

# Credible Conservation Offsets for Natural Areas in British Columbia - *Summary Report 2009*



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Creekside, Salt Spring Island, BC - Shari MacDonald

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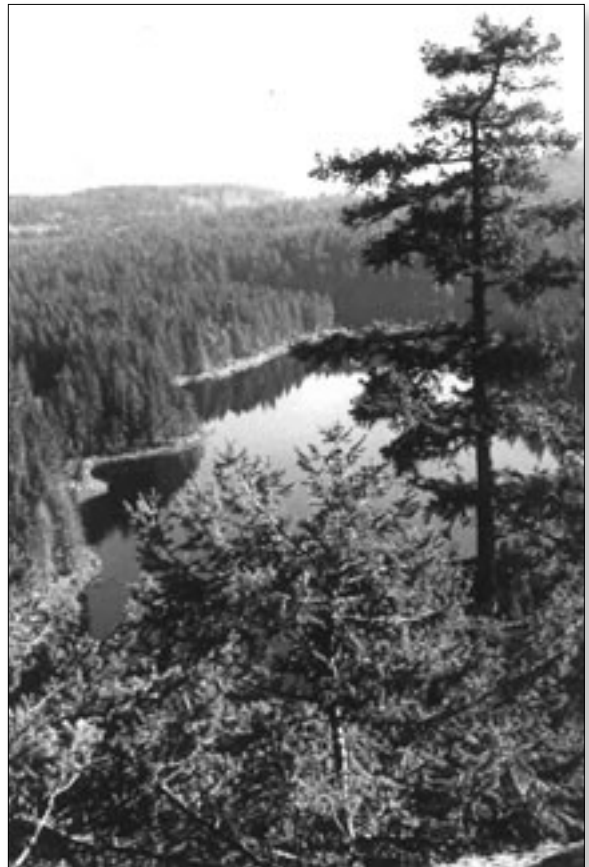
# Introduction

The Land Trust Alliance of British Columbia published a report in 2008, *Mitigating and Adapting to Climate Change through the Conservation of Nature in British Columbia*.<sup>1</sup> The key recommendation of that report was to explore the “major opportunities to use the remarkable value of conserved lands” including carbon and ecosystem services through the growing offset markets. A full technical report by Dirk Brinkman and Richard Hebda (online at [www.landtrustalliance.bc.ca](http://www.landtrustalliance.bc.ca)) reviews the context and opportunities for valuation of carbon and ecosystem services for offset projects in BC. Conservation projects, including a site’s ecological restoration and management, provide options for generating revenue and support for conservancies, land trusts, First Nations, and other owners and managers of protected and conserved lands. The report compliments recent discussion papers about carbon offsets for BC’s diverse and rich ecosystems.<sup>2</sup>

The technical report outlines the principles of valuing carbon and ecosystem services, and summarizes the rapidly changing institutional framework, mechanisms and markets for originating and selling of offsets for nature conservation in BC. Pioneering case studies are profiled to show the range of emerging opportunities and challenges for developing carbon/conservation offsets in both the voluntary and compliance markets.

There has been historic and legitimate opposition to forestry offsets on the basis that large emitters will simply buy their way out of immediate emission reductions, by paying for distant future forest carbon sinks. The technical report includes considerable discussion of the global context, some of the debates over the last decade, and the scientific data that is accumulating about full-cost accounting for carbon and the role of forests and ecosystems in a comprehensive climate action plan. It is important that some of these fundamental relationships between terrestrial ecosystems and the atmosphere, emission reduction and sinks increasing, and the critical timing for action all be well understood.

The technical report and this summary are aimed primarily at a professional audience since the valuation and business of carbon and ecosystems service offsets are in early stages of development and currently involve a bewildering complexity of methods, standards and regulatory frameworks, all in the process of being refined.<sup>3</sup> As the first pilot projects for conserving **living carbon** begin, are tested, and have their methods refined, assigning value to nature will become more comprehensible and more widely integrated into all conservation projects. Land trusts and other managers of conservation lands are encouraged to get acquainted with the language and methods of this process, since significant and exciting opportunities are available. The conclusions of the report are contained in the recommendations at the end of this Summary Report.



Maxwell Lake, potable water for Salt Spring Island residents, protected by conservation covenants held by Salt Spring Island Conservancy and TLC The Land Conservancy of BC  
Photo: Damien Barstead

1 Wilson, S. and R. Hebda, 2008. *Mitigating and Adapting to Climate Change through the Conservation of Nature in British Columbia*. Land Trust Alliance of British Columbia.

2 Three discussion papers within British Columbia have come out on carbon offsets, forests and biodiversity in 2008/09 all of which are recommended reading. *A Discussion Paper on the Feasibility of Funding Riparian Restoration with Revenue Sourced from Carbon Credits*, Fraser Basin Council/Offsetters, January 30, 2009; *Carbon Management in British Columbia’s Forests: Opportunities and Challenges*, Gary Bull, Forrex Series 24, 2009 and *Carbon Sequestration in British Columbia’s Forests and Management Options* by T.A. Black et al November 2008 of the Pacific Institute for Climate Solutions. A fourth paper is in draft form and due to be released by the Forest/Climate/Biodiversity Working Group of various ENGOs in BC, Jim Pojar’s, *The Credible Case for Nature Conservation in BC: Biodiversity, Carbon and Climate Change*. Also the report *Catching Up: Conservation and Biodiversity Offsets in Alberta’s Boreal Forest* by Simon Dyer et al for the Canadian Boreal Initiative provides useful insight into Alberta’s opportunities.

3 Detailed in both the Wilson and Hebda, 2008 report and the LTABC’s earlier report, *Safeguarding Canada’s Wealth: Bringing Stewardship and Conservation into the Economy*, L. Horsfall and S. Harrington, 2004.

## Urgency for Natural Area Conservation

*Natural ecosystems (land and ocean) remove about 50 to 60 percent of human-caused greenhouse gas emissions and curb more intense global climate change. Globally, forest ecosystems contain more than half of all terrestrial carbon and account for about 80 percent of the exchange of carbon between terrestrial ecosystems and the atmosphere.*

*British Columbia forests have some of the highest carbon stores in Canada averaging 311 tonnes per hectare with some coastal forests holding 600 to 1,300 tonnes per hectare. Based on averaged estimates, the total carbon stored by BC's forests amounts to 88 times Canada's annual greenhouse gas emissions (989 times BC's GHG annual emissions).*

*(Wilson, S.J. and R. Hebda. 2008.)*

There is a growing recognition among scientists and professionals associated with land use of the urgency to engage all sectors of society in land stewardship to counter climate change, loss of biodiversity and environmental degradation. Conservationists, land trusts, government land managers, First Nations, foresters, farmers, private landowners, municipalities, land-based businesses, utilities and the public at large all have a vital obligation and opportunity to get involved.

The Convention on Biological Diversity identifies four benefits of living carbon stewardship: sequestering carbon, avoiding emissions, protecting the ecosystem services that nature provides for humans and other species, and protecting biodiversity (the diversity of life that provides the resilience to adapt to changing conditions.) Improved management of carbon stocks and ecological restoration are mandatory to avoid crossing the threshold of 2 degrees C warming in the global mean surface temperature. In addition to increasing the amount of carbon sequestered by plants, ecosystem carbon sinks must be maintained and enhanced, especially in light of their declining capacity to annually absorb CO<sub>2</sub> emissions.

Ecosystems provide an enormous range of services or values in addition to storing and sequestering carbon, many of which form the foundation of human well-being.<sup>4</sup> Such values have motivated the conservation and protection of ecosystems by many land trusts and other land conservation and management agencies as well as governments. Any climate change initiative involving nature conservation will have the enhanced value of protecting vital ecosystem services. From the perspective of climate change alone, these services provide the adaptation component, which provides resilience to climate change.<sup>5</sup>

Reports and initiatives from around the world emphasize that preservation of forests and other ecosystems is an essential component of a comprehensive global climate action plan.<sup>6</sup> To avoid catastrophic climate change, international climate talks have set new priorities to conserve nature (living carbon) through tools/protocols such as REDD (Reducing Emissions caused by Deforestation and [Land] Degradation).

## Emerging International Opportunities for Conservation Offsets

International rules and protocols for compliance carbon offset projects related to forests are evolving rapidly. New agreements and their interrelationships at global, continental, provincial and regional scales have to be watched closely because they shape opportunities for conservation projects in general and influence carbon credit opportunities in BC in particular.



Badger - one of many threatened species in BC - Photo: The Land Conservancy of BC

4 *Millennium Ecosystem Assessment 2005 Ecosystems and Human Well-being: Vol 5: Synthesis*. Island Press. Washington, DC.; Wilson, S.J. and R.J. Hebda. 2008.. 58 p. available on-line [www.landtrustalliance.bc.ca/research](http://www.landtrustalliance.bc.ca/research); Ranganathan, J., Ruadsepp-Hearne, C., Lucas, N., Irwin, F., Zurek, M., Bennett, K. Ash, N. West, P. 2008. *Ecosystem Services: A Guide for Decision Makers*. World Resources Institute. 75 pp.

5 Eliasch J. et al. 2008. *Climate Change: Financing Global Forests*. London: Earthscan. 264 pp. [http://www.occ.gov.uk/activities/eliasch/Full\\_report\\_eliasch\\_review\(1\).pdf](http://www.occ.gov.uk/activities/eliasch/Full_report_eliasch_review(1).pdf). Austin, M.A., D.A. Buffett, Nicolson, D.J., Scudder, G.G.E. and Stevens, V. (eds). 2008. *Taking Nature's Pulse: The Status of Biodiversity in British Columbia*. Biodiversity B.C. Victoria, B.C. 268 pp., Wilson, S.J. and R.J. Hebda. 2008.

6 Seppala, Risto, A. Buck, P. Katila. April, 2009. *Adaptation of Forests and People to Climate Change: A Global Assessment Report*. International Union of Forest Research Organizations. World Series, Vol. 22. This recent report states that protecting primary forests and 'reducing forest degradation and deforestation' stand out among the management strategies as having the highest scientific support and agreement for conserving biodiversity and to prevent future emissions from forests that would otherwise accelerate climate change. (Appendices 6.2 and 6.7 on pages 172 and 181 of the main report.)

On December 8<sup>th</sup>, 2008, in Poznan Poland, the United Nations Framework Convention on Climate Change (UNFCCC) agreed to include a tool/protocol (also referred to as a **modality**) for forest protection measures known as Reduced Emissions from Deforestation and Degradation (REDD). This was a new addition to the previous protocols for Afforestation, Reforestation and Restoration (ARR) originally put forward through the Land Use, Land Use Change and Forestry (LULUCF) guidelines. It is anticipated that REDD initiatives could reduce deforestation emissions by 75% through altering historic forest land use patterns.<sup>7</sup>

In a wonderful serendipity, suggesting that we are reaching a tipping point for change, in the same week, the BC government passed the first "Emission Offset Regulation" as part of their target of a 20% reduction in 2004 GHG emission levels by 2020. As the international negotiations added tools for ecosystem sink conservation, the BC Legislature effectively enabled the use of these mechanisms within British Columbia.

This is very significant for Canada since, despite the federal momentum of having ratified the Kyoto Protocol in 2004, any possibility of using the emerging international tools to conserve forests have been stalled in this country. BC's Climate Action Plan, which is a part of the Western Climate Initiative (WCI), recognizes both the trading value of emission reductions from avoiding forest degradation, and ecosystem sinks created through forest enhancement and restoration programs, but before December 8th, offered no regulatory direction for project developers, proponents or land managers.

While at this time there are no guidelines or validated project methodologies within BC, the California Air Resources Board (CARB) which is also a part of the Western Climate Initiative, adopted the nation's first standards for forest-generated emission reductions and has completed validated forest conservation/restoration projects which offer ready prototypes for similar projects in British Columbia (Van Eyck Forest, Lompico Forest and Garcia Forest Projects - see case studies at the end).

Although the first subsequent requests for expressions of interest from the Pacific Carbon Trust in April 2009 were only for enhanced silviculture projects, considering the new tools and protocols emerging for REDD projects, there is a whole new opportunity for conservation organizations to "set the standards" and play a **critical role in ensuring conservation of natural areas is the highest priority now for carbon offsets in a climate action plan.** President Obama's recent commitment to cap and trade and the government appointees for implementing this system are also encouraging.

Furthermore, with the establishment of a basic framework for carbon as an ecosystem service value, the methodological process for trading other ecosystem values also have an excellent opportunity to emerge. This is because carbon offset protocols provide important precedents for other ecosystem values - precedents on the fundamental process that have to be accommodated in any robust offset trading system. The technical report attempts to address some of the issues that arise on the route to a new market economy of ecosystem service trading, especially for land trusts and other managers of conservation lands in BC.

*British Columbia's forests, peatlands, soils and other ecosystems (e.g., wetlands, grasslands) play a critical role in carbon sequestration and storage. BC's rich and productive coastal and interior wetbelt rainforests and its peatlands are huge reservoirs of carbon, storing carbon in living plants and soil. **However, when natural ecosystems are converted to other uses or are heavily degraded by human land use, much of this stored carbon is released back into the atmosphere as carbon dioxide.***

*(Wilson, S.J. and R. Hebda. 2008.)*

*The United Nation's 2005 Millennium Ecosystem Assessment found that 60% of the world's ecosystems are being degraded at an unsustainable rate.*

*More than 43% of identified species in BC are listed as of provincial conservation concern. The greatest threats to biodiversity are climate change and ecosystem conversion, resulting in loss of ecosystem resilience.*

*(Taking Nature's Pulse: The Status of Biodiversity in British Columbia)*

7 Eliasch J. et al. 2008. *Climate Change: Financing Global Forests*. London: Earthscan. 264 pp. [http://www.occ.gov.uk/activities/eliasch/Full\\_report\\_eliasch\\_review\(1\).pdf](http://www.occ.gov.uk/activities/eliasch/Full_report_eliasch_review(1).pdf), Austin

### **Reducing Emissions From Deforestation & Degradation and forest sector carbon neutrality**

*The World Bank launched a US \$300 million Forest Carbon Partnership Facility in December 2007. Projects to prepare national forest protection plans are being prepared in 30 countries through its Readiness fund of US\$100 million for surveys of current forest assets, monitoring systems pilot programs, reforestation, improved forest management and REDD.*

*In Bali in 2007 at the UNFCCC negotiations, Norway pledged US\$2.5 billion for conservation REDD activities through its International Climate Change and Forestry Mechanism, with a particular focus on the Amazon.*

## **Introduction to Offset Markets**

At present, the valuation of carbon in natural areas for market ready carbon credits is new, experimental and often daunting in its complexity. The need to engage all conservation organizations, land trusts and land planners and managers in this important task is critical; not only to prevent more emissions from going into the atmosphere from deforestation or degradation of natural areas, or to absorb carbon dioxide with new growth, but also to take advantage of this opportunity to help finance the work that must be done to protect biodiversity and the ecosystem services that keep us alive.

The following summary explains the process of how carbon is valued for a market in a natural area, to provide a starting place for readers and an introduction to the terms used in this report. The later section on Principles of Carbon Accounting explores each of the concepts in greater depth.

## **Overview and Introduction of Terms**

The means by which carbon markets or registries (like the California Climate Action Registry (CARR) or the Pacific Carbon Trust (PCT)) assess land for offsets is on a **project** by project basis. Projects can be one large property or an amalgamation of properties and can be forest related, grasslands or wetlands or combinations of ecosystem types. The atmospheric benefits of each project have to be measured using a rigorous scientific, verifiable methodology. The methodologies are most developed for forests because there are two hundred years of rigorous forest research data gathering and analysis methods on which to rely. Parallel work exists for soils but the carbon dynamic in soils is not as well understood as the growth of trees, so the soil methodologies are just now being developed. It is expected that wetland methodologies will take another year or two before they are available. Each project is required to be described in exacting scientific detail in a defined structured report known as a **Project Design Document** (PDD) which reflects the methodology. Land use change projects are one means for taking up atmospheric carbon or for avoiding emissions (more easily understood is the process of reducing emissions from energy projects) by which **originators** (whoever originates the project, which could be land managers or their partners from any sector) can register their GHG benefits to carbon markets or trade them with final emitters like BC Hydro, Government of BC or other industry emitters.

Each carbon registry has a set of tools or protocols to assist the originators in calculating, reporting and verifying the emission inventories. For example in the international scene the default tool/protocol through the UNFCCC for conserving natural areas is called Reducing Emissions from Deforestation and Degradation (**REDD**). In California, REDD standards are adapted specifically to that jurisdiction under what is called **Forest Project Protocols**. These protocols require a series of measurements to be taken that quantify the carbon emissions avoided by proceeding with a decision to protect or restore the natural area. The tools/protocols are set into a framework of legislation allowing the buying and selling of carbon for that particular activity, e.g., conserving natural forests. The tools/protocols also set the **standards**, which determine the methods of valuing, **verifying** and **validating** the amount of carbon stored. Each registry has their own methods for these procedures, though not all registries meet or exceed the default values or international standards set by the UNFCCC.



Once a project is initiated, there is a whole list of criteria to be met, including passing tests of **permanence**, the degree of negative **leakage** and **additionality**. These are explained in further detail in the longer section below. One of the most onerous standards is demonstrating permanence. How will the avoided emissions be permanently stored for the next 100 years? The current standard in California for ensuring permanence for conserving natural areas is the placing of a legally-binding conservation covenant (known as an easement in the US) that provides legal assurance of permanent avoidance of emissions. Once an amount of carbon (often as CO<sub>2</sub> equivalents) has been valued, verified and validated, it becomes a carbon credit.

Carbon credits can be sold in either **voluntary** or **compliance markets** and are usually purchased to offset a company/individual's emissions; although buyers also purchase future credits against an expectation that the prices that emitters will have to pay in the future will increase. The only regulatory market demand in BC at the moment is from the Government of BC and its crown corporations who are committed to being carbon neutral. Industrial sector requirements are still being set. Carbon credits in the compliance markets have registered serial numbers similar to money so that the offset benefit cannot be used twice in meeting compliance obligations.

*At the UN Conference on Biological Diversity, in Bonn May 2008, Germany pledged E800 million Euros over four years to protect the world's forests and another E500 a year after 2013 to protect forests and other ecosystems under threat.*

## Offset Markets

There is a growing interest from both voluntary and compliance markets in projects that avoid deforestation and natural area degradation or add absorptive capacity. Regardless of whether the voluntary or compliance market is chosen, project originators (especially conservation directors and managers) require credible, accountable, affordable and trackable methods that meet widely accepted standards so that projects can be assessed, ranked, and their progress evaluated.

### Voluntary Markets and Standards

Anja Kollmuss, lead author in *Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards*<sup>8</sup>, states that "Voluntary carbon markets are so complex that you can't really make simplistic conclusions. There is no way to come up with a perfect standard because the way you define 'perfect' depends on what your goal is."

An analysis of markets for nature/carbon in British Columbia suggests that Canada's voluntary carbon markets are no exception to other voluntary markets in their diversity.<sup>9</sup> Voluntary markets range from informal programs such as the Trees in Trust Program, who assist land managers e.g., Nature Trust of New Brunswick, Meewasin Valley Authority in Saskatoon, but do not do any formal valuation - to energy utility companies with policies that require offsets, such as BC Hydro and expect to comply with international or national standards of valuation.



Endangered Taylor's Checkerspot Butterfly, found on Denman Island Conservancy lands. Photo: Andrew Fyson

<sup>8</sup> Kollmuss, Anja, Helge Zink, Clifford Polycarp. 2008. *Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards*. World Wildlife Fund: Germany

<sup>9</sup> Offsetters. *A Discussion Paper on the Feasibility of Funding Riparian Restoration with Revenue Sourced from Carbon Credits*. January 30, 2009. Fraser Basin Council: Vancouver.

*The publication The Eliasch Review, Climate Change, Financing Global Forests, commissioned by the government of the UK for the Poznan UNFCCC negotiations in December 2008, regards these commitments by such small countries as Norway as “priming the pump” for the public and private sector funding required to halve deforestation by 2020 and make forestry carbon neutral by 2030.*

Between the two extremes of these volunteer markets, there is a diversity of approaches - depending on the goals of the buyers and the sellers. A useful way to understand the range of markets is to understand the varying motivations of the buyers:

- Individuals who are contributing to the purchase of nature to protect ecosystem services, such as biodiversity, often do not require valuation. This practice has existed since the creation of land trusts, and now carbon has been recognized and adds another “ecosystem service.”<sup>10</sup> The participants trust or accept the values forwarded by the proponents from the land trust or conservation agency. The buyers/donors intuitively believe they are doing the right thing, “investing” in nature, and do not need to have any business rationale in the “offset” sense. In fact, not being part of an offset market may be viewed as a positive thing, because they are not enabling or providing an excuse for a carbon emitting or ecosystem degrading activity elsewhere.<sup>11</sup>
- Companies, such as power utilities, e.g. BC Hydro, have chosen to follow, on a voluntary basis, recognized compliance standards within a regulatory framework. These businesses are interested in offsetting emissions and other ecological impacts to scientifically demonstrate that they have met their commitment to being environmentally responsible and taking action on climate change.
- Companies, individuals and organizations, e.g., Air Canada, Harbour Air and carbon-free conferences buy credits to offset their carbon emissions related to particular activities, such as air travel. The airline companies, and others who buy offsets on behalf of customers insist on some level of accountability to be able to demonstrate that their customers’ money is buying real climate benefits. For example, they might demand International Standards Organization 14065 protocol, which are requirements for documentation that is auditable. The Canadian projects currently do not have the regulatory context for the equivalent validation of the UNFCCC Clean Development Mechanism (CDM) projects such as those purchased by British Airways in the UK.

Recent initiatives to compare and audit various offsets from different offsetters are revealing considerable value differences. These variations between offset products, combined with the bewildering complexity of the market, leave the public with few means by which to judge the validity of any voluntary credits. There might be an assumption that the provider is doing due diligence to validate the projects; on the other hand there is sufficient lack of trust by some to warrant the more traditional philanthropic buyer - who “invest” in conservation and land trust projects because they feel they keep the public trust. While the potential revenues make it very attractive for getting

<sup>10</sup> Wilson and Hebda, 2008

<sup>11</sup> Personal communication Andrew Lush, Trees in Trust, 2009

nature conservation into this market, there is also considerable reputational risk if standards are not of the highest integrity. **The establishment of credible valuation methods and standards is the purpose of this paper and is part of what Kollmuss points to as “the complex field based on goals.”**<sup>12</sup>

Voluntary markets are diverse and somewhat volatile as they are all in their early stages. It is expected that voluntary standards will align with the compliance market so as to ensure validation and verification of carbon, ecosystem service and social benefits. Currently, the California Climate Action Registry (CCAR) 2008 standards are the most rigorous and reflect the broad societal and ecological benefits/impacts of projects. They also stand up to the much-needed rigour of the validation and verification process, which itself is reflected in the ability of CCAR credits to command the highest prices.

In BC, the voluntary market is at an early stage of development with few pilot projects initiated for conservation of natural areas - although ecological restoration projects have been used in offsets using ISO guidelines (which are simply guidelines for reporting, and have limitations, see Community Ecosystem Restoration Project). There is great potential in BC for natural area conservation projects in the voluntary market, provided high quality standards are met.

### ***Compliance Markets and Standards***

Concurrently, there are rapidly evolving frameworks for valuing living carbon and ecosystem services for compliance markets. At large-scale international levels, the **highest** standards are those developed by the United Nations Framework Convention of Climate Change (UNFCCC). For regions like the Western Canada Initiative (WCI) operating outside of the international agreements, the Forest Project Protocols (FPP) developed by California Climate Action Registry (CCAR) 2008 are rapidly gaining acceptance.

The first natural areas protected as Forest Projects have now passed the final stages of registration in California. This advance, hopefully, sets the scene for developing **compliance** offset markets in British Columbia. The Province of BC recently passed the Emission Offset Regulation, and some provisional concept guidelines for forest offset development for the Pacific Carbon Trust and is presently developing protocols for developing these projects. These regulatory changes and protocols will provide the institutional framework to accept offsets for natural area conservation. A discussion paper on how BC can expand its silviculture investments into a forest climate market was released on March 25<sup>th</sup> 2009<sup>13</sup>. In parallel, on April 7, 2009, a Silviculture Systems and Forest Dynamics dis-



The Islands Trust Fund has protected this forest on Gabriola Island

<sup>12</sup> Kollmuss, 2008

<sup>13</sup> [http://www.for.gov.bc.ca/hfp/silviculture/discussion\\_paper/SilvicultureDiscussionPaper-FINAL.pdf](http://www.for.gov.bc.ca/hfp/silviculture/discussion_paper/SilvicultureDiscussionPaper-FINAL.pdf)

cussion paper<sup>14</sup> was released to guide forest offset development for the new Pacific Carbon Trust. The first calls for expressions of interest are only for enhanced silviculture projects. However, with the announcement that “Additional forest-based projects are expected as more methods for quantifying carbon sequestration are developed,”<sup>15</sup> an opportunity opens to push REDD projects to the forefront. Other initiatives are also pushing REDD opportunities forward, which are provided for in the California Climate Agreement Regulation and the new federal Waxman Climate Change bill before the US Congress, and the serious engagement of US negotiators at the UNFCCC meetings towards convergence with the Emission Trading System, and the post 2012 international climate protocols which include REDD in advance of the Copenhagen negotiations in December 2009.

## Offset Markets for Ecosystem Services in BC



Lindsay Dickson Nature Reserve, Denman Island Conservancy - Photo: John Millen

British Columbia has much potential to develop a market for ecosystem services. The province has the greatest biological diversity at ecological and taxonomic scales in the country and much of it remains in a relatively sound state.<sup>16</sup> *Taking Nature's Pulse*, a major scientific report by Biodiversity BC, concludes that “British Columbia’s biodiversity is globally significant because of its variety and integrity, but without immediate action is vulnerable to rapid deterioration, especially in light of climate change.”<sup>17</sup> The region has a comparatively stable social infrastructure and legislation for supporting perpetual conservation covenants providing for permanence. There is also a well-developed professional competence to assess ecosystem values in a systematic manner, plan projects and implement protection, restoration and management. British Columbia is a world leader in measuring and understanding biological diversity and ecosystem characteristics with a strong research interest in non-timber forest products, ecological service businesses and Traditional Ecological Knowledge.

Offset trading has developed in the US and Europe for other ecosystem values, such as habitat and water quality or water cooling capacity. Offset banking protocols have extended into grassland and riparian ecosystem trading in the US and Europe, and financial mechanisms for these services are emerging from the current economic downturn as a part of the new green economy. Again it is environmental non-governmental organizations (ENGOs), businesses and local governments that are pioneering the science, standards and trading platforms for future ecosystem value trading. The BC Chapter of the Society for Ecosystem Restoration undertook a peer review of an initiative by Robert Seaton to develop criteria to permit an audit certified Registered Professional Biologist or Ecologist to validate a project’s ecosystem benefits. Such a system is will support the development of an ecosystem services market in the province. BC is showing leadership for example, through BC Hydro’s commitment to “no net incremental environmental impact.”

<sup>14</sup> <http://www.for.gov.bc.ca/hre/standman/>

<sup>15</sup> Press release, *Carbon Trust Looks to Invest in Forest Offsets*, Ministry of Forests and Range, April 3rd, Reference #: 2009FOR0064-000652 2008

<sup>16</sup> M.A. Austin, D.A. Buffett, D.J. Nicolson, G.G.E. Scudder & V. Stevens (eds.). 2008. *Taking Nature's Pulse: The Status of Biodiversity in British Columbia*, Biodiversity BC

<sup>17</sup> Austin et al, 2008, p. 3.

# Principles and Definitions of Carbon Accounting

**F**orest Absorbing Carbon Emissions (FACE) developed the first recognized and formally traded carbon sequestration projects in forests. Their standards were later refined by the IPCC for the UNFCCC in their *Land Use Change, Land Use Change Forestry* guidelines. As a consequence of these early actions, developments in accounting of forest ecosystems have defined the concepts and criteria for other terrestrial carbon sink accounting in other ecosystems such as soil, grasslands and wetlands.

## Projects

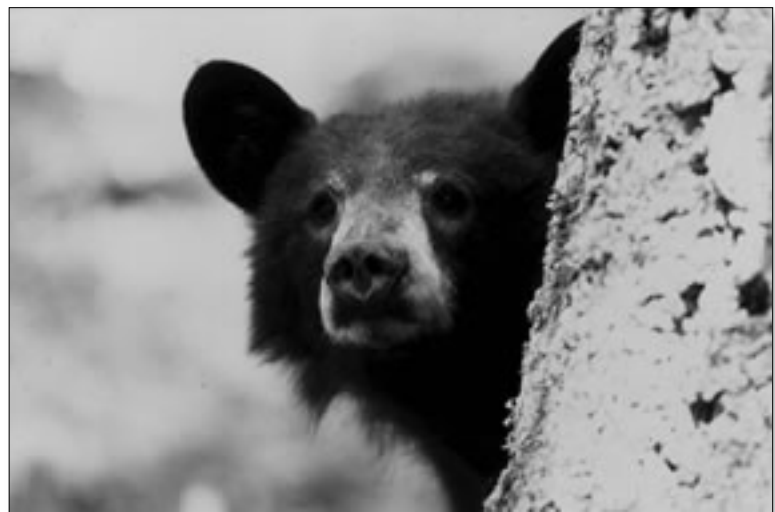
Projects are qualified areas strictly defined by predetermined boundaries where both the business as usual and projected project activities that lead to defined future conditions are expected to take place. The most rigorously defined standards of ecological carbon accounting were developed for project initiatives, although many of those guidelines also apply to the national forest on each nation's carbon account. The data and analysis is inevitably less precise on a national scale like Canada. Forest projects are typically areas greater than 1000 ha whose existing and potential revenue will be adequate to fund the high costs of project development and registry. The few pilots that have been done in North America were highly dependent on revenue from the sale of carbon credits, and the price of the carbon credit is often in direct relationship to the quality of accounting and the rigour of the standards - although that is not always a direct relationship. The following definitions are stated in terms of projects because conservation trusts will be doing projects on defined areas. However, the same basic concepts do apply at all levels and scales of carbon accounting, including at the national level. The following principles have been derived from the experiences of carbon accounting in existing projects, some of which are profiled in this summary document (under Case Studies).

## Baseline

In order to understand the carbon benefits of the proponent's proposed changes to land management and other practices, it is first necessary to define and describe the emissions and uptakes of carbon that would occur in the absence of the project. The baseline condition is the detailed accounting of amounts and trajectories in the carbon pools and emissions which will occur without the undertaking of the project.

## Additionality

The effectiveness of an offset program in mitigating climate change depends on one simple but key outcome: the offset project results in less GHG gases



Polly Bear in Valhalla Provincial Park  
Photo: Wayne McCrory

in the atmosphere than otherwise would be the case. This may seem like a simple goal but achieving it is usually complex.

Additionality, in its simplest terms means that the project must prevent emissions or remove GHG amounts greater than would be the case if the project were not undertaken. In the California Climate Action Registry (CCAR) (2008) protocol, this means that reductions must be greater than would have occurred under business-as-usual conditions. This additionality is determined into the future by comparison to a "quantitative baseline estimate" of carbon stocks on the project lands. The creditable offset amount is the net increase in carbon stocks (the result of avoided or reduced emission) as a result of the project.

## Leakage

Offset projects may have secondary on-site and off-site effects resulting in CO<sub>2</sub> (and other GHG) emissions from obviously causally related activities. Some of these occur outside of the project boundary and are not easy

to account for, (e.g., displaced resource removal activity (timber removal from a non-project site). For a forestry offset project such secondary leakage effects may include harvesting of offsite forests as a replacement for the non-harvested timber and increased transport of products. For example, if a community forest proponent proposes project offsets in a specific part of their forest which they decided to conserve, but then increases logging elsewhere on its lands, the logging related emissions must be deducted from the project's carbon account.

The California protocol includes specific methods and guidance for calculating leakage risk for a reforestation project. It gives an example of reforestation on harvested forest land that leads to clearing of land for the same harvest production elsewhere. Emissions from the cleared land must be recognized as these equivalent emissions have been created as a result of the project. In the case of conservation lands the same report gives an example where a preservation project might force the shifting of grazing activity, thus simply shifting the associated emissions and still having their 'leakage' on the project account.

Leakage activities are normally also defined with a geographic area, often a large geographic area, like a country, province or state.<sup>1</sup> The value of using large areas is that the shifting of

resource harvesting and emissions to off-project sites can be reasonably detected and accounted for because a net increase in carbon stocks must be demonstrated for the project area.

In the case of a small constrained conservation area, most of the emissions of concern would be those related to the management activities associated with the site and those related to limited associated product resource sales and distribution if any.



Garry Oak - Burgoyne Bay Provincial Park protected by TLC The Land Conservancy of BC, SSI Conservancy, The Nature Trust of BC, BC Government and thousands of generous donors. - Photo: Gordon Scott

<sup>1</sup> Eliasch, 2008.

## Permanence

Technically permanence means that GHG reductions remain permanent and that there are no reversals whereby the credited reductions no longer remain in the carbon sink. The California draft protocol defines the interval for permanence to be 100 years. A reversal is defined essentially as a decrease in the difference between project and baseline carbon stocks from one year to the next. In the draft California protocol some of the carbon credits of a project are placed in a buffer pool to anticipate reversals, basically providing a self-contributed reversal insurance for the project (according to a risk rating for the project). Credits from the buffer pools must eventually be replaced according to a defined set of rules.



Thomson Wildlife Sanctuary covenanted by Central Okanagan Land Trust

Risks to permanence include financial, management, social and natural (risks are explained in detail in CCAR2008: Appendix C). For conservation projects, financial and management risks concern the stability of the organization in control of the project and on-site actions that would lead to biomass reductions (illegal timber harvest for example). Social risks concern broad changes in society such as the government altering climate change policy.

Conservation lands are most likely subject to natural risks of carbon and other value losses. In general, these can be discounted for, based on some understanding of the likelihood of a natural event occurring. For British Columbia's mountain pine beetle forests, there are regional calculations available for emissions associated with a mountain pine beetle outbreak for example, which could be used for estimating a discount for this sort of risk. Similarly there are values available for other sorts of pests with respect to yield losses from standing forests. Aside from including a discount for risk, the CCAR 2008 draft protocol focuses on two approaches to deal with natural disturbance reversals: mitigating the disturbance (fire-proofing or fuel reduction for example); and rapid restoration (specifically reforestation) of a disturbed site as part of the recovery plan.

## Project Period

The project period is the length of time over which the project will monitor carbon and other values and receive credits for the benefits of the project.

## Project Boundary

For ecosystem projects, the project boundary defines the area within which the project activity will take place, and carbon benefits will accrue. To avoid the problem of proponents including and excluding areas based on actual GHG credits, most methodologies require that project boundaries be defined before the project commences.

## Methodology

Each ecosystem climate project must adhere to a specific standard for developing the baseline conditions and monitoring changes to them. This methodology may be designed specifically for the project, or it may be an existing one designed for some other project. The methodology must be consistent with the requirements of the regulatory or voluntary carbon regime under which the credits are to be validated and verified.

## Validation

Under most regulatory and voluntary carbon regimes, some form of audit by an independent auditor is required to validate that the project has used the chosen methodology properly to develop a baseline for the project, and to put into place a plan for monitoring the results of the project.

## Verification

Once a project is underway, an independent verification of the monitoring results is required before carbon credits can be issued under most voluntary and regulated systems.

## Conservatism

Accounting the carbon benefits of a project is potentially subject to error. For instance, the baseline is an estimate of what would have happened in the future without the project, and as with most projections, typically involves considerable uncertainty about what future conditions will be. To reduce the chance that a project will be credited for carbon benefits which are not real, a principle of conservatism is usually required in carbon accounting, so that estimates of benefits will be more likely to err on the low side than the high side.



Released in Nichola Valley - Male Red Burrowing Owl - Photo: M. Mackintosh

## Project Design Document

The Project Design Document (PDD) in most standards is the central record of the property, the specific baseline condition and the methodology by which it was determined, the management plan that will create additionality and the indicators that will be measured and validated.

## Global Standards

Though there remain some differences between how standards are treated, the vigorous debate around the world is in fact arriving at an increasing number of elements with common definitions so that there is a gradual methodological convergence across all of the regulatory systems. The overall driver for this convergence is that the atmosphere is a global commons and accounting for atmospheric benefits ultimately will have to be recognized on



national accounts within a global strategy (e.g. 2007 IPCC recommendation the world meet a Global target in 2050 of 50% of 1990 emissions). National credibility rests in national peer reviews, which must be registered in an international multilateral jurisdiction to retain credibility. To date there is only one such internationally recognized jurisdiction, and that is the United Nations Framework Convention on Climate Change (UNFCCC) and its historically unparalleled body of peer reviewed scientists, the IPCC (Intergovernmental Panel on Climate Change).

## Competing Standards

Because nations have, what the UNFCCC has agreed to call, common but differentiated interests, different climate action models are constantly being proposed. Some speculate that just as the US dollar replaced the gold as the standard of currency value in 1972, the strength of the emerging US carbon market will dominate change in some aspects of the UNFCCC standards. However, at the time of writing of this report, the visible features of the emerging US climate regulations strongly reflects the developing new UNFCCC standards. These UN standards are also reflected in the subset North American trading regimes like the Western Climate Initiative (WCI), the Regional Greenhouse Gas Initiative (RGGI, the eastern states equivalent) and the Voluntary Carbon Standards (VCS).

## UN vs other Standards

The UNFCCC Clean Development Mechanism (CDM) forest carbon measurement and analysis tools for developing methodologies are available to use on the UNFCCC CDM web site.<sup>2</sup> However, due to the highly divergent interests between nations, the UN bureaucracy has been long on protocol and short on efficacy, resulting in complex registry, approval and validation processes. This complexity has resulted in the emergence of parallel standards like the Voluntary Carbon Standard (VCS), CarbonFix and others. These standards developed by the voluntary sector have the goal of reducing transaction costs, while maintaining scientific credibility. It is the UN's role to establish a critical bioethical scientific framework and then encourage market momentum to cause practical considerations to predominate in the delivery of these standards. The sheer volume of the North American market has the potential to develop an acceptable second tier and less bureaucratic standard. But until the VCS and regional standards include all of the critical elements of the UNFCCC standards, it is best to match up to UNFCCC standards to avoid potential project disqualification. Use of global standards is important in offset transactions, because buyers are often global corporations, or part of global organizations (e.g. BC Hydro is not only a member of the World Council of Sustainable Business, but currently they chair the environmental committee) and are committed to international accounting protocols, like the UNFCCC to manage their multilateral accounting obligations.



Creekside Rainforest  
Photo: Andrea Collins

<sup>2</sup> Clean Development Mechanism (CDM) protocols for afforestation, reforestation, restoration (ARR) methodologies and tools for developing methodologies for forest carbon accounting can be found at [http://cdm.unfccc.int/methodologies/ARR-methodologies/approved\\_ar.html](http://cdm.unfccc.int/methodologies/ARR-methodologies/approved_ar.html)

## Three Strategies to Increase Forest Carbon

Currently there are three main strategies for increasing forest carbon stocks:

**1. *Reduced Emissions from Deforestation and Degradation REDD*** - (also avoided conversion) this strategy involves preventing actions that would occur without a need to manage for climate change. This offset strategy includes preservation of ecosystems, thus avoiding emissions from disturbance. Normally to qualify under government programs (e.g. California, BC), the avoided conversion has to be clearly demonstrated to have been likely to occur in the near future. Such projects aim to maintain the carbon sink value (considerable in the case of BC coastal forests) and have the potential to add to it if the ecosystem is sequestering carbon (through photosynthesis).

**2. *Improved Forest Management IFM*** - a verifiable forest management program that has GHG benefits. The improved management approach involves altering management practices such that the GHG emissions of degradation are decreased and the sequestration of carbon is increased. The California forest protocol focuses on the application of natural forest management practices to promote and maintain native forests. California has defined Sustainable Forest Management practices which provide auditable permanence for an improved practice. Certification standards also have the potential to define some improved practices. Improved management for optimum carbon carrying capacity requires highly specific management plans.

**3. *Afforestation, Reforestation or Restoration (ARR)*** - returning land to forest lands from a degraded state:

***Restoration*** - Is the direct human induced activity to reduce emissions of greenhouse gas by restoring degraded ecosystems thus limiting carbon stock degradation;

***Afforestation*** - Is the direct human-induced conversion of non-forested land to forested land that has not been forested for at least 50 years through planting, seeding and/or human induced promotion of natural seed sources;

***Reforestation*** - Same as afforestation except that it has not been forested for at least 20 years.<sup>3</sup>

Accounting for carbon credits within each of these types of land use change must meet the same criteria as other initiatives to demonstrate reduction of atmospheric GHGs. **The REDD approach would seem the most likely to be consistent with conservation initiatives. However many conservation projects often also involve restoration and improved forest management.**



Aspen Copse, Grasslands, Rabbitbrush  
Photos: Richard Doucette

3 Definitions from the Ad Hoc Working Group on Further Commitments for Annex 1 Parties under the Kyoto Protocol. UNFCCC, LULUCF, Seventh Session, 8 April 2009. Land use, land-use change and forestry.

### *Other ecosystem modifying interventions*

A report on Australian temperate forests<sup>4</sup> lists some additional strategies to maintain and restore carbon sinks, each of which may, with the right project design, reduce emissions or increase a project's carbon reservoir. These include:

1. Assisting ecosystems to reach climax through accelerated succession
2. Converting one ecosystem to another: e.g. re-flooding former marsh land to restart organic matter accumulation
3. Connecting ecosystems through restoring corridors to build biodiversity
4. Modifying the chemistry of aquatic systems, e.g. liming lakes to neutralize toxic metals
5. Restoring extirpated ecosystem to recreate habitat for species at risk
6. Removing invasive species, amending soil, modifying hydrology.

### **Carbon Pools**

There are three primary carbon pools within the CCAR (2008) protocols: living biomass, dead biomass, soil carbon. Up to six carbon pools are recognized in other standards - above ground living biomass, below ground living biomass, soil, dead wood, litter, and timber products and others use foliage, stem, litter roots and soil carbon. The choice of and accounting for pools depends on the type of project undertaken, and the requirements of the standards being used. Translating forest inventory into carbon stocks must also take into account terrestrial-atmospheric processes and is more complex. It is a useful exercise to become familiar and keep abreast of the tools available from the different registries as methods improve.

### **Default Values**

For many of these pools, the proponent has two options to calculate carbon amounts and fluxes and monitor the carbon value. One is to obtain specific measurements for the ecosystem and the other is to apply (default) values accepted within the regulatory framework of the project.

In BC, these default values are not yet defined, but may be related to or derived from the ecosystem types used by Ministry of Forests and Range through the Biogeoclimatic Ecosystem Classification system (BEC). Since having such ecosystem-based default values could reduce accounting costs for small project areas, conservation trusts are encouraged to lead in the development of sample projects of the more common ecosystems.



Chatterbox Falls, protected by Princess Louisa International Society and the Nature Conservancy of Canada - Photo: S.Harrington

4 Mackey, B., Berry, S.L., and Lindenmeyer, D.B. 2008. *Green Carbon: the role of natural forests in carbon storage*. Part 1, A green carbon account of Australia's eucalypt forest, and Policy implications, Australian National University, Canberra 47 pp.

Many specific properties will have been disturbed so that typical default values need to be modified for the degree and nature of disturbance and the current seral stage. Project specific measurements will be required and will likely generate greater credit values due to increased certainty of measurement. At this time there are few accepted default measurements<sup>5</sup> in BC.

As larger properties or aggregated sets of properties will most likely be assembled to justify the costs of developing the mensuration, analysis, planning and credit modeling, a number of ecosystems and even complex ecosystem compositions such as combined wetlands and forests are likely to have to be quantified.<sup>6</sup> Consequently, the proponent's option for using default values is not expected to be substantively available for some time in BC.

After a few years of consistent techniques applied across a provincial offset program enough measured carbon in each site type might be available to infer values for various plots of land. It may appear as if few large scale research programs could accelerate the emergence of these data sets, but the research would likely best be done within the discipline of actual projects meeting international protocols and guidelines for optimum market value.

5 Example is the chrono-sequence data for Vancouver Island. Trofymow, J.A. and B. A. Blackwell. 1998. *Changes in ecosystem mass and carbon distributions in coastal forest chronosequences*. p.40-42. In J.A. Trofymow and A. MacKinnon (eds). *Structure, Process, and Diversity in Successional Forests of Coastal British Columbia: Proceedings of a Workshop*. Feb. 17 - 19, 1998. Victoria, B.C. Northwest Science. Vol. 72 Special Issue No. 2.

6 Note here that wetlands (except for some swamps) have low sequestration values but extremely high storage values. For example , Burns Bog in the Fraser Lowland stores  $1-2 \times 10^6$  metric tonnes of carbon Hebda et al. 2000. *Burns Bog Ecosystem Review: Synthesis Report for Burns Bog, Fraser River Delta, South-western British Columbia, Canada*. Environmental Assessment Office, Victoria, B.C. 271pp.



Restored and protected salmon stream Comox Valley Land Trust and The Nature Trust of BC

# Challenges and Opportunities

## Technical Challenges of Carbon Markets

Carbon offset projects for the compliance market, and to an increasing extent, voluntary markets, currently require many complex analyses. These analyses include describing a baseline condition of the land projected forward through the term of the projects (100 years within CCAR) and accounting for additionality, leakage and permanence. The definitions of additionality, leakage and permanence in carbon offset projects are evolving through compliance programs. There are already clear enough working definitions in the BC Emission Offset Regulation (to be adapted for use with reference to the California Forest Protocol) to initiate at least large-scale conservation offset projects.

Regulatory offset programs have relatively strict requirements for additionality and potentially for leakage. Permanence definitions within the Western Climate Initiative require projects to be in place for 100 years, for which conservation projects have to register conservation covenants (as also recommended by the BC portion of the Canadian Land Trust Standards and Practices). Selling offset periods against emissions to protect permanence may help define additionality. Land trust conservation projects have the advantage of mandated permanence, (especially with a secondary land trust covenanting the property). Even if projects fail to produce an adequate return economically, they can be indemnified by carbon and ecosystem payment arrangements to protect the carbon values in the project.

Specific technical methods for BC to measure carbon emissions and sinks are continuing to evolve. At this time for compliance offsets, establishing the offset value requires expert involvement until widely accepted default values are developed. The value of carbon through default values will always be less than measuring it for each site and should only be used on small projects. Small projects may not be able to afford the increased valuation costs relative to the net gains to be made in picking up the extra carbon. Global default values from the IPCC, likely underestimate BC carbon stocks and ecosystem-based inventories. For these reasons BC regional models need to be developed.

Large-scale projects proposed by relatively large organizations/agencies (with the research capacity and funding) are required to develop methods, which can withstand peer review and be replicated by the smaller organizations. The voluntary offset markets are also evolving and will increasingly require the same standards of compliance. However, with the right analysis some properties can be identified for early action through the voluntary market.

There are uncertainties about carbon stocks and emissions in BC ecosystems, especially in soils, and this is an area of potentially high offset value to support the evolving research. Generally models and literature suggest that the biggest opportunity for significant carbon removal is through conservation of natural areas (avoided deforestation) with long established soils.<sup>1</sup>

*Nurturing gift relationships with nature ... offers a promising strategy for getting beyond the compulsive instinct of market culture to alienate nature and for honoring deeper humanistic and ecological values. Curiously, this desire may sometimes express itself through the market. A good example is the land trust movement, which uses the institutions of the market (property law, market exchange) to acquire land in order to retire it from market acquisition in perpetuity. Another example is cooperatives, which have market relationships with outsiders while allowing more democratic, equitable relationships internally. This paradigm-described earlier as "property on the outside, commons on the inside" is a model that may help us inscribe functioning commons within a market society.*

*(David Bollier, Silent Theft: The Private Plunder of our Common Wealth, Routledge, 2002, p. 4)*

<sup>1</sup> Trofymow reference, Brown, R. 2008. *The Implications of Climate Change for the Conservation, Restoration and Management of National Forest Lands*. Defenders of Wildlife. National Forest Restoration Collaborative [http://www.defenders.org/resources/publications/programs\\_and\\_policy/biodiversity\\_partners/implications\\_of\\_climate\\_change\\_for\\_conservation\\_restoration\\_and\\_management\\_of\\_national\\_forest\\_lands.pdf](http://www.defenders.org/resources/publications/programs_and_policy/biodiversity_partners/implications_of_climate_change_for_conservation_restoration_and_management_of_national_forest_lands.pdf)

*As the government agencies that set socially acceptable boundaries for market activity were slowly sabotaged by budget cuts and curbs on their authority, a wide array of commons in American life became open game for market exploitation: public lands, government R&D, information sources, and ethical norms for safety, health, and environmental protection.*

*(David Bollier, p. 4)*

In the full technical report, the authors provide a sample framework for carbon value assessment. The sample framework for quantifying carbon employs all of the essential underlying concepts for most standards which define the Baseline and the Project Design Document (PDD), such as additionality, leakage, permanence, project period and boundary, methodology, validation and verification, conservatism and the three main action paths to carbon credits or **modalities** - Reduced Emissions from Deforestation and Degradation (REDD); Improved (and enhanced) Forest Management (IFM); and Afforestation, Reforestation or Restoration (ARR). The application of these concepts ultimately is always specific to each project, and requires a unique careful analysis of the carbon dynamics of the system, which is embodied in the baseline and PDD - just as there must be specific analysis for integrating the other ecosystem values.

## Technical Challenges of Ecosystem Services

The valuation of ecosystem services is a rapidly evolving field and as yet in BC there are no widely accepted methods of valuation particularly with respect to monetary value. BC ecologists and other professionals understand how to classify ecosystems and how to identify the various natural services, from water quality, biodiversity to spiritual significance, but assigning monetary value to some of these services is not well developed - some have argued that it is impossible to develop one valuation technique for the other ecosystem values. For example, while scientists have measured how forests purify local air and provide health benefits the market still has to set prices for how much we would pay per hectare for these benefits. One proposed approach is to use as a baseline the health costs of poor air quality and then calculate the air cleaning atmospheric benefit. Relatively standard methods have emerged for the relative ranking of particular sites permitting the prioritizing of management options for different mixes of ecosystem service at various scales. Surveys find that managing a forest for biodiversity, erosion control, carbon and small amounts of timber gets a higher rank on social, economic and ecological grounds than managing forests for simple timber values. Calculations which compound these benefits into a Net Biome Production value or Net Ecosystem Production value are now being used to examine alternative management scenarios to determine optimum land use plans.

The international community is building ecosystem service classification systems and valuation using protocols proposed by the Millennium Ecosystem Assessment<sup>2</sup> (MEA) and the World Resources Institute<sup>3</sup> and being used by some regional governments. BC has a robust world-class ecosystem classification system, and therefore, is uniquely placed to become a leader in the next phase - compounding the Net Biome Production using regionalized future condition scenarios. Some services are more easily measured than others, e.g., water quality, while other services provide considerable challenges such as climate change adaptation value and biodiversity value. Another challenge in multiple value analysis is that international protocols presently prioritize valuation of human-centred services and do not valuation of nature-centred services, (e.g., intrinsic values).

In the technical report, the authors propose a ten-step quantitative valuation approach which: identifies and describes ecosystem services; estimates the amount and reliability of the services; estimates the value of the services; estimates the risks

<sup>2</sup> Millennium Ecosystem Assessment 2005

<sup>3</sup> Ranganathan, J., Ruadsepp-Hearne, C., Lucas, N., Irwin, F., Zurek, M., Bennett, K. Ash, N. West, P. 2008. *Ecosystem Services: A Guide for Decision Makers*. World Resources Institute. 75 pp.

involved in maintaining the services; and estimates the costs of valuation and returns of a project. An additional experimental valuation tool based on relative ranking, derived from standardized measurements, is proposed and described in detail in an appendix. Use of this tool may assist in a thumbnail calculation, which demonstrates if there is significant potential value (both monetary and non-monetary) of conservation projects when carbon benefits and ecosystem services are integrated.

Valuation will certainly provide a workable mechanism for making choices about land use and reveal whether the only route to conservation is through selling projects in a traditional manner (fundraising for the 'love of the land' with unquantifiable benefits) or whether including carbon and other ecosystem service values can help expand the scope and funding sources. The use of these valuation and reporting tools could provide the flexibility to move BC projects in new directions and enable offset investors to compare what they are investing in against other options, to their own objectives, and to facilitate tracking of the investment.

## Business Challenges and Opportunities

To date, no parcel of conservation land in BC has provided a compliance carbon or biodiversity offset, so the business opportunities are only speculative at this stage. However, the first US projects, e.g., the Van Eyck Forest Project, Garcia and Lompico Forest under the California Climate Action Registry standards have been accepted and credits registered. The Garcia Forest Project has also been developed with a full analysis of costs and returns. The Garcia Forest project, (detailed within the technical report and summarized in Case Studies section) includes a cost analysis which suggests how BC conservation trusts can meet some of the challenges they face at this early stage. It was one of the large scale pilot projects which absorbed the high costs of being a pilot, 'learn by doing.' BC will build on the experiences of California and other regions to initiate conservation, restoration, or similar types of credible projects.

Valuation of small offset projects (the acquisition of a small patch of old growth or other forest or ecosystem projects) and the development of a project prospectus, i.e., tracking and reporting protocols, especially for compliance offset programs, is little different from doing full vegetation inventories and analyzing management options for a conservation plan. However, carbon markets have additional data requirements - links to greenhouse gas (GHG) dynamics and critical questions related to modeling. These issues have the added dimension of having to track which market rules are best for a project. These challenges may be onerous and expensive in the beginning. Small projects may not be able to meet offset criteria, such as requirements of meeting additionality tests and calculating leakage

Another major constraint for small projects in getting compliance carbon offset projects off the ground is offsetting risk. For a project to meet standards under CCAR (2008)<sup>4</sup>, it is usually required to set aside 10% of the land (or credits) that is discounted to compensate for risks such as fire and pest outbreaks. With a small property, there is not enough land for a discount and risk is high as one fire could take out the whole old growth stand.

*On the other hand, the passion needed to champion new models for protecting the commons is not likely to emerge from market culture alone. It will arise from people who relate to human and ecological needs as sovereign forces in their own right, and not as commodified objects subject to market control. The sophistication with which we blend the personal and inalienable with the monetized and marketable is becoming a more urgent matter. With each passing day, market forces are colonizing territories of nature that were previously inaccessible to humankind such as wildlife habitat, global water flows, the planets atmosphere, and other realms, big and microscopic. The rapid enclosure of these "frontier commons" is a worrisome development.*

*(Bollier, p. 68)*



BC's carbon storing grasslands - Grasslands Conservation Council - Photo: Chris Harris

<sup>4</sup> California Climate Action Registry CCAR Forest Protocols latest version released in April 2009, [http://www.climateaction-reserve.org/wp-content/uploads/2009/03/fpp-update\\_forest-project-protocol.pdf](http://www.climateaction-reserve.org/wp-content/uploads/2009/03/fpp-update_forest-project-protocol.pdf).

## Case Studies

No conservation project in BC has yet sold credits in an established voluntary or compliance market because nature conservation has only recently been recognized as a legitimate carbon offset mechanism (as in the California draft protocol for example; CCAR 2008). However, BC has a long history of working towards offsetting various environmental impacts through activities like reforestation through the Forest and Range Practices Act and BC Hydro Regional Compensation programs like the Columbia Basin Trust.

Some of the case studies noted below already play the function of being pilot projects. These have been undertaken in the province and member states of the Western Climate Initiative by conservation land trusts, land management agencies, academic institutions and corporations to value carbon and/or ecosystem services and indicate some aspects of the potential voluntary and compliance markets. These pilot projects have used various frameworks and methods and point to specific challenges. Comparative project pricing reveals considerable variability in value. These case studies profile some of the challenges of developing project models.



Horsefly River, protected by *TLC* The Land Conservancy of BC



## For each of the following case studies, the following aspects are discussed:

**Project:** Name as registered with a registry

**Buyer:** If there is a buyer there is a buyer noted, but this can also be the proponent or party most likely to benefit from the project who purchased the project because it met their goals.

**Originator/Broker:** The proponent that puts forward or “originates” the project for valuation and verification can be the owner of the land or an agent acting on behalf of the owner. Brokers can be originators as well or contracted independently to find markets for credits. **Note:** *Nothing noted about brokers should be constituted as a recommendation from the authors.* It is clear that there is going to be stiff competition to broker carbon, and at this early stage, with such a high level of uncertainty, proponents can feel that on the one hand, they have a lot to lose through ignorance, but they are also vulnerable to giving brokers advantages in exchange for insuring some of this perceived risk. In response to the emerging demand most bank, major accounting and financial firms are setting up a carbon trading desk and team. This rapid proliferation of brokers suggests that the market will soon be quite competitive, and has discouraged some savvy proponents from being the first to close deals.

**Values:** Most projects have some specific values embedded in their goals; however, some projects may seek to capture all of the ecosystems benefits, including its additional products, services qualities and processes. This can include, timber, carbon, water quality and quantity, biodiversity, erosion control, non-timber products, traditional cultural and medicinal values and recreation.

**Carbon valuation method:** Refers to the standard governing the methodology by which the carbon value is established. Some proponents (including the author) use several valuation methods in order to

segregate out the highest potential values for each site type, modality or value.

**Standards:** These are the standards set for compliance with a governing regulation and can be voluntary standards which generally are designed to meet the UNFCCC requirements, and try to anticipate the Copenhagen post 2012 rules.

**Carbon activity:** This is the land use means by which carbon is being stored, what are known as the carbon modalities: REDD, IFM, ARR. For other ecosystem services, the offset type is far more varied.

**Cost to operationalize:** This is the cost of bringing the offset value to market and on small projects, at this stage, may exceed the value of the credits.

**Money raised:** Not all credits are sold, or traded, and not all can be monetized.

**Permanence:** Primarily refers to the nature and duration of legal and anticipated natural tenure of the ecosystem reservoir. In BC it is generally addressed through conservation covenants that are binding and flow with title over 100 years, a standard requirement of permanence for most compliance markets. Physical risks to a carbon reservoir like fire, pests or disease has given rise to a concern about the permanence of a biological carbon sink.

**Additionality:** How the project defines the baseline and qualifies its actions as being beneficial for GHG reduction. Understanding detail is critical in the analysis of this attribute.

**Summary:** Describes the project and gives some historical context.

**Issues:** Challenges or questions raised about the project.

## Lompico Headwaters Forest, Los Altos California

**Seller:** Sempervirens Fund <http://www.sempervirens.org/lompicocarbonproject.htm>

**Buyer:** Pacific Gas and Utility under Climate Smart Program

**Broker:** Sempervirens Fund

**Values:** Wildlife, biodiversity and carbon storage. Avoided emissions through conservation.

**Carbon valuation method:** California Forest Protocols

**Carbon activity:** REDD

**Standards:** CCAR, registered September 2007

**Type of offset:** Voluntary. Under the ClimateSmart Program PG&E cannot use the credits it purchases from Sempervirens Fund to meet any mandatory emissions cap. These credits are “over and above” any current or future emissions requirement. The carbon offsets it is purchasing are simply one more way of reducing PG&E’s footprint.

**Cost to operationalize:** Privately funded as a pilot project. Information not available.

**Cost effective:** 14,000 carbon credits will be sold from the Lompico Forest Carbon Project to PG&E as part of PG&E’s ClimateSmart Program. The credits are generated over a period of 14 years: 2007-2021. Over 28,000 mt CO<sub>2</sub>e (equivalent) in emissions reductions credits are anticipated to be generated over the next 100 years

**Permanence:** Conservation easement

**Additionality:** This land was to be logged under existing regulatory framework.

**Summary:** Founded in 1900, Sempervirens Fund is California’s oldest land conservation organization. The Lompico Forest Carbon Project will result in the first carbon credit sale under CA’s Forest Protocols that does not involve logging. Most projects submitted for CCAR approval to date involve sustainable logging where carbon credits are generated in return for a reduced timber harvest.

**Lompico, in contrast, is a 100% preservation project, and sets an important precedent for the development of future emissions reduction projects based on forest protection.**



Lompico Forest - Photo: Sempervirens Fund

This is the first project Sempervirens Fund has seen that establishes an economic value for redwood forestland other than timber harvest or development potential. The valuation and origination of the project was done through private donations with the intention of selling carbon credits to the local utility, Pacific Gas and Electric. The 202 acre forest was second growth around 80 to 100 years old and was given permanence by the placing of a conservation easement for strictly preservation with no logging. This is the first carbon credit purchase in the compliance market on the basis of complete preservation within the Western Climate Initiative.

## Trees in Trust

**Seller:** land trusts

**Buyer:** members of the public

**Broker:** Trees in Trust non profit  
(www.treesintrust.com)

**Values:** Ecosystem services, cultural values and carbon storage

**Carbon valuation method:** No valuation method used, assumption of carbon storage values

**Carbon activity:** Potentially REDD

**Standards:** none

**Market:** voluntary

**Cost to operationalize:** Very inexpensive to run, online registration

**Money raised:** Little investment as there is no valuation or registration process, low returns

**Permanence:** Forest ecosystem land acquired and covenanted

**Additionality:** Avoided deforestation, degradation and land conversion

**Issues:** Falls in line with other voluntary ecosystem acquisition by donors on the basis of trust. Very inexpensive to implement but also foregone opportunity.

**Summary:** Trees in Trust, in conjunction with the Nature Trust in New Brunswick and other land agencies, is an online program that sells affordable shares in small parcels (255 square metres) of mature woodland as ways for individuals to help protect (biodiversity and intergenerational services) nature and combat climate change. Buyers 'purchase' an existing protected parcel of woodland of a partnering land trust or agency and the proceeds go to purchase more woodland in the region. Trees in Trust are not part of any formal voluntary offset market and according to Andrew Lush (Director), "that is part of the attraction. There is a certain amount of cynicism towards government systems for carbon offsetting." There is no valuation method. Lush, using the literature and online tools available on mature woodland sequestration, roughly estimates how much carbon a



Caughey-Taylor Reserve, New Brunswick  
Photo: Trees in Trust

unit of conserved woodland prevents from getting into the atmosphere over time. For example, they suggest that buying 3-4 acres of woodland offsets the average individual's annual personal CO<sub>2</sub>. He points out, "it is not particularly scientific, people are making a reasonable decision that their financial contributions help store carbon." Currently the lowest charitable donation allowed buys 1/6<sup>th</sup> of an acre in New Brunswick. The transactions are done completely online and don't require any staff time handling payments, producing maps or printing certificates. Trees in Trust was launched in November 2007 and raised approximately \$10,000 in sales at Christmas time. There is no reporting or monitoring on the condition of the lands and these projects are unlikely to meet regulatory guidelines, should they want to enter into the more formal markets.

## Creekside Rainforest – Saltspring Island, BC

**Seller:** The Land Conservancy of BC & The Salt Spring Island Conservancy

**Buyer:** members of the public

**Broker:** none

**Values:** Ecosystem services, cultural values and carbon storage

**Carbon valuation method:** Private Woodland Planner, on-line tool

**Carbon activity:** potentially REDD

**Standards:** None

**Type of offset:** voluntary

**Cost to operationalize:** Very inexpensive, done by volunteers

**Money raised:** None on any formal markets. Voluntary donors simply donate money on the basis that they recognize the carbon storage capacity as an important selling feature.



Creekside Rainforest - Photo: Shari MacDonald

**Permanence:** Conservation covenant

**Additionality:** This land was to be logged and subdivided under existing planning regulations.

**Issues:** The small size of this property raises the issue of risk, such as a fire, which might impact the carbon sink. There is no standard monitoring to see if carbon value and other ES values remain, other than the baseline inventory required through the conservation covenant, but which did not include carbon storage. This property might meet regulatory guidelines, but expenses of accounting, verification and monitoring would be too large for the area involved.

**Summary:** This is a typical acquisition of a land trust except that the carbon potential was added as a bonus “selling feature.” by the land trusts involved to raise money for the acquisition of Creekside Rainforest on Saltspring Island. The carbon budget was calculated using the Private Woodland Planner Model available online which

uses basic forest attributes. Other values used as selling points included culturally important features, biodiversity ecosystem services. There was no participation in a more formal voluntary carbon offset market. Over one million dollars were raised and it is impossible to determine what proportion of these donations were motivated by a desire to offset carbon emissions. There is no formal carbon sink and sequestration monitoring and report plan. Importantly though, these ‘back of envelope’ calculations are important for reserving future options of proper carbon registration as they demonstrate additionality.

**Community Forests:** *Vedder Mountain Forest, Chilliwack, Cascade Lower Canyon Community Forest, Hope, Sunshine Coast Community Forest*

**Seller:** Community forests lease holders/Government of BC

**Buyer:** Not sold, experimental projects

**Broker:** yet to be determined

**Values:** Ecosystem services, including timber sales and management (as legislated requirements for community forest lands), cultural values and carbon storage

**Carbon valuation method:** Canadian Budget Model CBM-CFS2

**Carbon Activity:** REDD, IFM and ARR

**Standards:** None yet

**Type of offset:** Not determined

**Cost to operationalize:** Done by students for clients

**Money raised:** Carbon credits not sold

**Permanence:** Management plan might require being monitored under covenant

**Additionality:** Comparison of regular 'business as usual' logging plans

**Issues:** As an example the Sunshine Community Forest initiative is a complex project that would likely involve all three modalities to offset emissions: REDD, IFM and ARR. The cost of valuation and originating one of these projects without amalgamating them might exceed the value of the carbon credits.

**Summary:** A series of small-scale projects have been undertaken by Gary Bull, Department of Forestry and students at the University of British Columbia in conjunction with several stakeholders including First Nations. These projects are, according to Bull, voluntary and 'learn-by-doing' initiatives" and their details are in many cases proprietary. The projects typically looked at community forests, near urban areas, that are experiencing issues of competing interests and values, e.g., high biodiversity values, cultural and recreation. The goal of the analyses was to evaluate management options for a wide range of values. Carbon storage is seen as both a value and a means of potential revenue to manage the lands for values other than timber.

Three case studies are available publically: Vedder Mountain in Chilliwack, Cascade Lower Canyon Community Forest near Hope and Sunshine Coast Community Forest.

Vedder Mountain in Chilliwack is a Crown forest of 3350 ha with species at risk and multiple users from greater Vancouver. Lower Canyon Community Forest is 8290 hectares and is spotted owl habitat while the Sunshine Coast Community Forest consists of five areas totaling 11,807 hectares.

In each case, a variety of forest management scenarios are developed, ranging from a business-as-usual scenario to low intensity harvesting with large conserved areas. Each ecosystem service of the study area is analyzed for different future scenarios. Services included in the analyses include timber products, non-timber products, soil, water quality, wildlife, biodiversity, recreational use, social/economic well-being and carbon. Students used the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS2) to determine above and below ground carbon accounting over a period of time. In some cases, they used existing forest inventory data, making it a desk exercise. In some instances they collected field data to determine the type and age of forest. The CBM model provides the carbon numbers in the form of metric tons of biomass (tC) which are easily converted to Kyoto Protocol Carbon Dioxide Equivalents (CO<sub>2</sub>e) - the units that are used to sell carbon credits in carbon markets (Bull, 2008).

Technically, the community forests could apply as forest carbon offset projects and sell their carbon credits potentially even under a regulatory framework as long as their sink and sequestration values, requirements for additionality, permanence and leakage could be verified. The projects cover relatively complex and large areas for which the costs of project initiation, valuation, monitoring etc might be affordable, especially if data already exist for similar ecosystems and conditions. Legislated requirements (such as sustained timber harvest), whether under a voluntary or regulated market, may limit options for adaptive management related to maintaining carbon sink values and sequestration rates. The Sunshine Coast Community Forest (Morrison et al. 2008) is one example of a multi-criterion (ecosystem service) analysis that involves valuation by relative ranking for scenario comparison. The analysis also demonstrates how biodiversity values can be highly simplified and presented by an ecosystem proxy, in this case how much Old Growth remains according to the scenario chosen. Whether or not this is adequate remains to be seen.

## The Community Ecosystem Restoration Project

**Seller:** ERA Ecosystem Restoration Associates Inc. (Land is owned by District of Maple Ridge, but ERA holds carbon rights to improvements on the forest for 100 years)

**Buyer:** Shell Canada, Zerofootprint, Air Canada customers, Catalyst Paper, Pemberton Music Film Festival, Run for 1 Planet, others.

**Broker:** Zerofootprint, self brokered

**Values:** 100 year carbon credits are being sold to offset emissions today. Pending CCB Standards Validation. Other ecosystem services, e.g., invasive species removal etc.

**Carbon valuation method:** CO<sub>2</sub> fix carbon modeling, with project standardized to ISO 14064-2

**Carbon activity:** ARR

**Standards:** ISO 14064 - 2 certified

**Type of offset:** voluntary market

**Cost to operationalize:** unknown

**Money raised:** According to Zerofootprint who purchased the credits and through Air Canada were charging over \$15/tonne their website claims that the planting of over 25,000 indigenous trees on an area of 83 hectares developed over 200,000 tonnes of credits.

**Permanence:** Restoration plantings are all on either a) riparian zones protected by Municipal, Provincial and Federal statutes or in regional parks. This project's permanence is backed up by agreements with Maple Ridge to protect the project areas and its implementation. By planting native species in appropriate sites, survival and permanence of plantings are encouraged. ERA also holds back a 25% buffer of unsold credits to protect against disease/fire/underperformance. The spatially distributed nature of the plantings also minimize risk of catastrophic failure.

**Additionality:** Baseline is the senescence of Red Alder forest to invasion by Himalayan Blackberry and prevents re-growth of conifer forest. Due to the fragmented nature of habitats, and low conifer seed stock, natural re-establishment of a conifer forest is extremely unlikely. There are no municipal/provincial/federal statutes, nor precedent, that

require the restoration of this landscape, and project costs would be prohibitive in absence of carbon financing.

**Issues:** There has been some controversy about the project with some observers claiming it commenced by cutting well established alders which would create an emission that would have to be deducted from the claimed credits. All alder clearing and land preparation carbon fluxes are included in the carbon modeling and calculation. Because the cleared trees will die and decompose in the baseline case as well as the project case, the net carbon benefit remains unchanged. The other criticism was that 220,000 tonnes on 83 hectares may occur at best in 250 to 300 years. At 350 Stems per hectare, this would equal out to 7.57 tonnes of CO<sub>2</sub>e per tree (including soil stocks, underground biomass and woody litter) over 100 years. In response ERA, the company which planted the trees, advised that it planted considerably more trees than 23,000 - reasonable for 83 hectares. Another criticism was that the project proposed to use credits from 100 years from now to offset today's emissions.

**Summary:** Air Canada has partnered with Zerofootprint, a carbon offset company, to provide a voluntary offset market for air travelers. Zerofootprint have selected three projects, one of which is a 83 hectare forest restoration project in Maple Ridge developed and planted by ERA, also an offset provider. The project is aimed at ecological restoration of degraded logged forestland in urban areas with a range of native species followed by some ongoing management to free-to-grow status. This involved the planting of indigenous Douglas Firs, Sitka Spruces, Western Red Cedars, Western Hemlocks and Cottonwoods since 2006. By late 2008, ERA has had over 600,000 tonnes of CO<sub>2</sub>e verified ex-ante, by von Schilling Forest Management Ltd.

## Pack Forest, University of Washington

**Seller:** University of Washington

**Buyer:** auction

**Broker:** U of Washington Ecosystem Services  
Auction, some credits will be sold in October, 2009

**Values:** Ecosystem services, cultural and carbon storage

**Carbon valuation method:** ECOSEL model<sup>1</sup>

**Carbon activity:** varied options

**Standards:** None yet

**Type of offset:** voluntary

**Cost to operationalize:** relatively inexpensive, computer model

**Money raised:** Experimental. Not sold yet.

**Permanence:** Conservation covenant/easement which has considerable solid jurisprudence in the State of Washington.

**Additionality:** This land was to be logged more intensively under existing regulatory mechanisms. The project was to both reduce timber harvest and reforest.

**Issues:** The initial auction was a trial, and did not involve cash transactions. While the results suggested that funding would be forthcoming, a full live auction still has to be held.

**Summary:** Pack Forest is a 4,300 acre forest that belongs to the University of Washington and is described as a self-sustaining forest with revenues coming from timber production. The University administration is keen to explore non-timber revenue alternatives that would help avoid the risk of conversion to real estate. Different management scenarios were analyzed using ECOSEL software to generate valuations for increasing degrees of carbon protection and ecosystem services. Bidders will be invited to bid on the different scenarios and thereby determine a market value for carbon and ecosystem services without the costly step of valuation and brokers. Initial trials with this system provide some interesting conclusions.



Pack Forest old growth Photo: Duane Emmons

For example, 65% of the bids were for the scenario that favoured carbon sink protection and sequestration with delivery of a high level of ecosystem services. The auction mechanism demonstrates that what may appear to be difficult to value, ecological services, in the broadest sense have real monetary value.

<sup>1</sup> *Cintrasfor News* Fall 2008, ECOSEL An Auction Mechanism for Forest Ecosystem Services, Sandor F Toth, Gregory Ettl, Sergey S Rabytgyov

## Darkwoods – Nature Conservancy of Canada

**Seller:** The Nature Conservancy of BC (NCC)

**Buyer:** Exploring various markets possible

**Originator/Broker:** Carbon Credit Corporation

**Values:** Wildlife habitat, biodiversity, other ecosystem services, cultural

**Carbon activity:** REDD, IFM and ARR.

**Carbon valuation method:** First stage - timber values, second stage - methods suitable for compliance markets.

**Standards:** CCAR, Chicago Carbon Exchange

**Type of offset:** Voluntary or compliance

**Cost to operationalize:** Still in development. Very expensive, expert involvement.

**Money raised:** Not determined yet

**Permanence:** Conservation covenant would be required to be registered.

**Additionality:** This land was to be logged and subdivided under existing planning regulations.

**Issues:** Benefits from large size which provides options to manage risk and reversals. Largely an ES project with carbon values added to strengthen the case. Demonstrates the synergy of biodiversity and CE offsets.

**Summary:** Darkwoods is a 55,000 hectare tract of land in the Southern Selkirk Mountains, between Nelson and Creston, BC. It was purchased by the Nature Conservancy of Canada after being put up for auction. There were no regulatory restrictions on the logging or conversion of this land to other uses. It is significant ecologically especially as a large unfragmented mountain ecosystem with crucial winter habitat for mountain caribou in the south Selkirk Mountains. Part of the rationale for protection as well as a potential revenue stream for acquisition is the carbon sink value and future sequestration. The carbon valuation was carried out by Dr. Bill Freedman of Dalhousie University and director of NCC using the carbon sink value based on standing volume of the timber from timber inventory. The analysis did not include a subsurface soil carbon estimate that also would remain in the sink.



Darkwoods - Photo: Tim Ennis

The initial calculation formed an important strategic step in later carbon valuation by experts with the Carbon Credit Corporation. Pierre Iachetti of the NCC stresses the importance of documenting the initial valuation of carbon and the motivation to purchase the land for carbon sequestration as a critical first step in the process of getting carbon credits in the compliance market. The issue of permanence was relatively easy to demonstrate through purchase and conservation covenants, but the additionality issue was secured through documentation of the other bidders in the auction and the potential carbon loss through deforestation and conversion. A proportion of the carbon credit are anticipated to be held back as part of the insurance against loss through fire, insects etc. (see CCAR 2008 approach).



## Van Eyck Forest, California

**Seller:** Fred M. van Eck Forest Foundation

**Buyer:** Pacific Gas and Electric

**Originator/Broker:** Pacific Forest Trust

**Values:** Ecosystem services and carbon storage

**Carbon activity:** REDD, IFM and ARR

**Carbon valuation method:** California Forest Protocols

**Standards:** CCAR

**Type of offset:** compliance/regulatory market

**Cost to operationalize:** Very expensive, expert involvement

**Money raised:** No information

**Permanence:** Working forest conservation easement

**Additionality:** This land was to be logged more intensively under existing regulatory mechanisms, offset results from change in management

### Issues:

**Summary:** In 1993, Laurie Waybun and Constance Best founded the Pacific Forest Trust to promote carbon sequestration in the forests of California. In 2007, the Pacific Forest Trust provided the first project under the newly minted Forest Protocols, which established the means and standards for admission into the compliance markets. The Van Eyck forest, a 2,200 acre redwood forest had high biodiversity values, was an important wildlife habitat and had old growth characteristics. The long term management plan and conservation easement, under which the project was officially registered, is projected to permanently reduce half a million tons of CO<sub>2</sub> emissions over a 100 year period.

In a highly visible event in 2007, Governor Schwarzenegger offset his carbon emissions for travel by purchasing credits from the Pacific Forest Trust. It is the first emissions reduction forest



Spotted Towhee - Photo: Todd Carnahan

project registered under the accounting standards adopted by the California Air Resources Board (CARB). CARB was set up to assist California's carbon reduction targets. According to Waybun, "We like to give them [landowners] six-figure checks on an ongoing basis as additional carbon continues to be stored. Demand from buyers continues to grow and money is increasingly available in these new carbon markets." Permanence is guaranteed through covenants and additionality is met by comparing business as usual logging activities (baseline) to the lower intensity harvest management plan, which maintains the carbon sink and increases sequestration.

## Garcia River Conservation Project

**Seller:** The Conservation Fund

**Buyer:** TCF's traditional supporters under Climate Smart Program

**Originator/Broker:** The Conservation Fund

**Values:** Ecosystem services and carbon storage

**Carbon valuation method:** CCAR Forest Protocol.

**Standards:** CARR standards.

**Carbon activity:** REDD, IFM and ARR - future credits are not being sold to offset current emissions.

**Cost to operationalize:** This was the first project of its kind and took approximately four years of intensive 'learning by doing' to validate. Costs are broken down below to provide a detailed analysis.

**Cost effective:** The project has sold about 140,000 tonnes of 2007 credits but has only started its marketing.

**Permanence:** Perpetual Conservation Easement (PCE) designed to be registered on a private property in California.

**Additionality:** This land was to be logged more intensively under the previously registered management plan. Now most of it is being conserved and some of it is being harvested under the criteria and practices of California's registered Sustainable Forest Management plan.

**Issues:** This was a pilot project for the Conservation Fund and as such cost an immense amount of dedicated key management time. However, now that they have developed an internal methodological approach, the investment can be put towards other projects.

**Summary:** This 'summary' is longer than the others as the Garcia River Project is the most important pilot project for improved forest management within the Western Climate Initiative because it involves all three forest carbon modalities: REDD, IFM and ARR. It was developed over the past five years and has gone through all phases to validation. The documents related to this project can be found on the CARB website at <https://thereserve1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=102>.

apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=102. These documents provide a helpful template of each of the steps for registering a forest project within CCAR and are likely to be similar in BC.

The Garcia River Forest (GRF) project was defined by The Conservation Fund (TCF) within the California Climate Action Registry (CCAR) as a conservation forest management project to create additional carbon stocks in the forested area through modifications of harvest and regeneration practices, relative to baseline practices, as defined in the CCAR Forest Project Protocol. The GRF meets the CCAR project eligibility requirements set by using native species, and by being secured by a perpetual conservation easement.

TCF elected to contract with SGS/SCS (Scientific Certification Systems registered verifiers) to perform a verification audit of their Garcia River Forest conservation-based forest management project for the year 2007. Carbon Credits for Year 2007: 126,169 CO<sub>2</sub>e emission reductions Plus CCAR adjustment added 17,174 CO<sub>2</sub>e emission reductions = Total issued for year 2007 = 143,343 tonnes CO<sub>2</sub>e.

Permanent Inventory Plots: a stratified inventory was conducted by an expert consultant Terra Verde Inc. involving relatively intense randomized representative sampling representing 22,583 acres.

The baseline and project activity were modeled to a 100-year horizon to quantify GHG emission reductions associated with the project. The existing carbon stocks were projected using the Forest Projection System (FPS) growth model and the modeling data included harvesting scenarios defined by the project description and baseline assumptions to be consistent with the California Forest Practice Rules.

Steps in the CCAR validation process:

**Step 1:** initial review: Project Summary Worksheet (a standardized CCAR form) uploaded documents into Climate Action Reserve Database which confirmed initial conformance with the data

requirements of the CCAR Forest Project Protocol. From this review an Audit Plan was created to focus on the critical elements presenting potential risk for errors in the reported data. These data risk elements included inventory data collection and handling, assumptions underlying the project and baseline characterizations, application of the growth model, and compliance with the California Forest Practice Rules.

**Step 2:** A site visit by CCAR was used to review project records, review the correlation of CCAR document submittals with the site and project characteristics, discuss methodologies used to calculate carbon pools and growth models, visit random portions of the ownership in order to acquire a familiarity with the property issues, assess the appropriateness of the vegetative stratification, and conduct a field review of the sampling methodology which was undertaken through check cruises of a random sample of the project developer's inventory plots.

**Step 3:** Based from the newly submitted data in response to requests generated during the initial site visit, CCAR conducted a second visit and received a briefing on these changes by the project developer.

**Step 4:** This was the final step in the verification process and involved a final review of the submitted data, analysis of raw data collected during the check cruise, completion of the certification activities log, and drafting of the certification opinion and final report.

These four steps sound logical and simple. In reality, the Garcia River project, because it was TCF's pilot project, took years to develop and provided critical learning for both CCAR and TCF as well as SSG. The business case modeling involved far more exploratory strategic option exploration steps. However, in subsequent projects, all three parties expect this process to be as simple as it is described here.



Redwood Forest Garcia - Conservation Fund  
Photo: Chris Kelly

## Crown Land Initiatives in BC with Carbon/Biodiversity Objectives

Three initiatives in British Columbia whereby government agencies are creating internal offset markets under their own regulatory frameworks are described. It is clear that these precedents will influence BC's future role in global climate standards and markets. The regulatory requirement to reforest applies on both BC's crown forests and large private forest land, which combined constitute a huge land area. The current requirement to reforest harvest areas and other ecosystem obligations in the Forest & Range Practices Act form the business as usual baseline, but their terms of reference could also have major influences on the evolution of offset markets, valuation costs through economy of scale, markets, buyers confidence, standards etc.

### Crown Land Post Harvest Reforestation Projects

**Owner/Originator:** Province of BC

**Buyer:** the harvester buys the right to harvest by offsetting harvest disturbance with reforestation. It should be emphasized that this is not a carbon compliance purchase, but it is nevertheless an offset purchase.

**Broker:** no broker, direct reforestation services are purchased by the forest sector tenure holder from BC's silviculture industry

**Values:** Restored mixed species, ecosystem appropriate, free growing forest stand

**Carbon valuation method:** there is no carbon valuation, but there are statistically sound audits as defined by the Forest Practices Board, with a set of randomly selected licensees being required to cooperate with full audits every year, and occasional province wide audits to confirm the Forest & Range Practices Act regulations are fully met.

**Carbon activity:** Reforestation of harvested areas have no carbon benefits outside of creating carbon neutrality for the harvest area.

**Standards:** Forest & Range Practices Act, Association of BC Professional Foresters, various governmental silviculture guides and standards and research and practice precedents from within BC and across Canada.

**Market:** The Forest & Range Practices Act legislation created a stable reforestation industry serving a \$200 million dollar restoration offset market.

**Cost to operationalize:** Cost per hectare to reach free growing ranges from \$1500 to \$6000 and averages about \$2000. Approximately 35% of the area regenerates naturally but still involves monitoring and careful surveying costs and occasional fill planting. Before the economic downturn 180,000 hectares were being harvested each year.

**Cost effective:** Annual forest sector revenues are over \$14 billion, so spending approximately \$200 million for reforestation and approximately \$200 million for other ecosystem services for the right to harvest may reasonably be considered a good public investment.

**Permanence:** These areas are in the commercial forest and will be harvested at the end of the next rotation and therefore are not permanent in that sense. Reforestation of harvest areas has historically been called 'basic silviculture' in BC. This is regarded as forming the baseline on which Improved Silviculture Activities that might qualify for carbon could be considered.

**Additionality:** 'Basic silviculture' obligations are not considered additional and by virtue of having commenced before 1989, this is considered business as usual and forms the baseline.

**Issues:** In general, the stewardship accountability for commercial forest tenures of assuring post harvest stands arrive at a free growing state enroute to the maturity reflected by the harvest stand has been a fundamentally successful regulation. However, 22 years since the establishment of the regulation it is time to review the interim accountability



Photo: S.Harrington

goal of free to grow and consider moving the goal posts of accountability to full rotation concept intended within sustainable development concept of timber supply. Of course provincial reforestation stocking standards have been under pressure from the forest sector to regionalize issues which reflect differences in conditions in order to reduce per hectare costs.

After 22 years it is time to determine whether or not these shifts have compromised the public and provinces regional forest value goals. This has become difficult because, despite the land use planning tables of the nineties, there is no current robust long term vision for the forests of British Columbia that is commensurate with the depth of understanding of its ecosystem role. These goals are missing at a regional level because First Nation rights and title which have been made clearer by court decisions were not accommodated during the planning processes, and because there is dramatic change in BC's forests, particularly because of climate change. These goals are missing at a provincial level because of threatened species and evolving public understanding of the multiple ecosystem services, values and benefits discussed in this report. These goals are missing nationally because there is no provincial federal vision for Canada's forests especially because of the of the critical importance of the global role of forests in responding to climate change.

In April 2009 the province shifted its stocking standards to anticipate the effects of climate change, but the work of the newly minted Future

Forest Ecosystem Initiative is still evolving. FFEI's exploratory science and adaptation planning against regionalized scenario analysis of climate change's effects creates a perpetual management challenge that does not end until, in some parts of the interior, ecosystem phase shifts from forest to grassland are complete.

**Summary:** In 1987 BC passed the world's first user pay reforestation regulation, which was based on ecosystem restoration principles. Essentially, the right to harvest suddenly included a regulation requiring the harvester to, at his own cost, restore a climax mix of appropriate tree species on each site ecotype within the forest ecosystem disturbance area of harvesting -- no matter whether the disturbance was a clear cut or a selection harvest.

In 2004, 15 years after the regulation was imposed, the Forest Practices Board reviewed the province and found 97.5% of the stands had reached, or were on track to reach free to grow before the deadline set for each ecosystem type. This level of success revealed that a provincial offset program working to ecosystem appropriate standards can meet the goals set for it.

More carbon accounting analysis is required to examine more explicitly the baseline values of the lifecycle in various ecosystems in order to support the initiation of projects on Crown forestland within the Pacific Carbon Trust.

## The Coast Conservation Initiative

**Seller:** Parties to the Mid Coast Accord, which include local and aboriginal communities, aboriginal rights and title which are yet to be settled within the region, forest companies, government of BC and conservation organizations.

**Buyer:** credits still have to be measured, validated and registered

**Broker:** Sustainability Trust BOD, advisors and executive are the brokers for the economic activity that protects the coast from a resumption of harvesting

**Values:** this regional conservation initiative will protect a wide range of values that had the risk of being degraded through historic harvesting practices. Improved Forest Management and REDD will both create value. But the amounts of these ecosystems values are yet to be determined. For carbon the initial value may be picked up within the Pacific Carbon Trust.

**Carbon valuation method:** one key test for the success of REDD is whether the local economic and employment benefits can support the communities with the conservation region.

**Standards:** standards for the economic activity with a triple bottom line is that it does not impact the US Lumber Tariff against unfair subsidies to Canadian forest sector businesses

**Market:** Temperate rainforest conservation foundations

**Cost to operationalize:** unknown - too new, but includes six years of negotiations, and the identification, registry and measurement of the carbon benefits will still have to be developed

**Cost effective:** unknown - too new

**Permanence:** if registered on any title lands, through the perpetual conservation covenant embedded within legislation and government policy, but it is vulnerable to subsequent governments reconsidering the decision if there is pressure from the coastal communities that there is inadequate economic activity generated from the Sustainability Trust

**Additionality:** Turning Point compiled a binder documenting all of the discussions related to carbon credits which had taken place throughout the six years of negotiations. This establishes that the initial investment of \$120 million was made with the full intention to supplement the funding of the alternative economic activities that support this REDD initiative from carbon credits in order to adequately protect the regional conservation goals.

**Issues:** This trust fund promises to create a parallel economy within the region to replace the approximately 6 million cubic metres of annual harvest and its associated economic spin offs which were extirpated by the conservation decision. Whether or not the businesses that come forward and may receive capital of funds for feasibility will be viable remains to be seen. No project of this scale has been undertaken within either a developed or developing country, and the methodological issues, the questions of the impact of such a large quantity of credits on the fledgling market and the robustness of the new BC Emission offset Regulation being tested in its early stages with a project of this scale all give rise to a high level of uncertainty that this project is viable. Eligibility questions arise immediately, as the project may be deemed to be the product of government policy, although there is ample evidence it is a result of ENGO and regional proponents years of lobbying.

**Summary:** Announced on March 31, 2009, the last day of negotiations, this is the largest REDD project in BC. In order to qualify the REDD activity it is necessary for the Coast Conservation Trust to establish offsetting economic activity for the people on the coast who worked in the forest harvesting and milling sector, but are now displaced by the conservation initiative. The purpose of the \$120 million Sustainability Trust is to offset the economic impact of a major ecosystem conservation area mandated by the Province in BC's mid coast region. In that sense this initiative is the reverse of the one before it, the Columbia Basin Trust (see next page), where the footprint of the dams was established before some offsets were sought.

## The Columbia Basin Trust

**Seller:** Columbia Basin Trust (CBT) Board of Directors

**Buyer:** BC Hydro

**Broker:** CBT executive

**Values:** Ecosystem services and cultural values for residents of the Columbia basin (drainage) in Canada

**Type of valuation method:** comparative analysis based on public consultation and advisory input

**Standards:** none

**Market:** Voluntary

**Cost to operationalize:** Relatively expensive as it is highly political and involves a lot of studies and soft analysis

**Cost effective:** tenders are sometimes direct, and sometimes competitive

**Permanence:** Some conservation land acquired and covenanted, restoration work also on BC Hydro land is covenanted for conservation

**Additionality:** Projects must be incremental to any that would otherwise occur.

**Issues:** The impact of the Columbia Treaty system of dams in the east Kootenay and upper Columbia far exceeds any offset value that might ever arise from this program. The program would have been better off to set some goals, and then propose projects that best reached those goals with the limited funds available.

**Summary:** Like many jurisdictions in the developed world, BC set up several offset funds in the nineties. One such trust fund, the Columbia Basin Trust (CBT), was set up by BC Hydro in 1996. BC Hydro allocated \$2 million a year in expenditures to 2010 and revenue from an endowment fund of \$45 million to fund ecosystem restoration projects in the Columbia drainage whose extensive US/BC Columbia Treaty network of dams had created considerable ecological havoc. Within the CBT trust there have been a number of small conservation initiatives, the latest of these being CBT's



Photo: Christina Heinemann

support of the Valhalla Mile.<sup>1</sup> Over the life of its program the CBT has assisted in the acquisition of a number of conservation offsets to mitigate its environmental footprint.

This initiative however, is not results based. There is no metric demonstrating even a percentage offset benefit. Instead, the CBT provides a limited amount of cash allocating the income earned from the CBT's investment program to whatever the current appointed CBT Board of Directors feels best meets its mission which includes both formal advisors, the government of BC and its stakeholders - all residents in the basin.

1 <http://www.cbt.org/newsroom/?view&vars=1&content=News%20Release&WebDynID=988>

## The Pacific Carbon Trust

**Seller:** (Proponents have not yet responded to this recent request for expressions of interest.)

**Buyer:** Pacific Carbon Trust (PCT)

**Broker:** PCT executive

**Values:** 700,000 and 1,000,000 tonnes of carbon-dioxide equivalent offsets each year, largely to meet the public sector commitment to become carbon neutral.

**Type of valuation method:** BC Emission Offset Regulation (soon to be released for public comment a draft BC forest offset protocol)

**Standards:** WCI, BCEOR, ISO

**Market:** Province of BC Market for Government carbon neutrality by 2015

**Cost to operationalize:** remains to be seen

**Cost effective:** invitation to solicit proposals through an expression of interest typically results in relatively cost effective carbon offsets

**Permanence:** this will depend on the strength and practicability of BC's still to be released protocol

**Additionality:** Projects must be incremental to any that would otherwise occur.

**Issues:** additionality

Offsets associated with three types of forest activities will be considered by the Pacific Carbon Trust for the purposes of their RFI:

**(1) Afforestation** - The direct human-induced conversion of land that has not been forested since December 31st 1989 to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.

**(2) Using select seed (forest management)** - Reforesting with seedlings grown from seed (and vegetative propagules) selected to produce trees with desirable traits such as faster growth, better wood quality (wood density/carbon content) and insect and disease resistance, beyond what is anticipated under the baseline scenario.

**(3) Fertilizing (forest management)** - The addition of nutrients to increase tree growth on sites

deficient in one or more soil nutrients, beyond what is anticipated under the baseline scenario.

It is somewhat surprising that these are the first additionality invitations from the Pacific Carbon Trust. BC has a sophisticated body of analytic and research data for developing silviculture-based projects but these project invitations suggest that it is still in its infancy when accounting for the potential benefits of IFM.

**1. Reforestation:** The invitation to do ARR (Afforestation/Reforestation/Restoration) on land that has been without forests since 1989 is completely in compliance with IPCC guidelines for meeting the additionality test, but the fact that the trust is only purchasing 10 years of the offsets, that is while the new seedlings are still relatively small, makes this a difficult project type from which to get very much carbon.

**2. Select seed:** On Crown land under the Forest & Range Practices Act it is required to use select seed if it is available, so that makes it difficult to understand how an additionality test can be met.

**3. Fertilization:** fertilization trials in BC do provide benefits in the first ten years, however, the permanence of these benefits may be brought into question. There are nutrient deficit areas where the limiting factor to growth is positively identified. In that case, there may be a supportable analysis that shows that shifting growth up to the next limiting factor, whatever that is (e.g. moisture), creates a sustainable benefit. If that is not identified, the offset may require legal agreements that the fertilization will be repeated every ten years as many long term trials show that growth can trend back to that of unfertilized stands as some other limiting factors to growth on the forest site prevail. It is likely that good accounting of the energy required to manufacture, transport and distribute the fertilizers will be deducted from the carbon absorbed from the atmosphere as would be required of any methodology.

**Summary:** Despite these concerns, this request for expressions of interest is a good sign, and will result in BC's first market-based forest offset projects, helping develop the pathway to conservation offsets of natural systems in BC.



# Recommendations

Recommendations from the full technical report by Brinkman and Hebda are summarized in this section. They include using British Columbia's new Emission Offset Regulation for carbon offsets and getting involved in emerging ecosystem service offset markets for new and existing natural area conservation projects. With the infrastructure nearly in place to support the first forest carbon projects for REDD in BC, there is now a credible case for providing a future funding mechanism for the work of conserving and restoring natural areas by land trusts, conservancies and other land management agencies including municipalities, First Nations, parks and other land planning agencies.

## A1. Contribute to Global Ecosystem Sinks Vision and High Quality Standards

BC has the ability to contribute to a global vision of how nature conservation and ecological restoration can be a major force in climate change action plans and an emerging green economy. With the level of professional expertise and the significant natural legacy of the province, BC also has the opportunity to set global standards of excellence and initiate programs towards achieving those ends. Land trusts, conservancies and other land management agencies including municipalities, First Nations, parks and other land planning agencies will benefit from these developments and will also find considerable opportunity for mutually beneficial collaboration. Capitalizing on the wealth of BC's incredible natural areas to transform its economy requires that we all work together and share the learning of this rapidly emerging sector in world markets.

- 1. Recommendation:** Conservation organizations and agencies become educated in the international, continental, national and regional developments in the language, concepts and principles of climate change offsets; as well as becoming involved in developing sound climate policy, standards and programs that integrate among all these levels of governance.
- 2. Recommendation:** Conservation organizations and agencies should work towards initiatives that have the highest credibility in meeting objectives to limit the impacts of climate change that are accepted globally. The broader the applicability of a standard usually the higher the value of the initiatives. The stronger international markets become the wider the ecosystem scope for conservation initiatives.
- 3. Recommendation:** Conservation organizations and agencies should align behind a common request to the Government of Canada for a clear climate plan and strategic direction that includes nature conservation as a key element of a climate action plan.



Tiger Lily - Photo: Todd Carnahan

- 4. Recommendation:** Conservation organizations and agencies should align behind a common understanding of and vision for a global ecosystem sink through conservation and restoration initiatives to minimize climate change.

## A2. Influence Provincial Standards

Given the wide range of values yielded through applying different standards, it is obvious that the details of BC's regulations and standards will have considerable influence on the potential value of carbon offsets and the emergence of other ecosystem value markets. Consequently the following recommendations are included.

- 5. Recommendation:** Prepare a formal response to the Minister of Forests and Range concerning the allowable offsets for the Pacific Carbon Trust, inviting a broader vision than the existing proposed 'Silviculture-based one' and giving consideration to enabling REDD projects and mixed modality (REDD, IFM & ARR) projects.
- 6. Recommendation:** Watch closely for BC Hydro's new unpublished standards and consider adopting them, as BC Hydro may become one of the first buyers of conservation offsets based on a systematic valuation of each service benefit.

## B. Research & Collaboration



Photo: Janet McIntyre

Land trusts and other conservation organizations have a long history of permanently protecting land for ecosystem services. BC requires demonstration prototypes to lead the sector. At this time to qualify projects for compliance market standards requires significant investment in expertise to obtain data, develop models and establish credible business offset projects.

- 7. Recommendation:** LTABC in collaboration with other agencies, academic institutions and interested parties, including those outside of BC, develop the expertise to evaluate its capacity to offer conservation offset projects including Carbon and Ecosystem Services in BC.
- 8. Recommendation:** LTABC secure funding and take the lead in bringing together prospective partners to analyze project types, aggregate properties and benefits from sharing transaction, research and valuation costs.
- 9. Recommendation:** LTABC, in partnership with individual land trusts, raise funding to undertake a test program to quantify carbon benefits for select past and new projects using the highest standards and market carbon offset criteria.
- 10. Recommendation:** LTABC undertake a closer analysis of the examples of a potential partnership with BC Hydro to align the goals of natural area conservation by land trusts and land managers and BC Hydro's new goal of zero cumulative environmental impact.

**11. Recommendation:** The Darkwoods Forest Project of The Nature Conservancy of Canada is one of the first large conservation carbon projects in British Columbia. It is recommended that NCC share the results of its valuation work on the Darkwoods Forest Project and its carbon offset assessment with LTABC members to help inform similar projects for conservation land trusts and other protected areas in BC.

**12. Recommendation:** LTABC share the learning and distribute the findings and recommendations of this report as widely as possible. Also engage in discussions of the evolving offset market and protocols to become familiar with the concepts and language.

**13. Recommendation:** LTABC in collaboration with climate sector professionals, an academic or other business/science partners, secure funding for research to develop a coordinated and collaborative project to evaluate and test key methodologies for:

- i) evaluating ecosystem services and carbon benefits, across all the projects being developed within BC's conservation trusts
- ii) supporting an evaluation of the best and most reliable integrated carbon/ecosystem service offset strategies/projects to simplify decision making for investors.
- iii) quantifying carbon and ecosystem service values in representative properties.
- iv) exploring opportunities and challenges of different geographic scales of projects - from comprehensive projects on large areas with complex carbon activities to the simplified smaller, high-quality REDD projects (such as protecting remnant old-growth forest areas).



Belted Kingfisher - Photo: Todd Carnahan

## C. Develop Pilot Projects

The experience of other jurisdictions, such as California, is that the most effective way of developing standards and methodologies which are operational, feasible and meet the highest expectations of the conservation community, is to learn by doing. Implementing projects using different standards or protocols reveals considerable variation in the volume and tradable portion of the offset credits. The next set of recommendations address the need to ensure optimum value yield from the implementation of pilot projects.

**14. Recommendation:** Secure dedicated professionals that have the capacity to compare offset values for projects if they were traded in different regulatory jurisdictions and markets.

15. **Recommendation:** Support consensus building among land trusts, land managers and all levels of government to assure they will capture the highest potential conservation credits within the province's regulatory frameworks for the best long-term future.
16. **Recommendation:** Carry out a comprehensive compilation of literature which contains verifiable data for each ecosystem type which develop ranges of carbon offset values derived from a) research reports, b) models, c) direct measurement in the field and d) default standards for key areas in BC and collate these with further field measurements to confirm the ranges this produces.
17. **Recommendation:** reach out to foundations and government bodies for support to develop criteria and indicators for markets that recognize ecosystem conservation and ecological restoration. Build on the experimental tools of the technical report by using them to develop provisional cumulative net ecosystem productivity calculations.
18. **Recommendation:** Identify the buyers and develop precedents for negotiating market transactions with these parties



Ponderosa Pine Wycliffe Corridor protected area - Photo: Kathleen Sheppard

## D. Conservation Projects and the Offset Markets

The integration of business mechanisms with the conservation of ecological services provides an opportunity to raise support for conservation initiatives as never before. The number of opportunities will grow rapidly especially for carbon offsets as the impacts of climate change intensify. Projects with the option of qualifying for the voluntary market or the compliance market will have pros and cons requiring a fairly sophisticated analysis to determine the route to the highest monetary support and the lowest project risk. Currently, the analysis and project development for the voluntary market is much less onerous than for the compliance market; however, compliance market standards result in offsets with higher potential purchase prices and will likely appear more attractive to investors because of the government indemnity of risk. Currently the market is complex and underdeveloped so that brokers can be very helpful in understanding these emerging market elements. However a contract engagement may both be premature and perhaps overlook the internal market each conservation trust has built for marketing its own projects to its traditional philanthropic community.

**19. Recommendation:** Encourage conservation trusts to analyze their diverse property holdings and categorize their inventory in the context of the array of options discussed in the longer technical report. These will include sorting for projects best suited for different markets, which could be based on eligibility or other regulatory attributes, ecosystem types, management treatment types, sizes, sets that may only qualify for early action, direct marketing in the voluntary market, sizes which are too small to carry their transaction costs, sizes which might best consider default values, etc. Initially it may be useful to start each conservation portfolio of project types by sorting into divisions set out within BC's Emission Offset Regulation for projects which:

- a. were started before November 27<sup>th</sup>, 2007 and do not qualify as climate action projects within BC's Emission Offset Regulation, but which may be used for a local trust voluntary conservation carbon offset through direct sales to existing or new donors;
- b. were started after November 27<sup>th</sup>, 2007 and completed before the present so may qualify within BC's Emission Offset Regulation but will have to demonstrate a credible dependency on carbon values to qualify as additional;
- c. were committed to after November 27<sup>th</sup>, 2007 but have not been fully funded or completed and may be able to use the argument that they are financially dependent on climate trading funding;
- d. are being contemplated and may become feasible, especially if these projects can trade in some additional carbon or ecosystem service values, which is one test that qualifies them as additional.

These latter two sets of projects may have the capability of being designed to attract the highest volume and value of credits and will help select for future conservation opportunities which have the highest offset value within the current BC compliance market. The set of projects within each of BC Emission Offset Regulation are also wisely divided further, particularly while a number of credible standards may still apply, such as the Voluntary Carbon Standard and again according to how each fit the different standards.

**20. Recommendation:** Land trusts should make no formal arrangements with brokers until land trust directors and other land managers actually have developed an inventory to trade that has been segregated into its regulatory types. When land trust credits are ready to sell, there will be plenty of brokers competing for the right to handle the credits.

**21. Recommendation:** Provide the research, pilot studies and promote the credibility and permanence of legally conserved private and public land projects as reliable, high quality offset originators.

## E. Share Information and Collaborate

Capitalizing on the wealth of BC's incredible natural areas to transform its economy requires that land trusts work together to secure the broadest possible benefits. REDD has been supported in the Waxman Bill before congress in the US and in CCAR in California and it is certain to become a part of BC's Emission Offset Regulation. More than any other modality it offers an opportunity for doing projects of scale like the mid coast accord. Almost all climate offset projects lend themselves to a mosaic of treatments on various areas on each of which different offset strategies can be undertaken. There are considerable economies of scale from assembling large projects to motivating trusts, conservancies and other land management agencies to look for creative collaboration with municipalities, First Nations, federal and provincial regulatory agencies like parks and private land owners.

**22. Final Recommendation:** share information and collaborate.



Photo: Duanne Emmons



Baby Long-eared Owl - Photo: Bob McKay



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