Funding Natural Capital

Determining the Desired Characteristics of an Ecosystem Services Credit

A report by

Upstream Innovations

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Executive Summary

Humans depend on the natural capital provided by ecosystem services. Alternative Land Use Services (ALUS) is a community-developed, farmer delivered program that provides financial support to farmers to enhance and maintain ecosystem services. ALUS currently receives grants and donations to fund their program, but seeks to diversify its revenue stream by creating an ecosystem services credit that provides purchasers with the full suite of benefits from the restored landscape.

The purpose of this study was to determine the value of ALUS' proposed voluntary ecosystem services credit to individual consumers and industry leaders, and to provide a value proposition that optimizes uptake among these potential purchasers. The objectives of the study were to:

1. Identify which ecosystem services are of interest to different stakeholders (specifically institutions and individuals)
2. Determine motivations and barriers of stakeholders to pay for these ecosystem services
3. Determine the desirability of a bundled ecosystem service credit to the PES market
4. Determine the specific features of a bundled ecosystem service credit that will optimize the voluntary funding to ecosystem services providers and agricultural land owners

To achieve the project objectives, we conducted 151 surveys with individual consumers, 17 semi-structured interviews with industry leaders from six industries, as well as desktop studies reviewing existing literature on payment for ecosystem services.

Key findings are as follows:

- Individual consumers have a high interest in restoring all landscapes supported by ALUS, particularly wetlands and woodlots. Industry members prefer areas in which they have a direct impact, particularly carbon and water.

- Individuals were motivated by concern about climate change mitigation and food production, but generally lack knowledge about offsetting. Industry leaders preferred internal impact reductions rather than offsetting their practices. A desire to satisfy stakeholder demand was identified as a primary motivation.

- Industry leaders were open to the idea of a bundled credit, while individuals tended to be indifferent.
- Proximity to the project community was an important attribute of the credit to both individuals and industries. Third party certification and transparency were also key attributes.

Two recommendations were presented to ALUS that provide guidance in marketing and selling the ecosystem services credit to a variety of stakeholders:

Recommendation #1: Offer the credit as a carbon offset, as there is already an established carbon market in Canada with existing standards and certifications.

Recommendation #2: Offer a bundled credit sold by area of land conserved. The credit can be introduced as a social donation initially, targeting locally based businesses and individuals as long-term customers.

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About Upstream Innovations

Our team consisted of five individuals from diverse backgrounds. Together, we pooled our knowledge and resources to complete the following report. We divided our team into a survey group and an interview group in order to successfully complete these tasks in time. The survey group consisted of Colin Little, Alex Watkins and Mackenzie Zettler. These three individuals worked together to create the survey, collect the data and analyze the results. The interview group consisted of Alison Carlyle and Sophia Sanniti. Together, these two individuals contacted and interviewed industry members and analyzed the results from the interviews. Each member contributed and as a team we worked together to complete the final report.

Table of Contents

List of Tables

List of Figures

List of Abbreviations and Acronyms

ALUS	Alternative Land Use Services
CSR	Corporate Social Responsibility
GHG	Greenhouse Gas
MEA	Millennium Ecosystem Assessment
PES	Payment for Ecosystem Services
WP	"Willing to Purchase" Consumer Group
PWP	"Potentially Willing to Purchase" Consumer Group

1.0 Introduction

From water filtration to air purification, humans depend on the natural capital provided by ecosystem services. However, urban expansion and intensified agricultural practices can reduce or affect the benefits these services offer. As a result, market-based mechanisms such as payments for ecosystem services (PES), have emerged as the preferred option for provision of ecosystem services on private agricultural land (FAO, 2007). These markets provide financial aid to agricultural producers who convert marginal lands into productive ecosystems that provide these services.

Ecosystem services – such as air and water filtration, carbon sequestration, and pollination – provide a multitude of benefits to humans, and abundant natural capital is necessary to achieve these services (Levine & Chan, 2011). However, in recent history, the quality of the natural environment has deteriorated due to human influence, reducing the flows of ecosystem services significantly in some regions (Kroeger & Casey, 2007). In fact, according to the Millennium Ecosystem Assessment (MEA), 15 of 24 identified ecosystem services are in decline (MEA, 2005; Fisher, Turner & Morling, 2009). The decline of ecosystem services highlights the increased need for conservation efforts. By associating a monetary value to ecosystem services and integrating them into the global economy (rather than viewing them as an externality), there has been an increased emphasis on their importance.

Alternative Land Use Services (ALUS) is a "community-developed, farmer delivered program that provides financial support to farmers to enhance and maintain ecosystem services" (ALUS, 2011). ALUS currently receives grants and donations to fund their PES system, but would like to diversify their revenue stream by creating an ecosystem services credit, which provides purchasers the full suite of benefits from the restored landscape. Prior to creating and marketing the credit (currently referred to as an 'eco-credit'), ALUS requires further research on the consumers' willingness to pay for ecosystem services and the value proposition of the ecosystem services credit.

The purpose of this study is to determine the value of a voluntary ecosystem services credit to consumers and industry leaders and provide a value proposition that will promote uptake among these potential purchasers. The specific objectives of this study are to:

1. Identify which ecosystem services are of interest to different stakeholders (specifically institutions and individuals)

2. Determine the motivations and barriers of stakeholders to pay for these ecosystem services
3. Determine the desirability of a bundled ecosystem service credit to the PES market
4. Determine the specific features of a bundled ecosystem service credit that will optimize the voluntary funding to agricultural land owners

Upon completion of these objectives, ALUS will have a better understanding of consumer and industry perspectives of ecosystem services. The outcome of this project is a value proposition for the proposed ecosystem services credit, which will aid ALUS in marketing the product to a wide variety of stakeholders.

2.0 Background and Context

Natural capital is our finite stock of natural and environmental resources that provide ecosystem services. The destruction of natural areas due to development activities represents a loss of natural capital, which affects the capacity for ecosystems to provide the services that we as humans rely on, such as air filtration and water purification (Olewiler, 2004).

Agricultural development has a significant impact on ecosystem functions, as it requires large tracts of privately managed properties. In order to derive economic value from these properties, farmers produce goods (food and fiber) for sale on existing commodity markets. However, the services provided by intact and functioning ecosystems are often perceived as externalities, due to the failure of traditional markets to capture their value to society. Individual landowners lack the incentive to provide a public good (air purification, for example) at their own expense (Boyd & Banzhaf, 2007; Jack, Kousky & Sims, 2007).

PES is an approach that can be applied to agricultural landscapes to reduce environmental degradation from agriculture and enhance the capacity of the land to provide ecosystem services. PES mechanisms provide compensation to people, commonly farmers, for providing some type of ecosystem service (Piard, 2012). The immense land area required for agricultural production make it suitable to provide ecosystem services, making PES a viable financial tool to engage farmers in increasing natural capital. These concepts are explored further in the following sections.

2.1 Ecosystem Services

The concept of ecosystem services has become the convention for describing human-ecosystem relationships. Levine and Chan (2011) have defined ecosystem services as "the processes whereby ecosystems render benefits to humans" (p.11). The MEA (2005) classifies ecosystem services into the following four categories:

> *Supporting*: Cleansing, food security, and preserving overall diversity
> *Regulating*: Life support and weather buffers
> *Provisioning*: Seafood, forest products, agricultural products, etc.
> *Cultural*: Cultural health, inspiration, recreation, etc.

Although there is no universal definition of ecosystem services due to the complexity and nuance of the concept, similar definitions and categorizations are widely accepted in the literature (Boyd & Banzhaf, 2007; Palmer & Filoso, 2009). "Provisioning" ecosystem services are easily commoditized and have defined economic value in traditional markets. The intent of PES schemes is to place similar economic value on Supporting, Regulating, and Cultural ecosystem services.

2.2 Payments for Ecosystem Services

Markets for PES are beginning to develop globally to provide land owners and managers with an economic incentive to support the development and management of ecosystem services. PES markets have been predominately funded by public capital (Liu, Li, Ouyang, Tam & Chen, 2008), although some private markets are beginning to develop that promote participatory involvement from both investors and ecosystem service providers (Rosenberg, 2010).

Many studies argue that if government funding dissipates, land owners who have received funding to provide ecosystem services will no longer have an incentive or obligation to maintain such natural capital (Bullock, Aronson, Newton, Pywell & Rey-Benayas, 2011; Bohlen, 2009). A study assessing the sustainability of China's PES Grain-to-Green-Program in 2009, found that nearly 2% of ecosystem service providers intend to reconvert their land for agricultural production once financial support from the government ceases (Chen, Lupi, He, Ouyang & Liu, 2009). If government funding ceases, landowners who provide ecosystem services through government funded projects will not be able to economically justify sustaining these ecosystem services (Bullock et al., 2011). To counteract this trend from occurring it is essential that PES markets diversify their funding streams and do not rely solely on financial support from

government programs. Voluntary PES markets and models are in the early stages of development globally and are facing challenges with establishing sustainable demand within the market, and standardizing both market metrics and ecosystem service accounting units. There is also a significant lack of experience and public knowledge to effectively implement such programs.

2.3 Environmental Offset Credits

One alternative to government-funded PES programs is the emerging markets for environmental offset credits. Market-based instruments such as carbon taxes, cap-and-trade systems, and conservation and mitigation banking attempt to internalize the value of ecosystems, and let regulated markets determine an appropriate price of natural capital. There are a wide variety of offset credit mechanisms that facilitate the trade of ecosystem services – particularly in the areas of carbon, water, and biodiversity (Sustainable Prosperity, 2012). Participation in such markets can be compliance-driven or voluntary.

Sustainable Prosperity (2012) has conducted extensive market analyses of the Air and Carbon, Water Quantity and Quality, and Habitat and Biodiversity markets in Canada. Their *Environmental Markets 2012* report identified 14 voluntary environmental markets in the country, twelve of which focus on Habitat and Biodiversity conservation (Sustainable Prosperity, 2012). Voluntary carbon offset sales by Canadian offset providers equated to approximately C$25.2 million, although "only 1MtCO_2e of voluntary carbon offsets, valued at $8 million USD, was purchased by Canadian buyers in 2011" (Sustainable Prosperity, 2012, p.17). Sustainable Prosperity (2013) values the Canadian carbon market at $190 million, whereas the habitat and biodiversity market is valued much higher, at $530 million. Voluntary markets for ecosystem services are emerging in Canada, although many are still in the growth stage.

Ecosystem Marketplace (2013) synthesized much of the information from their global air, water, and biodiversity market analyses in the *Matrix for Innovative Markets and Market-Like Instruments for Ecosystem Services*. According to the matrix, the value of the voluntary carbon market globally was around $53 million in 2012, and is experiencing 55% annual growth by volume. Ecosystem Marketplace predicts the global voluntary carbon market may be worth close to $2.2 billion in 2020. Voluntary private sector watershed payments are currently valued at $4.3 – $4.8 million, with annual growth of around 3%. Potential for voluntary watershed payments could approach an estimated $10 million by 2020. Finally, the market for voluntary biodiversity compensation – which is valued approximately $25 million – is showing annual growth of around

10%, for an expected value of $70 million in 2020 (Ecosystem Marketplace, 2013). This information represents the most comprehensive valuations on voluntary payments for ecosystem services currently available.

2.3.1 Individuals and Environmental Offset Credits

The voluntary offset credit market for individuals is a mechanism for private citizens to offset various environmentally harmful activities that occur in their day-to-day lives. Environmentally conscious consumers can neutralize their ecological footprint from a wide range of goods and services (such as air travel, daily energy use, and consumer goods) by voluntarily purchasing an environmental offset credit. Funds from the credit purchase are then delivered by credit suppliers to projects that improve ecosystem functions. The largest and most established markets for individual offsets are carbon markets that offset greenhouse gas emissions (GHGs). Much of the literature that provides evidence of individual voluntary transactions focuses on carbon markets.

Currently individual credit purchasers account for less than 2% of the voluntary purchases in the carbon market in 2013 (Peeters-Stanley & Yin, 2013). This is despite the fact that they are "some of the most public-facing offset offerings [à la travel offsetting or other point-of-sale offset options]" (Peeters-Stanley & Yin, 2013, p.47). It is worth noting that despite the relatively small size of the individual offset market relative to institutional offset purchasers, there has been considerable growth in individual offset purchases year-over-year. Blasch and Farsi (2013) observed 100% growth in worldwide individual offset purchases from 2010 to 2011, particularly among European consumers. Overall, they conclude that based on current growth trends, there is "considerable potential demand for voluntary carbon offsets that might well exceed the one observed within existing voluntary carbon offset markets" (Blasch & Farsi, 2013, p.3). For a number of reasons, uptake of voluntary offset credits has yet to become a mainstream behavior among individuals.

Consumers are however progressively becoming more ecologically conscious, and are actively seeking environmentally friendly products and services (Han, Hsu & Sheu, 2010). In the context of environmental offset credits though, individual consumers are a highly heterogeneous consumer group and generally have divergent ideas and reasoning that explains the services they value. According to at least one study, demand for voluntary carbon offsets was "highly context dependent, and strongly varies with the types of offered mitigation projects" (Blasch & Farsi, 2013, p.3). Offset purchasers were far more inclined to purchase offsets that support projects with easily understandable benefits, such as afforestation and renewable energy projects (Blasch

& Farsi, 2013). Gossling et al. (2009) also concluded that offset projects that require technical or expert knowledge are too difficult for typical consumers to grasp, which inhibits the participation in a payment scheme that supports those projects. The general complexity of offset schemes and lack of understanding among many consumers was cited as a barrier to individual participation in offset markets in multiple additional studies (Nakamura & Kato, 2013; MacKerron et al., 2009).

Ribaudo et al. (2010) described linked markets as a key to extracting payments for ecosystem services from individuals. The researchers in this study posit that individual offset consumers derive more value when offset providers "link the provision of an ecosystem service (a social good) with the provision of a private good" (Ribaudo, Green, Hansen & Hellerstein, 2010, p.2087). For example, hunters that value the private good of recreation on farmer's landscapes are likely to pay for projects that support habitat creation for game animals. Hein et al. (2006) find that scale is important in determining which ecosystem services are significant to stakeholders. Recreation services are one of the most popular services on the community level (Hein, van Koppen, De Groot & van Ierland, 2006; Pleininger, Dijks, Oteros-Rozas & Bieling, 2013). Communities and landowners also value other cultural services, such as aesthetics (Pleininger et al., 2013) and cultural and historical value (Fontana et al., 2013).

Motivations for purchasing offset credits can vary tremendously among consumers. Ribaudo et al. (2010) contend that consumers' willingness to pay for carbon offsets is driven in large part by the fact they want to avoid being considered as a 'free-rider'. Individuals tend to already be conscious of environmental issues and show an interest in limiting their personal ecological footprint. This is supported by Blasch & Farsi's (2013) conclusion that "people participating in voluntary carbon offsetting schemes have adopted environmental- and climate-friendly behaviour in various fields of their life and consider carbon offsetting as a complement to such behaviours" (p.20). In general, credit purchasers are motivated in large part by altruism and the belief that consumers have an intrinsic responsibility to be environmentally conscious (MacKerron et al., 2009). Other motivations driving individual offset credits include the ease of supplier-purchaser transactions, direct linkages between activities and offsets, and the presence of public awareness campaigns (Peeters-Stanley & Yin, 2013; Jacobsen, 2011).

The most significant barrier inhibiting the purchase of offset credits among individuals is the lack of knowledge and understanding of the concept. Multiple willingness to pay studies elucidate that this is a major limiting factor in voluntary offset markets. Gossling et al. (2009) found that only about 25% of air travelers were familiar with concept of an environmental offset credit. These

researchers noted that many travelers had expressed curiosity in the concept when they were made aware by those conducting the survey. Nakamura and Kato's (2013) study of air travelers determined that less than half of the respondents were familiar with the concept of carbon offsetting, and only around 1% had actually participated in an offset program. A second prominent barrier to individual's participation in carbon markets was the lack of perceived responsibility for emissions. Gossling et al. (2009) study revealed that only one-third of air travelers believed that they were personally responsible for managing their environmental impact from flying. Individual consumers often believe that government and industry are responsible for managing ecosystem impacts, as opposed to individuals.

As the concept of environmental offset credits evolves, there is increasing emphasis on capturing the value of the whole scope of ecological benefits (i.e. a bundled credit package) in addition to carbon sequestration. A bundled credit accounts for all positive environmental aspects of an ecosystem, from water filtration to pollination to habitat and biodiversity preservation. Whether individuals perceive greater value in a bundled credit of ecosystem services remains unanswered. MacKerron et al. (2009) suggest that conservation projects with an emphasis on co-benefits may grow the voluntary offset market. Their study found that once respondents were made aware of the existence of a strong certification regime, they were willing to pay substantially more for offsets with co-benefits (MacKerron et al., 2009). Other studies though, have theorized that individuals perceive greater value in conserving individual species on a landscape rather than the landscape as a whole (Miller & Lloyd-Smith, 2008). In theory, the value of the bundle should equal the sum of the value of all individual components. In practice, individuals may value specific components more than stacked benefits.

2.3.2 Industry and Environmental Offset Credits

Industry is an excellent market for ecological offset credits, as firms generally have more financial resources than individuals. According to the *Ecosystem Marketplace Matrix* (2013), significant demand for offsets in the voluntary carbon markets comes from corporations, NGOs, universities, and other offset supplier/intermediaries. Voluntary biodiversity offsets are typically purchased by major conservation NGOs, infrastructure project developers, and public works developers (Peeters-Stanley & Yin, 2013). In North America, carbon offset purchases were transacted primarily by manufacturing (40%) and events/entertainment sectors (19%) (Peeters-Stanley & Yin, 2013). Another active industry is the agricultural sector, where 73% of offsets were transacted within the supply chain (Peeters-Stanley & Yin, 2013). Voluntary purchasers of

water credits are likely to be major water users – private water companies, beer and beverage companies, electric companies, food manufacturing, and agribusiness (Peeters-Stanley & Yin, 2013).

Motivations for business and other organizations to participate in voluntary offset markets can vary tremendously by industry sector. Any company's environmental policy must be based on the economic fundamentals of the company: the industry structure and the company's position within that structure, while also identifying a source of competitive advantage through the investments being considered (Orsato, 2006). A report by KPMG (2011) found a consistent year-over-year growth in the number of companies engaging in some form of corporate social responsibility (CSR) indicating that corporate interest in the environment has been increasing in general. CSR is a direct motivator for the purchase of offset credits, as companies find it increasingly difficult to ignore the business case for a triple bottom line that promotes environmental and social components in addition to economic success. One group of researchers found that industries which purchase voluntary offsets benefit from positive public relations, innovation within the organization, and facilitating future participation in carbon reduction programs (Kollmuss, Zink & Polycarp, 2008). Carbon offset markets have been embraced due to their environmental and economic efficiency, and the potential to provide sustainability co-benefits in advancing capacity and technology that can easily be transferred to other industry sectors (Kollmuss, Zink & Polycarp, 2008). The reality is that managers want to maximize benefits for both the consumer and their corporate profits.

Barriers that inhibit industry participation in offsetting are primary related to the uncertain tradeoff between a company's investment and the financial returns. Orsato (2006) finds that managers are often overwhelmed with prioritizing environmental investments, whether they should invest in high-level management systems or investigate changes from the production level. In most cases, voluntary offset purchases are an example of beyond compliance leadership. They offer a way for a firm to differentiate itself from its competitors. Companies that take this approach may be willing to continually invest in ambitious practices such as certifications and environmental management schemes, as well as unprofitable environmental improvements.

There has been a wide range of criticism towards carbon offsets in both the compliance and voluntary markets. Main criticisms include how a significant number of offset projects are non-additional, as they would have been implemented anyway, while other concerns around equality and fairness have been raised claiming how carbon offsets enable an unsustainable lifestyle in

developed nations by funding these projects in developing nations. It has also been noted that benefits from carbon offset projects rarely find their way to the host community, and that accounting methods for the offsets are not precise enough to justify real emission reductions (Kollmuss, Zink & Polycarp, 2008).

There is a diverse range of concerns from both an individual and industry perspective when considering participating in the voluntary offset market. Individuals remain highly active in seeking ways to neutralize their ecological footprint through the offset market and through purchasing environmentally friendly products and services. Yet the projects that individuals are willing to support are highly context dependent, and participants are easily disengaged when technical or expert knowledge is required. There has been a noticeable increase of corporate interest in the environment, with an ultimate goal of maximizing benefits for their customer and their company's profits. However there remains a tremendous amount of uncertainty regarding the tradeoff between financial investment in a voluntary offset project and the financial returns, as well as the overall concern with locating and identifying the projects and quantifying results. This research will identify from a consumer and corporate level, the motivations and barriers to participating in the voluntary offset market. In particular, it will determine whether these two groups perceive greater value from a bundled or a single service ecological offset credit, and what motivating factors influence their perceptions.

3.0 Methodology

Primary data collection components included both a survey of individual consumers, and interviews with industry representatives. The purpose of the survey and the interview was to determine the desirability of ALUS' ecosystem services credit and enhance the value proposition presented to potential credit purchasers. Table 1 displays each individual research objective and the associated survey and interview questions. A full list of survey and interview questions is available in Appendix A, which guides the interpretation of Tables 1 and 2.

Table 1. Primary data collection methods by objective

Objective	Question Number	
	Survey	Interview
Identify which ecosystem services are of interest to stakeholders	12	4, 5
Motivations and barriers of stakeholders to pay for ecosystem services	9, 10	1 – 3, 7
Desirability of a bundled ecosystem service credit	14	6, 8, 11 – 12
Specific features of a credit that will optimize the voluntary uptake	13, 15-19	9, 10, 13

3.1 Detailed Survey Procedure

Surveys were developed to gain insight on individuals' awareness of ecosystem services, their willingness to pay for these services, and how to appropriately package the proposed ALUS ecosystem services credit. Therefore, the survey was organized into three parts. Part A collected respondent information, including demographic information. Part B gathered insight on the current awareness of ecosystem services and which services respondents value the most. Part C focused on the proposed ecosystem services credit and determining what characteristics of the credit would entice respondents to purchase it.

The survey period lasted from January 2014 to March 2014. Throughout this period, the surveys were distributed at various locations, using paper copies and tablet computers. The surveys were distributed at St. Jacob's Farmers Market, in St. Jacob's, ON, on February 6th and February 8th, and at Seven Shores Urban Market & Café, in Waterloo, ON, on February 11th. Surveys were also given to volunteers and customers of Queen Street Commons Cafe, in Kitchener, ON, during this period. In addition, online surveys were distributed and a link to the survey was placed on the front page of the Waterloo Region Food System Roundtable's website. All respondents – regardless of where the survey was distributed – received the same survey. Surveys were conducted at locations where environmentally conscious individuals are likely to frequent to attract individuals who might be more aware of agricultural and food issues, as well as ecosystem services and would consider purchasing the proposed credit.

The majority of the survey questions were interpreted based on frequency analyses. By analyzing theses frequencies for the questions that align with the goals of the objectives we were able to identify the predominant interests and values of possible credit purchasers. This information was used to determine the features of ecosystem services credit that would effectively optimize voluntary funding from individual consumers. Additionally, some questions (particularly demographic data) were collected, but fell outside of the scope of our research objectives. This information is summarized and analyzed in Appendix B.

3.2 Detailed Interview Procedure

Through initial secondary research, six industries were identified as possible purchasers of environmental credits: food and beverage, entertainment, construction, retail, energy, and financial services. Participants in the interviews were management-level employees that were

directly involved with sustainability or environmental decisions within these industries. To achieve a representative sample, a minimum of 2-3 management-level employees per industry was the initial target group.

Interview participants were recruited primarily through personal networks. A total of seventeen interviews were conducted between January 28 and March 3: four interviews in food and beverage (two national corporations, two local operations), two in retail (both national), two in entertainment (both local), five in financial services (four national, one local), two in construction (both local), and two in the energy industry (both national). Once the interviews were completed, they were partially transcribed and separated based on research objectives to identify common patterns and themes. For objectives one and two, interviews were analyzed by industry to understand what industries value, and motivations and barriers for each industry. Objective three was analyzed without grouping and objective four was analyzed using the following consumer groupings.

3.3 Willingness to Pay Analysis

Respondents of both the survey and interview were categorized into three groups based on their willingness to purchase an ecosystem services credit. Survey respondents were grouped based solely on their response to the question "Would you consider offsetting activities in your daily life that have negative impacts on ecosystem services, by purchasing an offset credit?" There was little room for interpretation in the categorization process of survey respondents. The qualitative and unpredictable nature of interview responses however, meant that the categorization of industries' willingness to pay for offset credits was subject to interpretation. Generally, interviewees whose organizations have offset negative activities in the past, or would currently consider offsetting were considered willing to purchase (WP). Interviewees whose organizations have not offset in the past, but may consider offsetting negative activities in the future based on certain conditions, were considered potentially willing to purchase (PWP). Interviewees whose organizations do not practice any form of environmentally beneficial activity or CSR initiatives were categorized as unwilling to purchase.

Table 2: Grouping survey and interview respondents by their willingness to purchase and ecosystem service credit

Willingness to Pay	**Survey**			**Interviews**		
	Question Number	Response	Number of Respondents	Question Number	Response	Number of Respondents
Willing to purchase ecosystem services credit (WP)	13	Yes	80	6	Have or currently offset	6
				8	Would purchase offset	
Potentially willing to purchase ecosystem services credit (PWP)	13	I don't know	53	8	Would not currently purchase offset, but may in the future	7
Unwilling to purchase ecosystem services credit	13	No	12	1-3	Do not practice any form of CSR	4
Total Respondents			**145***			**17**

* Note: There were a total of 151 respondents but six did not specify whether they would be willing to purchase

The three credit consumer groups were analyzed based on their responses to the survey and interview questions to determine their desired attributes for an ecosystem services credit. These research objectives have been analyzed for each possible consumer group to determine that group's environmental interests, motivations and barriers to purchase, and the features which they would like to see characterize an ecosystem services credit. This was done so that the attributes of the credit could be tailored to those most likely to purchase a credit. By also defining those who are potentially willing, this group is also considered in the credit design. The group of respondents that were unwilling was excluded from the analysis.

3.4 Limitations and Constraints

The structure of some survey questions limited the amount of analysis and trends that could be identified from the data. Many of the questions were formatted as 'select-all-that-apply' answers. This led to many participants selecting every possible option, which provided less than optimal results. With low levels of variation among responses, it was difficult to analyze and provide

recommendations based on these questions. A survey designed to allow definitive responses would yield more conclusive results. As for interview respondents, the use of personal networks meant that sustainability professionals could be targeted in the six chosen industries, and were more likely to participate in the interview. Unfortunately, this procedure was inherently biased. There is a larger representation of finance and food and beverage professionals, which is a reflection of the interviewers' personal networks.

4.0 Results

The results from the survey and interviews provide a basis for understanding how individual consumers and industry leaders perceive the importance of ecosystem services and what attributes of an ecosystem services credit are found to be most valuable to them. We assessed the results of the survey and interview for individual consumers and industry by determining which ecosystem services were of interest, the motivations and barriers to PES for individual consumers and industry, and by identifying the desirability and preferred features of an ecosystem services credit.

4.1 Ecosystem Services of Interest

To determine which ecosystem services were of interest to stakeholders, survey participants were asked which ALUS offered ecosystem restoration projects they would be willing to pay for. Due to the nature of the interview, interviewees were asked directly which ecosystem services they found to be important.

4.1.1 Consumer Survey

Figure 1 shows that there was a clear preference towards the restoration of Wetland ecosystems, with 87% of the willing to purchase consumer group and 71% of the PWP consumer group selecting this ecosystem. Additionally, it is notable that 80% of respondents within the WP consumer group also selected Woodlot

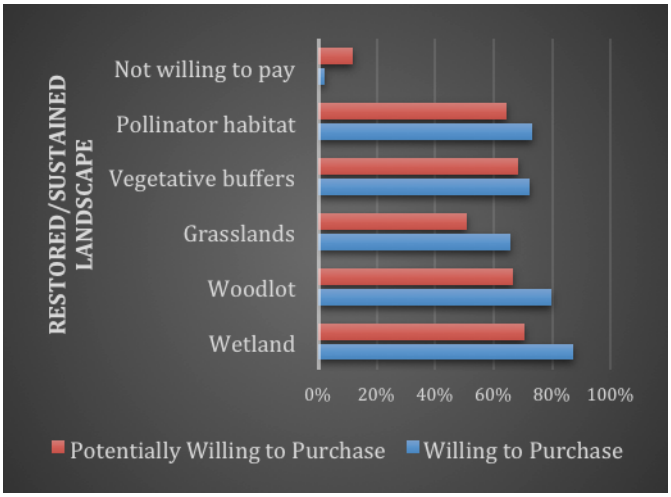

Figure 1: Landscape preference of survey respondents

ecosystems as desired restoration landscape, making it the 2nd highest preferred option for the group. Furthermore, the three remaining landscapes (pollinator habitat, vegetative buffers, and grasslands) were all selected by at least 50% of survey respondents from each credit consumer group, showing there is significant interest in restoring a diverse number of ecosystems. There is little difference in the landscapes and ecosystem services each consumer group is interested in. Overall the WP group is generally more interested in restoring all landscapes. However, there are very similar trends in the top choices that each consumer group identified, with both having a preference towards Wetlands and Woodlots.

4.1.2 Industry Interview

The companies interviewed had difficulty choosing ecosystem services that they value. Only one interviewee in the food and beverage actually cited ecosystem services of concern, such as biodiversity, mitigation of soil erosion, and water or air purification. Rather than naming ecosystem services, interviewees addressed environmental areas of concern within the company, and using these concerns conclusions were drawn by choosing ecosystem services which were related to the these concerns. Summaries of each industry can be found in Table 3.

Table 3. Ecosystem services of value by industry

Industry	Environmental Concerns	Ecosystem Services
Financial	Energy, water and paper use	Carbon, water filtration
Food & Beverage	Waste (Food waste + recycling), water	Composting, water filtration
Energy	Water	Water filtration, air purification
Entertainment	Water, food waste, carbon emissions	Carbon, composting, water filtration
Retail	Energy efficiency and supply chains	Carbon
Construction	Energy use	Carbon

Water filtration and carbon sequestration are the two biggest concerns overall, though composting is also mentioned by both the food & beverage and entertainment industries. Both interviewees from the entertainment industry recognized that carbon was difficult to reduce on their own. Of the two individuals interviewed in the construction industry, one mentioned the concern of carbon and energy use in both the construction process and the efficiency of the final product. The other interviewee mentioned that they are not concerned with ecosystem services because they build in the downtown area, therefore they do not recognize that the land they are building on disrupts the ecosystem.

In the finance industry two of the five interviewees mentioned land concerns: one mentioned that the land their company branches use could alternatively be forested areas, and one mentioned their concern with sensitive areas in the projects they invest in. Supply chain was also a concern mentioned by interviewees in food & beverage. Finally, other areas mentioned by the energy industry include carbon and energy efficiency, air purification and land use change.

4.3 Motivations and Barriers to Payment for Ecosystem Services

To identify motivations and barriers to participate in voluntary offset credit activities, the survey asked individuals to select responses about what motivates them to participate in environmental initiatives. Interview respondents were asked to characterize the motivations and barriers of their organization to participate in environmental initiatives as well as environmental offsets.

4.3.1 Individual Consumers

When survey participants were asked to select what their motivators are for participating in environmental activities both credit consumer groups tended to have similar responses (Figure 2). The most predominant motivator for both groups was climate change mitigation, which was selected by 67% of the PWP consumer group and 68% of the WP consumer group. The second most frequently selected response for both consumer groups was food production, selected by 57% of the PWP consumer group and by 46% of the WP consumer group. Also noteworthy is that over 40% of respondents from both consumer groups identified recreation and leisure as a significant motivator for participating in environmental initiatives.

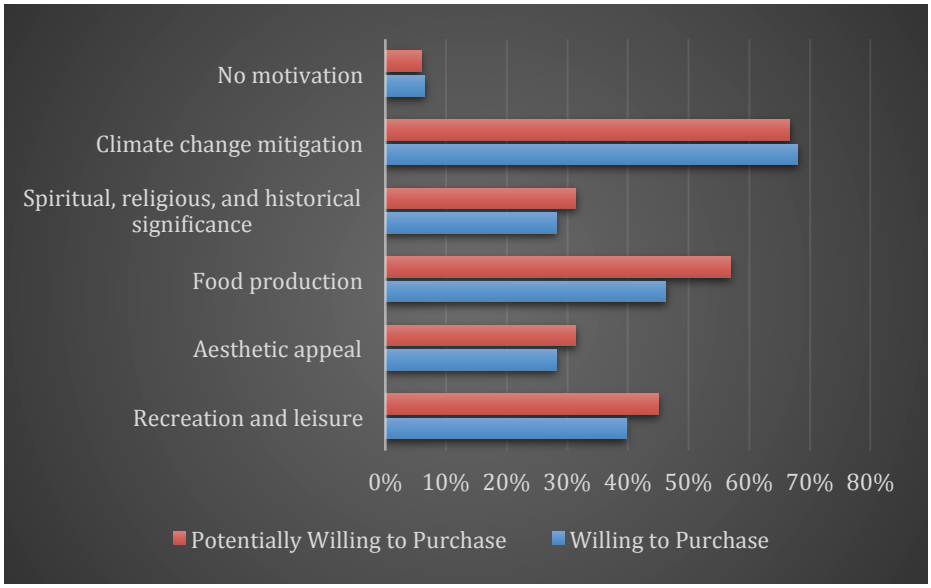

Figure 2: Individual motivators for environmental activities

One of the main barriers identified from previous literature on voluntary PES was a general lack of knowledge on the concept of ecosystem services. We asked survey recipients if they were aware of the concept of ecosystem services (Figure 3). There was a common trend from both credit consumer groups, with approximately 40% of the PWP consumer group and 35% of the WP consumer group having no familiarity with the concept of ecosystem services and the benefits they provide to our society.

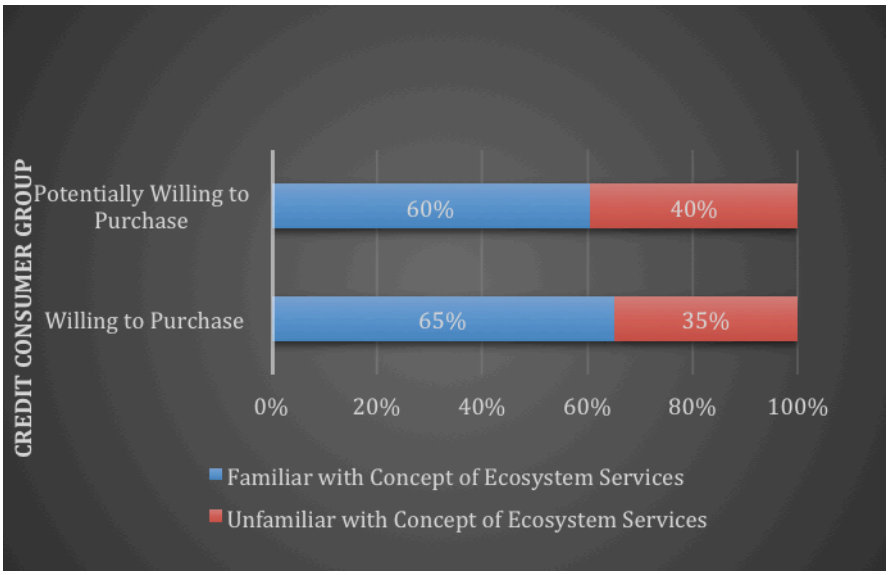

Figure 3: Individual awareness on the concept of ecosystem services

Each consumer group had very similar motivations towards the concept of payment for ecosystem services. Both groups identified climate change mitigation, food production, and recreation and leisure as their top three motivators for participating in environmental initiatives. However, there was a slight difference in the awareness level for each group. The WP consumer group is more familiar with the concept as opposed to the PWP group. This could likely explain why the WP group is more inclined to buy an ecosystem services credit. Additionally, it should be noted that there is still a significant lack of environmental awareness for both groups, with a large portion of the respondents having no knowledge on the concept of ecosystem services.

4.3.2 Industry Interview

Motivations and barriers were determined by looking at both an organizations motivations to engage in environmental initiatives and by looking at their motivations and barriers to participating in the PES or carbon credit market. A summary of industries main motivations and barriers can be found in Table 4.

Table 4. Summary of industry motivations and barriers to engage in environmental initiatives

Industry	Main Motivation	Main Barrier
Financial	Appealing to stakeholders	Prefer making improvements to products and processes
Food & Beverage	No consensus	No consensus
Energy	Social license to operate	Cost and regulations
Entertainment	Difficult to reduce carbon on their own	Prefer making improvements to products and processes
Retail	No consensus	Prefer making improvements to products and processes
Construction	Appealing to stakeholders (owner of building)	Cost

In the retail industry, motivations for CSR include cost savings, and the belief that it is the right thing to do. Retail interviewees did not purchase credits and instead express their desire to spend money in areas that will actually decrease impacts. They view offsets as an unnecessary additional cost that does not truly improve environmental performance. One interviewee also expressed a desire to improve product design, as they found the majority of their impacts come from end-use with the consumer. One participant from the entertainment industry currently purchases offsets, their motivation however were external. A partnering business stepped in and purchase offsets for them. Motivations for entertainment industry do not come from appealing to consumers. One participant cites cost savings, and the other explains that their organization was built on environmental principles so the environment motivates everything they do. Both interviewees agree that a barrier is the desire to reduce emissions on site. However, they both recognized the value in offsetting, since eliminating carbon emissions was impossible with the travel of entertainers and maintaining the necessary indoor environment.

The finance industry also would rather reduce their own footprint than purchase offsets, with two participants citing this as a barrier. Other barriers mentioned include one individual explaining that they do not feel responsible for the energy used, as they do not own the building, while another claimed they have not yet looked into offset purchases. Motivations from this group include appealing to stakeholders such as investors, consumers, and also employees. One interviewee also mentioned that a motivation for them to purchase renewable energy was the desire to promote this practice, and grow the renewable energy market in Canada. One also mentioned a concern for the high amount of business-related travel from employees as their motivation to purchase carbon credits.

There was no consensus found in the respondents regarding barriers and motivations from participants in the food and beverage industry. One company mentions a desire to avoid environmental impacts rather than purchase offsets, especially for big companies with large resources. Another participant mentioned the existence of other "low-hanging fruit" that could be addressed first. The final barrier mentioned was that they felt no pressure from stakeholders to purchase credits. Motivations for this group again have no consensus, with one interviewee explaining the difficulty of increasing efficiencies in their restaurant as a motivation to offset, as well as business related travel. Another, larger company described offsets as a band-aid solution that they would use in the intermediate as they improved operations.

In the construction industry, a main motivation would be the organization or individual who is paying to have the building constructed. The construction companies come with a proposal and those who can do it the cheapest is often chosen; therefore the added cost of purchasing credits would be the barrier. When looking at requirements for LEED certified buildings, sensitive areas often require input from municipalities, which usually demand local preservation rather than offsets. Finally, the energy industry is mainly motivated by regulations, though both companies mention the importance of local communities as a stakeholder, one through a social license to operate, and one mentioning the importance of outreach to the communities. Both interviewees also discuss cost, with one individual expressing it as a barrier, because of the regulatory costing system of energy in Canada. The other cites cost savings as a motivation for engaging in certain environmental initiatives.

A common theme that was apparent across all industries was the importance of community and social giving. Even companies without environmental initiates funded or supported community projects, or encouraged employees to become involved in community activities.

4.4 Identifying Desirability and Features of an Ecosystem Services Credit

The following sections identify the desirability of an ecosystem services credit in existing environmental markets.

4.4.1 Individual Consumer Desirability

Consumers were asked several questions in the survey to determine the desirable characteristics and features of an ecosystem services credit. The survey had respondents identify their preferred ecosystem services credit structure, the significance which the proximity of the ecosystem service

being delivered has on their purchasing decision, the value added by a credit provided by farmers, and how they would prefer to be recognized for their purchase of an ecosystem services credit (Full Questions available in Appendix "A"). The results from the survey and these specific questions will allow our research to identify the preferred attributes and characteristics consumers wish to see formulate an ecosystem services credit.

There are several key results which appeared from the survey questions related to identifying the desired characteristics of an ecosystem services credit for the WP credit consumer group (Figure 4):

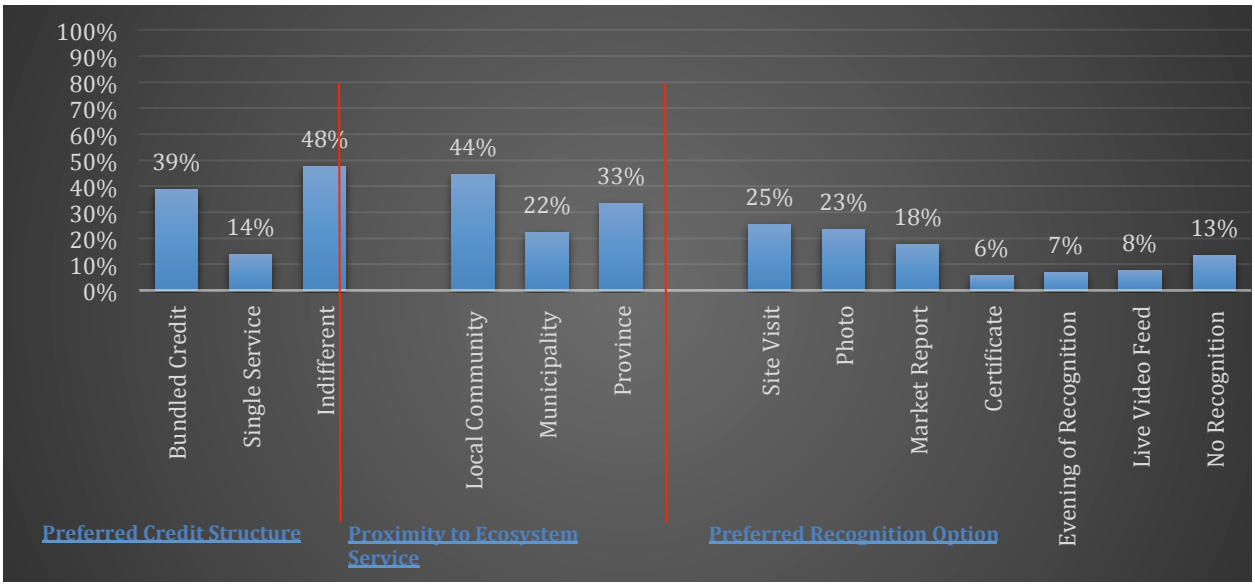

Figure 4: Desired Credit Attributes Willing to Purchase (WP) Consumer Group

Preferred Credit Structure: Forty-eight percent of the respondents are indifferent between the credit structures. Those who are interested in the credits structure preferred a bundled package, with 39% of the respondents preferring a bundled credit and only 14% preferring a single service credit.

Proximity to Ecosystem Service: Proximity of the ecosystem service is relevant to 68% of the target consumers. Additionally, consumers clearly would prefer ecosystem services that are provided within a close proximity to their local community or municipality, with a combined 66% of respondents selecting these two options.

Farmer Delivered Ecosystem Service: Seventy-eight percent of consumers answered that they are more willing to purchase an environmental offset credit that is provided by farmers.

Preferred Recognition Option: In terms of recognition for the purchase of an ecosystem services credit, consumers preferred three options: an on-site visit of a restored ecosystem (25%), a photo and description of the ecosystem (23%), or a detailed description of the environmental benefits provided by their investment (18%).

There are several significant results which appeared from the survey questions related to identifying the desired attributes of an ecosystem services credit for the PWP credit consumer group (Figure 5):

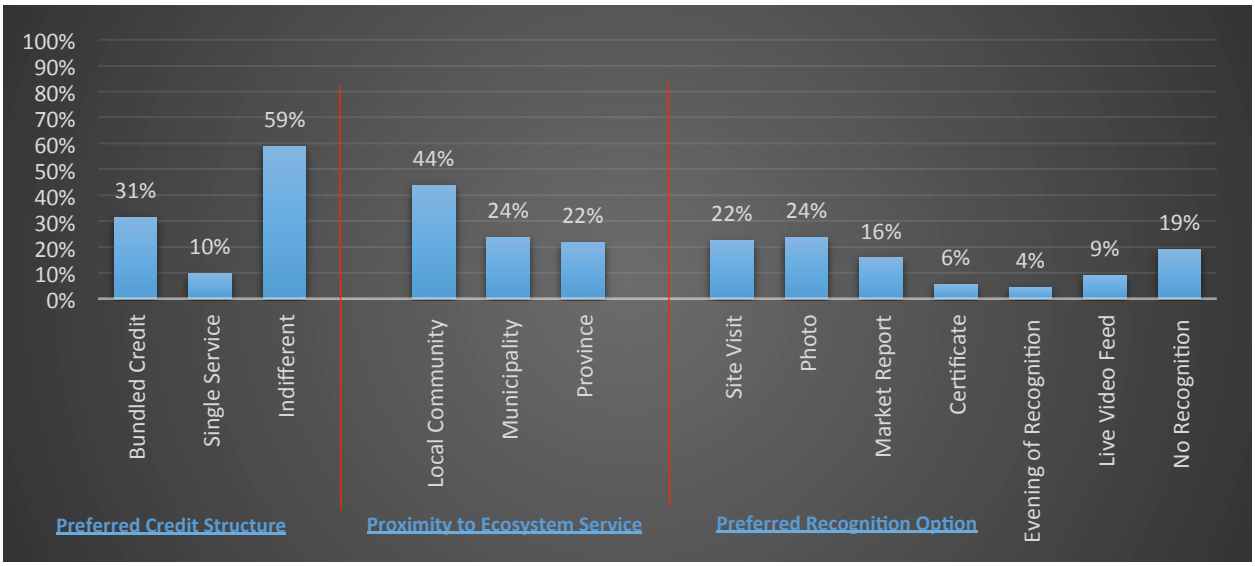

Figure 5: Desired Credit Attributes Potentially Willing to Purchase (PWP) Consumer Group

Preferred Credit Structure: Fifty-nine percent of respondents were indifferent towards the structure of the credit, although those who were interested preferred the idea of a bundled landscape ecosystem services credit.

Proximity to Ecosystem Service: Seventy-nine percent of respondents answered that the location of the provided ecosystem service would influence their decision to purchase an ecosystem services credit. Of those respondents, 44% answered that they would like to see the ecosystem service provided within their local community.

Farmer Delivered Ecosystem Service: Fifty-seven percent of the respondents within the consumer group answered that they would be willing to purchase an environmental offset credit if the ecosystem services were provided by farmers. Additionally, 41% of the consumer group was still unsure of whether farmer delivered ecosystem services would influence their decision to purchase a credit.

Preferred Recognition Option: There was clear preference towards three credit recognition options, with 24% of respondents preferring a photo and description of the ecosystem, 22% preferring a site visit of the ecosystem, and 16% preferring a detailed market report displaying the environmental benefits of their investment.

Each consumer group had very similar interests and ideas concerning the characteristics and attributes of the ecosystem services credit. Both groups were indifferent towards the structure of the credit providing a bundle of ecosystem services or a single service credit. This may be due to a lack of knowledge displayed by both groups on the concept of ecosystem services and environmental offset credits. Without knowledge on the concept of ecosystem services it would be hard for a consumer to understand the additional benefits provided by a bundled suite of ecosystem services.

A key strength each consumer group identified was the additional value found from a credit that is provided by farmers within a local proximity. This may be due to the strong connection consumers can develop with an ecosystem service that is provided locally. It allows consumers to see the tangible benefits the ecosystem service is providing first hand to the community, as opposed to a traditional carbon credit, which does not offer this level of transparency. Additionally, both consumer groups identified the same preferred credit recognition options: receive recognition through an onsite-tour of the ecosystem, a photo and description of the ecosystem, or a detailed market report displaying the environmental benefits provided from their investment. This trend may be due to the increased transparency and connection these options allow a consumer to have with the restored ecosystem. Each of the three options allows consumers to see the direct environmental benefits provided to the community from their investment.

Overall, there was little variety in the desired characteristics of an ecosystem services credit by each group. This may be a result of the lack of knowledge on the concept and consumers not fully understanding the functions and purpose of an ecosystem services credit. However, the common themes that became apparent through the survey results will still be vital to determining the preferred individual consumer package for the ALUS ecosystem services credit.

4.4.2 Industry Interview: Desirability of an Ecosystems Services Credit

Nine of the 17 people interviewed expressed their preference for improving internal processes over purchasing credits. Some interviewees did express interest in purchasing credits when they

could not reach targets through internal improvements – to offset while they implemented changes – or when it was the least cost option. Only one interviewee expressed interest in purchasing credits over making internal changes; however, this may be a reflection of the food and beverage industry as the respondent stated they find it hard to make changes because the restaurant industry is very wasteful. Two interviewees also stated that credits would be a great option for smaller firms that do not have the resources to take on other environmental initiatives. One interviewee from a smaller firm expressed interest in purchasing a credit rather than improving their internal operations, but this decision would not be made without the guidance or request of the landlord to do so. Additionally, one interviewee did not consider offsetting as an option because the company did not own the building they were operating in.

There was interest in having a bundled credit among interview participants with only five individuals saying they would prefer a single credit over a bundled credit, and six others saying they would consider either, depending on their circumstances. Ten individuals felt that the credit being offered by farmers gave it greater value than other credits. Reasons given mainly consist of either being in the food and beverage industry, or having some other connection to agriculture as a firm. In addition, one individual in the construction industry found this created more value as they are operating in an area that relies heavily on agriculture. The remaining participants did not find value in farmers offering the credit above any other group of stakeholders, but agreed it was a valuable trait that should be promoted.

Everyone interviewed recognized the value of the credit within a Canadian context. Those with small businesses or those who had branches or stores in different communities across Canada saw an increased value in being able to pick a credit that is in a community in which they operate, as they felt this would help build a stronger connection between businesses and the community. Only one individual expressly stated that picking the specific community would not add value, as long as the credit was still tied to a project in Canada.

4.4.3 Industry Interview: Desired Features of an Ecosystem Services Credit

The group was divided based on their likelihood of purchasing the credit. This was determined by looking at their preference of purchasing credits versus making improvements internally. Their previous history with credits and corporate social responsibility initiatives were also taken into consideration.

In the group that was WP, there were three from finance, one from energy and two from the food and beverage industries. This group does not include anyone from the construction, energy or retail industry. In this group, two of the six individuals expressed interest in the bundled credit. The remaining four said they would be interested in both credits, depending on the circumstances. No one in this category was interested in purchasing a single service credit. The majority of respondents when asked did not prefer the term "eco-credit". Of the seven interviewed, three stated that this term was not appropriate and most offered other suggestions. Only one person was excited about the term, and the remaining two thought that the term was suitable but could be improved. Reviewing the attributes that this group found important, six of the seven individuals mention the importance of third party certification and transparency. Two of these individuals state that third party certification is not enough on its own, and even greater transparency is needed. Everyone in this group mentioned that although price would be a consideration when purchasing, the group would be willing to pay more for a credit with higher quality. Three individuals in the group mentioned that recognition was not a motivating factor for them to engage in purchasing credits. One of these individuals even mentioned that if there were too much focus on a public recognition, this would deter them from purchasing a credit. The proximity of the project associated with the credit was said to increase the trustworthiness of the project by one individual in this group. It was also mentioned that credits should be based on solid ecological metrics. Finally one individual mentioned the importance of following nationally and professionally created standards in creating the credit, to increase credibility.

The category of people who might consider purchasing a credit includes both of the retail and entertainment representatives, and one individual from construction, finance, and food & beverage. Comparatively, in the category of people that might consider purchasing an ecosystem services credit, four of the seven expressed greater interest in the single ecosystem service, whereas only three would be more willing to purchase a bundled credit. Looking at the attributes this group finds desirable, third party certification is also very important to them, with six of the seven discussing the importance of transparency and making sure the credit is legitimate. Choosing the community is a desirable attribute to everyone in this category, with one person suggesting an idea for credits to be purchased by inputting your location and finding the closest available options. Price seems to play more of a role with this group, with three of the seven saying that it is an important factor. Only two of the people in this group mention quality, impact and effectiveness as a concern.

5.0 Analysis and Discussion

This section triangulates the results and findings from our survey and interview in the context of existing literature. The findings of the survey and interview are synthesized by objective to determine common themes and trends.

5.1 Identifying ecosystem services of interest to stakeholders

Water filtration and carbon sequestration were the two most prominent ecosystem services of interest among industries. Hein et al. (2006) identified scale as a large factor in determining which ecosystem services are of value. Since industries are further from receiving the benefits, they value larger scale ecosystem services, such as climate change mitigation. One interviewee mentioned that carbon is currently the language of business when it comes to the environment. Carbon and energy efficiency were mentioned by every industry as a major concern. The carbon market in Canada is a fifth of the size of the biodiversity and habitat markets (Sustainable Prosperity, 2012). However, this market breakdown does not look at corporate giving, and may explain why no formal biodiversity or habitat credits exist currently in Canada.

Consumer group respondents were most inclined to pay for wetlands, followed by woodlots then pollination. In the survey it was stated that both of these natural landscapes provide biodiversity and habitat creation, indicating that these services are of particular importance to individuals.

Wetlands offer flood control and water filtration. Water filtration could be the reason that survey respondents found wetlands so important, as Waterloo Region is the largest urban municipality in Ontario to rely almost exclusively on groundwater (Region of Waterloo, 2010). Interviewees also mentioned water as a concern to their companies, which is interesting considering the abundance of available fresh water resources in Canada. One interviewee however, mentioned that despite the availability of water in the region, keeping water clean and free of pollutants is a major concern. Therefore, water filtration seems to be an important ecosystem service to Canadians and Canadian businesses.

The most popular consumer choices, woodlots and wetlands, are familiar landscapes to individuals. Previous research on valuing ecosystem services concludes that cultural services, such as aesthetics, recreation and leisure and cultural and historical value are most valuable to individuals (Pleininger, 2013; Hein et al, 2006). This, rather than the ecosystem services they

provide, may be the reason they were most chosen by individuals as a landscape they were willing to pay for by both the WP and PWP groups.

5.2 Motivations and Barriers for Payment of Ecosystem Services

There are many reasons why firms and individuals participate in voluntary environmental offsetting activities. The increased awareness of global climate change has prompted many people to engage in these activities. The main motivators for environmental activities identified in this study were: climate change mitigation, food production, and recreation and leisure. These results align with Laroche et al. (2001), who stated that individuals who purchase and consume green products are concerned with global security and climate change. Offset credits offer a convenient method for consumers to actively mitigate their ecological impacts and they are a mechanism to contribute towards climate change mitigation.

On the other hand, industry values the business-case of an environmentally friendly image. The competitive advantages of a socially responsible brand-image, and acceptance among stakeholders were primary motivators for participation in the offset credit market (Kollmuss, Zink & Polycarp, 2008).

The biggest barrier we observed in the voluntary offset credit market was a general lack of knowledge about the offsetting concept, which is consistent with existing literature (Nakamura & Kato, 2013; Gossling, 2009). One reason for this could be people are not aware of the impacts their daily activities have on ecosystem services. Industry respondents were aware of operational impacts on the environment but had difficulty identifying ecosystem services affected. Further, industry respondents preferred internal impact reductions rather than through the purchase of offsets. In some cases, they believed that the cost of an offset credit was not justified, and that financial resources should be allocated for operational improvements that would reduce environmental damage. These findings were also consistent with previous industry literature (Orsato, 2006).

5.3 Identifying Desirability of an Ecosystem Services Credit

The companies are more concerned with finding cost effective environmental improvements and would not see the benefit of purchasing offset credits. Only one interviewee expressed interest in purchasing credits over improving internal processes. This individual was from a specialty

restaurant, and this answer is a reflection of the difficulty in decreasing waste and inefficiencies, particularly when you do not own or control the building.

Survey participants were indifferent to the credit's structure (bundled versus single). This may reflect the lack of knowledge on ecosystem services and how they interact. Since the interviews were conducted with industry members engaged in sustainability within their organizations, there was greater environmental literacy. Preferences for the bundled or single ecosystem services credit are still split evenly; however, only five individuals would always choose the single credit over the bundled credit. Companies are able to see the value of credits with co-benefits, and MacKerron (2009) suggests that this may help grow the voluntary offset market.

Finally, although not everyone agreed that farmers offering the credit created more value to them, they all expressed that this was certainly a marketable characteristic. Not surprisingly, among those who agreed that the farmer created a greater value were somehow linked to the agricultural industry. This answer is expected considering this type of credit would be a great way to engage agricultural stakeholders. As one individual expressed, operating in an agricultural area allows the organization to derive greater value from an agricultural offset credit. This is similar to research by Badola (2011), who found that communities value functions that directly relate to a community's wellbeing. In this instance, agriculture interacts positively with the community economically; therefore the community is concerned in agricultural wellbeing. Though agriculture credits are sold in Canada, one interviewee mentions that they have found it difficult to locate an agricultural credit that is readily available for purchase. This is the gap that the ALUS ecosystem services credit could fill.

5.4 Packaging an Ecosystem Services Credit

Consumers responded to attributes that were easier to comprehend, such as the proximity of the ecosystem benefits to their homes and the delivery of ecosystem services by agricultural producers. These particular features elicited strong positive feedback from survey participants. Industries seem to have a preference for credits that delivered ecosystem benefits in close proximity to their operations, and greater preference for features that increase the perceived quality and value of an offset credit. Neither individuals nor industries had a strong desire to be recognized for purchasing offset credits.

Proximity to local community was a preferred option for consumers of the ecological credit because the benefits become tangible. This is consistent with existing literature that makes links between the spatial scale of ecosystem services, and the cultural, aesthetic, and recreational value that the individuals derive from functioning ecosystems (Hein, 2006; Pleininger, 2013). The survey results indicate individuals are motivated to participate in environmental initiatives that promote local recreation and leisure. Industry perceptions on the location of projects were similar, as organizations want to benefit the communities in which they operate. It was also mentioned that closer proximity equated to greater overall transparency in the credit structure.

The improvement of agricultural landscapes, and subsequent financial support to local farming communities was a popular feature of the offset credit with both survey respondent categories. Consumers appeared to value a credit offered by farmers, who clearly value (and require) a healthy, functioning ecological landscape to produce their commodities, but are often forced into removing natural features to create space for cropland. It is possible that respondents recognized that the offset credit could offer a mechanism to retain and create more natural areas, without placing an unreasonable financial burden on farmers. Since the surveys were conducted at locations that targeted environmentally conscious individuals with an interest in local food and food issues, this could be another influential factor. Industries viewed third party verification of ecological benefits as an important attribute to the credit, including the ecological basis and trustworthiness of the credit. Existing literature emphasizes the value consumers find in third-party certified environmental products (Schleenbecker and Hamm 2013; Janssen and Hamm 2012) therefore it is not surprising that businesses are more inclined to invest in third-party certified products.

Post-purchase recognition and follow-up did not seem to be a very important attribute for most potential offset credit purchasers. While there was some interest by consumers in site visits to ALUS farms and a market report that synthesizes net benefits of the credit, many survey respondents would prefer not be recognized for purchasing an offset credit. This seems to indicate that while credit purchasers appear to place a tremendous amount of value in an ecosystem services credit, they do not feel the need for personal acknowledgement. Furthermore, the support for a photo of the restored ecosystem in addition to a site visit and market report indicates that there is great value in connecting individual credit purchasers with tangible evidence of environmental improvements. Interviews conducted with private organizations also revealed that recognition was not a significant attribute in the decision to purchase an offset credit. It is

possible that private organizations are concerned with green washing accusations and affiliation with credits that fail to deliver the promised ecological benefits. They may be wary of participation in the credit market as a whole, and are not convinced that the value of an offset credit justifies the investment.

6.0 Recommendations

Based on this research study, we designed two options for the ALUS ecosystem services credit. The first is a carbon credit with co-benefits, and the second is a biodiversity bundle credit.

6.1 Carbon Credit with Co-benefits

The first option is for ALUS to offer the ecosystem services credit as a carbon offset, highlighting the co-benefits that are provided by the project. In Canada, carbon already has an established market base with existing standards and certifications. Carbon is also understood better by industries and the language is more familiar to individuals and consumers. In order to create this option we have two recommendations.

(1) Follow existing credit standards

ALUS should use existing certifications and standards. More research needs to be done to determine which standards would be most appropriate.

(2) Choose descriptive name

The name of the ecosystem services credit should be chosen to reflect what the credit is for. Potential consumers of this credit are concerned with the term “eco” and worried about green washing, therefore a more descriptive name is important. Ideas for names from interview participants include “Agriculture Credit” or “Woodlot”, “Grassland” or “Wetland” Credit.

6.2 Biodiversity Bundled Credit

The second option is a bundled credit that is sold by the area of land conserved, and lists the environmental benefits, such as carbon sequestered or water filtered. This credit will require more knowledge by individuals and will be creating a new market for ecosystem credits. The biodiversity and habitat market in Canada is much larger than the air and carbon market, so this voluntary credit market is potentially larger. To create the second option, we recommend the following three actions.

(1) Present in the short term as a social donation

ALUS should introduce and market the credit as a social donation initially rather than an offset in order to build support and create a consumer base. ALUS will appeal to more businesses by presenting themselves as a community donation, as this is a corporate social responsibility motivation for many companies.

(2) Target local, small industries and local individuals

Since this credit will initially be presented as a social donation, targeting locally based industries and individuals as purchasers of the credit will be more successful. Small businesses should also be targeted since it is small business that will be the consumer in the long run. Small businesses find it more difficult to make internal improvements due to a lack of resources and are therefore more likely to offset their negative environmental impacts.

(3) Research and communicate effects to ecosystem services

In order for this credit to be successful in the long-term with the creation of a biodiversity credit market, it is important for businesses and individuals to understand the effect their direct actions have on ecosystems and different ecosystem services. Additionally, consumers can avoid green washing by contributing to a cause that results in positive, measurable impacts. This knowledge is important so that people will be more willing to offset their practices. More research needs to be done in this area, and findings need to be communicated with businesses and individuals. It is essential for the credit to attain certification for verification of its positive environmental contributions.

7.0 Conclusions

Both individual consumers and industry members are open to the concept of the ecosystem services credit and provide a promising future for the biodiversity and habitat market in Canada.

Individual consumers have a high interest in restoring all landscapes supported by ALUS, particularly wetlands and woodlots. In terms of motivations for environmental activities, individuals were primarily motivated by climate change mitigation and food production, while a general lack of knowledge in environmental awareness and ecosystem services was identified as the key barrier. Individuals were indifferent about whether the credit should be offered as a bundled or single service credit, although those interested in the credit structure preferred a bundled package. Proximity of the project was a highly desirable feature of the credit, as

individuals found great value in the possibility of enhancing their local community and experiencing real, tangible benefits on a personal and community level. They were additionally more willing to purchase a credit offered by farmers, as individuals found value in the opportunity for community support.

Industry members emphasized a strong concern for areas in which they have a direct impact, particularly with carbon and water. However, the majority of interview participants had difficulty linking their operational activities with impacts on the external environment. Therefore their environmental concerns related mostly to secondary impacts such as energy consumption and waste. Stakeholder demand was the strongest motivator for industry to engage in environmental initiatives, while a preference for internal impact reductions in place of offsets was the major barrier. In terms of the ecosystem services credit, industry had a stronger interest in the single service credit, but a bundled credit was more appealing to those that were identified as WP. Proximity to the project was a more desirable feature of the credit to industry members than the farmer-delivered aspect. Small local companies and national corporations found great value in supporting and enhancing the communities in which they operate. While supporting the local farmers was seen as a valuable attribute, some industry members did not find more value in farmers offering the credit, versus other stakeholder groups such as Aboriginal peoples. The most desired attributes for the credit include price, quality, and verification. While price is a strong factor, industry members held that transparency and third party verification would increase the quality and impact of the credit. Therefore industry members were willing to pay a higher price for a credit that is third-party verified with a greater impact.

Overall, both individual consumers and industry members expressed a strong interest in the proximity of the project to their local community to derive positive, tangible benefits. The farmer-delivered aspect of the credit was also found to be of great value, as potential customers had a positive response to the opportunity for community support. This response may have been influenced by the targeted responses, since the interviewees were directly involved in sustainability and surveys were conducted at locations that attracted environmentally conscious individuals with an interest in local food and food issues. Further research to capture the opinions of other less environmentally focused consumers may be beneficial. The validity and transparency of the credit is the most important feature of the credit that must be verified and promoted. Third party certification is essential to optimizing uptake by potential purchasers, as there is a major concern regarding authenticity and green washing. By promoting verification and

transparency of the credit, potential customers believe the quality and impact of the credit will increase, and uptake will ultimately be optimized.

A significant finding in this study was a lack of environmental awareness in both individual and industry participants, particularly in awareness of the benefits of ecosystem services to society. Individuals, although concerned about broader environmental issues, lacked knowledge of the offsetting process. Industry often could not connect their practices directly to impacts on local ecosystems. It is beneficial to educate stakeholders because their influence could also place pressure on industry to become more aware of their environmental impacts, and therefore create markets for ecosystem services.

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Appendix A: Survey and Interview Questions

Individual Consumer Survey

SECTION 1: RESPONDENT INFORMATION

1. Respondent gender: ☐ Male ☐ Female | **2. Age:** | **3. Postal Code:**

4. Which option best describes your educational background?

☐ High School ☐ Vocational / Trade School

☐ College / University (Undergraduate) ☐ College / University (Graduate Studies)

5. What is the estimated annual income in your household?

☐ < $25,000 ☐ $25,000 - $50,000

☐ $50,000 - $100,000 ☐ > $100,000

6. How many people live in your household?

7. What environmental activities do you participate in? Please check all that apply.

☐ Energy Conservation ☐ Purchasing Organic Food Products

☐ Water Conservation ☐ Purchasing Certified Green Products (e.g. Energy Star)

☐ Recycling ☐ Sustainable Commuting (e.g. public transportation, bicycle)

☐ Composting ☐ Donations to Environmental Causes

☐ Environmental Credits/Offsets

- **8. If yes, what type(s) of credit?**
  - ☐ Carbon ☐ Biodiversity
  - ☐ Water ☐ I Don't Know

☐ I Don't Participate in Environmental Activities

9. What is your motivation for participating in environmental activities?

☐ Recreation and Leisure ☐ Spiritual, Religious, and Historical Significance

☐ Aesthetic Appeal ☐ Climate Change Mitigation

☐ Food Production ☐ No Motivation

☐ Other (please specify below)

SECTION 2: ECOSYSTEM SERVICES

Ecosystem services are the benefits that people obtain from nature. For example, a healthy wetland provides the benefits of water filtration, habitat for endangered species, and carbon sequestration.

10. Were you familiar with the concept of ecosystem services prior to filling in this questionnaire?

☐ Yes ☐ No

11. Who do you feel is responsible for maintaining ecosystem services?

☐ Government ☐ Industry/Business ☐ Land Owners and Managers

☐ Individuals ☐ Other (please specify below)

12. What natural landscapes would you be willing to pay for to be restored and sustained? Please check <u>all that apply</u>.

☐ **Wetland**

Ecosystem Services Provided: Flood Control, Water Filtration, Habitat Creation, Biodiversity

☐ **Woodlot**

Ecosystem Services Provided: Erosion Control, Carbon Sequestration, Habitat Creation, Biodiversity

☐ **Grasslands**

Ecosystem Services Provided: Habitat Creation (Grassland Birds), Pollination, Erosion Control

☐ **Vegetative Buffers (Trees and Shrubs) Planted Along Streams**

Ecosystem Services Provided: Clean Water, Habitat Protection (Fish Habitat), Nutrient Management

☐ **Pollinator (Bee and Wasp) Habitat Restoration**

Ecosystem Services Provided: Pollination, Habitat Creation (Bees and Wasps), Biodiversity

☐ **I Am Not Willing to Pay to Restore or Sustain Any Natural Landscape**

SECTION 3: ECOLOGICAL OFFSET CREDITS

A credit which represents a reduction in harmful activities to the environment and sustains essential ecosystem services.

13. Would you consider offsetting activities in your daily life that have negative impacts on ecosystem services, by purchasing an ecological credit?

For example, purchasing a carbon credit to offset the CO_2 emissions from driving your vehicle.

☐ Yes ☐ No ☐ I Don't Know

14. Would you prefer to purchase an individual ecosystem service credit or a bundled package of ecosystem services? Please check one.

☐ **Bundled Credit Package Based on Landscape**

Bundle Example #1: Wetland (Biodiversity, Water Filtration, Habitat)
Bundle Example #2: Grassland (Pollination, Erosion Control, Biodiversity)
Bundle Example #3: Woodlot (Carbon Sequestration, Water Filtration, Biodiversity)

☐ **Single Ecosystem Service Credit**

Service #1: Carbon Sequestration
Service #2: Water Filtration
Service #3: Pollination

☐ **I Am Indifferent Between the Options Presented Above**

15. What payment method would you prefer in order to purchase an ecological credit?

☐ Monthly Fee ☐ One-Time Donation

☐ Annual Fee ☐ I Am Indifferent Among Payment Options

☐ Other (please specify below)

16. Would the location of the restored landscape (responsible for providing the ecosystem services) affect you purchasing decision?

☐ Yes, I Would Like the Restored Landscape to be Located in My (Please Check One):

17.

☐ Local Community

☐ Municipality

☐ Province

☐ No, I Am Indifferent About the Location of the Restored Landscape

18. Would you purchase an environmental credit if you knew that these ecosystem services are being provided by farmers?

For example, landscape restoration occurs on farmland, and farmers receive the financial benefit.

☐ Yes ☐ No ☐ I Don't Know

19. How would you like to be connected and recognized for your contribution to ecosystem services? Please check <u>two</u>.

☐ I would like a site-visit/tour of a restored ecosystem.

☐ I would like to receive a photo and description of the restored ecosystem.

☐ I would like to read a market report that recognizes my contribution, and shows the impacts of my investment.

☐ I would like to receive a certificate of recognition for my contribution.

☐ I would like to attend an evening of recognition for ecosystem service providers and credit purchasers.

☐ I would like to have access to a live video feed of the restored landscape.

☐ I would prefer not to be recognized.

Interview Questions

1. Do you currently employ corporate social responsibility practices? Why or why not?
   - Regulations
   - Cut costs
   - Appeal to consumers

2. Can you walk us through the history of CSR within the company?
   - when you started
   - why you started
   - any major environmental or social concerns you have encountered
   - what the goals are: short or long-term

3. What is the structure of CSR within your company?
   - how many people are devoted to it
   - do senior managers promote environmental goals
   - is it tied with operations, human resources etc.

4. Are there certain ecosystem services that your company has a priority to conserve?

5. Do your company's operations have an impact on the ecosystem services that your company values?
   - If water is a major resource in your operations, are you interested in water conservation and water quality?

6. Do you currently offset your practices?
   - carbon credits
   - renewable energy credits

7. If so, what were the motivations in purchasing that particular credit?

8. Would you purchase a credit that preserves ecosystem service(s) rather than spending money and effort to do this within your company? Why or why not?

9. In order to purchase a credit, what characteristics of the credit are most important to your company?
   - price
   - specific metrics
   - effectiveness/impact
   - location (choosing the community)
   - transparency
   - accuracy
   - third party certification
   - payment type
   - recognition

10. Would you prefer to purchase an individual ecosystem service credit or a bundled package of ecosystem services?

a. Bundled credit package based on restoration of:
Bundle example #1: Wetland
Bundle example #2: Woodland
Bundle example #3: Grassland

b. Single ecosystem service credit
Service #1: Carbon sequestration
Service #2: Water filtration
Service #3: Biodiversity

11. This bundle is currently being referred to as an "eco-credit". Do you feel that this captures the essence of the credit?

12. The "eco-credit" offset is a service provided by farmers. Is this characteristic more desirable then existing offset credits?

13. The community where the offset takes place can be chosen when purchasing an "eco-credit". Does this characteristic create more value to a credit then existing carbon credits?

Appendix B: Survey Demographic Information

The willing to purchase credit consumer group is made up of young professionals with a high education and income level (Table 5). A majority (89%) of respondents in this group have received at least a diploma or degree from a college or university institution. Additionally, the majority of the members of this group have a high household income, with 60% of respondents earning $50,000 or more and of this 60%, 26% of respondents are earning greater than $100,000 annually. The group is composed of roughly an equal number of males and females, and has an average age of 31.6 years.

Table 5. Willing to purchase credit consumer group

Gender		
	Respondents	Percentage
Male	36	47%
Female	41	53%
Age		
Average Age	31.60	
Education Level		
	Respondents	Percentage
Highschool	8	10%
Vocational / Trade School	1	1%
College / University (Undergraduate)	41	53%
College / University (Graduate)	28	36%
Household Income		
Response	Respondents	Percentage
< $25,000	11	21%
$25,000 - $50,000	10	19%
$50,000 - $100,000	18	34%
> $100,000	14	26%

The potentially willing to purchase credit consumer group is composed of middle-aged individuals with a medium income level and high level of education (Table 6). The average age of the group is 37.7 with a slight variance in gender, with 37% of respondents being male and 64% of respondents being female. Eighty-four percent of the individuals in this group have received at least a diploma or degree from a college or university institution. Additionally, the majority of the members of the group have a medium household income, with 68% of the respondents earning $25,000 to $100,000 annually.

Table 6. Potentially Willing to Purchase Credit Consumer Group

Gender		
	Respondents	Percentage
Male	19	37%
Female	33	64%
Age		
Average Age	37.73	
Education Level		
	Respondents	Percentage
Highschool	4	8%
Vocational / Trade School	4	8%
College / University (Undergraduate)	23	45%
College / University (Graduate)	20	39%
Household Income		
Response	Respondents	Percentage
< $25,000	4	13%
$25,000 - $50,000	11	34%
$50,000 - $100,000	11	34%
> $100,000	6	19%