Non-timber Forest Products in a Douglas-fir Ecosystem

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Introduction

Logging a young Douglas-fir forest has the potential to generate a nonrecurring sum of $600,000 (Culbertson, 2013). However as this report will investigate, less ecologically harmful ways of revenue generation exist that can generate comparable and recurring funds. We undertook this project alongside the Galiano Conservancy Association under the mentorship of Quirin Hohendorf. The overall goal of this project is to: **explore ways to generate revenue to support the Galiano Conservancy Association sourced from a Douglas-fir ecosystem restoration site that excludes timber products, in ways which do not harm the ecosystem, and are within capacity**. The statement *within capacity* is included to prevent the recommendation of an initiative that would become too laborious or time intensive for a member of the association to bring to fruition. The following report is both a proposal and scoping of sources that could generate within capacity revenue.

We have categorized the suggestions into two groups: indirect and direct methods. *Indirect* methods do not require a constant input of labour, and the proposed method of revenue generation adhering to this description is selling carbon offsets. The second *direct* method will require a consistent input of labour, and the example provided under this description is value-added products sourced from naturally occurring resources in a Douglas-fir ecosystem.

What is an NTFP?

A non-timber forest product (NTFP), as described by the United Nations Food and Agriculture Organization, is a "product of biological origin other than wood derived from forests, other wooded land and trees outside forests. They may be gathered from the wild, or produced in forest plantations, agroforestry schemes and from trees outside forests" (B.C. Government, 2009). NTFPs can be used as an alternative form of revenue generation to prevent the cutting of trees. NTFPs can be anything from mushrooms to berries to firewood. There is a rapid increase in the harvesting and use of NTFPs in the Pacific Northwest that has created a more than 100 million dollar industry, which employs over ten thousand people in the states of Washington, Oregon, and California (Ballard & Huntsinger, 2006).

District Lot 63

Figure 1: Location of District Lot 63 on Galiano Island.

Figure 2: District Lot 63 young Douglas-fir forest understory.

and

The location focused on for the implementation of non-timber forest products for this project is District Lot 63, which is part of network of protected areas on Galiano Island as a result of the "Mid Island Protected Areas Enhancement Project" (Scholz, Erickson, & Azevedo, 2014). DL 63 is a planted 62 ha young Douglas-fir ecosystem as a restoration response to logging, neighboured by mature forests (Scholz, Erickson, & Azevedo, 2014) (see Figure 1). Currently the site is covered in 74,000, 45 year old Douglas-fir trees with a relatively bare

understory (see Figure 2). The lot was clearcut twice; the first was in 1967 clearing 20% of the forested area, and the second in 1978, removing all but 2 ha of the standing trees (Scholz, Erickson, & Azevedo, 2014). Due to the industrial logging, the site's ecological integrity was heavily compromised which included a decrease in "large live and dead trees, species diversity, spatial heterogeneity, and biological community" (Scholz, Erickson, & Azevedo, 2014). However, the lot's position surrounded by the patches of mature forest "provide an ideal opportunity for not only increasing diversity within the formerly logged tract but also improving habitat connectivity through a well planned restoration program," (Scholz, Erickson, & Azevedo, 2014). Part of that restoration program could be the implementation of NTFPs, as they could ensure the forest remains growing as revenue is generated from it. Therefore, we are proposing selling non-timber forest products from the Douglas-fir ecosystem to encourage the continuation of the standing forested area, and to be able to fund other initiatives for the Conservancy with the revenue generated.

Indirect Products

An intriguing indirect method of revenue generation involves the sequestering of carbon already occurring from the Douglas-fir trees on the lot and using it to receive revenue from voluntary carbon offsets. A carbon offset is "a credit used for greenhouse gas reductions achieved by one party that can be purchased and used to compensate (offset) the emissions of another party," (David Suzuki Foundation, 2014). Essentially, selling carbon credits will not equal a net reduction in overall carbon usage, but the company or enterprise may purchase carbon credits to offset their carbon usage by keeping trees standing that may be projected for future logging to continue sequestering carbon. Overall, selling carbon credits may prevent a universal carbon emission growth, with one credit equivalent to one tonne of carbon that does not enter the atmosphere.

To generate revenue from sequestering carbon, the project must be classified as a voluntary carbon trading scheme, which is one of three carbon sequestering schemes. Unlike voluntary, the other two schemes are governmentally regulated. The first is know as either the

Clean Development Mechanism (CDM) or Joint Implementation (JI) (Adams, 2008). These two methods are managed by the UN as part of the Kyoto Protocol. The projects aim to reduce emissions, and are awarded carbon credits on a country-wide basis according to their reductions. However, since Canada is presently not part of the Kyoto Protocol, this scheme is currently unavailable.

The second is the EU Emissions Trading Scheme (EU ETS) and functions on a cap-and-trade system. Member countries aim to reach a certain level of reduction, and if unable to do so, they can buy credits from countries that have met and surpassed this level (Adams, 2008). Although, Canada has not yet joined the 31 member countries, therefore this option is also currently unavailable. Until Canada includes responsible carbon management into its governmental protocol, voluntary carbon offset programs remain the only scheme for sequestering projects to utilize.

To calculate the potential earning power of District Lot 63, we multiplied the size of the lot in hectares by the number of trees on the lot by the pounds of carbon sequestered per tree per year. Using a chart by the U.S. Department of Energy (1998), we were able to conclude the sequestering power of Douglas-fir trees aged 45 years (Scholz, Erickson, & Azevedo, 2014), which is 48.7 pounds per tree per year. With approximately 74001.6 trees on the 64.8 hectare lot (Scholz, Erickson, & Azevedo, 2014), (64.8 ha)*(74001.6 trees)*(48.7 lbs/tree/per) gives us a total of 3,603,877.92 lbs, or 1,634,691.53 kg of sequestration power. This sum is then multiplied by the average cost of a carbon credit, approximately $6-12 (n.a., 2017), the annual average revenue generation power of selling carbon credits is $9,808.14 to $19,616.28.

Concerns

Today in Canada Carbon offsetting is not yet monitored by any official government program or legislature (Adams, 2008). Some carbon emitting corporations have taken advantage of this service to promote an image to the public as ‘clean,’ or even contributing to carbon emission reduction. Corporations are able to take advantage of the voluntary carbon offset system because it is not yet managed and monitored by an official government sector, rather by

third party certification agencies. This leads some to believe offsetting carbon is a constructed feature in a capitalist society that serves to alleviate guilt from carbon emitting parties, without contributing to carbon management targets. A study conducted by the United Nations Framework Convention on Climate Change (UNFCCC), 2015, analyzed the carbon trading market to identify the parties corrupting the system and labeling them as criminal, their findings are a call for greater carbon offset regulation.

However, when an individual, enterprise, or industry is transparent in the use and implication of carbon offset, significant carbon management can be achieved. This became apparent in the analysis of the airline, Harbour Air, which is a small business on the West Coast, popular for their float plane flights from Victoria to Vancouver. Flight is a carbon intensive endeavour, and this does not exclude the float planes operated by Harbour Air. However, this business has reduced consumption where possible and now factors in their unavoidable carbon emission to each flight and offsets by allocating equivalent funds to carbon sequestering initiatives (HarbourAir, 2017). Harbour Air is aware of the emission their business in aviation is responsible for, yet they believe that until a non-carbon emitting method of flight is possible, carbon offsetting is the most effective way to implement carbon management. Thus, Harbour Air has created a net carbon emission that is not increasing, but also not a net reduction, hence the terminology, carbon neutral. For example, Harbour Air is funding a protection initiative for BC's Boreal Forest and the transition of a local greenhouse operator to transition from natural gas to biomass, both of these initiatives qualify as a carbon offset as they are equivalent to a reduction of carbon in the atmosphere (Offsetters, n.d.). Similarly, to a carbon offsetting management corporation like Offsetters, prevention of deforestation of District Lot 63 on Galiano Island would qualify as an initiative to be sold as a carbon credit, due to its sequestration power.

To further exemplify the feasibility of a carbon offset program from a seller's perspective, the Cheakamus Community Forest Carbon Offsets can be analyzed. Although the total scale of this project is significantly larger than that proposed for District Lot 63, occupying 33,000 ha of tenured land; the management is broken down into multiple smaller lots that could be individually compared to the proposed project (Ecotrust, n.a). This project is able to sell their offsets for $25/tonne, with this revenue used as an alternative to that generated by logging.

Therefore, this revenue generated prevents deforestation while continually circulating funds through the Cheakamus Community. By designating this land with a 25 year tenure agreement, the conservation of the forest and its revenue generation is insured. Provincial certification, climatic, and market parallels can be drawn between this project and the proposed carbon offset on District Lot 63, making it an ideal case study to model a project upon.

Inclusion of Restoration

A carbon offset project is in principle an act of restoration; it utilizes the ecosystem service of carbon sequestration and manages levels of atmospheric carbon. Yet, because there are not set regulatory standards in voluntary carbon offsetting (Adams, 2008), the principles of restoration are not mandatorily included. Incorporating restoration projects into District Lot 63, in addition to the direct and indirect methods proposed has the ability to expand the potential of the ecosystem. An example of restoration that could be performed on District Lot 63 would be management of the invasive species, Scotch Broom, and the introduction of additional native species. Although it is not currently abundant on the lot, Scotch Broom is established in peripheral areas; it will likely encroach into District Lot 63 if preventative restoration measures are not taken. Efficient, effective, and engaging restoration initiatives would create an ecosystem with improved function and biodiversity, which will enhance the integrity of the ecosystem and in turn create a more economically prosperous project. The UNFCCC agreement is promoting and endorsing carbon sequestration projects that include restoration practices that serve to add social, cultural, and economic value to the area (Alexander, et.al., 2011) Restorative efforts, such as the Scotch Broom example provided, would also serve to ensure the ability to harvest the necessary vegetation for other NTFPs by preventing the competition of invasive species. These two methods have a symbiotic relationship; on one hand, they prevent deforestation via a carbon sequestration project creates an area ideal for harvesting NTFPs. On the other hand, the restoration practices that would take place while harvesting the raw materials necessary for NTFPs will increase the sequestration power of the forest.

Future of Carbon Sequestration

As the buying and trading of carbon offsets expands to occupy a larger niche in the global market, a call must be made to government for responsible regulation. Carbon offsets require regulation and integration into the targets set during global climate conferences, as they have the ability to significantly contribute to their feasibility. As government regulation forms around carbon offsetting, it should be lobbied to include the application of the restoration principles addressed in the previous section of this report. The trajectory of carbon offsetting is expected experience significant market growth in the future (Carbon Emissions Futures, 2017). To ensure corporations cannot continue to take advantage of carbon sequestration, the improved regulation and standard of offsetting must also enhance.

Direct Products

The concept of a direct product refers to a NTFP sourced directly from a forest and sold to consumers on markets either as value added products or as raw materials. Locally sourced and sold NTFPs add significant value to local communities and economies, by providing a measure of security and sovereignty while decreasing reliance on exports (Shackleton & Pandey, 2014). By utilizing existing areas that can produce edible or service products without requiring the dramatic alteration of said landscapes, it engages the principles of permaculture and food forestry (Shackleton & Pandey. 2014).

The direct products proposed in this report are two value added products sourced from plants naturally occurring in the Douglas-fir ecosystem in discussion. The examples provided are jam made from the berries of the Salal plant, and olive oil infused with the needles of the Douglas-fir tree. However, the NTFPs that can be sourced from this ecosystem are not limited to these products. Outlined in the 'Income Opportunities in Special Forest Products' handbook, nearly every plant has the potential to generate revenue on various markets (Thomas, & Schumann, 1993). For example, raw products such as Salal leaves may be harvested and sold to florists as greenery for their bouquets (Thomas, & Schumann, 1993).

It should be noted that the economic estimates offered in this proposal are only estimates gathered from various sources and used to create an average so that estimated revenue can be pictured. The revenue generation estimates for both infused olive oil and salal jam are based upon the retail prices of similar products set by individual suppliers, across various websites, such as etsy.com. A full-scale economic research model would be needed to show the capability of the project working successfully.

Olive Oil

Infused olive oil is a value added product with relatively low input and can generate sizable revenue. The process of infusing olive oil is not a labour intensive production; it only requires pouring olive oil over the harvested needles of the Douglas-fir and laying wait for 4-6 weeks while the flavour infuses. Products online similar to this range from $12-16 with a production cost of about $4, equivalent to roughly a net profit of $8-12 per 200ml unit. These products could be sold at local artisan shops or farmers markets. By sharing a product using local channels such as these, other businesses and vendors are supported, serving to engage a community with the sale of these specific NTFPs. It is reasonable to predict that 10 units could be sold each week, therefore, generating approximately $4,160 a year.

Salal Jam

Salal jam is another possible value added product that could generate revenue from the Douglas-fir ecosystem on District Lot 63. This product will require more effort inputted to create as the berries will need to be foraged, followed by preparation and production of the jam, which includes includes ingredients such as pectin and production processes such as sterilizing jars. However, similarly to the infused olive oil, the production of Salal jam encourages community engagement as the foraging process can be done as a community and the jars can be sold in local farmer's markets and artisan shops supporting the local community, as well. Salal jam ranges from $8-10 online with a production cost of approximately $3. This equals to a profit of about

$5-7 to the conservancy. With a fair assumption that 10 jars of Salal jam can be sold each week, this value added product may generate approximately $2,600 per year.

Future of NTFPs

Currently there is a movement to encourage the introduction of locally crafted NTFPs into a wider market, including provincial and national markets (Mckie, Stretesky, & Long, 2015). The benefits of NTFPs within a local economy are recognized and projected to apply accordingly to these wider economies (Mckie, Stretesky, & Long, 2015). NTFPs provide a source of revenue to independent parties that can be used to supply or supplement household income requirements (Mckie, Stretesky, & Long, 2015). This source of additional revenue would then be used to circulate within the local economy supporting other independent suppliers and community services and programs. "In some areas the current or potential income from NTFPs is greater than timber (Pandey and Shukla, 2008)… NTFPs to be worth about US $27 billion per year to the Indian economy, compared to US $17 billion from timber products in 2007," (Shackleton, & Pandey. 2014). With this being stated it is apparent why there is a current mobilization towards including NTFPs management plans into national development agendas and economies.

Direct products such as infused olive oil and Salal jam have great potential to engage community and generate revenue for the Galiano Conservancy Association. Yet, one potential detriment is the disruption of natural processes through harvesting, for example, Salal berries are a native food source for birds and other animals habituating in the Douglas-fir ecosystem. Therefore, a mass removal of the berries for human consumption could impact the dietary cycles of other life in the forest. To avoid this occurrence, the recommendation of rotational and light harvesting will be made. However, the threat of disruption in entirely alleviated in the indirect method proposed of selling carbon offsets. Thus, we recommend both indirect and direct methods of revenue generation be put in place so that when berries are not in season or the rotational harvest is on break, revenue is continued to be generated.

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