors. For example, a person who holds values related to interpersonal conformity might have the motivational goal of having a yard that looks similar to his neighbors' yards. This motivational goal is addressed (and so the value expressed) when he pulls weeds and irrigates his lawn so that it matches nearby yards. With an understanding of the motivations people have to engage in environmentally-related behaviors, we can more effectively understand the benefits people derive from ecosystems, and more effectively promote changes to people's attitudes and behaviors.

Basic individual values are cognitive representations of basic needs common to all humans. These needs can be categorized as biological needs, interactional needs for interpersonal coordination, and societal needs for group welfare (Schwartz & Bilsky, 1987). Examples of these in urban ecosystems may include clean air from urban trees, group gardening that utilizes interpersonal coordination, and the various spoken and unspoken rules that govern group gardening dynamics and the consequent smooth functioning of those groups, respectively. Values manifest as transsituational goals to achieve these needs by working as guiding principles in a person's life (Schwartz et al., 2012).

Schwartz identified 19 basic values present across cultural boundaries. They appear universally because of their grounding in one or more of the basic categories of needs common to humans (biological, interactional, and societal needs). This values framework is widely used in research on people's motivations for behaviors and attitudes. Specifically, it has been used in research contexts including behavior in general (Feather, 1995; Verplanken & Holland, 2002), political identities and attitudes (Schwartz et al., 2014; Vecchione et al., 2015), pro-environmental behavior (Dietz, Fitzgerald, & Shwom, 2005; Nordlund & Garvill, 2002), and pro-environmental attitudes (Stern & Dietz, 1994; Wesley Schultz & Zelezny, 1999). Schwartz's 19 values and their most basic conceptual definitions in terms of the motivational goals they foster are below.

Value	Conceptual definition in terms of motivational goals
Self-direction-thought	Freedom to cultivate one's own ideas and abilities
Self-direction-action	Freedom to determine one's own actions
Stimulation	Excitement, novelty, and change
Hedonism	Pleasure and sensuous gratification
Achievement	Success according to social standards
Power-dominance	Power through exercising control over people
Power-resources	Power through control of material and social resources
Face	Security and power through maintaining one's public image and avoiding humiliation
Security-personal	Safety in one's immediate environment

Security-societal	Safety and stability in the wider society
Tradition	Maintaining and preserving cultural, family, or religious traditions
Conformity-rules	Compliance with rules, laws, and formal obligations
Conformity-interpersonal	Avoidance of upsetting or harming other people
Humility	Recognizing one's insignificance in the larger scheme of things
Benevolence-dependability	Being a reliable and trustworthy member of the in-group
Benevolence-caring	Devotion to the welfare of in-group members
Universalism-concern	Commitment to equality, justice, and protection for all people
Universalism-nature	Preservation of the natural environment
Universalism-tolerance	Acceptance and understanding of those who are different from oneself

Table 1. Schwartz' 19 basic individual values and basic conceptual definitions (Schwartz et al., 2012)

Although Schwartz's basic values are common to all people, individuals differ in how they rank the importance of specific values. These rankings are of relative importance, showing variance in strength but not in polarity. This is to say that, while people place different levels of importance on different values, they do not hold any values in negative regard (Verplanken & Holland, 2002). A person's ranking of any one value does not exist in isolation from the other 18 values. Instead, a person's ranking of a value is likely to be similar to their ranking of compatible values and different from their ranking of opposing values. These values can be categorized in different ways, including along the axes of social or personal focus, and growth or self-protection. These axes create four quadrants of value categories: self-transcendence, openness to change, self-enhancement, and conservation (Schwartz et al., 2012).



Figure 1. Schwartz' circular motivational continuum. This shows the 19 basic individual values in relation to each other and the categories into which they fall. Values close to each other on the continuum are congruent while those opposite each other are opposed (Schwartz et al., 2012).

The 19 values can be represented on the circular motivational continuum. Compatible values are located near each other on the circular motivational continuum while opposing values are located farther away (Schwartz et al., 2012). For example, a person for whom self-direction-thought is important is likely to also consider the compatible value universalism-tolerance to be important. This person's value of self-directed thinking is compatible with an open mind that is tolerant of new ideas and other people who may express different attitudes or engage in different behaviors. In an urban conservation context, these values may manifest as a desire to determine one's own attitudes toward environmental behaviors or legislation, and an understanding that other people may have different ideas about similar topics. Conversely, a person is likely to hold opposing values as less important. The same person who considers self-direction-thought and universalism-tolerance to be important is unlikely to consider the opposing value conformity-rules, found on the opposite side of the continuum, as equally important. In a conservation context, this person may be resistant to the idea of outside entities, like city legislature, demanding conformity to rules by regulating their actions in their yard.

The functions that values perform

Values can influence attention, perception, and behavior but only if they are active and held as particularly important by the individual in that context (Verplanken & Holland, 2002). For a value to become active when deciding whether or not to engage in a behavior, a person must

1. perceive the need to address a problem,
2. be aware of viable actions that could address the problem, and
3. have a sense of responsibility to address the problem. This sense of responsibility can come from a perception of accountability, having an established role that dictates responsibility, having a sense of distinctive suitability for addressing the particular need, or being appealed to directly to take action.

A person does not, however, need to be consciously thinking of a value for it to be active (Schwartz, 2010). Nor does a value need to be activated in the same context in which it impacts a person's behavior – values can be activated through priming activities then subsequently affect behavior in unrelated actions (Verplanken & Holland, 2002).

Once active, a person's values can determine the direction of their attention, their perception of an issue, or their behavior.

- Direction of attention – Activated values can induce a person to seek more information about items or topics related to these values. They can also serve as amplifiers of available information that is congruent with the active value. This means that the person in question places greater emphasis on this information than on otherwise comparable information that is not congruent with the active value (Stern & Dietz, 1994).
- Influence perception – Values influence people's assessment of the benefits and costs of a behavior. The behaviors which are congruent with an active value are perceived to have greater benefit and less cost than if the value were not active (Verplanken & Holland, 2002).
- Determine behavior – In part due to an increased attention and modified perception of cost and benefit, a person's values influence their behavior. Behaviors that are congruent with activated values are more attractive, behaviors that are opposed to are unattractive (Feather, 1995; Schwartz, 2012).

Values are more likely to influence a person's behavior if the values in question are among the person's central values (i.e. the values they hold as particularly important). A person's central values come more easily to mind and are more likely to be activated than values held as less important (Verplanken & Holland, 2002).

Values influence on behavior

Values determine the relative attractiveness of different behaviors. A person's values give behaviors valences (i.e., degrees of attractiveness or aversiveness). Actions become more attractive to the extent that they promote attainment of value-driven motivational goals. Sensing that an action will attain these goals sets off an automatic, positive, affective response. Sensing that an action threatens a person's motivational goals sets off a negative affective response (Feather, 1995). Therefore, prediction of behavior on the basis of a person's values must take into account not only the values congruent with a behavior but also the values opposed to it. From these values, each behavioral option gains a valence.

A behavior that is relevant only to active values with which it is congruent will have a positive valence. A behavior that is relevant only to active values with which it is opposed will have a negative valence.

When a behavior is relevant to both congruent and opposed values, the person experiences cognitive dissonance. This dissonance is minimal when the person strongly prioritizes either the congruent or the opposed values. In such a circumstance, the behavior has a clear overall valence despite some element of dissonance (Schwartz, 2012). For example, the choice to spend a weekend constructing a rain garden (a landscape feature that captures storm water) may be congruent with universalism-nature values if the person believes that doing so would provide environmental benefit. Conversely, spending time on this task may oppose the values stimulation and hedonism if the person finds the installation process dull or unpleasant. It would be the relative importance the person places on each of these values (and the degree to which each was activated through priming or other means) that would determine the valences of installing or not installing a rain garden over the weekend. These valences would in turn influence the person's behavior.

In instances where opposing and congruent values are in conflict and there is no clearly favored choice, cognitive dissonance is significant. In these instances, the person will delay taking any action and will attempt to reduce their conflict of values. The person may accomplish this conflict reduction by reinterpreting the situation so that what they initially perceived as a need to act is considered to be of reduced importance, or so that they evaluate their actions as less able to affect the desired change, or so that they evaluate the cost of acting to be greater than originally thought (Schwartz, 2010).

Acquisition and modification of values

A person's values are fairly stable but can change under certain circumstances. These changes have their root in instances of cognitive dissonance. When a person is faced with repeated or significant instances of cognitive dissonance, they may reduce this dissonance by changing the parts of their value structure that are in conflict (Bardi, Lee, Hofmann-Towfigh, & Soutar, 2002). These instances of cognitive dissonance and subsequent change in value structure can come from shifts in societal attitudes, personal experience (Rokeach, 1973), or new life situations (Bardi et al., 2002) such as moving to a new community or having a child.

Changes in value rankings may be long-term or short-term. Long-term value changes are associated with the repetition of individual instances of cognitive dissonance (Doring et al., 2015). Short-term value changes, in which values return to their original baseline sometime after the cessation of the stimulus that prompted the change, are associated with a single cognitive-dissonance inducing event (Verkasalo, Goodwin, & Bezmenova, 2006). Some research has indicated that values may also change as part of a person's aging process, although the impact of aging is so intertwined with changes of personal experience and life situations that it may be these factors prompting the change in value rankings rather than aging itself (Bardi et al., 2002).

When a person's values change, they do so not individually but in clusters as mapped on the circular motivational continuum. Compatible values tend to shift in a similar direction and opposing values tend to shift in the opposite direction (Bardi et al., 2002). For example, a person whose dominance-power value increased in importance would likely also experience an increase in their dominance-resource value and a decrease in the importance of their universalism-concern value.

A person's attitudes may change even when their values remain stable. Attitudes are expressions of values created by a person taking a positive or negative stance toward a behavior, object, idea, or person. For an attitude to change, a person must experience dissatisfaction with the degree to

which their existing attitude represents their values. One way to create this dissatisfaction with existing attitudes is to persuade the person that a shift in their attitudes could better express a value they hold as important. Katz uses the example of a person holding negative attitudes toward minority groups (which may express the person's security values). In the case of this hypothetical person, Katz writes that they may be persuaded to change their attitudes in order to satisfy their higher priority values about international prestige garnered from having a democratic country (which expresses the person's higher-priority achievement values) (Katz, 1960).

We can imagine a similar example related to urban conservation. An urban homeowner may hold negative attitudes toward environmental regulations affecting their management of their property. This could be an expression of this person's self-direction-action value. If, however, this person placed higher priority on another value, they might be persuaded to form a more favorable attitude toward environmental regulations if the regulations were framed as congruent with this other value. If benevolence-dependability was a higher priority value for this person, they may hold more favorable attitudes toward regulations if they are framed as targeting community members who are less responsible than they are. These regulations could be framed as designed to make less-responsible individuals engage in the behaviors that the person in question is already engaged in independently. Such a framing not only suggests that the regulations do not actually impinge on the person's actions (and therefore do not threaten their self-direction-action value), it also suggests that this person is a particularly responsible community member. It does this by suggesting that other individuals need the guidance of regulations to achieve what this person has taken care of on their own. This concept would help the person to reinforce their identity as a dependable individual, thereby addressing their benevolence-dependability value. If this value were held in higher priority than the self-direction-action value, the person is likely to have a more favorable attitude toward the regulations.

Applications in environmental conservation

Basic individual values can be used to understand people's motivations for environmentally-related behaviors. With an understanding of these motivations we can more effectively understand the benefits people derive from ecosystems, and more effectively promote changes to people's attitudes and behaviors.

Nordlund and Garvill identify four types of factors that can influence environmental behavior.

1. Attitudinal factors like values, beliefs, norms
 2. Contextual factors like materials costs and rewards
 3. Personal capabilities like financial resources and skills or knowledge necessary to engage in the behavior
 4. Habits or routines that are or aren't in line with a behavior
- (Nordlund & Garvill, 2002)

The first three of these factors can be influenced by a person's values. Values can affect a person's attitudes (Katz, 1960), perceptions of cost and reward (Verplanken & Holland, 2002), and can therefore influence what financial or other resources they may be willing to invest. As such, the concept that a person's values can influence environmental behavior is congruent with this research. Scientists have demonstrated this influence, noting that self-enhancement values are generally negatively related to pro-environmental behavior (Nordlund & Garvill, 2002; Stern & Dietz, 1994) and self-transcendence, openness to change, and universalism values and are generally positively related to pro-environmental behavior (Karp, 1996).

A person's attitudes are often the intermediary between their values and their behaviors. These attitudes perform the function of expressing a person's values, thereby reconciling their self-identity with how they express themselves in the world (Katz, 1960). This means that individuals take on value-expressive attitudes toward conservation topics. Because these attitudes may be driven more by a person's values and self-identity than by ecological research, these attitudes can manifest in environmental behaviors which may or may not support environmental best practices.

A single environmental attitude or behavior common to multiple individuals can have different motivational bases in each person (Katz, 1960). For example, one person may recycle because doing so is congruent with their universalism-nature value, while another person may recycle because their conformity-interpersonal value drives them to act similarly to their recycling neighbors. Because of the variance in motivation that may exist for a single behavior, we must understand the psychological need met by a behavior or attitude to predict or change it (Katz, 1960).

Katz illustrates a pitfall that impacts some of the conservation rhetoric in the United States. Attempts at attitude change that rely on promoting fear of consequences for maintaining existing behaviors are effective only when the person perceives a clear path for avoiding the feared consequences. In the case of many environmental challenges, there is no such clear path. In the absence of clear alternatives, the person is unlikely to change their behavior and will instead develop a negative attitude toward the person, object, or idea associated with the feared consequence (Katz, 1960). In this way, some pro-environmental campaigns may alienate the very people they wish to engage as allies. Changing a person's environmental behavior is better accomplished by appealing to the values they are expressing through their existing behavior (Katz, 1960). To do so, we must first understand the motivational basis that drives the person to hold the targeted attitude or engage in the targeted behavior.

Persuading a person to change their environmental behavior can be accomplished using Schwartz's structure of basic individual values in one of two ways. The person can either be prompted to change their values and so their behavior, or to change their understanding of a behavior in relation to their static values such that they are motivated to modify the behavior. Because people's values are relatively stable, attempting to change behavior by changing values is unlikely to be efficient. For a person's values to change, the person must experience significant or repeated instances of incompatibility between their experiences and their values (Rokeach, 1968), and even then the change in values may be temporary and revert to baseline once the stimulus to change has disappeared (Verkasalo et al., 2006). Therefore, behavior change can be more effectively promoted by targeting changes to a person's concept of the values their behavior expresses. Through new experiences, a person may come to believe that their behaviors no longer appropriately express their values. In these instances, a person may change their behavior without changing their values. This happens either when the person believes an old behavior no longer expresses the value it once did, or when the person identifies a higher priority value they can express through a different behavior (Katz, 1960).

In the case of novel behavior options for which the person does not yet hold an attitude, the person seeks to find an attitude to hold toward the behavior that is congruent with their central values. When developing this attitude, the person is open to suggestion about what values they would express by holding either a positive or a negative attitude toward this behavior. If the behavior is promoted as congruent with one of a person's central values at the time they first encounter it, they are likely to adopt a positive attitude toward it (Katz, 1960). In environmental conservation, this speaks to the importance of framing issues in as advantageous a way as possible from the very beginning of public discourse about them.

How issues are framed can have a significant impact on people's behaviors. For example, people are more likely to respond to risks when those risks are posed to something they hold as important (Nordlund & Garvill, 2002). Many environmental conservation actions can be framed in a variety of ways (e.g., for human health, or economic well-being, or the benefit of – or to avoid risk to – charismatic wildlife). Issues framed as relevant to the salient concerns of an individual are more likely to be acted upon. Therefore, although self-enhancement and conservation values generally have a negative influence on pro-environmental behavior (Karp, 1996), a re-framing of the values that pro-environmental behaviors express could increase a person's motivation to engage in them. One such example may be choosing certified organic over conventionally grown produce. In these instances, it is possible that framing a behavior in terms that are congruent with a person's self-enhancement and conservation values (for example, linking purchasing organic produce with avoidance of health risks, or increased social status) would increase their motivation to engage in the pro-environmental behavior of choosing organic produce, despite these classes of values not generally being associated with pro-environmental behavior.

It is therefore conceivable that home owners who are unlikely to be motivated to achieve environmental benefit for its own sake may be motivated to engage in pro-environmental behaviors for non-environmental reasons. In addition, self-perception theory (Thøgersen & Crompton, 2009) suggests that people use their own behavior as a cue to inform their own attitudes. In other words, a person who begins a pro-environmental behavior may, assuming they understand the environmental benefit of the behavior, strengthen their self-identity as a person who engages in pro-environmental behaviors and, therefore, increase their engagement in other environmental behaviors in order to be consistent with this identity.

Opportunities for novel research

The frequency with which considerations of natural capital are included in decision-making processes may have increased, but they are still frequently ranked low in public concern and often perceived to be separate from mainstream economic and social activity (Guerry et al., 2015). Ecosystem service frameworks attempt to bridge the gap in understanding between ecological function and human benefit, ideally making clear to stakeholders why they might choose to preserve and enhance ecosystem functions. While mainstream ecosystem service frameworks succeed in defining the nature of the benefits at the interface of a human and the ecosystem, they do not consider the psychological function these services provide. In other words, they do not describe why the person is motivated to access or promote a particular service in a particular way. This leaves an opportunity to strengthen the cognitive connection between ecosystems and human beneficiaries by framing ecosystem-derived benefits in terms of individuals' motivations to access them.

While some of these motivations may be partially described by layering multiple ecosystem service categories (e.g. using a food provisioning service derived from a shared garden as a medium for a social relations service), these other services are not derived directly from the ecosystem but from the interaction of the ecosystem service with the goals of the individual. It is these motivations' broad situational scope and foundational nature (foundational to the behavior and identity of the individual) that makes them challenging to accurately describe using a layered ecosystem service approach. For example, the Millennium Ecosystem Assessment framework would classify a tree shading a sidewalk in the summer as a climate regulation service. While this is completely accurate, it says little about the way in which human beneficiaries value this service. Presumably beneficiaries enjoy the hedonic pleasure of a cooling sensation, but they may also consider their use of a tree for temperature regulation as an ego-promoting opportunity to confirm their identity as a consumer of nature-based solutions. Humans are

strongly motivated to confirm to themselves and others, through actions or attitudes, the type of person they perceive themselves to be (Eagly, A.H., Chaiken, 1993; Katz, 1960). While, in this shade example, the ego-promoting motivation may not be conscious, it may nonetheless be a primary driver of the choice to manage in favor of this shading service. Therefore, the satisfaction of this motivation may be a considerable benefit derived from this service, and one that is difficult or impossible to describe using existing ecosystem service frameworks alone.

Objectives

I investigated homeowners' motivations for engaging with the ecosystem services derived from their yard and the attitudes they hold toward their property in general. This is intended to clarify some of the ways in which people value the services their yards provide. With this information, researchers and ecosystem service analysts can improve their assessments of ecosystem value, and individuals involved in environmental outreach can create engagement strategies that are congruent with the values homeowners hold in relationship to their property.

My objectives for this research were:

- 1. Identify the values that homeowners hold in relation to their homes and yards, and the motivational goals they seek to address through their engagement with these spaces.**
- 2. Identify homeowners' values that they do not ascribe to their yards but which may be congruent with or opposed to engaging in pro-environmental behavior related to yard management.**

Even values which homeowners do not ascribe to their yards may still affect their motivation to engage in yard-related behaviors. This is true both in instances when the value in question is congruent with a pro-environmental behavior and when it is opposed to it. For example, an interviewee who likes having indoor space for his children to play suggests that this person may hold benevolence-caring values, which may have congruence with pro-environmental behaviors they could engage in as part of their yard management.

- 3. Identify some of the yard-derived ecosystem services that homeowners find the most salient.**
- 4. Assess homeowner's attitudes toward specific environmental issues related to the management of yards.**

Considering homeowners' awareness of and attitudes toward specific yard-related environmental issues helps to build a more robust understanding of how their values relate to environmental attitudes and behaviors. The first environmental issue I asked homeowners about was storm water pollution from household chemicals. The existence of multiple outreach campaigns and references for related best practices for homeowners (Puget Sound Starts Here, n.d.; Seattle Public Utilities, n.d.) suggest that this is a topic of public concern for which homeowner behaviors are targeted as a solution. Further, the National Pollution Discharge Elimination System (NPDES) requires municipalities to address the pollution of water bodies via contaminated run off. NPDES requirements allow municipalities to achieve some of these requirements via public outreach promoting individual behavior change. (United States

Environmental Protection Agency, n.d.) The second environmental issue I asked homeowners about was the amount of urban tree canopy. Promoting city-wide tree canopy is a goal identified by the City of Seattle (City of Seattle, n.d.) and local environmental advocacy groups (Seattle Audubon, n.d.) and is expected to yield benefits including habitat improvement, air quality, and aesthetic value. The City of Seattle approaches this goal through multiple avenues, including policies that limit the removal of trees from private property, provide financial support for tree planting, and educational programs that promote adding trees to yards. These issues were appropriate choices for consideration in a study related to behavior change because of the efforts already being put into these topics through behavioral avenues, and because of the potential to yield positive environmental results from changes in the behaviors of individual homeowners.

Methods

I collected data to achieve these research objectives by conducting semi-structured interviews with Seattle homeowners. I chose to interview Seattle homeowners partially for the ease of conducting research in the city in which I live, but also because doing so addresses questions about the unique attitudes of homeowners in this city. Seattle is a large city with a land area comprised in no small part of single-family residential lots. As such, it presents an opportunity to research the benefits that homeowners derive from their properties and an opportunity to recruit them to engage in pro-environmental behaviors.

Study Area and Sampling

Seattle neighborhoods can be roughly classified as belonging to either the wealthier northern portion of the city or the less-wealthy southern portion of the city. For the purposes of this study, I define the boundary between the two as the line formed by Interstate 90 and South Royal Brougham Way (indicated approximately by the dashed line on the map in Figure 2). More neighborhoods in North Seattle have a median owner-occupied home value above Seattle's median home value than do those neighborhoods in South Seattle. This distribution of home values mirrors regional distributions of other socio-economic metrics including household incomes, level of education, and percentage of neighborhood residents near poverty.

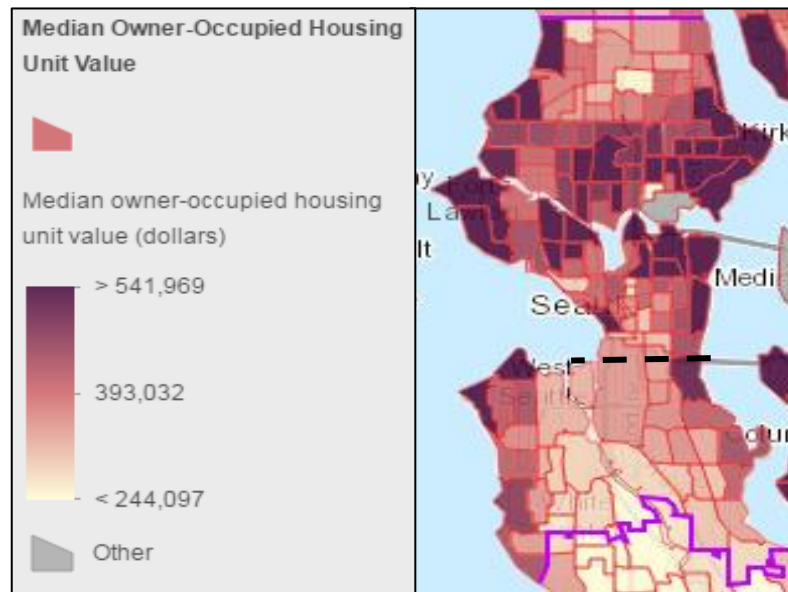


Figure 2. Sampling regions and median owner-occupied housing unit value. North and south Seattle sampling regions are divided by the dashed line. The map is from the City of Seattle and shows data from the 2010 U.S. Census Bureau ACS Selected Housing Characteristics Data Profile (City of Seattle Population and Demographics).

I stratified my sample to include similar numbers of homeowners in North Seattle and South Seattle. In South Seattle, I excluded the West Seattle neighborhoods on the shoreline with home value and household income characteristics more representative of North Seattle neighborhoods. This stratification supported me in including homeowners who live in a range of neighborhoods where attitudes and experiences related to homes and yards may vary.

I recruited participants using advertisements on neighborhood email lists and social media groups, presentations at community events, and promotion via word of mouth through my personal network. Text from a recruitment email I sent to neighborhood email lists and a post I made to neighborhood Facebook groups are included in Appendix A. No recruitment materials contained information that was likely to be construed as environmentally-focused or to suggest the researcher's own views in this regard. This eliminated a sampling bias that may otherwise have existed had subjects responded to an advertisement for an explicitly environmentally-focused study. I determined sample size through a saturation method. Using this approach, I added interviewees to my sample until additional interviews ceased to yield any concepts which had not already been identified (Glaser & Strauss, 1967). I stopped sampling at 17 interviews.

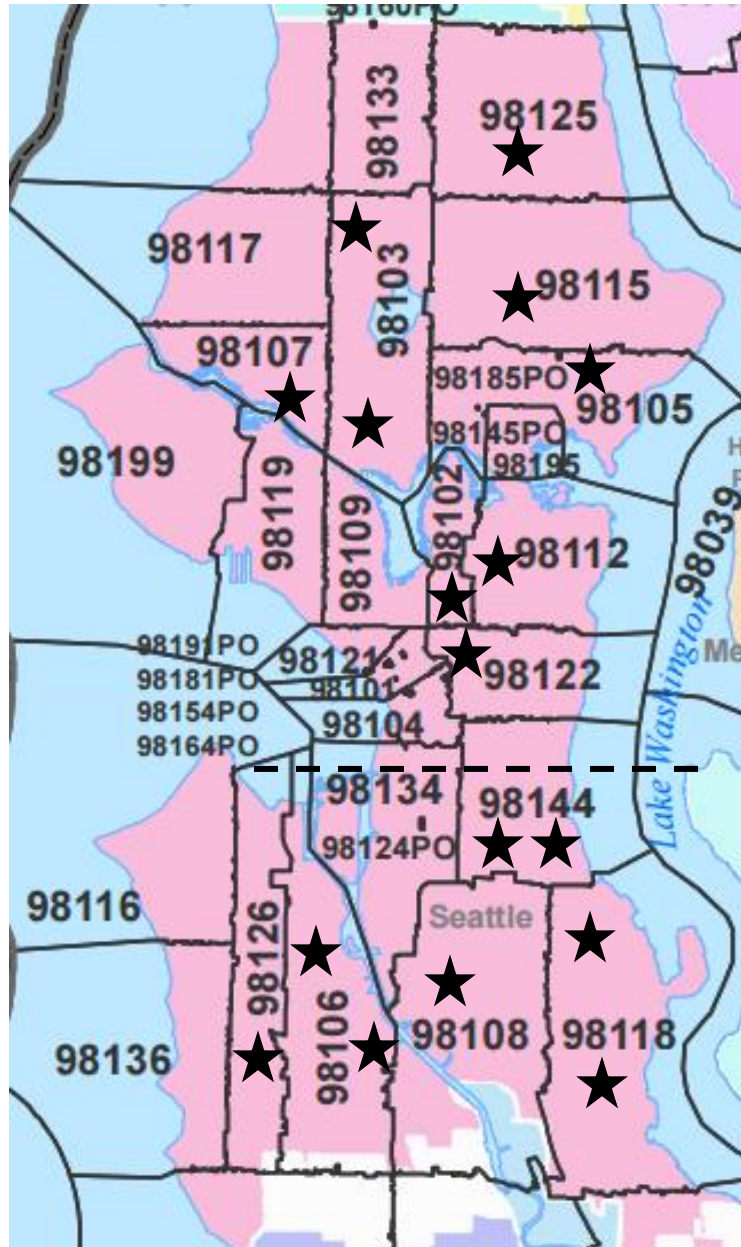


Figure 3. Geographic distribution of interviews. Each star represents an interview conducted in that zip code. Map of zip codes from King County (King County, 2013).

Data collection

I collected data via semi-structured interviews as inspired by Glaser and Strauss' grounded theory. Using an open-ended interview strategy and an analysis approach informed by grounded theory (described in more detail in the Analysis section) allowed me probe into interviewees' motivations to understand the values at the root of their behaviors and attitudes. In contrast, a survey or a more prescribed interview structure would have limited interviewee responses to options conceived of when

developing the research instrument. Such an approach would not allow for specific inquiries into individuals' behaviors and attitudes as they arose on a case-by-case basis.

My interview method was informed not only by Glaser and Strauss' grounded theory but also by Dexter's complimentary elite interviewing. Elite interviewing is defined by "stressing the interviewee's definition of the situation... encouraging the interviewee to structure the account of the situation," and "letting the interviewee introduce to a considerable extent... his notions of what he regards as relevant, instead of relying upon the investigator's notions of relevance" (Dexter, 1970). This type of interviewing technique, which features open-ended questions and allows the interviewee to determine what are relevant topics, is particularly appropriate for collecting data on individuals' attitudes and personal motivations. Using this type of data collection approach has been identified as an effective tool for understanding stakeholders' attitudes toward ecosystem services (Asah et al., 2014).

I conducted each interview in such a way as to collect the data described under Interview Prompts in Appendix B. I used these listed prompts as a guide for my interviews. I started each interview by asking the interviewee to tell me about where they live. Beginning with such a broad question allowed me to identify some home and neighborhood attributes that each interviewee was conscious of. In many interviews, I used responses from this question to create a list of specific topics to follow up on as the interview progressed. When an interviewee did not mention any ways that they engage with their yard, I asked about their yard directly. For every benefit that an interviewee reported deriving from their property, I asked prompting questions to identify the value that their engagement with this benefit addressed (i.e., the motivational goal they used this benefit to satisfy). These prompting questions included phrases like "How is that important?" and "What do you like about that?" In some cases I asked interviewees the questions as they are written in the Interview Prompts appendix. In other cases I modified the language of my questions to better fit the specifics of the interview (e.g., phrasing questions in terms of topics raised by the interviewee, or using simple prompts to request elaboration such as "What was that like?" or "Tell me more about that"), or omitted a question if the interviewee had answered it without prompting.

I also asked interviewees when they realized that the benefits they identified were important. This question helps to determine when the people interviewed acquired the values they now hold. Knowing how these values were acquired can be useful in identifying the malleability of these values and in crafting persuasion strategies that leverage not only a person's values but also the context in which they acquired them. I then asked if there are any challenges facing Seattle. If the person did not make clear their reason for concern about these challenges, I asked probing questions to identify what values motivated their concern. I then asked what homeowners could do to help with these challenges. Responses to this question suggest the avenues that these homeowners think may be particularly effective for solving the challenges they describe. Appeals for engaging in pro-environmental behavior may be particularly effective with these homeowners if the desired behavior is in some way linked to the type of solution they identified. If the interviewee did not identify any environmental challenges, I followed up by asking if there are any environmental challenges facing Seattle. I then repeated the processes for identifying the values that motivate their concern and determining the types of solutions they identify as potentially effective. After interviewees were allowed to answer these open-ended questions, I asked if contaminated storm water runoff and amount of urban tree canopy were concerns. As before, I repeated the processes for identifying the values that motivated their concerns (if the person identified these topics as concerns) and for determining types of solutions. I asked these specifically environmental questions late in each interview so as to not bias early responses toward environmental topics. I finished each interview telling the interviewee that they had shared some very helpful thoughts, then asked them if they had anything else to share. In many cases, this yielded

additional discussion of the homeowner's interaction with their property. I concluded each interview with a written demographic survey collecting the following data. This survey instrument is in Appendix B. I recorded interviews on a portable digital device for transcription and analysis.

Analysis

I transcribed each interview shortly after conducting it then analyzed it using the coding structure described below in an approach informed by grounded theory. Grounded theory is a research approach defined most simply as the discovery of theory from data (Glaser & Strauss, 1967). This contrasts with approaches focused on hypothesis testing in which the researcher approaches the data with a theory already in mind which he or she seeks to demonstrate the likelihood of. A research process informed by grounded theory would instead approach the data not looking to test any one hypothesis but rather to discover data of interest and to build hypotheses or theories emergent from that data. Similarly, a grounded theory approach treats outliers not as data to be excluded from analysis, but as indications that there may be an unexplained process in effect and as an indication of an opportunity for further inquiry (Corbin & Strauss, 1990; Timmermans & Tavory, 2012). Analyzing data using strategies informed by grounded theory requires data collection methods that support this type of analysis. My semi-structured interviews, relying on interview techniques that privilege the interviewee's perspective as per Dexter's elite interviewing (Dexter, 1970) are methodologically consistent with grounded theory analysis inasmuch as they reduce researcher influence on the nature of the data collected and allow for the data to guide the research process as it emerges.

In the context of my research, using a grounded theory approach means approaching interview subjects with the intent to learn how they engage with and conceptualize their properties rather than with the intent to test a specific hypothesis related to their use of specific ecosystem services or expressions of specific basic individual values. Such an approach may be particularly useful when the researcher seeks to not only describe observed phenomena but also to explain its workings (Corbin & Strauss, 1990). It is therefore an appropriate approach for my research which seeks to understand not only what ecosystem services homeowners consciously access but also the cognitive functions these services perform for them (i.e., not just describe the observed phenomena of their engagement with services, but also explain the workings of these services for beneficiaries on a cognitive level).

I transcribed and analyzed each interview shortly after conducting it. In line with grounded theory, this allowed me to leverage data and hypotheses generated from previous interviews to guide later interviews to cover productive topics and test developing hypotheses. For example, early interviews revealed that some subjects found having relationships with their neighbors to provide security benefits (e.g., reliable assistance in an emergency, or people to watch over one's home when traveling). Knowing that this connection between social relationships and security existed for some homeowners allowed me to check for its existence in others. I analyzed interviews by coding transcripts in the software NVivo 11. Coding qualitative data "is a procedure for organizing the text of... transcripts, and discovering patterns within that organizational structure" (Auerbach & Silverstein, 2003). Coding entails identifying segments of a transcript by the theme or themes it supports.

To address my primary research questions, I used a coding structure based on Schwartz's 19 basic individual values (Schwartz et al., 2012) and a list of ecosystem services. I drew my list of ecosystem services primarily from the Millennium Ecosystem Assessment report (Island Press, 2005). Although there are multiple ecosystem service frameworks, the Millennium Ecosystem Assessment report is generally perceived as a credible source and the service categories it defines provide a functional overview of the majority of ecosystem services that a Seattle homeowner could reasonably be expected to derive from their property. Further, while the service categories defined by the

Millennium Ecosystem Assessment report may or may not be the most exhaustive, they are a commonly recognized point from which to begin.

To the list of ecosystem services identified in the Millennium Ecosystem Assessment report, I supplemented the services noise reduction and privacy and modified “human disease regulation” to “human health” as a category more inclusive of all types of physical and mental health. I added these services to those identified in the Millennium Ecosystem Assessment report because they appeared in interviews and needed representation in my coding structure. This modification of analysis based on the appearance of data is defended by Corbin and Strauss, who write that grounded theory approaches allow for the process of research and discovery to guide examination and analysis (Corbin & Strauss, 1990). In this case, the discovery is the availability of these services from yards. I was able to use this discovery to guide my examination and analysis by adding these services to my coding structure in order to look for other instances of their occurrence.

A list of codes used to identify passages suggesting values or describing ecosystem services follows. This list is a complete list of codes available to classify values or services described by interviews – some codes in this list were not found to describe any passages in the collected data. Codes pertaining to interviewees’ values have a two-level hierarchy. Each value-coded passage pertains to a specific value (e.g., conformity-interpersonal) and the value category to which that value belongs (e.g., conservation). To read selected interview passages coded for these values, see Appendix C. The same is true of codes used to describe ecosystem services – all passages referencing an ecosystem service are coded at both a category of service (e.g., regulating services) and a specific service (e.g., air quality maintenance). To read selected interview passages coded for ecosystem services, see Appendix D.

Values

Conservation values: conformity-interpersonal, conformity-rules, tradition, security-societal, security-personal, face

Self-enhancement values: power-resources, power-dominance, achievement, hedonism

Openness to change values: stimulation, self-direction action, self-direction thought

Self-transcendence values: universalism-tolerance, universalism-nature, universalism-concern, benevolence-dependability, benevolence-caring, humility

Ecosystem services

Cultural services: cultural diversity, spiritual and religious values, knowledge systems, educational values inspiration, aesthetic, social relations, sense of place, cultural heritage, recreation, ecotourism, intrinsic value, noise reduction, privacy

Provisioning services: food, fiber, fuel, genetic resources, biochemical, ornamental resources, fresh water

Regulating services: air quality maintenance, climate regulation, water regulation, erosion control, water purification and waste treatment, regulation of human diseases, biological control (pests), pollination, storm protection, human health

Supporting services: soil formation, nutrient cycling, primary production

Some interview passages were not coded at all, while others were coded for multiple references. For example, a passage about vegetable gardening might be coded as referencing a food provisioning service and, depending on the interviewee's experience with this gardening, possibly also as providing a recreational or sense of place service. This same vegetable gardening passage might also be coded as referencing the benevolence-caring value if the interviewee's motivation for engaging in the gardening is driven by a desire to demonstrate care for in-group members (e.g. family or neighbors) by giving them produce, or coded as stimulation if the interviewee's motivation was related to the novelty of trying out new plant varieties and gardening techniques.

To support and expand upon my research questions related to developing persuasion strategies for pro-environmental management of yards, I also coded interviewee responses to identify community and environmental challenges they perceive as relevant in Seattle, to identify classes of solutions they believe to be effective, and how they report acquiring the values they now hold. Each of these lists was developed based on data present in interviews with the exception of challenges related to tree canopy and storm water contamination. I prompted interviewees who did not mention these challenges on their own to share their views about these topics, including whether or not they were concerns. Lists of codes used to identify passages about challenges, solutions, and value acquisition are below.

Challenges

Affordability and Income inequality, homelessness, green space, taxes, air pollution, invasive species, population (local), tree canopy quantity, habitat, noise pollution, storm water contamination and runoff

Solutions

Business, education, next generation, social, confusion about how to solve, financial, non-profit organization or foundation, technical, cues for care, government, personal action

Acquisition

Aging, childhood, family member(s), moving to a new place, specific significant event

After coding interviews, I used Nvivo matrix queries to look for occurrences of passages at each coding reference. Matrix queries can show instances where codes or coded data sources overlap. For example, a matrix query could show all passages coded for social relations ecosystem services by interview. A different query could show instances where a passage coded for an ecosystem service is also coded for a value (e.g., passages discussing both a human health service and implying a security-personal value) across all interviews. I used these queries to gain an overview of the ecosystem services, values, value acquisition methods, challenges, and solutions revealed through interviews. It is important to note that, while these queries can provide counts of the quantity of instances where the designated criteria occur, these counts are not necessary to answer my research questions. Further, because of the exploratory focus of my study (and its research design which is optimized for discovery of novel interactions between peoples' values and the ecosystem services they access rather than quantitative comparisons), frequency counts of coded references may be misleading. While these counts do provide an "at a glance" assessment of the more commonly mentioned services and values, there is no way to perform a statistically rigorous comparison of the differences in these counts. I therefore used these matrix queries not to provide a scalar comparative assessment of the relative frequency of passages coded for different topics, but rather as a tool to recall what values and services were represented in which interviews, and the instances in which values and services interacted.

Results

Values

Looking at the aggregated values implied by homeowners' statements related to their properties provides a coarse perspective on the motivational goals interviewees seek to satisfy via their yard overall. To acquire an overview of these values, I used NVivo's matrix query function to report the references coded for each value within each interview as described in the Methods section. The values implied most consistently were benevolence-caring (well-being of in-group individuals), security-personal (safety and ease in one's immediate environment), and universalism-nature (care for and connection with natural systems). Security-personal and universalism-nature values were implied to some extent in all interviews (although in some instances universalism-nature values were related to parks rather than the interviewee's yard). Benevolence-caring values were implied in all but two interviews. All other values were implied less consistently across interviews. All basic individual values were implied at least once except for conformity-rules, tradition, power-resources, and power-dominance which were not implied in any interviews. To read selected interview passages coded for all values represented in interviews, see Appendix C.

Statements exemplifying benevolence-caring values discuss benefits that the homeowner derives from their yard in terms of individuals in their immediate social group. Two examples of such statements are below.

"I think there's got to be some development benefits to [kids playing in the yard]. Although I don't claim to know exactly what. But for physical development, coordination, and... you know... understanding things and exploring. Exploring develops your curiosity about things."

"For my mother-in-law gardening has been kind of a big thing. She... in her prior place, she had a lot of potted plants outside. Having some outside space for her to be in and for her to be able to do some gardening is important."

While each of these statements include aspects that suggest the interviewee may also feel an affinity toward nature (i.e., hold universalism-nature values), in these instances, the benefits of this affinity with nature are being sought not for the homeowners themselves but for the children of one and the mother-in-law of the other. This desiring of well-being for in-group members is what associates these statements with benevolence-caring values. These statements (and others like them made by other homeowners) suggest that these individuals may be motivated to manage their properties in order to secure well-being for in-group members (who, for some interviewees, were non-family neighbors), and may be persuaded to engage in certain yard management actions if these actions are cognitively linked with the well-being of in-group members.

Security-personal values relate to senses of stability, order, health, and safety for oneself and in one's immediate environment. Of the two statements exemplifying this that are included below, the first addresses the interviewee's desire for security in terms of privacy (feeling secure from the unwanted gaze of others) which he gains through the visual shielding provided by trees in his yard. The second statement addresses the interviewee's desire for a space that provides health benefits (or at least avoids health-related harms). These two statements, although differing in specific goals, both

speak to these homeowners' desires to receive benefits related to a sense of security and safety from their yards.

"And [the trees] are so big now that it is a little more private in summer... Which is nicer in the summer because that means you can have more of your windows open, and you are not quite on stage for the busy street, because there are some trees in between you."

"I'm looking out the windows and I can see [trees] from here, and... it just makes me feel like there is probably some fresh air here still... I feel like I can breathe in here and get a little better air than if I do it on some black top parking lot out in the warehouse district."

Universalism-nature values are related to both nature-protective attitudes and desires to feel connected with nature. Each of the statements below demonstrates a different aspect of universalism-nature values. The first shows this person's nature-protective attitudes – she wants to protect elements of the natural world. The second shows another person's desire to feel connected with nature – he enjoys feeling as though he is "part of the landscape." While the first statement is focused closely on a single issue (protecting animals via habitat conservation), the second blends this person's universalism-nature values with personal-security values (as demonstrated by his desire for privacy – which may be desirable in and of itself, but which also serves as an enabler to feel like "a part of the landscape" rather than "part of urban structure") and hedonism values (his enjoyment of sitting outside). Although these statements made by these two individuals, and similar statements made by other interviewees, are not identical in content, they share motivational goals related to protecting and connecting with nature. They indicate that these homeowners (and others who made similar statements) derive benefits from their yard related to their personal connection with nature, and are motivated to engage in behaviors that promote this connection.

"I want to feel like I am... you know, all those little birds and all the little weird grouse or little field mice or whatever, just like you want... and just feel like, OK, you guys are safe. You know, I can't control the climate, but I can keep people from just mowing all this habitat down."

"I think here I just feel like I'm part of the landscape. It's hard to explain but it's an emotional connection. I can just go down and be down doing some weed clearing and come back and get a beer and just sit down there in the weeds on the bank and just look around and just really enjoy being there. And I know if, having lived on smaller city lots before, you know, you can be in your backyard and putter around but you always have this feeling that somebody may be watching or looking or listening and it's, there's just this, it's not just privacy, it's real in terms of feeling like when I am out there, I am part of the landscape not part of urban structure."

Ecosystem services and interactions with values

The ecosystem services mentioned most consistently were food, social relations, and aesthetic services. All but two interviewees reported deriving aesthetic services from their yard, all but five interviewees reported deriving social relations services from their yard, and all but six interviewees reported deriving food provisioning services from their yard. All other services were mentioned with less consistency across interviews. These ecosystem services were not only mentioned with a higher degree of consistency than other services, but they were also frequently discussed at greater length than other services. It is worth noting that this does not mean that the interviewees who did not mention deriving

these services from their yards do not do so. Interviews were conducted to allow homeowners to express the benefits derived from their property in their own terms and as they deemed relevant. The interviewees who did (or did not) report deriving an ecosystem service from their yard did so in response to open-ended prompts like “What do you do in your yard?” and “Tell me about where you live.” This suggests to some degree the salience of the ecosystem services reported or not reported but should not be construed as defining a clear binary between what services are and are not derived.

What is particularly noteworthy are the goals homeowners used these services to accomplish, not all of which were obvious in the basic nature of the service itself. The variety of goals homeowners used ecosystem services to address suggest that existing ecosystem service frameworks do not describe in totality the benefits that people derive from any given interaction with an ecosystem. In this study, individuals were using services to address goals that are neither intrinsically a part of the service nor necessarily apparent when observing the service-beneficiary interface alone.

The three most common values related to interviewees’ motivations for engaging with their properties were security-personal, benevolence-caring, and universalism-nature. Motivations related to security-personal values were often associated with ecosystem services that provided privacy in homeowners’ yards and homes.

“There’s another giant birch next door, that the landlord of the previous owners of that, took that down. That provided a lot of privacy because once that was gone... not that anybody’s particularly interested in our house, but I mean, there was... it provided a lot of privacy.”

“Plants can provide just enough screening that you actually have a sense of privacy... I’ve got a big grass thing that kind of shields us.”

“And [the trees] are so big now that it is a little more private in summer... you are not quite on stage for the busy street because there are some trees in between you.”

Security-personal motivations were also commonly referenced in regard to ecosystem services that promote physical and psychological health.

“There’s pretty much always something that’s alive here... And so it’s just, it’s good for my mental health.”

“I’m not very good at psychology but it seems like there’s probably some psychological value to having the natural world in evidence.”

“I’m looking out the windows and I can see [trees] from here, and... it just makes me feel like there is probably some fresh air here still... I feel like I can breathe in here and get a little better air than if I do it on some black top parking lot out in the warehouse district.”

Benevolence-caring values were associated with food provisioning services far more than any other ecosystem service derived from interviewee’s yards. It was rare, in fact, for food provisioning to be discussed without some mention of using the act of growing food, or the sharing of harvested food, as a means to engage with or care for in-group members.

“I share [my produce] with family and neighbors. It is a gift.”

“[My husband] makes jelly [from the grapes in our yard] and we give it to friends.”

“We have great strawberries. There’s this little guy next door who loves strawberries.”

“Most gardeners will share things.”

“We want to eat this food, right? Like, we have this garden we want to have fresh tomatoes, fresh cucumbers, we want to eat them and we don't want to use pressure treated wood for the planter boxes, we're not going to dump a bunch of chemicals on there... I want to protect myself and my family.”

“[The garden was] more just for the kids to play with. Not really generating a big meal maker.”

“And probably do a little vegetable garden. That will also be a good thing for our four-year-old there to experience, too.”

Universalism-nature values were often associated with sense of place, habitat, aesthetic, and food provisioning services. Universalism-nature values tended to be associated with a wider range of ecosystem services than many other types of values were. This may be because universalism-nature values are focused on a person's connection with nature in general rather than through any specific avenue. Statements associated with universalism-nature values associated with sense of place services included emphases on sense of place within the region, within one's own yard, and in one case within history.

“You see some of these gigantic old fir trees... And the ornamental trees are nice but just the impact of seeing something that's been there for 100 years, 200, 300 years... It's a pretty amazing thing that, you know, before there were white settlers that showed up at Alki Beach that some of the trees were around.”

“It's an ability to emotionally connect with where you are living... Here, I just feel like I'm part of the landscape.”

“Every day I look to see how much bigger [the plants in my yard] are getting, what blossoms are coming, and I am thinking, oh, later I am going to have to trim them all down and get something else in, but that is part of a whole process of going out in the yard and every time you go out there, there are some changes.”

“We live in the Northwest and [native species are] what grows here. I'd hate to see it all go away and see it all be English garden or something.”

Statements associated with universalism-nature values and habitat services focused more on protection of nature rather than connectedness to it.

“The birds aren't out there screaming and like hammering on the pavement saying come on we're running out of places to live. And that's the kind of thing that just like that's what keeps me going with giving money and trying to provide habitat and I'm trying to encourage my neighbors all the time to plant trees and remind them that a lawn full of grass is really not a lot better than pavement.”

“I created like a, a wildlife habitat. So, all native plants. So they feed [the animals]. All four seasons.”

“It gives wildlife habitat. Birds especially.”

Statements associated with both universalism-nature values and aesthetic services focused on the visual benefits provided by local ecosystems while also integrating some element of direct appreciation for a specific nature-based interaction. There is a fine line between these instances of direct appreciation for

a nature-based interaction and aesthetic services in general. These statements represent not just instances of aesthetic service provisioning (in which the beneficiary looks at an aesthetic object) but also expressions of universalism-nature values. This is because they each include the interviewee either intentionally supporting an element of their local ecosystem (e.g., appreciating the aesthetics of birds while through providing food for them) or enjoying the aesthetic service of a natural process itself (e.g., considering the process of changing weather patterns, rather than the weather itself, to be aesthetic).

“I just love the little critters... I’ve got a [bird] feeder here, and I’ve got another one out there... I look out there and there will be eight or ten little chickadees in there and they’re just so cute.”

“I think being able to just see the environment is more important. I mean, this big tree in a wind storm just bows and the branches whip around and you can see wind patterns, and the crows come by and you can tell by the afternoon if there is going to be a squall or rain and the crows are all headed up and saying, let’s get home before it starts raining. You get all these side effects of this weather that you are able to observe and it is really interesting.”

Other interviewed homeowners used their engagement with food provisioning services as a way to feel connected with, or protective of, nature. In this way, they used these food provisioning services to address their universalism-nature values.

“I like sustainable. I like something I can feed myself. And then create harmony.”

“Normally with Seattle, you know, it’s, you’ve got kind of the summer and the winter, right? You know, where summer is beautiful, everyone looks forward to the summers. Winters are kind of tough, kind of grey, and I’m not really a skier. But having, having the kind of gardening thing gets you to think of it like, well, in the fall it is, you know, we need to plant different crops in the fall, and you think about like, you know, what I am going to do to the soil in the spring... So you go from more of a two season, like, you know, summer, winter, to really start thinking about spring... and changing seasons.”

“I think it’s healthy to contribute to any kind of sustainability in your community and organic gardening does that well.”

Acquisition

Many interviewees reported having held their values for most of their life. This is consistent with other research findings that suggest that basic individual values tend to be stable (Bardi et al., 2002; Rokeach, 1973). This reinforces the concept that persuasion appeals may be more efficient when seeking to reframe the values that a targeted attitude or behavior expresses as compared to when seeking to change the value itself.

Among those who reported having held their values since childhood, four interviewees described their acquisition of their values as due specifically to the influence of family members, while eight interviewees attributed this acquisition to childhood experiences in general (e.g., cultural attitudes where they grew up, experiences playing outside, etc.). One person described his desire to connect with nature as stemming from childhood experiences playing outside as follows.

“Like when I was a kid, we had a giant, I mean... we lived out in the suburbs and we had a big yard. But we had a big field across the street and a big forest and it’s just... I got so much out of being there that I just don’t know if I can ever be a proper urban dweller.”

Another described her motivations to care for others (i.e. satisfy benevolence-caring values) as growing from her exposure to her father's work as a doctor when she was young. Although professional medical work may be more associated with universalism values because of its broad and sometimes impersonal reach, this interviewee nonetheless used her experiences with this field to explain her attitudes related to the well-being of individuals she knew personally and identified as being a direct part of her community.

"It's the way I grew up. My dad was a family doctor. And... he moved his office into our home. So eventually our dining room became where he saw patients, and the living room was the waiting room... So that's just the way I grew up."

Another person described leadership experiences as a young person fostering his desire as an adult to care for others.

"I guess going back to my youth... I was in a church youth group in junior high and was kind of a leader in that group."

One interviewee described the influence that her father's work when she was young had on her desire to engage in behavior related to renewable energy.

"My dad worked in solar energy research, like, 40 years ago. So I always felt like we'd get solar someday and all that work my dad did would be put to good use."

Among the interviewees who described acquiring their current values later in life, changes in perspective due to aging (which was sometimes paired with retiring) were a common theme. One interviewee described how she came to value engaging with and caring for others as she grew older.

"I moved here when I was in my twenties, you know... and I was just doing sex, drugs, and rock and roll back then and, it's like, community? No, no, it was all about me. So once I passed through the me generation got, just, more settled into old lady status... I think I just grew into it."

Another talked about how it was retiring, rather than aging alone, that shifted his behaviors related to nature due to a change in the demands on his time.

"As you can see looking out here today, just watching the weather, and we got a little bird bath, and my wife just recently got into bird watching... we see birds and stuff, and I probably never would have had time to do that while I was working."

Despite interviewing a number of people who had at one point moved to Seattle, only one attributed this move as being the trigger for his current attitudes.

"I've been in the Pacific Northwest for about 10 years now, and moved out after college... So, yeah, just a total change in the way I think about everything basically since I've moved to this region of the country. It's totally different."

Challenges

When asked if there are any challenges facing Seattle, interviewees mentioned the growth of local population and questions of affordability more often than any other issues. These were topics widely discussed in the community as a whole during the period these interviews were conducted.

These challenges were often related to interviewees' concerns about changes to the city's character (e.g., more dense construction and multi-family homes) and the related negative impacts on their lives and habits. For example, one person lamented crowding at Pike Place Market and traffic on the way to it as preventing him engaging in a type of outing he previously had with his daughter.

"When [my daughter was younger] she and I would sneak down to the market early on weekend mornings... and get her a little doughnut... On a Sunday morning at seven o'clock you could do that. Even now, seven-thirty or eight o'clock it is already full down there on a Sunday morning.... It's just shocking."

People also expressed frustration related to increases in undesirable characteristics of Seattle life in more general terms related to traffic and wealth distribution.

"I see [traffic] only getting worse and worse and worse."

"The divide between the wealthy and poor is getting more and more."

Many, but not all, interviewees held negative attitudes toward residential densification proposals (the proponents of which suggest residential densification as a means to address housing scarcity for lower- and middle-income households and to reduce the rate of suburban sprawl).

"Our neighborhood has a pretty strong voice in opposing the [higher density] development that's being proposed."

"We've been fighting the city forever [against increased residential density]... Here in [my neighborhood] we are very vocal and we always have been, because we really value our neighborhood and we protect it."

"At the top of the list would be affordability... The mayor and council has come up with the [residential up-zoning for increased housing density plan] which I think is well intended but I don't agree at all with how they are heading into this."

Because of their concerns about the changes occurring in their city, these homeowners may be motivated to feel a sense of stability and continuity in the places they live. This suggests that behavioral appeals linking the desired behavior to stability in their neighborhoods and lifestyles may be well received.

When asked if Seattle faces any environmental challenges (which were rarely mentioned without specific prompting – answers to the more general query were usually socially-focused), interviewees most frequently mentioned air pollution, lower than desired quantity of trees, and pollution of local waterbodies (tree quantity in seven interviews, air pollution and water pollution in six). Air pollution was often mentioned in a personal health context. I prompted interviewees who did not discuss tree canopy and storm water pollution spontaneously to share their attitudes toward these topics. Although the majority of interviewees held concerned attitudes related to quantity of urban tree canopy and storm water pollution, some interviewees were unconcerned about these topics.

Statements related to air pollution often included concern about human health. Examples of statements related to air pollution are below.

“SeaTac’s growing exponentially in air traffic and the fine particulate from that is demonstrably bad for your lungs. And so that’s the only thing I don’t love about this house, because I worry that I am doing myself irreparable damage.”

This statement comes from one of the many interviewees who identified air quality as an environmental concern in Seattle. Her statement that low levels of air quality are “bad for your lungs” and may be doing “irreparable damage” echo similar health-related concerns identified by other interviewees as reasons for their concern about air quality. This linking of local environment with personal health is also an expression of security-personal values.

“Our proximity to the highway and, you know, things get dirty outside really quickly this close to the highway. And so I’m like, how much of our dirt in the yard is toxic because of the chemicals that have settled here? Our kids’ school is right next to the highway and it bothers my daughter specifically.”

This statement mirrors the previous in its emphasis on human health as a reason for concern about air quality. For this interviewee, however, the health concern reported was not for herself but for her children. This is an expression of this person’s benevolence-caring values.

Storm water contamination and the associated pollution of local water bodies was also identified as a concern by a number of interviewees, even before I asked them about it specifically.

“Yeah, it’s a huge challenge. It’s one I don’t think anybody ever thinks about, like at all. But yeah, that’s Puget Sound’s health. It’s enormous.”

Although the majority of interviewees reported that storm water contamination is a concern in Seattle, a small number reported the opposite.

“I don’t see it happening. I mean, obviously it is not the right thing to do. But I don’t see it happening. I mean, when I walk down my street I don’t see people changing their oil over the gutters or whatever. I’m sort of agnostic on that one.”

“[Contaminated runoff is not a problem] in [my neighborhood]. Because... I get so pissed off at these big Round Up [pesticide] sales at QFC in the spring and at Fred Meyer. They just sit there, nobody buys them because everybody buys organic stuff around here... And we just, I think people that live in [my neighborhood] just subscribe to that basic theory in life. So it’s not a huge issue, of run off.”

To the homeowner who made the first statement, not seeing Seattle residents engaging in acts like “changing their oil over the gutters” suggests that contamination of storm water is not a concern. This statement is in some ways congruent with the second statement. This second statement suggests that the interviewee (who is proud of her organic lifestyle) believes that others in her community hold similar beliefs and engage in similar behaviors – despite her report that products she considers to be antithetical to this are repeatedly offered for sale at local stores. It is possible that each of these people

are responding more to their concept of the place where they live as an environmentally-friendly community than they are to the specifics of storm water contamination.

Some interviewees suggested that the quantity of trees in Seattle was an environmental challenge they were concerned about. Among those who did not suggest this as a concern on their own, the majority of interviewees responded affirmatively when asked specifically if it is a challenge in Seattle. In some cases, interviewees went on to elaborate on the ways in which they value trees.

“People keep cutting down trees. And it is sad when a tree goes down because an apartment building or townhouses goes in. And it just pisses me off hugely when a tree goes down because a single-family dwelling wants to be bigger or have more of a view. I keep thinking, you are about to need an air conditioner.”

“There are very few trees in this neighborhood. And I am trying to turn that into something where I can just encourage people and not be aggressive in my message, and not be like, what the hell is the matter with you? Put in some trees... It's just like, look at your stupid yard, it's all grass and concrete, what are you thinking?”

In contrast, a small number of interviewees reported being unconcerned about the quantity of trees in Seattle.

“Well, I mean, it's always nicer. It's more attractive, it provides whatever carbon dioxide... that sort of process. But I mean, in the scheme of things, a few more trees here and there is not going to do much in that regard.”

This person is aware that trees provide ecosystem services but does not think that the number of trees that may be lost or gained in Seattle will have a meaningful impact on the provision of these services. This may be an example of how attempts to link trees with carbon sequestration or air purification have oversold the value of these services in an urban context – if trees are promised as a means to address local environmental challenges then fail to do so in a way recognized by some stakeholders, the argument for their preservation loses persuasive power.

Solutions

The solutions interviewees proposed to both environmental and social challenges most often relied on individuals taking personal action. All but one interviewee suggested personal action as a solution to the challenges they identified when asked how homeowners can help. Statements related to addressing challenges via personal action are below.

“I suppose it's arguable by some standards... like, solar panels in Seattle, that's ridiculous... But in this era, we're doing everything we can to lift our spirits along these lines, to do something to contribute. And like, feel like, OK, we're walking the walk. We're not just giving money to things. We are doing things like this that make us feel like, OK, we can't do anything better.”

This person consciously uses her choices as a means to align her actions and her self-identity (“walking the walk”). Participating directly, as opposed to “just giving money,” strengthens her perception of alignment between her actions and identity. Her statement that engaging in these personal actions

allows her to feel like she “can’t do anything better” suggests that she considers herself to have a personal responsibility to engage in pro-environmental behaviors that she can address by putting solar panels on her home.

“And every citizen, I hope every citizen thinks, you need to do something... We don't copy exactly - I do this, why don't you do that? I am upset? No. You do what you can. What your knowledge allows.”

While this person’s attitude toward personal action emphasizes the individual nature of these actions more so than the attitudes of many other interviewees (“we don’t copy exactly,” and “you do what you can”), it is congruent with other interviewees’ perspective that addressing challenges in Seattle includes a component of individuals’ to personally engage.

“You can clean up after yourself and not leave your beer cans in the park. You know, to the extent that you can clean up around your place. If there's a big storm and sticks fell off your tree you can pick some of that stuff up. You could just be a decent human being. Like, I guess you could just do that.”

This person’s response may not show high levels of fluency with environmental issues, but it does show that even this person who is not as intimately familiar with environmental challenges believes, to some degree, that it is his responsibility to “be a decent human being” and perform basic environmental maintenance activities. The nearly universal presence of ideas related to personal responsibility as part of the solution to challenges suggests that framing desired behaviors through a personal responsibility lens will have resonance with many Seattle homeowners.

Other commonly proposed solutions focused on government action. The proposed mechanisms for these actions were not uniform, however. Some of these solutions emphasized prohibition of undesirable actions via legislation while others emphasized the opportunity for government programs to add benefit rather than prevent harm.

“It also depends on the government regulations. If they said, OK, the store... if they permit the store to sell the chemicals, right? People are going to buy them, right?”

“People will do terrible things if there aren't restrictions. They'll hire someone to cut down these trees if they're in their view. So yeah, I think, because we're in a city, we have to have some rules protecting what we have.”

Both of these statements suggest a belief that people require rules to behave in desirable ways and that government can create and enforce these rules. These are both examples of government prohibiting undesirable actions.

“There was a tree planting project, and a city program came by and planted some trees. And I was happy to see that.”

“It’s good that the city encourages [personal actions like recycling] and tries to educate people about the things that they can do.”

These statements demonstrate the belief that government intervention can be used to improve conditions through positive actions rather than prevent their degradation through prohibition. The second statement is also an example of the value interviewees place on personal actions to address challenges.

While all four these statements about government relate positively to government intervention for environmental benefit, their lack of uniformity suggests that proposing to change environmental behaviors via a specific government action may not be well-received. The variety in attitudes related to government intervention, even among these interviewed homeowners who suggested it as a solution themselves, indicates that there is nuance to solutions in this category that must be paid attention to if government-related solutions are to be accepted.

Although mentioned in the context of challenges rather than solutions, some interviewees identified financial incentives structured against pro-environmental behavior in such a way that suggests they may consider restructuring of these financial incentives as a potential solution.

“It's, you know, it often boils down to price, and that's why [the herbicide] Round Up continues to sell.”

“I think about [installing] a solar panel for my roof. But it doesn't work for now. Because my electrical bill is too low. I use everything like saving energy lights. So almost like, I pay a minimum already. If I had solar panels, the city said they won't buy my extra power. They won't. Not because of political problem, but because they have too much cheap hydroelectric power already.”

Both of these statements indicate a belief that price is a driver of environmental decision making. While this alone does not indicate that these people would necessarily support market-based interventions like a carbon tax, it does suggest that conversations surrounding pro-environmental behaviors may do well to include an acknowledgement of financial realities and provide financial incentives when possible.

Discussion

Urban homeowners are in a unique position to both benefit from their local ecosystem and have a significant impact on its management (individually in terms of their own yard and collectively in terms of the total land area used for the yards of single-family homes). My research uses semi-structured interviews to understand in depth some of the ways in which these people engage with, benefit from, and choose to manage their properties. It has relevance for its findings (related to homeowners' values, salient ecosystem services, and their interactions) and as a methodological proof of concept. As a proof of concept, it demonstrates the opportunity for additional levels of insight into the ways in which individuals use and benefit from ecosystems via more open-ended research strategies. Although such a research approach is not without limitations (namely, that the open-ended nature of its inquiry prevents results from being meaningfully quantified in a way that allows for quantitative comparison or testing for statistical significance), it allows for insights into homeowners' motivations that would be difficult to collect using more quantitative approaches.

The analyses here allow for the discovery and identification of some of the motivations Seattle homeowners hold related to their properties and some of the cognitive functions that ecosystem services perform for these beneficiaries. It is not intended to identify with certainty which (if any) of

these values or services are the most or the least important. Rather, it demonstrates that Seattle homeowners use the ecosystem services derived from their yards to fulfill a range of motivational goals that may not be obvious from only observing the interface of the ecosystem service and the beneficiary. Relatedly, it posits that these motivational goals may more directly describe the homeowner's motivation to engage with and manage in favor of an ecosystem service than does the more obvious nature of the service itself.

Many ecosystem service frameworks, like those published by TEEB and in the Millennium Ecosystem Assessment report, are highly effective tools for describing the primary mechanisms by which ecosystems interface with humans. However, these frameworks do not describe beneficiaries' motivations for accessing these services, and therefore do not describe the psychological function that ecosystem services provide for the individuals who access them. This layer of motivation and function is relevant for ecosystem service assessment and promoting changes in ecosystem-related behavior. Understanding the psychological function for which a person accesses any given ecosystem service allows for a more complete assessment of the benefits the individual derives from the ecosystem. My research shows that Seattle homeowners sometimes access ecosystem services for benefits that are not obvious in the service itself (as described in the previous section "Ecosystem services and interactions with values").

Motivations for engaging with ecosystem services, like those revealed in this research, may be context specific – it is likely that they result from an interaction between the individual's personal history, immediate social context, and physical environment. Nonetheless, it is possible that researchers could predict with some degree of accuracy the functions which stakeholders are using ecosystem services to perform by researching these interactions in a representative set of individuals. This would not be unlike generalizations made about the services provided by ecosystems overall. While individual ecosystems must be surveyed to assess with certainty what services they are providing, experts can nonetheless make reasonable extrapolations about the services provided by unknown ecosystems based on their knowledge of similar ecosystems. Similarly, it is conceivable that the patterns of functions that homeowners use ecosystem services to perform may be similar within demographic boundaries across multiple populations. Additional research with a larger sample that includes multiple geographic regions could help to test this hypothesis.

Relevance for promoting urban conservation behaviors

Many campaigns that seek to change individuals' behaviors for environmental benefit seek to do so by raising awareness of environmental challenges and solutions. These efforts may result in changes in attitudes toward environmental issues, but these changes in attitudes do not necessarily lead to changes in behavior (Duraiappah et al., 2013). It is changes in behavior, rather than attitudes alone, that are necessary to impact environmental outcomes. Even for individuals who hold pro-environmental attitudes, the opportunity to help the environment alone is often not a sufficient motivator – there must also be an opportunity to fulfill goals with personal and social focuses (Asah & Blahna, 2012). Relative to generic appeals, people tend to respond more to appeals that make it apparent how engaging in the desired behavior will satisfy their own motivational goals (Clary, Snyder, Ridge, Miene, & Haugen, 1994). This more-effective behavioral appeal strategy helps individuals to cognitively access their own salient motivations for engaging in the desired behavior.

Therefore, appeals for pro-environmental behavior related to Seattle homeowners' management of their yards are likely to be more effective when addressing homeowners' existing values and motivations related to their property. This can be accomplished by framing the costs and benefits of their behaviors in the terms most salient to their motivational goals. Among homeowners interviewed, the most commonly implied goals were related to the values security-personal, benevolence-caring, and universalism-nature. Findings from these interviews suggest that Seattle homeowners may be more responsive to behavior change appeals that suggest that the desired actions are effective ways to express these values or achieve their related motivational goals. For example, a campaign to increase the rates at which Seattle homeowners add native plants to their yard could be framed in each of the following ways.

Security-personal: Native plants can help your yard to be a comfortable, green space all year round. Plus, they can easily survive in our climate and so can be a good investment.

This appeal links native plants with personal comfort and security in the homeowner's immediate environment. By mentioning that native plants provide this comfort "all year round" and that they "survive in our climate," it implies that other plants might not provide such consistent comfort and might risk the homeowners investment and comfort. These concepts of stability and risk speak to the concerns of someone who holds security-personal values.

Benevolence-caring: Adding native plants to your yard lets you create a healthy and beautiful environment for your family. Plus, you can share the natural heritage of our region by introducing your family to the species that grow here.

This appeal suggests that native plant landscaping is a medium through which to care for one's family. It uses words like "share" that the reader may associate with benevolence-caring values, and implies an image of the reader doing this sharing while engaging in a benevolent way by introducing family members to the native plants.

Universalism-nature: Plug into nature by planting the trees, bushes, and flowers that thrive in your region. Plus, when you plant native plants, you're providing food and habitat for animals like birds to live in your yard.

This appeal connects using native plants in the person's yard to the well-being of other living things. It also specifically implies that the person can engage in a caring act related to local birds (which were mentioned in multiple interviews as enjoyable to see). The inclusion of "in your yard" strengthens the connection between the birds and the reader's personal provisioning of their food and habitat.

Conclusion

Although traditional ecosystem service frameworks are an excellent tool for describing the immediate interactions between an ecosystem and a beneficiary, they represent only a portion of the total benefits a person derives from the ecosystem. One important facet of benefit they generally exclude is the beneficiary's motivation for gaining this benefit at all or through the particular means in

question. Individuals choose to access ecosystem services in order to satisfy a motivational goal (these goals are products of the values they hold). The satisfaction of these goals is a benefit provided by the ecosystem service that is not obviously a part of the service itself, but is rather a product of the interaction between the ecosystem service, the individual, and the context in which the individual is operating.

Understanding individuals' motivations for engaging with ecosystem services can enrich ecosystem service assessments in any context. This layer of understanding may have particular significance, however, in places where humans are consciously managing ecosystem functions to a high degree. Some ecosystem services must be accessed actively and with some degree of intention (e.g., provisioning). We may think of some other ecosystem services as being accessed passively (e.g., climate regulation via carbon sequestration). In highly managed landscapes like cities, however, even services that might otherwise be accessed passively may require active intent to acquire so that the urban landscape is managed in such a way that the service is not excluded. For example, a city allowed to develop without intentionally preserved green space is unlikely to yield climate regulation services through shading or carbon sequestration, or water purification through the biological absorption of contaminants. When these services are consciously desired, however, urban landscapes can be managed to provide them by restoring or building wetlands, or increasing urban vegetation like street trees or green roofs. In these highly-managed landscapes, the decision makers' motivations to access and manage for ecosystem services is particularly relevant to understanding the availability of these services and how to increase their provision.

Understanding the motivations of people in positions to make decisions about ecosystem management can also help conservation advocates to frame pro-environmental management behavior in terms most salient to the decision makers. Appeals that help decision makers to cognitively link their management options with their existing values and motivational goals are more likely to result in the adoption of the desired behavior. My research suggests that, among homeowners in Seattle, appeals linking pro-environmental behavior to benevolence-caring, security-personal, and universalism-nature values are likely to have high levels of resonance.

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Appendix A: Recruitment documents

Email text

I'm a graduate student at the University of Washington. I'm conducting a study of Seattle homeowners' attitudes about their homes and yards. Would you consider participating? Any information you share will be anonymized and incorporated as a critical part of my thesis. If you are selected for an interview, I will meet you at your location.

It's important that this research includes a diversity of viewpoints within our city. I would love to include your unique perspective!

If you'd like to be considered for an interview, please complete the form at <http://bit.ly/2fFQSxs>. Please feel free to contact me with any questions at nicknev@uw.edu.

Thanks for your time!

Nick

Facebook post text

Want to share your perspective as a Seattle home owner? Apply to be interviewed!

I am recruiting Seattle homeowners for interviews about their home and yard. If selected for an interview, your ideas will be included in a research project at the University of Washington.

Please apply via the form at <http://bit.ly/2fQsxs>.

Text from online application to be interviewed

Want to share your perspective as a Seattle home owner? Apply to be interviewed!

I am recruiting Seattle homeowners for interviews about their home and yard. If selected for an interview, your ideas will be included in a research project at the University of Washington. The interview would be conducted by a graduate student researcher.

Questions? Please contact Nick Neverisky at nicknev@uw.edu. Thanks for sharing your unique experience as a Seattle home owner!

Please answer the following questions.

Do you own a home in Seattle?

Yes

No

How many years have you lived in your current residence?

Open-ended

How many years have you lived in Seattle?

Open-ended

What is your home zip code?

Open-ended

Contact Information

Name

Open-ended

Email

Open-ended

Phone

Open-ended

Year of birth

Open-ended

If you are selected for an interview, approximately when might you be available?

Are you generally available on weekdays, weekends, or both?

Weekday

Weekend

At what time(s) of day are you generally available?

Morning

Midday

Afternoon

Evening

Other comments?

Open-ended

Appendix B: Research instruments

Interview prompts

1. Tell me about where you live.
2. What do you like about your home?
 - a. How is [the service identified] important?
determine what motivational goal(s) each service helps the person to attain.
 - b. When did you first realize [the service identified] was important?
determine the context in which the person acquired the value.
 - c. How else could you gain the important benefits you just described?
determine other behaviors the person believes could satisfy the motivational goal.
Relates to substitutability.
 - d. What do can homeowners do to maintain or improve [the service identified]?
determine what the interviewee believes provides the service.
 - e. Who can help to maintain or improve [the service identified]?
 - f. What would make this person likely to help improve [the service identified]?
 - g. How do other people in your community value [the service identified]?
look for normative pressures in favor of or against relevant attitudes
3. What kind of things do you do in your yard? What kinds of things do other people do in your yard?

2.a – 2.h. Sub-questions from question 1 repeat for each yard-related activity identified.
4. Are there any challenges facing Seattle? What are some of the most important ones?
5. Are there any environmental challenges facing Seattle? What are some of the most important ones?
6. Can homeowners do anything to help with these challenges?
7. Some people say that it would be good to have more trees and other plants in our city. Is this important?
8. Some people say that rain water carries chemicals like fertilizers, pesticides, or cleaning products from yards into water bodies. Is this a concern?

Demographic survey instrument

How long have you lived in Seattle? _____

How long have you owned your current home? _____

Year of birth: _____

Zip code of residence: _____

Highest level of education completed (circle one)

- ☐ Less than high school
- ☐ High school/GED
- ☐ Two-year college
- ☐ Four-year college
- ☐ Graduate school

Household income last year (circle one)

- ☐ Less than \$25,000
- ☐ \$25,000-34,999
- ☐ \$35,000-49,999
- ☐ \$50,000-74,999
- ☐ \$75,000-99,999
- ☐ \$100,000-149,999
- ☐ \$150,000 or more

Do you identify as Spanish, Hispanic, or Latino? (circle one)

- ☐ Yes
- ☐ No

Ethnicity (circle one)

- ☐ American Indian/Alaska Native
- ☐ Asian/Asian-American
- ☐ Black/African American
- ☐ White
- ☐ Native Hawaiian/Pacific Islander

Appendix C: Selected values quotations

Conservation: conformity-interpersonal

"I don't know sort of the, this noise thing where like... do what you want until it affects somebody else."

"I'm just thinking about how you would do it without being... being rude to anyone now. Without putting in any additional shade."

"You are always telling the neighbors when you are doing something that is not standard so that they are not surprised."

"And making that stylish in some way could be useful for a lot of people because the flip side of, you should look after your yard because other people are interacting with it, doing something that is nice for everybody to look at and walk past and talk to you about, is social norms have a lot of weight."

Conservation: conformity-rules

Not present in interviews

Conservation: tradition

Not present in interviews

Conservation: security-societal

"[My mother] really did imbue in me a certain view about community... And if you are not together, you are in trouble. You cannot resist strong economic forces unless the community is standing together."

"[The mayor] is going about it differently by not listening to the old time Seattle people who've lived here for years and just basing his assumption and therefore the city's assumption on what's coming, and listening to the voice of the millennials that are coming to work... So they knock down a beautiful old home and instead of renovating it and put up you know, townhouse boxes. —said in the broader context of complaining about changes to neighborhoods, feeling like people who have lived in Seattle no longer have a say and are losing the city they know."

"I'm just kind of boggled and dismayed in a way because good housing is being torn down. A beautiful home that a family remodeled, and it was torn down when they sold it to a developer... I don't know how to phrase it. Just the fact that he's being destroyed and then the density is coming."

Conservation: security-personal

"So I mean I do... and I was very happy actually, behind our back fence there's a gate to the alley and when I moved in I was, there was a blackberry hedge and those are very prickly and basically made me feel very secure because nobody was going to get to our fence."

"So yeah [having the trees and bushes surrounding the yard] made me feel unhappy and less safe when it became more exposed. So I do think that does the trick and that, I'm not sure... the rest of our house is not protected in that way but just by lights and we have alarm systems."

"And there's another giant birch next door, that the landlord of the previous owners of that, took that down, that provided a lot of privacy because once that was gone... Not that anybody's particularly interested in our house but I mean there was... it provided a lot of privacy."

"If something happens to us you know individually like, somebody's there for you without thinking about what's in it for them or anything."

"There's more and more and more of them, like, SeaTac's growing exponentially in air traffic and the fine particulates from that is demonstrably bad for your lungs. And so that's the only thing I don't love about this house because I worry that I am doing myself irreparable damage."

"Just be alert and secure your house. You know I have my house with an alarm system. And I have a dog. And I have a good neighborhood where we watch out for each other."

"And I mean, just you know, knowing when you're gone for a weekend and feeling like you know some major kind of... if something were to happen with your house if there were to be a fire or... someone there would be, sort of that someone, that you would know, you know, that just someone... someone would give you a call or someone would call the police or call the fire department."

"I don't want to be afraid, to become really cynical or really just worried about stuff. So I think any of the steps we would take from my personal perspective would be almost just a preemptive... Preemptive just to because I don't want my sense of security kind of shattered."

"Mostly being able to know how [the food from our garden] is grown. So controlling what we put on the ground and what comes out."

"The stark location [without many trees] just makes me feel a little depressed. I mean, not a big deal, but there's just a difference... in just my mood."

"I don't want to live in close proximity to a lot of people that I never talked to where that I have kind of a Seattle freeze relationship with. You know, it's a neighborhood that pretty well-off, and I don't want to overstate it for there is crime here. There is a lot of opioid addiction, homelessness camps in the area. And people get their packages stolen. You know there is some robberies and things like that. And I just think having extra sets of eyes watching out for each other is nice."

"And it's just... It's just a nice. You don't want to live in a place where nobody talks to each other and it just feels kind of walled off. I have no desire to live in that kind of environment."

"We're a relatively safe neighborhood. I've just recently started locking my doors you know... but I have a big dog chained down the bottom of stairs and I have a sign on my back gate that warns off people. But that's just life in the city, I guess you have to expect that."

Conservation: face

"You wouldn't want to have a nice house with a shitty garden. Maybe in the back but not in the front, not from the curb side."

Self-enhancement: power-resources

Not present in interviews

Self-enhancement: power-dominance

Not present in interviews

Self-enhancement: achievement

"Owning a home has changed the way I think about a lot of things. And just my mindset with stuff. It's been really it's been really good. It's been really good for me. I like having something... I feel like everything I do around the house around the yard and projects, I'm doing... I personally get a lot of satisfaction out of it. I get a lot of self-worth out of it. I've learned I don't get a whole lot of satisfaction out of my job and I don't get a ton of self-worth, feel like I'm doing something positive with my job. But having this place and being able to take care of it and to improve this to to make it better is something that has really gives me a ton of satisfaction."

"It is the fact that [extra details added to a home] are fine. That they represent sense of going beyond. That you did more than just what was necessary to get the job done. And so that is what is so pleasing about it"

"[When I grow my own vegetables] I am outsmarting QFC."

Self-enhancement: hedonism

"There are other streets nearby that I know don't have trees on them, they are not very attractive"

"It was just not as nice to have to walk across the yard basically to get to your hot tub. So we had the deck installed, new deck, we were like let's just put the hot tub where it's more accessible."

"I know if it's nice out we like to be outside, but if it's not nice out, maybe not so much."

"So, trees are... again, I think that visually they make a huge difference. And I love the shade that they provide in the summer time. It just makes it a really nice environment."

"I love the fresh taste of stuff that is homegrown and it's not a economic issue, we can just go down, five blocks and Fred Myers got everything I need but the quality and the taste... Decades ago, when I grew my first homegrown tomatoes and ate them... I can not buy a grocery store tomato, they are just not worth eating and green beans are just like, you pick them off the vine and I have an asparagus patch and once asparagus has been picked, after twenty minutes it doesn't taste as good and you can imagine that days on the road..."

"And then with the big trees just to the west, but about 3:00, most of the house is in shade. This end of the house which heated up quite a bit in the morning still has sun until about 5:00 in the summer. But if we can get airflow underneath those frees from the west side of the house to push out the east side, then it really cools off nicely and can be quite comfortable. We just have to get that airflow going. But because of that, on nice sunny days we often fix a salad and then go outside. And throw a blanket on the lawn and have a picnic."

"Sitting in a chair, reading. And sipping some cold beverage."

"You enjoy seeing something that is beautiful. That is why I tend to like things that are flowering."

Openness to change: stimulation

"It's really valuable to have somebody or something show up or happen or get a good look at your surroundings from a fresh perspective."

"I mean it's fun to learn about the traditions and the holidays and to just have a different kind of, mix of people than I did on Capitol Hill."

"And learning so much. [Through working on my home] I've learned about all these tools. You know like, I've learned about, you know how the roof works, how all the systems in the house work. You know like where the ducts go. How the plumbing works, like I would drill into concrete, attach a sliding gate we've built out there, like building a retaining wall in the back, building a fence like. I just learned a ton of stuff that I think is really interesting."

"He's trying to grow a fig tree. And we want to just see what other kind of food we can do."

"[Engaging with neighbors and the outdoors] should be the major part of our life, not being holed up in our dwelling... and physical activity, it's the intellectual intensity, it's the cultural awareness, it's participation."

"Tomatoes and cherry tomatoes, tomatoes in general are fun challenges in our climate. We do not necessarily get hot enough or warm enough for them really to get red but tomato plants shoot up lots of different sucker vines. And you want to come in and trim them as they are coming on so you can direct all the energy to the fruit. So you are looking for the parts of the vine that come off that are going to flower and generate some fruits and you are looking for the other parts that will grow rapidly if you let them, but are not going to flower and you want to trim them off before they start sucking too much energy and too much of the nutrients... So, there is just kind of this, it is not just a, yeah, you planted it and it comes up and you throw seeds on the ground, you water it, that is all you have to do. There is some tending to it... It is a new problem solving thing."

"To stay engaged. That's what [my wife] was saying. You want to know what's going in people's lives. Otherwise you end with a very... you end up with tunnel vision. And we don't want tunnel vision. It's important to be engaged and be aware."

Openness to change: self-direction action

"One of the appeals [of this house]... was there is no HOA [homeowners' associations] or anything like that. There is no, like, legal governance of any kind. Everyone just kind of has their own place."

"We don't copy exactly. I do this, why don't you do that, I am upset. No. You do what you can. What your knowledge allows."

"We did have a couple of fruit trees out in front of the house. They were pear apples. But we didn't want to spray and no, I didn't want to put little socks over all of the... with that kind of things comes more responsibility than we were willing to take on."

"[My previous home was in] a condo association. So I had to pay the HOA [homeowners' association], and I had to always ask permission or get buy in, or consensus, and herd the cats every time I had an expense come up. And I was the president of the homeowners association and I just got so freaking sick and tired of dealing with people who did not give a damn that I just wanted my own house."

"I wanted to try [doing my own renovations]. I was curious as to what it would be like. And it's a way to get what you want."

Openness to change: self-direction thought

"Education. People are more open. Like me, I make some mistakes. But I read the newspapers - oh, This is harmful. I read the newspapers every day. Every day. Oh, this is not good. Oh this is good. So excited

that we know that... Think of living outside the box. You don't just stick with you old version where you always say no, no. I think a little bit deeper."

Self-transcendence: universalism-tolerance

"I respect diversity here. I have no problem. I understand that it can be difficult. It can be difficult because religion, culture, but open the heart. Open the mind. Right? You can live with."

"I personally would want, my kids go to public schools, want to be involved in that and would want to, want them to go to diverse schools, where there's a lot of different income levels, a lot of different ethnic backgrounds with kids and just having them be exposed to that. That is something that's really good."

"I think that all kind of, that's what diversity, that's what it brings it, you just learn that people at the root kind of want the same things and there's a lot of different variables pushing on them, act and behave in different ways but like you come down to, we've got a lot of stuff. Most people are complicated people. Most people are trying their best in their circumstances to do the best they can to do the right thing."

"It's a... again we're in the, like, white, tech, fairly well-off folks, but we feel like it's an environment where people are accepted. Where all types of folks are welcome to exist and feel comfortable and live where, want and love who they want, and all that stuff."

"Yeah I think, you know, similarly like, the preschool our daughter is in is like a fancy expensive preschool but, like it's.... the values of the place are such that a bunch of the kids that are in there are in their subsidized by the school so that it's not just all like white tech folks. it's a whole bunch of different folks at The school which I think is really helpful. It exposes her to more types of families and types of people. So that's generally positive and I want that for our neighborhood at large as well."

"If you give people part of a cultural ability to sit on the porch or sit on the park and interact with people going by they are going to become much more culturally integrated and much more tolerant, I think we have a lot less crime, a lot less bigotry and that sort of thing."

"But through soccer, the boys found diversity there. I just think Highland Park was the best elementary school. He had friends from Africa, immigrant kids from Africa, Mexico. That's the beauty of Seattle, is the salad that we are, you know the diversity."

"And as a person who grew up in Kansas, and South Dakota and Nebraska, no diversity at all. I just see it and I love it... It's acceptance of anyone. And not knowing any reason to not like a friend. Or not like a person."

"After the house was built we could have sold it and moved somewhere else. When we bought rentals after that... We had a rental that was in the nice part of town. It was a small house but, in a better zip code if you will. But we decided we wanted to be somewhere where you had the access to a diverse neighborhood."

"And so it's kind of cool to have that... different cultures, people come from different backgrounds... It's nice to be living together in the same neighborhood. But we've always traveled a lot. That appeals to people with... to see how we're all the same but different. So I guess the same goes for where you live."

Self-transcendence: universalism-nature

"[Feeding the birds] seems a nice thing to do when it's cold."

"It's maybe a little bigger than we need but we mostly bought it because, this enormous backyard which is just like a sanctuary. It is just beautiful. And I do like living on top of the hill instead of at the base of one. That's awesome. I don't take it for granted. Every morning when I come out the sun's coming up over the Cascades over here and then it's hitting the Olympics over there. It's just like, ah."

"The birds aren't out there screaming and like hammering on the pavement saying come on we're running out of places to live. And that's the kind of thing that just like that's what keeps me going with giving money and trying to provide habitat and I'm trying to encourage my neighbors all the time to plant trees and remind them that a lawn full of grass is really not a lot better than pavement."

"I like sustainable. I like something I can feed myself. And then create harmony... I don't like to get everything on the market. I grew my own gardens. Vegetables. Organic. I have organic chicken eggs. And you know, see this trashcan here? All full of water. I store over 2,000 gallons of water. So, like, free. And it's natural."

"My backyard? Okay. So mainly I care about is nature. Man and nature should and can be coexist. We survive in the nature, wildlife should be sharing survive. So winter time, I don't spoil them in the summertime but winter time, fall season, I feed them [gestures to bird feeders outside window]. And I make sure that I clean the bath and you know, make sure that they don't get disease as much as I can. And feed them because, and feed them in a tough time."

"I really like having a garden. And I really like being able to grow vegetables. We've only been here a year so we have a kind of short growing season. But we did this year we did tomatoes and zucchini and potatoes, brussel sprouts, got some asparagus going. You know it's really fun. I really enjoy doing it and it's like just it's really like you feel like you've got more of a connection to like where you are."

"You see some of these gigantic old fir trees. I mean they're just beautiful trees. And the ornamental trees are nice but just the impact that kind of seeing something that's been there for 100 years 200, 300 years..."

"We [installed solar panels] mostly because it's a more sustainable source of energy. And even if it is going to cost us a little more in the short run, we feel like it is an important step to wean ourselves from gas. And I guess electricity is mostly in this area hydropower, but... anyway, it was just like, the sun is always here... But I think overall for us it was less of a financial decision and more of a philosophical decision about where our power comes from."

"I just love the little critters. I've got a [bird] feeder here and I've got another one out here."

"Watching the weather is really great."

"Physical connectivity, and again that is a part of connecting with the site; connecting with the environment. I had a friend who one time was a gardener and she said, you know what I love the most about gardening, is the smell of top soil, and so even when you are digging there is this visceral... or smell of the soil. Or if you're cutting a branch and you cut, and go, 'oh I can smell, that is a juniper,' or cut some laurel... you can smell the plum flavors from the origins of the plant and even just pruning, this has... you got a thorn in one finger, a wonderful scent in your nose, rain going down your back, it's a real... you don't get those type of experiences sitting in the coffee shop at Starbucks."

"I think emotionally it's part of getting back and participating, being on some grass, around some bushes and stuff that you normally don't get in a completely urbanized environment."

“Well, one thing sitting here, I just love watching the weather and I think that's, it's something that you don't always get. You can get really tuned out of the environment just to say, oh it's raining, I got to get my raincoat or where did I leave my umbrella or should I wear those heavier shoes today and the weather becomes something that is adversarial and I think having, we have this, we are blessed with this view, but having some place to be out and going out, or even in a urban environment having a park where you can go to and saying, well, I can bundle up and go to the park. There is going to be a little snow fall today, I can go out to the park and see the snow on the ground rather than having to stay in my apartment and think, I wonder if the buses are running.”

“You can get muddy. You can get... run in the sprinkler, there's... an attachment to nature. You can watch a movie and see birds flying, but it's a different thing to be outside and watch the birds flying.”

“The biggest challenge would be Puget Sound, they're going to stop the cleanup efforts on Puget Sound... But I think Puget Sound is in danger.”

“[The stream and park adjacent to the yard] provides a place for water to go. It cleans the air. It gives wildlife habitat. Birds especially. It's amazing that... I mean the salmon aren't doing that well but just the fact that they can still attempt to have their life in the stream even though we make it really hard for them. I think it's neat to have a yin-yang of developed hard built world and then the natural, organic green world. I think you have to have balance of that.”

“[Native plants are important because] they lessen the population of invasive species, or the potential for some ornamental thing to go rogue and take over. But also that's the native habitat, and they grow with less water. They provide habitat for native species, what we have left of them. And I think they kind, I don't know, I've read that they're symbiotic and they kind of create a sort of system, like the fir trees depend on each other. Have you heard that? They promote the health of each other. Which is pretty amazing. Yeah, it's just, I guess we live in the Northwest and that's what grows here. And I'd hate to see it all go away and see it all be English garden or something.”

“I don't feel like I would be attracted to a house that took you know, 100 yards of cement to build the foundation and a million trees to make it. If you can take a house that has already been built, not huge but enough room in it, you know your footprint's a little smaller. I never thought I would be somebody talking about not burning up a ton of energy or reusing. Don't cut down some more trees to get more lumber, to make another house.”

“The green spaces just provide more opportunity for us all to learn from the land. Because buildings don't change but green spaces do, and we need to respect green spaces and promote them whenever possible.”

“Also working as hard as possible to have it be food gardening that doesn't require any extra inputs like all the compost from food scraps. So. Nothing that we wouldn't have bought already and nothing that would be extra or manufactured somewhere and watering with captured rainwater, which means we are we are more efficient with watering than is traditional.”

“But the other thing about the air conditioning [as opposed to cooling via shade from trees] is it that is a machine, somewhere there was a mine, that is electricity, that's electricity that we do not get for free out of hydropower in the summer because we are now worried about our snowpack and our summer water demand... and I would prefer to leave the hydropower water in the river for the fish, and in the river for the farms that grow the food I eat. I hope we never get down to choosing between the fish and the farms, but, both of those are better than my air conditioning if I can have a tree instead. Also, they are trees. I like trees.”

“So from an environmental perspective, is our human relationship with the world around us. Is an important part of the world around us. I mean, environmental protection does mean endangered species protection, it does mean adequate ecosystem balance, etc. But it also means human interactions with that environment. That is an important part of our approach to environment.”

Self-transcendence: universalism-concern

“People tend to think about decisions like that not just in... not just how it's going to benefit me, because it's such a, I mean a lot of people that are in their 60's and they're voting yes for [light rail expansion] but they're not going to see a lot of the benefits of it. And it's it's just take so long to build up those systems. So but to see people that are may not be getting as much of that than it did to themselves personally still be on board with some of these big long term initiatives as... it just makes me really proud to live in this city.”

“I think it gets you in a mindset to think in a more community based way. A lot of times we're just reacting to stuff. Right? I mean you're busy, you're stressed. It's very easy to just, when you're making decisions think about it just from this... Is this benefiting me? And it's just been benefiting the community is benefiting the planet or so I think. Seeing old growth trees still around gets you to think about like, wow, we've had to make an effort to preserve this. When you get to see people renovating houses that are 90 years old and not knocking them down and putting up modern gigantic houses. You know it's makes you... proud that people are doing something that's a little harder because it's better for everyone. Just more of a community mentality. And it's hard to it's hard to see and it's hard to have your first reaction always to be to think about the greater good in yourself. But I feel like I'm more like nudges there are that direction the better.”

“Others might be struggling, might be priced out a bit. [Seattle is] certainly changing in that way.”

“The northwest corner is demographically one of the lower economic demographics in the city, it is also, I think if I remember right, the most culturally diverse, it has the greatest number of racially diverse, culturally diverse, religiously diverse neighborhood of the city. And so to me that's really interesting and challenging because I think as the greater Lake City develops, I don't want to see those people displaced, I want to see them become part of Lake City.”

“I think we lose the diversity, I think we lose the cultural issue of it being a family city because if we have mostly apartment or condominium dwellers and really high priced...”

“I did see something on Facebook that people were putting food in [the book-sharing library they have in their front yard]. So I've been putting zip lock bags for just, I got some things at Costco, some protein bars and protein liquid, and put a zip lock bag in there with a note saying, if you are hungry... well it always gets taken. Because I have seen people who look like they're down on their luck walking by.”

“I think the challenge for Seattle is going to be more than homelessness. We're going to see Medicaid end. The divide between the wealthy and the poor is getting more and more.”

“I hope it is nice for people walking by under the shade.”

Self-transcendence: benevolence-dependability

"They were an old family that was very self-contained when we moved in but I kept like working on until finally we're like talking to them and everything and they started to have emergencies and I was able to like go over and help them like take them flashlights when the power went out and stuff like that."

"You can apply for the city and get street tree stuff. I used to do that. But I learned that sometimes the city of Seattle it short budget. So why don't we go ahead and do that, make a donation for the city. Instead of hey, give me the money. Hey, give me the trees. I do for my neighbors, I plant all the street trees here. And I ask my neighbor, she can't afford, okay I will buy. And my neighbor here, she can't afford, I go ahead and bought for her."

"And everybody is, we should do something, to do some to offset what we create. you know, CO2. We ride a car, we ride a truck, we cannot walk all the time to work. We've no choice. And at this point, we don't have electrical... [unclear] expensive electric car. Or solar car, whatever. We hoping the future to do something. But right now, we offset. We do something."

"I agree to pay tax for CO2. I agree. I agreed to pay for the pollution I create."

"Everyone has to try and do a couple little things, they can do to try and keep it that way to you know support protecting the areas as wilderness. So volunteer, doing this stuff, just try to keep the stuff around you know for future generations for our kids. You know just try and protect as much as we can."

"It is an obligation to be a part of the community and make the space beautiful if we can."

"If I see a weed growing in the [shared] parking strip flower patch I'll just pull it... You know, I work from home so I always bring the [shared] recycling bins in when the guys come by through the alley to get them."

"I love being of service in that way. I just... it's what you do for your neighborhood."

"I think it's healthy to contribute to any kind of sustainability in your community and organic gardening does that well."

"It's gratifying to be able to entertain [guests]. And if somebody wants to do something and ask if they can do it at our house, we can do that."

"I have been kicking leaves off of the storm drains for 3 weeks now I don't think we have a very extensive sewer treatment system that wants to deal with those leaves."

Self-transcendence: benevolence-caring

"We all just kind of know like OK we're here for each other and hopefully we like each other too."

"I really like all the humans in my environment. Like, I love all my neighbors."

"I have a good neighborhood where we watch out for each other."

"I pay attention to my neighbors here. You know, respect. I care for them more than my family members. Because we don't know. We live nearby. My family members can be, you know, I see several times in the year, but my neighbors, I see them every day."

"But in the summertime if we have organic we share with neighbors and family. It is like a chance to meet each other. A chance to share. A chance to, you know, talk with. Other than merely as related to yourself. Just take care of yourself. But then you don't know others."

"And I share with them, if they want something come here and I will give it to them. They don't need to buy."

"We want to eat this food, right. Like we have this garden we want to have fresh tomatoes, fresh cucumbers, we want to eat them and we don't want to use pressure treated wood for the planter boxes, we're not going to dump a bunch of chemicals on there. You know I mean just being... living in a city and being in a modern life you're getting exposed to way more chemicals than, you know, human beings should probably be exposed to. So anything we can do to limit that has got to be... So it's both a selfish perspective of our own personal perspective of, I want to protect myself and my family."

"We've got a basketball hoop that the neighborhood kids have used for, you know... we moved here in 89, so it was in the early 90s that they used it, and have since then. It's just, it's nice."

"And then a basement apartment for my mother-in-law so that we can help here out with some... her needs as well as help control rent and have that connection with her grandson."

"And probably do a little vegetable garden. That will also be a good thing for our 4 year old there, to experience too."

"There are tons of little kids. Which is just so much fun. And it's interesting, they haven't really gotten to know each other. Because they're off the day care. And that's a real different circumstance for families. Which is why it's important for us to have that barbecue at least so they can get to meet each other."

"Well, and the... we used to... it's kind of changed now, but we used to go down there and cut tunnels through the blackberries. The kids would go down there and we'd like, make a tunnel and at the end we'd clear it out and have a hide away place."

"I hope it is nice for people walking by under the shade."

Self-transcendence: humility

"I think one of the big things about ecologically sensitive stuff rather than non-ecologically sensitive stuff is not necessarily money or what you get out of it but you are not as in control if you are trying to do stuff in an ecological way because you just can't say, well the weather is this way and the climate is this way, I'll just buy some new stuff. You have to say, this is what I have got, what can I make out of it? This is not how we were brought up to do things and not a way that aligns with a profitable life."

"I think on the larger scale there's that sense of wonder that it inspires, even here. When there's a wind storm, or a cool bird like a heron will come and land out there, or some kind of hawk and then you go grab the book and try to figure out what it is. Sometimes it's eating something. It's that circle of life thing."

"What the city recommends for a planting strip... they are just overgrown shrubs. They do not give a person that sense of nature dominance. If you are walking down a street that has a lot of tall trees, you have a sense of your insignificance."

Appendix D: Selected ecosystem services quotations

Cultural: aesthetic

"I'm all for more trees, I mean I'm glad we have trees in our street. There are other streets nearby that I know don't have trees on them, they are not very attractive."

"I found somebody to come and she was just like walked around and was like well what if you change the focus to over here and then move these things and it was just like, it was really great. It was totally worth it to get somebody to just like, here's a new way to look at things."

"I put in that tree because the neighbors across well, for various reasons but then, across the way... It's so frustrating that they don't do anything with that like I don't want to look out on that. That's my view, right. So it's like putting this tree in the foreground has the added benefit of... just like it's the birds or there's always birds hopping around out there and that's why I put the humming bird feeder and so now it's like I've got something to look at so yeah, it is a nice place."

"It feels like when, when people live in a place and it feels like it's a detriment to the community... so to us it feels important to make the changes that we're going to make eventually to the yard, to make it appealing for our neighbors as well as ourselves."

"And it was very pretty, we had a view of the lake from upstairs, very filled with trees and greenery and it was very nice."

"They have such pretty foliage."

"I like the green. I like to look out and see the birds. And the trees."

"A lot of the garden needs to have some plants with some color... For the most part they are all out on the border of the yard. So I kind of used them to try hide the cyclone fence with a chain link"

"I guess I like flowers better than vegetables. I like gardens, not necessarily flowers per say. But I like change, I like everything in my garden to do at least two things, you just can't sit there and just be a plant, it has to bloom in the spring and bloom in the fall, or if it doesn't do that then it's got to be fragrant, or if it doesn't do that it's got to feed the hummingbirds or so... my garden is, it's alive, it's alive with things that bloom in the winter, or over the summer. So all these years I'd been gardening, I developed a really beautiful garden that is very active, it's alive."

"You enjoy seeing something that is beautiful. That is why I tend to like things that are flowering."

Cultural: cultural diversity

Not present in interviews

Cultural: cultural heritage

"Part of it is keeping alive some heritage too, because there... I have what we call the [last name] rose. It's my grandma's maiden name. And on her mother's farm in Wisconsin where all these Italian immigrants came, out on the farm was this old rambling red rose. It just spreads everywhere. So my

mother dug some up and took it to where some folks lived in Kansas, and I took some of Mom's, and all of my sisters have some of this rose. So that's out on the parking strip."

"Fresh air. Healthy living. Just you know... yeah. I just grew up outside... We just weren't in the house. That was in Hawaii."

Cultural: ecotourism

Not present in interviews

Cultural: education

"But it's really neat to see them explore, too. Hey Dad, there's a turtle! Look at the ducks! And I think it's very important to have that curiosity-driven discovery. Kids have a huge curiosity on their own. And I think our formal education system, we still kind of quash that by about fourth or fifth grade. And maybe it's just... part of my natural questioning nature that I want to keep instilling that in my son, but I think that's important."

"And they certainly learned about invasive species – I used to make them go out there and cut the ivies! And... I think it's important to be able to be a steward of the earth. And if you're in connection you get to appreciate the outside. And I think that's important."

Cultural: inspiration

Not present in interviews

Cultural: intrinsic value

Not present in interviews

Cultural: knowledge systems

Not present in interviews

Cultural: privacy

"So I mean I do... and I was very happy actually, behind our back fence there's a gate to the alley and when I moved in I was, there was a blackberry hedge and those are very prickly and basically made me feel very secure because nobody was going to get to our fence."

"And there's another giant birch next door, that the landlord of the previous owners of that, took that down, that provided a lot of privacy because once that was gone... Not that anybody's particularly interested in our house but I mean there was... it provided a lot of privacy."

"Plants can provide just enough screening that you actually have a sense of privacy... I've got a big grass thing that kind of shields us."

"And they are so big now that it is a little more private in summer. So, actually... which is nicer in the summer because that means you can have more of your windows open, and you are not quite on stage

for the busy street, because there are some trees in between you. In the winter we are kind of on stage.”

Cultural: recreation

“Well, one of the things, when we moved here, I didn’t quite realize the impact of living on a corner. All of a sudden you’ve got way more yard because it’s, you know, that whole, like, you’ve got a much bigger planting strip and stuff. And it’s been through, we’ve been through a lot of iterations as I’ve been experimenting with my yard. By the time that I die I’ll probably have gotten it right but it will have taken me 50 years to do so.”

“My husband and I will be sitting out there in the summertime.”

“Sometimes the chickadee will come over there and try to get in there as well. It’s kind of fun.”

“I mean, as you can see looking out here today, just watching the weather and we got a little bird bath and my wife just recently got into bird watching, we see birds species and stuff.”

“I have got probably, it’s crept up to about a thousand feet of area that I got, everything from berries to annual stuff to a lot of row crops and tomatoes and it’s a recreation and ethereal thing.”

“[Gardening] is a lot of work... and it’s a lot of work, or it’s a lot of recreation, or it’s a lot of fun and it just depends on where on the scale.”

“We have a plastic play slide house, toy, I think, in the front yard and he will kick the ball back and forth or just run around.”

“Relaxation. Being outside and exercise.”

“We used to go down there and cut tunnels through the blackberries. The kids would go down there and we’d like make a tunnel and at the end we’d clear it out and have a hide away place.”

“You take 2 years of observation to realize what you’re missing and when you put plants and they are the size of a large book and you have to baby them along while the roots get settled. And then they explode. So that is fun. Sometimes they get bigger than you meant. Anyhow, that is the nice thing about gardening. Paying attention to the plants that come in and out. And there is something that I avoid because the next door neighbors told me the rats really love it so that is what I am not growing. So, yes, all of these games.”

Cultural: religious and spiritual values

Not present in interviews

Cultural: sense of place

“And the natives, wildlife here, they’ve been here before we came in.”

“And I really like being able to grow vegetables. We’ve only been here a year so we have a kind of short growing season. But we did this year we did tomatoes and zucchini and potatoes, brussel sprouts, got

some asparagus going. You know it's really fun. I really enjoy doing it and it's like just it's really like you feel like you've got more of a connection to like where you are."

"We have a grape vine but we don't really like the grapes here so we're trying to graft a grape from our old house."

"It's an ability to emotionally connect with where you are living. I think if I lived in a much more dense area with the lack of privacy and windows all around, I wouldn't feel connected, I would just feel like a bystander and I think here I just feel like I'm part of the landscape. It's hard to explain but it's a emotional connection. I can just go down and be down doing some weed cleaning and come back and get a beer and just sit down there in the weeds on the bank and just look around and just really enjoy being there. And I know if, having lived on smaller city lots before, you know, you can be in your backyard and putter around but you always have this feeling that somebody may be watching or looking or listening and it's, there's just this, it's not just privacy, its real in terms of feeling like when I am out there, I am part of the landscape not part of urban structure."

"During the summer months when the garden is producing we just plan our eating and our meals on what's in the garden, if there is a lot of broccoli available we will do that. If I am going to make soup, if there are collards out, we'll chop it up and make collard chicken soup. Our menu evolves on what's going out there. I think that's another really good part of the connection to the environment is you know, again we compartmentalized our lives so living in a house and we can only get what we buy at the grocery store we developed all these little containers of our life that we are living and not really getting out and interacting."

"I think on the larger scale there's that sense of wonder that it inspires, even here. When there's a wind storm, or a cool bird like a heron will come and land out there, or some kind of hawk and then you go grab the book and try to figure out what it is. Sometimes it's eating something. It's that circle of life thing."

"I guess we live in the Northwest and that's what grows here. And I'd hate to see it all go away and see it all be English garden or something."

Cultural: social relations

"We use [our outdoor space] mostly in the summer for entertaining."

"We had a get together for this block quite a few months ago, I mean very mixed, very ethnic, very racially mixed."

"We have a yard that's big enough that we got married in back... We could have 100 people come, and it was fun."

"I mean since we moved in, yeah we eat out there, we entertain out there."

"We have a space that goes back that spans three properties. It's a really long back yard. And so the last property that expands is a new family with two kids and there's not an actual fence on that part of our property. And so we've just put like a few barriers like a built up garden and stuff. So we put in a little gate so the two little boys are always coming over to visit through that gate and I love that because we don't have any kids. And I love this feeling of just like, the kids feel like they can go anywhere."

“But in the summertime if we have organic [produce] we share with neighbors and family. It is like a chance to meet each other. A chance to share. A chance to, you know, talk with. Other than merely as related to yourself. Just take care of yourself. But then you don't know others.”

“Just that it is nice to have the grapes and [my husband] makes the jelly and we give it to friends.”

“It feels like when, when people live in a place and it feels like it's a detriment to the community... so to us it feels important to make the changes that we're going to make eventually to the yard, to make it appealing for our neighbors as well as ourselves.”

“And it's one of the things about, you know, these old houses with big front porches. And our little yards that we kind of mostly manage ourselves. And so you can see your neighbors and interact with them.”

“And we have great strawberries. There's this little guy next door who just loves strawberries.”

“My neighbors will stop by and chat about, you know, what's going on. Especially after the election, we had a lot of long conversations over the fence about politics.”

“My neighbors call my yard the neighborhood off leash park. Because I let people drop their dogs off, they're walking by, and their dogs play and I'm like, go get your coffee, come back... Selfishly, it's good for my dog too, then she has a buddy. But it's a fun way to get to know my neighbors. And a lot of time I'll say, oh I made coffee, come on in.”

“But I think it's healthy to contribute to any kind of sustainability in your community and organic gardening does that well.”

“I think just getting involved with the neighbors and a lot of that is done with gardening in the front yard, not fencing off the front yard.”

“I felt safe walking through Yesler terrace. Which, I know people in less benign cities would find very odd. It's technically... it's our rough part of town and I was like, yeah, we're a really nice town then. And I assume it was partly because everybody had a little place they were looking after, changing the whole design of the street.”

“Most gardeners will share things. You always have an excess of something and an under-plus of something. And you share seeds, and somebody will come over.”

Regulating: air quality

“And if we do the tear down and rebuild construction method of getting density, that... we lose a lot of trees in that. And air pollution is enough of a question... And we have Lake City Way that goes through our neighborhood. And that's going to keep increasing. How do we deal with scrubbing that air pollution and keeping a city that's healthy to live in? I think we need to do a lot more to plant more trees.”

“It cleans the air.”

“And then in my mind I think these [plants] are making fresh air so I want more of these.”

“We get a lot of particulates because this is a busy street and the front of the house gets dirty way faster than the back of the house. And there are all these measurements of trees doing some sound baffling and a lot of particulate baffling.”

Regulating: climate regulation

“Of course you know every tree is, you know, produces oxygen right? And you know - climate change.”

“So, trees are... again, i think that visually they make a huge difference. And I love the shade that they provide in the summer time. It just makes it a really nice environment.”

“And then with the big trees just to the west, but about 3:00, most of the house is in shade. This end of the house which heated up quite a bit in the morning still has sun until about 5:00 in the summer. But if we can get airflow underneath those trees from the west side of the house to push out the east side, then it really cools off nicely and can be quite comfortable. We just have to get that airflow going.”

“It just pisses me off hugely when a tree goes down because a single family dwelling wants to be bigger or have more of a view. I keep thinking, you are about to need an air conditioner.”

“You can just feel the house getting hotter and hotter until about 1 in the afternoon when the shade has hit the roof and then it actually starts getting cooler even though outside is getting hotter. Which really shows off how much the shade can do. And I hope it is nice for people walking by under the shade. Because it is a bus line you get a lot of people walking at least some blocks to go home.”

Regulating: human health

“We utilize the environmental, it's very important. Not only for wildlife. If wildlife can survive, humans can survive. Because it shows that the health of wildlife is surviving, humans can be healthy too. If you know that they can't survive, how could you survive?”

“And I mean just for us. I mean we want to eat this food, right. Like we have this garden we want to have fresh tomatoes, fresh cucumbers, we want to eat them and we don't want to use pressure treated wood for the planter boxes, we're not going to dump a bunch of chemicals on there. You know I mean just being... living in a city and being in a modern life you're getting exposed to way more chemicals than, you know, human beings should probably be exposed to. So anything we can do to limit that has got to be... So it's both a selfish perspective of our own personal perspective of, I want to protect myself and my family.”

“The stark location [without trees] just makes me feel a little depressed. I mean, not a big deal, but there's just a difference... in just my mood.”

“And, you know, the climate, because there's pretty much always something that's alive here. It's not like, I came from the Midwest, it was very bleak in the winter. And the spring didn't come till May. And so here, spring is showing signs here in February. And, so, it's just... it's good for my mental health.”

“[Growing your own food] is really ethereal and it's really healthy, because it is all organic.”

"I think for just... for your frame of mind. And to be in a good place. I'm not very good at psychology but it seems like there's probably some psychological value to having the natural world in evidence."

Regulating: noise reduction

"I like trees. And they do make the house a little quieter which is nice, because of the traffic and the buses."

"And with the hedge you're kind of sheltered. You can still hear the cars but it's not right on the street."

Regulating: pollination

"[Yard as habitat is important for] the bees, the bees for sure."

"[I plant] some stuff that the hummingbirds like. It's always nice to have as many pollinators as possible."

Regulating: water filtration

"[Having a yard] provides a place for water to go."

Provisioning: biochemical

Not present in interviews

Provisioning: fiber

Not present in interviews

Provisioning: food provisioning

"I mean we grow a lot of vegetables, we have berries that came with, like blackberries, raspberries like came with. And then we planted veggies and we use it, we definitely make use of the garden."

"I do think it saves money, it's cheaper to buy seeds than the packaged products."

"We called in City Fruit to take away boxes and boxes and boxes of apples from this tree, this old tree in the front yard. They took away 100 pounds one year and more than 100 last year."

"I like to eat the raspberries."

"I like sustainable. I like something I can feed myself. And then create harmony... I don't like to get everything on the market. I grew my own gardens. Vegetables. Organic. I have organic chicken eggs."

"But in the summertime if we have organic [produce] we share with neighbors and family. It is like a chance to meet each other. A chance to share. A chance to, you know, talk with. Other than merely as related to yourself. Just take care of yourself. But then you don't know others."

"I really like having a garden. And I really like being able to grow vegetables. We've only been here a year so we have a kind of short growing season. But we did this year we did tomatoes and zucchini and potatoes, brussel sprouts, got some asparagus going. You know it's really fun. I really enjoy doing it and it's like just it's really like you feel like you've got more of a connection to like where you are."

“Normally with Seattle, you know it's you've got kind of the summer, and the winter right? You know, where summer is beautiful, everyone looks forward to the summers. Winters are kind of tough, kind of gray and I am not really a skier. But having... having the kind of gardening thing gets you to think of it like, well, in the fall it is, you know, we need to plant different crops in the fall and you think about cover crops and thinking about like, you know, what am I going to do on to soil in the spring. And then when spring starts early, it's still terrible weather out and it's you know February, March, April you sort of start thinking about how the soil, and like, you know, do I want to... we've even got, downstairs, we've got grow lights and sprouted, like, we're sprouting seeds indoors to be able to transport them outside so just kind of, that's really good. I think for me when you get to this time of year when it's seems like it's so far away for sun and summer, you get to start your sprouts and it's like, it kind of speeds up everything, and kind of gives you something really to look forward to and kind of count down. So that's really nice.”

“I mean we have to try and give some of it away, because we just kind of... the tomatoes did great last year, so, hopefully that happens again. But yes mostly stuff to be for ourselves.”

“I mean we want to eat this food, right. Like we have this garden we want to have fresh tomatoes, fresh cucumbers, we want to eat them and we don't want to use pressure treated wood for the planter boxes, we're not going to dump a bunch of chemicals on there. You know I mean just being... living in a city and being in a modern life you're getting exposed to way more chemicals than, you know, human beings should probably be exposed to. So anything we can do to limit that has got to be... So it's both a selfish perspective of our own personal perspective of, I want to protect myself and my family.”

“Mostly being able to know how it is grown. so controlling what we put on the ground and what comes out. It's just fun to be able to create something in that way too. And use it. We always have rosemary, whenever we need it I just go out to chop some rosemary off the bush by the sidewalk. And we grew... we've mostly grown tomatoes and lettuce but we'd like to do more vegetables too. My husband really wants to grow more fruit trees. We have a grape vine but we don't really like the grapes here so we're trying to graft a grape from our old house. It's purple grapes because he makes jelly out of it. So he's trying to graft that onto the grapevine over there. And he's trying to grow a fig tree. And we want to just see what other kind of food we can do. We had a pear tree, like two pear trees and a plum tree in Portland also. So we missed that. It was kind of neat to be able to, you know, have our own food that we're growing and canning or whatever... I mean [knowing what went into it] would be the main practical reason I would say. But for us it is more... Just that it is nice to have the grapes and [my husband] makes the jelly and we give it to friends. It's... It's just satisfying.”

“I started doing some puttering and some minor digging, and yesterday I dug up a whole row for planting the peas and it was really good exercise and I felt exhilarated, I just felt like it was a rush.”

“I have got probably, its crept up to about a thousand feet of area that I got, everything from berries to annual stuff to a lot of row crops and tomatoes and it's a recreation and ethereal thing, I love the fresh taste of stuff that is homegrown and it's not a economic issue, we can just go down, five blocks and Fred Myers got everything I need but the quality and the taste... Decades ago, when I grew my first homegrown tomatoes and ate them... I can not buy a grocery store tomato, they are just not worth eating and green beans are just like, you pick them off the vine and I have a asparagus patch and once asparagus has been picked, after twenty minutes it doesn't taste as good and you can imagine that days on the road, so there's just this again, its really ethereal and its really healthy, because it is all organic and so we, during the summer months when the garden is producing we just plan our eating and our

meals on what's in the garden, if there is a lot of broccoli available we will do that. If I am going to make soup, if there are collards out, we'll chop it up and make collard chicken soup. Our menu evolves on what's going out there. I think that's another really good part of the connection to the environment is you know, again we compartmentalized our lives so living in a house and we can only get what we buy at the grocery store we developed all these little containers of our life that we are living and not really getting out and interacting."

"And probably do a little vegetable garden. That will also be a good thing for our 4 year old there, to experience too."

"It is just fun to see things grow as well. There is a little bit of that of, hey, I grew that, I planted that."

"Tomatoes and cherry tomatoes, tomatoes in general are fun challenges in our climate. We do not necessarily get hot enough or warm enough for them really to get red but tomato plants shoot up lots of different sucker vines. And you want to come in and trim them as they are coming on so you can direct all the energy to the fruit. So you are looking for the parts of the vine that come off that are going to flower and generate some fruits and you are looking for the other parts that will grow rapidly if you let them, but are not going to flower and you want to trim them off before they start sucking too much energy and too much of the nutrients... And, that was kind of a rewarding daily maintenance effort and in the end when the plant is just loaded with fruit and every bit of vine has some fruit on it."

"And we have great strawberries. There's this little guy next door who just loves strawberries."

"Tomatoes are worth it. There's nothing like a tomato from the garden. They're red all the way through, and meaty."

"We did yes, but at a very small scale, 4 by 8 and we put a pumpkin plant in it last year that took over the whole thing and ruined it for the entire... it was useless but other than that carrots you know, just a little room. More just for the kids to play with. Not really generating a big meal maker."

"But I think it's healthy to contribute to any kind of sustainability in your community and organic gardening does that well."

"There are two trees in the front here. Two Asian pears. I am working on the Asian pears. And I will until the end of February. So I have an Asian pear for lunch. And we have them in our salads. And we will until February."

"I am outsmarting QFC. That is part of it, we are not having to buy those."

Provisioning: fresh water

Not present in interviews

Provisioning: fuel

Not present in interviews

Provisioning: genetic resources

Not present in interviews

Provisioning: ornamental resources

Not present in interviews

Regulating: biological control (pests)

Not present in interviews

Regulating: erosion control

Not present in interviews

Supporting: habitat

“The birds aren't out there screaming and like hammering on the pavement saying come on we're running out of places to live. And that's the kind of thing that just like that's what keeps me going with giving money and trying to provide habitat and I'm trying to encourage my neighbors all the time to plant trees and remind them that a lawn full of grass is really not a lot better than pavement.”

“I just saw the coolest bird in my yard. And here's what you can get from putting in a little habitat for these poor little things.”

“I created like a... wildlife habitat. So, all native plants. So they feed [the animals]. All four seasons.”

“We utilize the environmental, it's very important. Not only for wildlife. If wildlife can survive, humans can survive. Because it shows that the health of wildlife is surviving, humans can be healthy too. If you know that they can't survive, how could you survive?”

“It gives wildlife habitat. Birds especially.”

“I'm a [certified] habitat here so I have all kinds of critters out there.”

“Very often there are a couple bird nests up in the top which is, okay, that was somewhere for them to live.”

Supporting: nutrient cycling

Not present in interviews

Supporting: primary production

Not present in interviews

Supporting: soil formation

Not present in interviews

Regulating: storm protection

Not present in interviews

Regulating: water purification and waste treatment

Not present in interviews

Regulating: water regulation

Not present in interviews