BIODIVERSITY OFFSETS IN A PUBLIC LANDS CONTEXT: A ROMANTIC CONCEPT OR A PRACTICAL TOOL TO BALANCE ECONOMIC DEVELOPMENT AND BIODIVERSITY CONSERVATION GOALS?

By

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ABSTRACT

Economic development through the exploitation of natural resources has led to biodiversity loss among other environmental issues around the world. The use of biodiversity offsets to balance economic development and biodiversity conservation goals has significantly increased during the last three decades. A recent report of the Organization for Economic Cooperation and Development (OECD) released in December of 2016[1] identified at least 56 countries with laws or policies requiring the use of these types of instruments worldwide. There are over 100 biodiversity offset programs operating in countries such as United States of America, France, New Zealand, Mexico, Australia and others, which are injecting over 3 USD billion per year into the world's economy.[2]

Experiences of different jurisdictions indicate that biodiversity offsets can become a promising tool in addressing the biodiversity loss issue in their territories. Canada and some of its provinces such as Alberta and British Columbia, which have important oil and gas sectors, and are home to important wildlife species, have been part of the biodiversity offsets debate, and have been exploring their use.

This research derives from the observation that although some of the international biodiversity offset experiences have been vastly studied, there is little experience analyzing the legal challenges of implementing biodiversity offset systems, including biodiversity banks (a type of biodiversity offset that creates biodiversity markets) on public lands.

The very nature of public land, where multiple users may simultaneously access the land and conduct a variety of potentially incompatible activities, can create extra legal challenges with respect to the implementation of biodiversity offsets.

Through an Alberta-focused case study, the thesis explores the characteristics that a planning and legal framework of a province with a majority of public lands would need to have in order to support the use of biodiversity offsets and a biodiversity banking system. It also identifies and analyzes the legal issues and challenges of implementing long lasting biodiversity offsets in that context.

[1] Organization for Economic Cooperation Development, *Biodiversity Offsets: Effective Design and Implementation* (Paris: OECD Publishing, 2016), at 15, online: http://www.keepeek.com/Digital-AssetManagement/oecd/environment/biodiversity-offsets_9789264222519-en#.WH2EBZLqg14#page17, [OECD2016]

[2] *Ibid* at 15,17 and 23. The OECD 2016 report says, for example that: biodiversity offset programs mobilized between USD 2.4 and 4 billion in 2011." OECD at 17.

Under the system studied by this dissertation, the main users of Alberta's public forests (forest operators and oil and gas developers) become the biodiversity bankers or suppliers, and buyers of biodiversity credits, respectively.[3]

This thesis is therefore a contribution to knowledge about how biodiversity offsets, specifically biodiversity banks, can be applied on provincial public lands, used by multiple users. It focuses on the legal frameworks, property right issues, permanence, and additionality needed for a potential biodiversity banking system for a province such as Alberta.

[3] For the purpose of this dissertation the term biodiversity credit or bio-credit refers to the credits emerging from a biodiversity bank implemented under a biodiversity banking system. The terms "biodiversity credit" or "bio-credit" are used interchangeably during this dissertation.

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INTRODUCTION

Biodiversity, understood as "the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part" constitutes a fundamental contributor to human wellbeing.[4]

From an economic perspective, biodiversity provides humankind with the natural capital[5] necessary to generate a variety of environmental goods and services (EG&S) humans depend on for food, climate regulation, clean air and water, aesthetic enjoyment and other benefits, which are the basis for human development.[6]

The anthropocentric and the biocentric perspectives are two different dichotomous perspectives that explain the relation between nature and humans, and that provide justifications to conserve biodiversity. While the anthropogenic perspective places humans as superior to the rest of the biological world,[7] the biocentric perspective considers humans as another member of the biological community, where all members have equal standing because of nature's intrinsic value.[8] Under a biocentric approach, any damage to individuals, species, or ecosystems negatively impacts the intrinsic value of nature.[9] It is no

[4] The biodiversity concept is an integrated and multivariable concept, which includes "diversity within species, between species and of ecosystems." *Convention on Biological Diversity*, 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993), art 2.

[5] Natural capital is "the stock of ecological assets, which provides a flow of ecosystem goods and services. For example, wetlands are considered natural capital since they provide a number of ecosystem services, such as water filtration and carbon sequestration." Extracted from Jay Anderson et al, *Natural Capital: Using Ecosystem Service Valuation and Market-Based Instruments as Tools for Sustainable Forest Management* (Sustainable Forest Management Network, 2010) at 12, online: <papers.ssrn.com/sol3/papers.cfm?abstract_id=2429041>, [*Anderson*].

[6] Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Biodiversity Synthesis* (Washington, DC: The World Resources Institute, 2005) at 1-2, online: <http://www.millenniumassessment.org/documents/document.354.aspx.pdf>. See also OECD, Environment Policy Committee, *Report on Implementation*, report prepared for *the 2004 Council Recommendation on the Use of Economic Instruments in Promoting the Conservation and Sustainable Use of Biodiversity,* (Paris: OECD, 2008) at 6.

[7] Alejandro Flores & Tim W. Clark, *Finding Common Ground in Biological Conservation: Beyond the Anthropocentric vs. Biocentric Controversy,* 105 *Yales F&ES Bulletin* 241, at 242-243, online: <environment.yale.edu/publication-series/documents/downloads/0-9/105flores.pdf>, [*FlorClark*]

[8] *Ibid.*

[9] Martin Maron et.al discussing the ethical debates of using biodiversity offsets. Martin Maron et al., "Taming a *Wicked Problem: Resolving Controversies in Biodiversity Offsetting" (2016) 66:6 BioScience* 489–498.

surprise that under a biocentric approach, implementing offsets to compensate for impacts caused somewhere else would be considered impacts to the intrinsic value of nature.[10]

This dissertation does not consider humans as superior to the rest of nature. However, it adopts a more biocentric approach, where nature provides certain goods and services to humans[11], and where the environment, including biodiversity can be negatively or positively impacted by human activities and decisions.[12]

WHAT IS THE ISSUE: economic development vs. biodiversity

Some Canadian provinces such as Alberta have achieved high economic development through natural resources exploitation, which has led to negative impacts on the environment, for example, due to water and soil contamination, and or wildlife and vegetation loss.

One of the main characteristics of Canadian provinces is that they have a majority of public lands. Rights over natural resources on public lands can be allocated to multiple users. The presence of multiple users with different goals in regards to natural resources can often exacerbate negative impacts over the environment. For example, the magnitude of negative impacts over the water quality and quantity of a lake located in the middle of tract of land used to exploit coal by a single coal miner, will probably not be as much as if the same lake is also used by the miner and also by an oil and gas developer to inject water into two different oil wells located on the same tract of land. The reason is simple, the more projects or more activities on a single tract of land, the more pressure on the land and its resources.

[10] See FlorClark, *supra* note 7.
[11] The Millenium Ecosystem Assessment developed by the World Resources Institute in 2005 follows a balanced anthropogenic perspective. The assessment identifies a list of different environmental services, including goods, which can be used by humans and other species. Some of these environmental services are for example, provisioning services such as food, water, timber, and fiber, wildlife; regulating services such as the regulation of climate, and water quality; and) supporting services such as soil formation. The assessment also recognizes the existence of cultural services, which are services provided exclusively for humans, such as recreation, aesthetic enjoyment. The Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Biodiversity Synthesis* (Washington, DC: The World Resources Institute, 2005) at 1-2, online: <http://www.millenniumassessment.org/documents/document.354.aspx.pdf>.
[12] *Ibid.*

The public goods, specifically the open access character of the environment has led to what Garret Hardin called "the tragedy of the commons,"[13] where each herder would add as many animals as possible to a common pasture land, to maximize its own benefit, even if his/her actions would deplete the pasture capacity of the land. Hardin's essay showed that one person's consumption methods and approach can actually negatively impact common access natural resources and their availability for others.[14]

At the national level, Canada, which is home to 25 per cent of the world's wetlands[15] and boreal forest ecosystems and to an estimated 140 000 species,[16] is not exempted from the biodiversity loss problem caused by development in a mostly public land context.[17] The country has witnessed significant biodiversity loss during the last decades, which has resulted in the extinction of species such as the Dawson's Caribou, Sea Mink, Great Auk, and of other species being declared either endangered or threatened. According to Environment Canada, as of April 15, 2015, 23 species have been listed as extirpated,[18] 241 as endangered species, 128 as threatened species, and 130 as species of special concern.[19]

The extraction of bitumen from oil sands in Alberta's boreal region is an important example of environmental problems resulting from multiple users in a public land context. It requires the construction of roads, the drilling of wells, and depending on the accessibility and depth of the oil sands deposits, the clearing of all vegetation overlaying these resources.[20] These extraction methods, in addition to the impacts of other

[13] Garrett Hardin, "The Tragedy of the Commons" 162 *Science, New Series* 1243, online: <www.geo.mtu.edu/~asmayer/rural_sustain/governance/Hardin%201968.pdf>.
[14] See also *ibid*. See also Jonathan H. Adler, "Taking Property Rights Seriously: The Case of Climate Change" (2009). Faculty Publications. Paper 30 at 301-302, online: <http://scholarlycommons.law.case.edu/faculty_publications/30>.
[15] See the PEW Environment Group, *A Forest of Blue: Canada's Boreal,* (Seattle: The Pew Environment Group, 2011), at 4, online: <www.blue-economy.ca/sites/default/files/reports/resource/PEGBorealWaterReport11March2011.pdf>.
[16] Environment Canada and Canadian Wildlife Federation, *Hinterland who is who*, online: <www.hww.ca/en/wild-spaces/boreal-forest.html>. See also The Canadian Biodiversity Web Site, *Canada's Species,* online: <canadianbiodiversity.mcgill.ca/english/species/index.htm>.
[17] *Ibid*.
[18] Extirpated species means: *"*a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild" *Species at Risk Act*, SC 2002, c 29, s 2 (1).
[19] Canada, Committee on the Status of Endangered Wildlife, *Species at Risk Registry*, online: <www.registrelep-sararegistry.gc.ca/species/schedules_e.cfm?id=1>.
[20] Canadian Association of Petroleum Producers, *Protecting Wildlife*, online: <www.oilsandstoday.ca/topics/Wildlife/Pages/default.aspx>. Further explanation of oil sands impacts is provided in the Background section. See 1.1.2. Impacts and oil sands extraction methods

development activities in the region have already caused significant mid-to long-term impacts to biodiversity. These impacts range from loss of wildlife species due to biodiversity fragmentation[21] to complete habitat loss.[22] For example, habitat loss caused by development is an important factor in the decrease in population of species at risk, such as the woodland caribou, whose numbers have declined by 50 % over the past 10 years.[23]

Addressing the biodiversity loss issue

The need to balance economic development goals and conservation goals presents significant challenges and has inspired a variety of responses.

There are different tools and strategies for addressing the threat that development poses to biodiversity, such as the creation of national parks and the use of conservation fees or the use of biodiversity offsets (as more fully explained below).

Some of the oldest and most studied biodiversity offset programs around the world are the U.S. Wetland Mitigation Banking system, and the U.S. Conservation Banking system, which are national programs, which as further explained in the conceptual section are types of biodiversity offset systems, which have their origins in the 80's.[24]

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[21] Seismic lines for example, contribute to the fragmentation of Woodland Caribou habitat, and to the decline of its population, because they become travel corridors for their predators such as wolves Carol Linnit, "Endangered Caribou Habitat", *Desmog Canada* (1 April 2015), online: <www.desmog.ca/2015/04/01/oilsands-companies-scramble-reclaim-seismic-lines-endangered-caribou-habitat>. See Wolfmatters.org, *Wolves & Caribou*, online: http://www.wolfmatters.org/wolf-culls--alberta-caribou.html>. See also David Suzuki Foundation, *Government inaction, industry tactics increase caribou risks,* online: < https://davidsuzuki.org/story/government-inaction-industry-tactics-increase-caribou-risks/>. See also Canada's Oil Sands Innovation Alliance, *Caribou Habitat Restoration-Restoring historic linear disturbances*, online: <www.cosia.ca/caribou-habitat-restoration>.

[22] The impacts caused by bitumen extraction vary. They can range from loss of wildlife species due to biodiversity fragmentation, the decline of bird and aquatic population due to tailing ponds, and pollution, to complete habitat loss. See Jennifer Grant et al, *Solving the puzzle: Environmental responsibility in oilsands development* (Drayton Valley, AB: Pembina Institute, 2011), online: <www.pembina.org/reports/solving-puzzle-oilsands.pdf>, [*SOLVPZL*]. See also Greenpeace, *Tar Sands and Boreal Forest,* online*:* <www.greenpeace.org/canada/Global/canada/report/2010/4/BorealForest_FS_Footnote_rev_4.pdf>, [GreenTar].

[23] GreenTar, *ibid*. See also WWF-Canada, *Living Planet Report Canada: A national look* at wildlife loss at 13, online: <http://assets.wwf.ca/downloads/WEB_WWF_REPORT_v3.pdf?_ga=2.105291651.147609817.1510458619-1619304027.1510458619>.

[24] The first wetland mitigation banks, for example, were established in the US in 1983. See US, Environmental Protection Agency, *Mitigation Banking Factsheet, Compensating for Impacts to Wetlands and Streams - What is a Mitigation Bank?*, online: <water.epa.gov/lawsregs/guidance/wetlands/mitbanking.cfm>, [*MITCOMPI*]. See also Becca Madsen et al, *Update: The State of Biodiversity Markets Offset and Compensation Programs*

The use of biodiversity offsets has significantly increased internationally during the last decades. A recent report of the OECD released in December of 2016, for example, identified over 100 biodiversity offset programs currently operating around the world.[25]

Unlike the U.S. systems, Canada does not have any biodiversity banking system. However the use of biodiversity offsets has expanded during the last years. Some regulators, such as the National Energy Board have been increasingly requiring biodiversity offsets as a condition of the issuance of permits for certain development approvals.[26] However, most of these requirements have been requested on a project-by project-case.[27]

Canada has however put in place "the Fish Habitat Conservation Program" (FHCP), which is a national biodiversity offset system created to compensate for projects that produce serious harm to fish and fish habitat. [28]

At the provincial level, provinces such as Alberta and British Columbia, which have important oil and gas sectors, and are home to important wildlife species, have been part of the biodiversity offsets debate. While B.C. allows the use of biodiversity offsets in support of the existing provincial development authorization process on private and public lands,[29] Alberta has piloted some biodiversity offset initiatives, or what Alberta's biodiversity offset designers call "conservation offsets."[30] These initiatives have been implemented to compensate for the impacts of development on private lands. Furthermore, the province is currently developing a biodiversity offset policy to enable the use of biodiversity offsets, including biodiversity banks, both on private and public lands.

Such a system has the involvement and support of industry, conservation organizations and academia. Oil and gas companies such as Suncor, forestry industries such as Alpac and

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Worldwide 2011 (Washington, DC: Forest Trends, 2011) at 2, online: <www.thegef.org/gef/sites/thegef.org/files/publication/Bio-Markets-2011.pdf>, [Madsen 2011].

[25] OECD, 2016, *supra* note 1 at 15.

[26] See discussion of regulatory biodiversity offsets in Canada. See section 2.1.2.1 Voluntary biodiversity offsets worldwide and in Canada.

[27] *Ibid.*

[28] For further details on the Canadian Fish Habitat Compensation Program, see section 2.1.3.4.1

[29] Government of British Columbia, *Environmental Mitigation Policy for BC*, online: <http://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/policy-legislation/environmental-mitigation-policy>, [EMPBEXP].

[30] This thesis adopt the term "biodiversity offsets." However, when discussing some of Alberta's initiatives and legal framework, it uses the term "conservation offset".

conservation organizations such as Ducks Unlimited, the Pembina Institute and others have demonstrated interest in participating in a potential biodiversity offset system for Alberta and are active members of Alberta Association for Conservation Offsets (AACO).[31]

1.1 Research question

Although the use of biodiversity offsets on public lands is a possibility included in the laws and/or policies supporting biodiversity offsets systems, the practical focus of these systems has been almost entirely on private lands. There is little experience analyzing the legal challenges of implementing biodiversity offset systems, including biodiversity banks on public lands.

At a simple glance, implementing biodiversity offsets under biodiversity banks seem to be more complex on public lands, where multiple and different developers, such as oil sands developers, forestry developers and others can have simultaneous access and development rights over a single tract of land.

The research questions this thesis aims to answer are:

i) Does implementing biodiversity offsets in the form of biodiversity banks on public lands involve more challenges than if implementing them on private lands?, and
ii) What are the theoretical and/or practical challenges exclusively applicable to cases involving the establishment of a biodiversity offset in the form of biodiversity banks on public lands?

To identify the types of legal challenges that implementing biodiversity offsets under biodiversity banks will face in a public lands context, this thesis explores different hypothetical situations. By way of example, consider the fictitious case of the Star Wood Forestry Company, which is interested in becoming a biodiversity banker and selling biodiversity credits. For that purpose, the company aims to establish a biodiversity offset on a tract of provincially owned land previously impacted by oil and gas operations. Although the oil companies have finished with this site, it still has potential coal deposits.

[31] Organizations such as Alberta Association for Conservation Offsets (AACO) have led the biodiversity offsets debate in the province. AACO is a non-governmental collaboration among diverse entities, including conservation organizations and industry, interested in conservation and biodiversity offsets. See Alberta Association for Conservation Offsets, *Who we are*, online: <http://www.aaco.ca/members.html>.

To create the biodiversity offset, Star Wood Forestry Company invests $250, 000 in planting trees, and native vegetation to cover seismic lines and restore caribou habitat. If Star Wood Forestry Company did not have clear rights to access the land and to implement the biodiversity bank, coal miners could potentially start extracting coal from the land and destroy all or some of the environmental benefits produced by the biodiversity offset. Later on, the lack of permanence of the environmental benefits of the offset could lead to fraud allegations by whoever bought credits from the bank, and Star Wood Forestry Company would probably be responsible.

Although fictional, this example is typical of the types of problems biodiversity bankers could face when implementing biodiversity offsets in a public land context, where each user pursues a different goal (e.g. conserving or restoring a degraded site versus exploiting resources such as coal).

Some of the questions identified from hypothetical situations along these lines include: whether private entities have the right to implement biodiversity offsets under biodiversity banks on provincial public lands? How to ensure permanence of biodiversity offset on public lands used by multiple users? or how to ensure that biodiversity offsets under a biodiversity banking system are additional in such a context? These and other questions concerning property and use rights to implement biodiversity offsets and biodiversity banks, permanence of biodiversity offsets, legal frameworks required to support biodiversity offsets and biodiversity banking systems, and additionality of these types of instruments are identified in the conceptual section and analyzed through a case study in the context of Alberta, in part II of this dissertation.[32]

1.2 Biodiversity Offsets, Biodiversity Banks and Banking systems – Definitions

This introduction has already mentioned that a biodiversity bank is a type of biodiversity offset. When conducting the research for this thesis I realized that both terms are connected and are often used as synonymous. However, they have conceptual differences. Considering that this thesis analyses the challenges of using biodiversity banks on public lands, it is important to clearly define "biodiversity offsets," "biodiversity banks" and

[32] The participation of First Nations in biodiversity banking systems is an issue identified as material for future research, and it is not analyzed by this dissertation.

"biodiversity banking systems," before entering into a discussion to address the research questions.

The Business and Biodiversity Offsets Programme (BBOP) is "an international collaboration formed by companies, financial institutions, government agencies and civil society organizations to develop best practices to achieve no net loss (NNL) or a net gain (NG) of biodiversity,"[33] and has probably created the most accepted and frequently used definition of biodiversity offsets.

> measurable conservation outcomes resulting from actions designed to compensate for significant residual biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken.[34]

These types of instruments "are based on the premise that impacts from development can be compensated for if sufficient habitat can be protected, enhanced or established elsewhere."[35]

Thus, biodiversity offsets refer to a set of actions (e.g. restore, conserve, enhance) that create certain measurable environmental outcomes to compensate for similar residual impacts caused by development somewhere else.[36]

There are various definitions of "biodiversity bank." Some definitions, such as the one adopted by the U.S. biodiversity banking systems, relate biodiversity banks to a site, such as a wetland, or a parcel of land, and to a set of actions to restore, enhance or conserve the land.[37] Other definitions link or compare biodiversity banks with a financial entity or

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[33] See The Business and Biodiversity Offsets Programme (BBOP), *Who we are: About BBOP*, online: <http://bbop.forest-trends.org/pages/about_bbop>.

[34] Business and Biodiversity Offsets Programme, *Glossary, 2nd ed* (Washington, DC: BBOP, 2012), online: <www.forest-trends.org/documents/files/doc_3100.pdf>, [*BBOPGLOS*].

[35] OECD, *Biodiversity Offsets, Effective Design and Implementation – policy Highlights* – Preliminary version - October 2014, at 3), [*OECD2014*].

[36] Biodiversity offsets quantify residual impacts from development, and create equivalent or better biodiversity components outside the geographic boundaries of a development. See Joseph W. Bull et al., "Biodiversity Offsets in Theory and Practice" (2013) *Fauna and Flora International*, at 2, online at: <http://www.forest-trends.org/documents/files/doc_3908.pdf>[Bull]. See also Kerry ten Kate, Josh Bishop & and Ricardo Bayon, *Biodiversity Offsets: Views, experience and the business case*, (Insight Investment Management & UICN, 2004) at 9, online: <cmsdata.iucn.org/downloads/bdoffsets.pdf>, [*KBB*].

[37] See U.S. Mitigation Banking and U.S. Conservation Bank. More details on Wetland mitigation banks and Conservation banks are provided in the theoretical section. See section 2.1.3 Examples of International and National Biodiversity Banking systems.

institution, because of the more conventional banking services they provide, and because the credits created through conservation, restoration or enhancement activities are considered to be tradable financial instruments. For example, the Sacramento Fish and Wildlife Office states that:

> A conservation bank is like a financial bank. It protects these resources like a bank protects your money. When someone plans a project that will impact endangered species or other natural resources, they can buy credits in a conservation bank.[38]

Similarly, the OECD compares biodiversity banks with actual banks. According to this organization, biodiversity banks are:

> a repository of existing offset credits, where each credit represents a quantified gain in biodiversity resulting from actions to restore, establish, enhance and/or preserve biodiversity (e.g. wetlands, stream, habitat, species).[39]

Some authors such as Bull clarify the relation between biodiversity offsets and biodiversity banks and add the idea that under a biodiversity bank, offset projects are created "in exchange for biodiversity credits, which can subsequently be sold to compensate for developments with comparable residual ecological impact."[40]

In other words, biodiversity offsets could exist without a biodiversity bank. They exist, for example, if the government approves a project with the condition that the developer itself or a third party on its behalf, creates an offset to compensate for the residual impacts caused by the project. However, biodiversity banks, as repositories of biodiversity credits, depend on the independent existence of biodiversity offsets created in advance of impacts caused by development. It means that biodiversity banks cannot exist without biodiversity offsets under them, because it is the latter which produce the environmental services, and therefore the credits that biodiversity banks sell to developers who need to compensate for residual impacts of their projects.

In sum, and for the purpose of this dissertation, it can be said that, while biodiversity offsets refer to a set of substantive environmental activities that create measurable environmental outcomes to compensate for impacts somewhere else, a biodiversity bank

[38] Sacramento Fish and Wildlife Office, *Conservation Banking*, online: <https://www.fws.gov/sacramento/es/Conservation-Banking/Home/es_conse-banking.htm>.
[39] OECD2014, *supra* note 35 at 5.
[40] Bull, *supra* note 36 at 2.

is the entity that provides the venue and method to have credits resulting from such activities or transactions held and exchanged. A "biodiversity banking system" is the system in which credits are created, traded and transferred. Biodiversity banking creates markets where developers who need to compensate for their residual impacts to obtain their development approval can purchase or acquire biodiversity credits.

The reason for using biodiversity banks instead of regular biodiversity offsets is that they offer a win-win situation for bankers, developers and the environment. As noted by the California Wildlife Office, they provide an economic incentive for those in a position to create and "bank" credits to conserve their lands or the lands they are using, and they provide developers with the possibility of meeting their mitigation obligations faster and at a lower cost.[41] Furthermore, buying credits from a biodiversity bank reduces project approval wait times, because projects can be approved faster with the certainty that the developer's future impacts will be compensated before they even occur. The developer saves money not only because the project will be approved sooner and with fewer delays, but also because the developer will pay a specific amount for the credits bought and will not need to incur in any unexpected expenses for operating or maintaining the offset. In addition, biodiversity offsets available through biodiversity banks avoid the temporal loss of ecological functions, because offsets are implemented before impacts occur, and they provide permanent or long-term protection. The latest information on the number of biodiversity banks indicated that as of August 2013 there were over 1,800 approved mitigation banks under the U.S. Wetland Mitigation Banking system.[42]

1.3 Structure of Dissertation, Arguments and General Findings

The dissertation is structured in two parts: A background and conceptual section, and a case study.

[41] California Department of Fish and Wildlife, *Conservation and Mitigation Banking*, online: <https://www.wildlife.ca.gov/Conservation/Planning/Banking> [*CALCONSMIT*].

[42] The Wetland Mitigation Banking system is the first biodiversity banking system in North America. It was created in the early 80's. See <*U.S., Environmental Protection Agency, Section 404 of the Clean Water Act, Mitigation Banking Factsheet*, online: <https://www.epa.gov/cwa-404/mitigation-banking-factsheet>, [*MITBANKFACTS]*. More about this system is explained in the Conceptual Foundations section. See 2.1.3.1.

Part I is a background and conceptual discussion. The background section on biodiversity losses on public lands presents the biodiversity loss problem caused by oil and gas developments, specifically oil sands on public lands, in Alberta, Canada.

The second section of Part I provides the conceptual basis for biodiversity offsets. This section explores the role of biodiversity offsets and banking in helping to address the biodiversity loss problem caused by oil sands development on public lands. It provides details on biodiversity offsets in general and focuses on biodiversity banks. It studies and compares some of the better-known biodiversity banking systems around the word, specifically: the U.S. Wetland Mitigation Banking, the U.S. Conservation Banking, and the New South Wales (NSW) BioBanking system in Australia. Based on the overview and comparison of these systems, this section identifies common characteristics, similarities and differences. It illustrates, for example, some of the theoretical essential principles of biodiversity offsets developed by the BBOP, and studies their effectiveness. This part concludes that biodiversity offsets, including biodiversity banking systems currently in place, have not been totally effective in practice, because they have not included all the theoretical essential principles developed by the BBOP. Furthermore, lessons learned from the U.S. biodiversity banking systems have helped other biodiversity banking systems to evolve and have influenced newer biodiversity banking systems, such as that in NSW, to overcome their initial technical and methodological limitations.

This section found that a public context with multiple users can provoke certain legal challenges and questions related to the legal framework and property or use rights needed to support developing, implementing and operating a potential biodiversity banking system (meaning the rights needed to implement long lasting biodiversity offsets and to transfer biodiversity credits) on provincial public lands. The section also identified the need to achieve and incorporate the essential principle of legal additionality into law and regulations. Legal additionality is discussed below in the conceptual section[43] and in more detail in the case study (Additionality chapter). Some of the relevant questions were: whether private entities would have the right to implement biodiversity offsets under biodiversity banks on provincial public lands?, If so, how to ensure that a biodiversity offset

[43] See subsection 2.2.3.2 Financial, technical or environmental, and legal additionality of biodiversity offsets.

will last if there are other land users with mineral rights underneath the tract of land where the biodiversity offset was implemented? What happens if the area managed to produce the offset is damaged by fire or otherwise. Is the loss insurable? How to ensure that conservation or restoration activities represented by biodiversity credits sold by a biodiversity bank are still in place if a mineral project affects the surface where biodiversity credits come from? How to choose biodiversity offset sites without mineral rights underneath in a province such Alberta, which has important mineral and oil and gas resources underneath its lands? Will private entities be able to trade and transfer biodiversity credits created through biodiversity offsets on public lands? Could small, communitarian forest users and/or indigenous peoples become bankers of the system? Most of these questions are studied in the analysis of the case study focused on Alberta, which is presented in Part II of the dissertation.

1.4 Case Study Overview of Chapters

The case study is divided in three chapters.

Chapter 1[44]: (the Legal Framework chapter) argues that the implementation and operation of a biodiversity banking system both on private and public lands requires a supporting legal framework characterized by rules regulating key features such as the creation of demand for biodiversity credits, the operation of offsets and the trade and exchange of biodiversity credits. The chapter examines whether Alberta's legal and policy framework has these features. The analysis of the features in Alberta's context found that those features could support a biodiversity offset able to operate both on private and public lands. Alberta's framework could support the implementation and operation of biodiversity offsets and a biodiversity banking system and that no major amendments to its current framework would be needed.

Chapter 2[45]: (the Property Rights chapter) provides an analysis of the property rights needed to implement and operate biodiversity offsets on public lands, and to transfer and sell biodiversity credits within biodiversity banks.

[44] Hereinafter "the Legal Framework chapter"
[45] Hereinafter "the Property Rights chapter"

Considering that surface and mineral rights are separate estates in Alberta, the analysis in this chapter found that mineral rights underneath the land need to be identified at the moment of implementing biodiversity offsets whether on public or private lands. The existence of mineral rights under the land where the offset is implemented could potentially impact the permanence of the offset, for example, if the surface where the offset was implemented had to be accessed in order to exploit the minerals underneath. Such a problem could equally impact both private and public lands.

The research also demonstrated that the current participation of private entities, specifically small and medium forest operators as bankers in the system might be precluded under the *Forests Act*. The reason for this limitation is that the *Forests Act*[46] follows a timber-harvesting approach that limits almost all forest activities to timber harvesting. As noted by the analysis, if biodiversity offsets were implemented under current dispositions, they could be considered non-compliance with the forest disposition because of a potential reduction of their timber harvesting mandate. Consequently, the forest operator's rights could be suspended or cancelled.

The Property Rights chapter argues, however, that expanding the traditional timber-harvesting approach to a more comprehensive and sustainable approach to forest management could help forest operators implement and operate biodiversity banks on public lands. This would become possible through the use of combined dispositions that would not only grant timber harvesting rights, but also conservation rights.

The chapter also argues that if a biodiversity banking system were created, biodiversity credits would likely be considered real property that could be transferable, even if the law does not specify its nature.

Chapter 3[47]: (the Additionality chapter) investigates whether the biodiversity banking system analyzed by this dissertation would comply with the principle of additionality,

[46] *Forests Act*, RSA 2000, c F-22.
[47] Hereinafter "the Additionality chapter"

which requires biodiversity offsets to provide additional benefits to those generated in the absence of an offset.[48]

The public lands context generates concrete questions regarding assessing and achieving additionality. Some of these questions are, for example: how can additionality be achieved on lands that are subject to multiple uses and are allocated to multiple users? Considering that the Crown in right in the province is the owner of public lands, and that its government, as *parens patriae*, has the mandate to conserve the province's lands and natural resources, would conservation or restoration activities be considered additional? Would a regulatory biodiversity banking system created and regulated through laws and regulations achieve a legal surplus? Further considerations of these and other aspects of additionality are studied in the Additionality chapter.

The analysis of the issue shows that achieving additionality with respect to biodiversity offsets is similarly difficult whether on public or private lands. Indeed, achieving additionality does not depend on the express inclusion of additionality as a requirement of the legal framework supporting a regulatory biodiversity offset system, but on the co-existence of legal and environmental additionality.[49] These aspects must be considered in any biodiversity banking system designed to work in a public lands context.

The chapter also examines whether biodiversity offsets implemented by private entities with legal mandates could be considered additional in the context of public lands. The analysis of the issue demonstrated that achieving additionality of reclamation activities could be challenged on the ground that reclamation is already a legal mandate, and that the reclamation deficit in practice is due to a lack of enforcement instead of a lack of financial or institutional capacity, as argued in some developing countries.

1.5 Main Findings of the Thesis

One of the main findings of the analysis provided by the three chapters is that although there are some challenges, specifically affecting the potential implementation and

[48] For a more detailed definition of additionality see Conceptual Foundations section, 2.3.3, and the Additionality Chapter.
[49] Each of these elements is explained in the Additionality chapter.

operation of biodiversity banks and biodiversity offsets on public lands allocated to private entities, most of the challenges equally affect biodiversity offsets and banks either on public lands or private lands.

The thesis shows that implementing biodiversity offsets under biodiversity banks on private lands could be easier, because the landowner could undertake restoration, enhancement or conservation activities on his/her land without the need of authorizations to do so. Current dispositions such as forest dispositions do not necessarily allow private entities to undertake other activities (such as restoration or conservation) beyond the scope of the disposition (e.g. timber harvesting).

The thesis also shows that threats to the permanence of offsets can equally affect biodiversity offsets whether on private or on public lands because minerals can exist under both types of lands, and mineral rights holders can access and cause impacts to surface lands (where offsets have been implemented) to exploit minerals underneath them. However, the thesis demonstrates that threats to permanence can be exacerbated in a public lands context where multiple operators have different rights to natural resources over and underneath the land.

The thesis concludes that beyond these mayor challenges to the implementation of biodiversity offsets and biodiversity banks on public lands, other aspects such as the transferability of biodiversity credits produced by biodiversity offsets do not depend on where the offset was implemented, but on whether the government reserves the ownership over the credit for itself, or whether legislation specifies that credits can be transferred and traded and by whom.

Furthermore the thesis demonstrates that additionality is a requirement of biodiversity offsets implemented either on public or on private lands.

1.6 Methodology

This dissertation uses the case study and the comparative research method. The case study method is an empirical inquiry, derived principally from observation. It is used to investigate a phenomenon in depth within its real-life context. [50]

One of the reasons for choosing the case study as research method for this dissertation is that this research topic (biodiversity offsets, specifically biodiversity bank systems) is a contemporary topic, which has evolved through the implementation and operation of pilot projects in different jurisdictions.

The case study method can be used for different purposes, including for theory building. It can be used, for example, when the theory supporting the new variables emerging from a different contextual and contemporary research area or subject matter has not been fully developed.[51] Although biodiversity offsets, and more specifically biodiversity banks, have been vastly studied during recent years, the legal drivers and consequences of implementing and operating them in a public lands context have not been subject to the same amount of research. The public lands context requires the exploration of multiple variables such as additionality or the rules relating to the implementation of required property rights and the operation of biodiversity offsets, and the transfer of biodiversity credits if biodiversity banks are created. Consequently, another reason for choosing the case study method was to generate findings that could be used to evolve the theoretical legal aspects and considerations related to implementing biodiversity banks on public lands. Furthermore, the case study method relies on multiple sources of evidence.[52] Consequently the case study conducted by this dissertation includes various interviews with key stakeholders, researchers and implementers of market-based instruments at both the international level, where research included the Katoomba Group and Forest Trends in

[50] See Robert K.Yin, "A (very) brief refresher on the case study method" in *Applications of Case Study Research*, 3rd.ed (Sage, 2012) at 4, online: <http://www.sagepub.com/sites/default/files/upm-binaries/41407_1.pdf >. See also Florian Kohlbaher, "The Use of Qualitative Content Analysis in Case Study Research" (2006) 7:1 *FQS Forum: Qualitative Social Research* 21, online: <www.qualitative-research.net/index.php/fqs/article/view/75/153>.

[51] Thomas G. Gary, "Sonia is typing… A typology for the case study in social science following a review of definition, discourse and structure" (2011) 17:6 *Qualitative Inquiry* 511. See also Thomas G. Gary, *How to do your Case Study* (Thousand Oaks: Sage, 2011).

[52] Robert K. Yin, *Case Study Research: Design and Methods*, 4th ed. (Thousand Oaks, CA: SAGE, 2009).

the U.S., and at the provincial level where research included the University of Alberta, the Alberta Ministry of Environment (Alberta Environment and Parks), Alberta Association for Conservation Offsets, among others.

In order to conduct the interviews, in 2014, I consulted the Office of Research Ethics and Integrity of the University of Ottawa. This Office confirmed that an ethics approval was not required for this research because my interviewers were not themselves the focus of the research. They were interviewed to obtain factual information on biodiversity offsets rather than for their personal opinions.

The information reviewed includes both primary and secondary literature. Primary literature includes statutes, regulations and policies from countries such as the U.S., Australia and Canada, and specifically Alberta. Secondary literature includes academic scholarship and policy reports, journal articles and other materials.[53]

The dissertation adopts concepts, principles and theories developed by the BBOP, which specializes in biodiversity offsets. Its conceptual section describes the biodiversity offsets concept, emphasizing aspects related to the biodiversity bank concept, and identifies and analyses some of the essential principles of biodiversity offsets developed by the BBOP, which include adherence to the mitigation hierarchy, limits to what can be offset, No Net Loss (NNL) as a policy goal, additionality, and others.[54] These principles have been considered and adapted by some biodiversity banking systems in place, such as the New South Wales (NSW) BioBanking system.[55] From the analysis of these principles, the dissertation concludes in its second part that a biodiversity offset system applicable to both private and public lands would need to comply with all these principles, but only further analyzed additionality in the context of a potential biodiversity banking system for

[53]Much of my research was conducted over the internet. Where a website is indicated in a footnote, it was last visited on April 10, 2017 unless otherwise noted.

[54] The BBOP has developed a set of 10 principles that are essential for the creation and implementation of biodiversity offsets. See BBOP, *Principles on Biodiversity Offsets*, online: <http://bbop.forest-trends.org/documents/files/bbop_principles.pdf>, *[BBOP essential principles]*

[55] The NSW government has not only adopted the BBOP principles but also adapted them to the context and needs of its own biodiversity banking system. As a result it has created its own set of essential principles for the use of biodiversity offsets in NSW. See NSW Office of Environment & Heritage (OEH), *OEH principles for the use of biodiversity offsets in NSW*, online: <http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm>,[*OEHPRIN*].

Alberta. The analysis of the principles also led to the conclusion that other aspects such as a legal framework to support a biodiversity offset system, as well as the property rights needed to implement and operate biodiversity banks (which have not been identified as essential principles by the BBOP) need further analysis, mostly when using biodiversity banks both on provincial private and public lands.

This dissertation also uses the comparative research method. The comparative research method involves the comparison of different biodiversity banking systems and their supporting legal frameworks to identify similarities and differences among the biodiversity banking systems in place around the world.

Parts I and II of this dissertation analyse and compare the U.S. Biodiversity Banking systems, the NSW BioBank system in Australia and Alberta's legal framework and property rights system. The analysis and comparison of international biodiversity banking systems provides lessons learned regarding the use of biodiversity banks abroad. This analysis revealed their main characteristics and provided concrete examples of how legal challenges identified and studied by this dissertation have been addressed in other jurisdictions. The comparison of these international systems during the first part of the dissertation helps identify legal challenges potentially impacting the implementation and operation of biodiversity banking system on public lands and to analyse these challenges in the context of Alberta's public lands.

PART I BACKGROUND AND CONCEPTUAL FOUNDATIONS

1.0 THE BACKGROUND FOUNDATION

While the Introduction to the thesis briefly identified the biodiversity loss problem caused by oil sands developments in Alberta, and defined what biodiversity offsets and biodiversity banks were, as well as their relation, this section provides more details on the context where the problem occurs and where a potential biodiversity banking system could be implemented. This section provides an overview of the province of Alberta, which is the province of the case study. This overview will help readers better identify and understand the legal challenges that can emerge from using biodiversity banking in a public lands context, which will be analyzed in the case study in Part II of the dissertation.

Alberta offers an ideal case study for three reasons: first, the majority of its territory is comprised of public lands; second, oil sands developments using both mining and in situ techniques affect large territories of public forests; and, third, it has a provincial planning process which manages development and addresses cumulative impacts through a new land use framework and regional plans.

This section starts by providing an overview of the land use classification of lands in Alberta. It then introduces the reader to Alberta's land use planning process and analyses whether this planning process could support the implementation and operation of a biodiversity banking system applicable to public lands in Alberta. This section also identifies the environmental and policy goals pursued by a potential biodiversity banking system in Alberta, and studies how these goals could be achieved within the province's planning process.

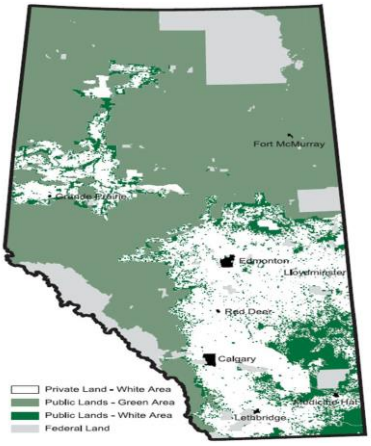
1.1 Context

1.1.1 Classification of lands for land use purposes

For land use purposes, Alberta is divided into White area (settled area) and Green area (unsettled or forested area).[56] The White area covers about 39 percent of Alberta, while the Green area covers about 61 percent of the province. Boreal forests, primarily located in Alberta's Green Area, are mostly public lands. They are home to different species, as well as to several fast growing industry sectors, which include intense timber production, oil and gas development, forestry, tourism and recreation, and infrastructure enhancement.[57]

[56] See Alberta, Ministry of Environment and Parks, *Land Use Framework*, pub. 1/321 (Alberta: Environment and Parks, 2008), online: <landuse.alberta.ca/PLANFORALBERTA/LANDUSEFRAMEWORK/Pages/default.aspx>, [*LUF*].
[57] *Ibid* at 10.

Figure 1 Green and White areas in Alberta[58]



Oil and gas activities in Alberta occur both on private (mostly White area) and on public lands (mostly Green area).

Alberta's Oil Sands region comprises a territory of roughly 140,200 km^2, which is divided into three regions: Athabasca, (93,000 km^2) Cold Lake (18,000 km^2) and the Peace River (29,000 km^2).

The division is pursuant to the *Oil Sands Area Orders* (OSA)[59] and the three regions represent respectively 66%, 13% and 21% of the territory.[60] The mineable oil sands surface area, located only in the Athabasca region, accounts for 4,800 km^2.[61] This is an area six times as large as New York City.[62]

[58] *Ibid* at 10.

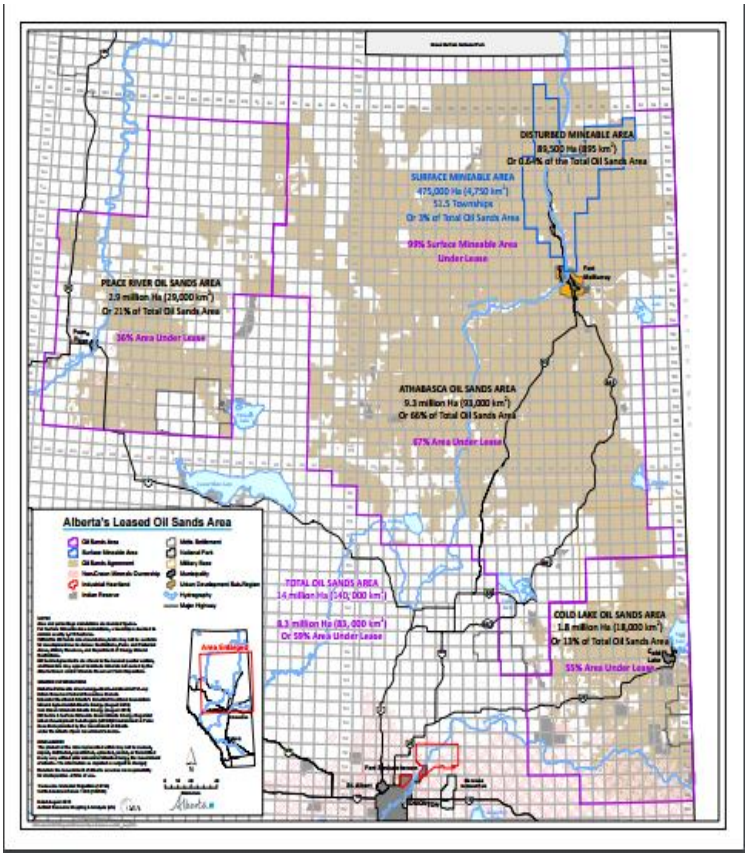
[59] See Alberta Energy Regulator, online: < http://www.aer.ca/ >. The Athabasca Oil Sands was declared an oil sands area by order OSA 1 in Calgary on August 7, 1984: Energy Resource Board of Alberta, Order no. OSA 1 (7 August 1984), online: <www.aer.ca/documents/orders/oilsands/osa1_Athabasca.pdf>. The Peace River Oil Sands area was declared by order OSA 2: Energy Resource Board of Alberta, Order no. OSA 2 (7 August 1984), online: <http://www.aer.ca/documents/orders/oilsands/osa2_PeaceRiver.pdf> Order no. 3 declared the Cold Lake region as a oil sands area: Energy Resource Board of Alberta, Order no. OSA 3 (7 August 1984), online: <www.aer.ca/documents/orders/oilsands/osa3_ColdLake.pdf>. See also Government of Alberta, Alberta's Oil sands, *Oil Sands Reclamation* (September 2013), online: <www.oilsands.alberta.ca/FactSheets/Reclamation_FSht_Sep_2013_Online.pdf>, [*ABOSR*].

[60] Alberta, Ministry of Energy, *Oil Sands Leased Area*, online: <www.energy.alberta.ca/LandAccess/pdfs/OSAagreeStats.pdf>

[61] *ABOSR*, *supra* note 59 at footnote 9. For a general overview of the oil sands, see Jennifer Grant et al., *Beneath the surface: a review of key facts in the oil sands debate*, (The Pembina Institute, 2013), online: < <http://www.pembina.org/reports/beneath-the-surface-oilsands-facts-201301.pdf>, [*BESUR*].

[62] The size of New York city is 789 square kilometers. See New York City, Department of City Planning, *New York Profile*, online: <http://home2.nyc.gov/html/dcp/pdf/lucds/nycprofile.pdf>.

Figure 2: Alberta's Leased Oil sands area[63]



As of 2016 about 67% of the Athabasca, 36% of the Peace River, and 55 % of the Cold Lake areas are under lease.[64] About 99% of the mineable area in the Athabasca oil sands area is under lease. It means that 83,000 km^2 of oil sands or about 59% of the total oil sands area is currently under lease.[65]

1.1.2. Impacts and oil sands extraction methods

Bitumen from oil sands can be extracted either in situ, or through mining techniques.[66] In situ operations in Alberta occupy the majority of the oil sands area, underlying 135,250 km^2, an area representing 97 % of the oil sands surface area.[67] These types of operations are

[63] Alberta, Ministry of Energy, *Alberta's Leased Oil Sands Area,* (August 2016), online: < http://www.energy.alberta.ca/LandAccess/pdfs/OSAagreeStats.pdf>, [*AERLEASEDA].* See also Alberta, Ministry of Energy, *AER Designated Oil Sands Area*, (Nov 2015), online: <www.energy.alberta.ca/LandAccess/pdfs/DesignatedOSA.pdf>, [*AERDSA*].

[64] *AERSDS, Ibid.* These lands are mostly public lands.

[65] See *AERLEASEDA*, *supra* note 63.

[66] Using in situ or mining techniques depends on the depth of where the oil sands deposits are located. Oil sands deposits that are less than 75 metres underground use surface mining. However, deeper deposits are extracted in situ through wells and techniques that heat and pump the bitumen to the surface. See Alberta, Ministry of Energy, *Talk about Oil Sands*, online: <www.energy.gov.ab.ca/OilSands/pdfs/FactSheet_OilSands.pdf>.

[67] See Canadian Association of Petroleum Producers, *Oil Sands Development*, online: <www.capp.ca/canadian-

responsible for the fragmentation of a vast territory of lands, and for important cumulative impacts in the province. On the other hand, bitumen extraction through mining techniques, which only accounts for 20 % of oil sands reserves, has a disproportionally larger impact on surface land and biodiversity per development project. Within this context each mining project could affect an area seven times greater than an in situ project would have impacted.[68] The reason why the footprint caused by mineable oil sands is so large is that extracting the bitumen through mining techniques uses more aggressive extraction methods that imply removing all the land and natural resources overlying the oil sands resources to expose the oil sands deposits, and consequently negatively impacting habitats and ecosystems.[69]

As of 2013, the oil sands mineable area cleared or disturbed was 895 km^2, accounting for about 1% of the total oil sands area.[70]

1.1.2.1 Impacts on environmentally sensitive areas – and oil and gas operators responsibility

In situ and mineable bitumen extractions have different impacts on biodiversity, but both cause biodiversity loss due to fragmentation of land and pollution.[71] Oil sands activities not only cause direct impacts to the boreal forest in oil sands areas, but they can also indirectly impact other areas of biodiversity importance. Oil sands regions are located upstream of the Athabasca River (north of the Wood Buffalo National Park and the Peace Athabasca Delta). The Peace Athabasca Delta, for example, is home to up to 400,000 birds that nest and depend on that habitat during spring and autumn.[72] Oil sands activities that change the composition and levels of the river could pose threats to the Delta region, and

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oil-and-natural-gas/oil-sands/oil-sands-development>, [*CAPPOS*].

[68] See Alberta, Ministry of Energy, *Facts and Statistics*, online: <www.energy.alberta.ca/oilsands/791.asp#Production>, [*EnergyFacts*]. See also Jennifer Grant, Eli Angen & Simon Dyer, *Forecasting the impacts of oilsands expansion* (Drayton Valley, AB: Pembina Institute, 2013) at 4, online: <www.pembina.org/reports/oilsands-metrics.pdf>, [*FOREIM*].

[69] Canadian Association of Petroleum Producers*, Overview: Land Use in Canada's Oil Sands*, (September, 2009), online: <energy4us.org/wp-content/uploads/2009/08/Oil-Sands-Land-Use-Overview.pdf>, [*OSLUO*]. See also *CAPPOS*, *supra* note 67.

[70] See Alberta, Ministry of Energy, *Facts and statistics*, online: https://www.energy.alberta.ca%2Foilsands%2F791.asp&ie=utf-8&oe=utf-8 . See *EnergyFacts, supra* note 68.

[71] *SOLVPZL*, *supra* note 22 at 20.

[72] GreenTar, *supra* note 23.

consequently, to the bird and aquatic species that depend on it.[73] Oil sands can cause water pollution, due to the need for tailings ponds, which contain the by-products of bitumen production.[74]

For example, in 2010 Syncrude Canada Ltd.,[75] one of the world's largest producers of crude oil from oil sands operating in Northern Alberta, was found guilty on two charges for the death of approximately 1,600 ducks in its settling or tailings pond, named the "Aurora Settling Basin," located in Northern Alberta.[76] This large artificial pond (approximately the size of 640 football fields) is used to extract water from tailings, which is wastewater from the processing of the oil sands deposits.[77]

Migratory birds need water bodies for rest and as a source of potential breeding sites. However, from a bird's perspective, tailings ponds are indistinguishable from natural water bodies. They are also warmer than other natural watercourses, and thaw sooner. These factors make them highly attractive but also extremely lethal to waterfowl during their early spring migration. Bitumen, one of the components of the tailings ponds, is a very viscous material. It creates mats on the surface, which can trap and sink waterfowl that land on the basin.[78]

Consequently, oil sand companies are required to have a Waterfowl Protection Plan as part of their operation licenses.[79] This plan should contain a bird deterrent program, based on

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[73] *Ibid*.

[74] Natural Resources Canada, *Oil sands: a strategic resource for Canada, North America and the global market* (2015) at 1, online: <www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/eneene/pubpub/pdf/os2015/14-0705-Oil-Sands-Brochure_access_eng.pdf>, [*OSASRC*].

[75] See Syncrude Canada, *About us,* online: <www.syncrude.ca/our-company/overview/>.

[76] *R.* v. *Syncrude Canada Ltd,* 2010 ABPC 229. According to the judicial decision, these charges were regulatory offenses, and therefore, strict liability refers to a "liability that does not depend on actual negligence or intent to harm, but that is based on the breach of an absolute duty to make something safe." In this case, preventing harm to the animals, when it was foreseen that they would be attracted to the pond as part as their early spring migration, was not making "something safe."

[77] Tailings contain water, sands and bitumen that remain after the processing of the oil sands. See *CAPPOS*, *supra* note 67.

[78] McCarthy Tetrault, "R. v. Syncrude Canada Ltd. 2010 ABPC 229 — A Case of Overstated Significance?", *Lexology* (17 July 2010), online: <www.lexology.com/library/detail.aspx?g=6f16c378-7814-483d-9c3c-8b5b822fdaa1>[*MT*].

[79] Syncrude's mineral surface lease required it to comply with *EPEA*, division 2 of Part 2 of the *EPEA* in regards to respecting approvals, registrations and certificates. Paragraphs 6.1.76, 6.1.77 and 6.1.78 of the *EPEA* approval required the Company to submit to the Government of Alberta a Waterfowl Protection Plan. See *MT*, *ibid*.

bird behavior studies. As demonstrated by the prosecutors, the company had carried out insufficient and delayed actions, which resulted in the death of the ducks.

The Court found that Syncrude "did not establish a proper system to ensure that wildlife would not be contaminated in the Basin or take reasonable steps to ensure the effective operation of the system."[80] As a consequence, the firm was found guilty of violations to provincial and federal provisions, specifically for "failing to store a hazardous substance in a manner that ensured that it did not come into contact with any animals, contrary to s. 155 of Alberta's *Environmental Protection and Enhancement Act* (*EPEA*),[81] and with depositing a substance harmful to migratory birds in an area frequented by migratory birds, contrary to s. 5.1(1) of *Canada's Migratory Birds Convention Act* (*MBCA*)."[82]

1.1.3 Reclamation

Reclamation has been introduced as one of the policy responses to address biodiversity impacts caused by oil sands developments and other industry-related activities. Reclamation is a set of activities such as the decontamination, or the stabilization, contouring, maintenance, conditioning or reconstruction of the surface of land[83] performed to reclaim and remediate the land to a state of "equivalent capacity,"[84] capable of supporting similar land uses, and equivalent vegetation and wildlife as it was before disturbance.[85] Reclamation has to be applied on an ongoing basis as oil sands operations are completed in

[80] *Ibid*.
[81] This section states that: "A person who keeps, stores or transports a hazardous substance or pesticide shall do so in a manner that ensures that the hazardous substance or pesticide does not directly or indirectly come into contact with or contaminate any animals, plants, food or drink." See *Environmental Protection and Enhancement Act*, RSA 2000, c. E-12, s 155 [*EPEA*].
[82] This section states: "No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area." *Migratory Birds Convention Act*, SC 1994, c. 22, s 5.1(1).
[83] Other reclamation activities are for example: "(i) the removal of equipment or buildings or other structures or appurtenances; (ii) the decontamination of buildings or other structures or other appurtenances, or land or water; (iii) the stabilization, contouring, maintenance, conditioning or reconstruction of the surface of land; (iv) any other procedure, operation or requirement specified in the regulations." See *EPEA*, *supra* note81, section 1 (ddd), RSA 2000, Chapter E-12, online: <http://www.qp.alberta.ca/documents/Acts/E12.pdf>.
[84] Equivalent capacity refers to the condition "in which ecosystem processes are functioning in a manner that will support the production of ecosystem goods and services consistent in quality and quantity as present prior to disturbance." See Marian Weber and Dan Farr, "Economic-Ecological Evaluation of Offset Policy Options in Alberta's Boreal Forest" (paper delivered at the XIII Annual BIOECON Conference, Geneva, Switzerland, 11-13 September 2011) at 4, online: <http://www.bioecon-network.org/pages/13th_2011/Weber.pdf>, [*Webfar*].
[85] *Ibid*.

a specific area. Reclaimed lands are certified by the government after confirming that they are in good condition for public use.[86]

Although in theory, it seems a good measure to deal with the biodiversity loss caused by oil sands developments, Alberta has faced a reclamation enforcement problem. Since reclamation was included as a legal requirement of the *EPEA*, only 77 km^2 from the total amount of disturbed lands[87] is under active reclamation.[88] This means that only 10 % of the oil sands mining footprint has been reclaimed by the oil sands industry, rather than 100 % of them as mandated by law, and requested by the government of Alberta.[89] In other words, reclamation has faced and still faces several limitations. Some of these limitations are, for example, technical limitations, lack of regional planning, and lack of binding implementation timelines.[90] These limitations have caused what some scholars have called a "reclamation deficit" in the province,[91] which has made it more complicated to address the biodiversity loss issue caused by oil sands developments in the province.

[86] *See OSLUO, supra* note 69 at 2.
[87] Although this disturbed area seems small in comparison to areas disturbed by conventional oil and gas activities in other Canadian provinces, this dissertation focuses on biodiversity impacts caused by oil sands in Alberta only, because as noted earlier, this province has the larger oil and gas reserves from Canada, and those reserves are mainly formed by oil sands (97% of Canada's proven reserves)
[88] *ABOSR*, *supra* note 59.
The Lower Athabasca Regional Plan 2012-2022 describes the economic development of the region: Government of Alberta, *Lower Athabasca Regional Plan 2012-2022* at 14, online: <https://www.landuse.alberta.ca/LandUse%20Documents/Lower%20Athabasca%20Regional%20Plan%202012-2022%20Approved%202012-08.pdf>, [*LARP1222*].
Reclamation is a legal requirement under the *Environmental Protection and Enhancement Act*, RSA 2000, c E-12, s 136. It mandates oil sands development and other industry-related activities to reclaim and remediate lands impacted by development. According to Marian Weber reclamation implies to achieve an ideal state of "equivalent capacity capable of supporting similar land uses, equivalent vegetation and wildlife as before the disturbance", See *Webfar*, *supra* note 84 at 4. The legal requirement of reclamation is mandatory under the *Environmental Protection and Enhancement Act*, RSA 2000, c E-12, s 136.
Equivalent capacity refers to the condition "in which ecosystem processes are functioning in a manner that will support the production of ecosystem goods and services consistent in quality and quantity as present prior to disturbance." See *Webfar*, *supra* note 84 at 4. See also Symon Dyer et al*. Catching Up: Conservation and Biodiversity Offsets in Alberta's Boreal Forest*, (Ottawa: Canadian Boreal Initiative, 2008) at 7, online: <www.pembina.org/reports/CatchingUp-Offsets.pdf>, [*CTUP*].
[89] *See OSLOU, supra* note 69 at 2.
[90] *Ibid*.
[91] See *Webfar*, *supra* note 84 at 4.

1.1.4 Oil sands investments, oil and gas prices, and future oil sands related projects.

Between 1999 and 2013 an estimate of CAD 201 billion was injected into oil sands developments.[92] Investments increased significantly in Alberta's oil sands areas from CAD 490 million in 1991 to a high of over CAD 27.2 billion in 2012. During this period of time lower taxes and other economic incentives (such as reductions in royalties paid)[93] promoted oil sands investments, and long-term development in the province.[94]

The rapid growth of the oil sands industry in Alberta slowed down in 2015 after an international drop in oil prices during 2014-2015 and due to the international political context, described below.[95]

These factors had a negative impact on Alberta's oil sands industry and developments, and in general on Alberta's economy.[96] However, some experts have argued that the oil and gas overproduction that caused the failing prices of oil respond to a cyclical phenomenon,

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[92] See Alberta Ministry of Energy, *EnergyFact*s, *supra* note 68.

[93] For example, oil sands projects pay between 1% and 9% of royalties until they their implementation costs are paid for, and the projects start producing profits. Once oil sands projects begin producing profits, oil sands developers pay between 25% and 40 % of their net value in royalties. In addition, oil sands projects receive tax breaks. See Alberta Energy Regulator (AER), *Oil Sands Royalty Rates*, online: <www.energy.alberta.ca/OilSands/pdfs/OScurveRate.pdf>. See also The Pembina Institute, *Thinking like an owner,* online: <www.pembina.org/reports/Owner_Factsheet.pdf>. See also Dave Sawyer, Seton Stiebert & EnviroEconomics inc., *Fossil Fuels - At What Cost? Government support for upstream oil activities in three Canadian Provinces: Alberta, Saskatchewan, and Newfoundland and Labrador* (Winnipeg: International Institute for Sustainable Development & International Institute for Sustainable Development Global Subsidies Initiative, 2010), online: <www.iisd.org/gsi/sites/default/files/ffs_awc_3canprovinces.pdf>. The study analyzed the governmental subsidy support to the oil sector in three provinces: Alberta, Saskatchewan, and Newfoundland and Labrador. The study showed that from a total of 63 different subsidy programs, 18 were in Alberta. The study concluded that most of the subsidies to the oil sector aim to promote exploration and development. This support is performed by offering economic incentives to exploration and development activities tax breaks and royalty reductions. See also Anthony A. Davis, "Separating fact from fiction in the claim that oil and gas companies are over-subsidized", *Alberta Oil, the Business of Energy* (31 July 2014), online: <www.albertaoilmagazine.com/2014/07/giver-taker>.

[94] See Government of Alberta, *Economic Facts*, online: <www.albertacanada.com/documents/SP-EH_AlbertaEconomicQuickFacts.pdf>. See Also Alberta Energy, *Energy's history in Alberta*, online: <http://www.energy.alberta.ca/about_us/1133.asp>.

[95] International crude oil price dropped in from $115 (1 June 2014) to below $55 (January 2015) a barrel. The reason for this sudden fall in the price of oil is that the Organization of Petroleum Exporting Countries (OPEC) failed to reach agreement on production curbs. Part of the problem is that the Saudis and their Gulf allies have decided not to decrease their oil and gas production and that America has become the world's largest oil producer. U.S. oil and gas imports have, therefore, significantly decreased. See, "Why the oil price is falling", *The Economist* (8 December 2014), online: <www.economist.com/blogs/economist-explains/2014/12/economist-explains-4>.

[96]Alberta faces a $500 million deficit. See "Alberta now facing $500M deficit due to dropping oil prices", *CBC News Edmonton* (8 January 2015), online: **<**www.cbc.ca/news/canada/edmonton/alberta-now-facing-500m-deficit-due-to-dropping-oil-prices-1.2894583>.

rather than to a permanent condition.[97] It is likely therefore that oil and gas activities and developments will rebound in Alberta, once oil and gas prices increase.[98] If so, oil sands developments are also expected to rebound, responding to steady and/or increasing oil prices.

Oil sands and oil sands transportation projects

Despite the oil sands crisis, there are several operating projects in the oil sands areas, new oil sands and oil sands transportation-related projects, such as pipelines to transport bitumen are planned to be implemented in Alberta. For example, the Alberta Government has recently approved three new oil sands projects for about CAD 4 billion in investments.[99] These projects include: the Blackpearl Resources's Blackrod project, the Surmont Energy's Wildwood project, and the Husky Energy's Saleski project, which together total about 95,000 barrels of potential daily production.[100] The different oil sands areas also have different operating and planned oil sands projects. They have, for example, 126 operating projects, 7 under construction, 15 approved, 18 under application and 10 new projects announced.[101]

Beyond oil sands projects, some companies, with support of the government of Alberta and the federal government, have proposed different mega projects to export bitumen from Alberta's oil sands to North American and Asian destinations: i) the Keystone XL pipeline, ii) the Northern Gateway pipeline, and iii) the Trans Mountain Expansion project. These projects might promote bitumen extraction in Alberta, because they can link production with national and international markets.

[97] See for example National Energy Board, *Canada's Energy Future 2016: Energy Supply and Demand Projections to 2040* (2016), online: <https://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2016/2016nrgftr-eng.pdf>.
[98] Tom Herramus and Steve Austin, "Will Collapse in Oil Price Cause a Stock Market Crash?", *Oil Price*, (14 January 2014), online : <www.oil-price.net/en/articles/will-collapse-in-oil-price-cause-stock-market-crash.php>.
[99] "Alberta approves three oilsands projects worth potential $4 billion in investments", *CBC News* (16 September 2016), online: http://www.cbc.ca/news/business/alberta-approves-three-oilsands-projects-worth-potential-4-billion-in-investments-1.3765197
[100] *Ibid.*
[101] See Alberta, Ministry of Energy, *Alberta's Oil Sands Projects and Upgraders - PDF maps (February 2017),* online: <http://www.energy.alberta.ca/LandAccess/pdfs/OilSands_Projects.pdf>, [*PROJUP 2017*]. See also the maps included in Annex 1 of this dissertation.

The Keystone pipeline aims to transport synthetic crude oil and diluted bitumen from Hardisty, Alberta to American refineries in the U.S. Midwest along the Coast of the Gulf of Mexico.[102] The 3,461 km pipeline has been implemented in different construction phases and has been operating since 2010. Phase 4 of the project, also called the Keystone XL, aims to build 1,179-mile (1,897 km), 36-inch-diameter crude oil pipeline to transport up to 830,000 barrels of crude oil from Alberta, Montana and North Dakota to refineries on the Gulf Coast.[103]

The Northern Gateway pipeline is a proposal by Canadian oil and gas company Enbridge, which seeks to transport 525,000 barrels of Alberta's oil per day to British Columbia, and from there to international markets in Asia and the northwestern United States. To that end, Enbridge would "build two pipelines stretching 1,177-km between the Alberta oilsands and the West Coast of Canada (from Bruderheim, Alberta, to the port of Kitimat, British Columbia).[104] As part of this project, one pipeline would transport Alberta's oil for export purposes while the other pipeline would transport imported natural-gas condensate in the opposite direction.[105] According to Enbridge, this project would generate $2.6 billion in local, provincial and federal tax revenues during 30 years of operation.[106]

On the other hand, the Trans Mountain Expansion Project is a proposal to expand an existing 1,150 km pipeline between Strathcona, Alberta and Burnaby, B.C. and from there to Asia. The project aims to create a twinned pipeline that nearly triples the capacity of the system from 300,000 to 890,000 barrels per day.[107]

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[102] TransCanada, Keystone pipeline, *About the project*, online: <keystone-xl.com/about/the-keystone-xl-oil-pipeline-project>. See more at: <keystone-xl.com/about/the-keystone-xl-oil-pipeline-project/#sthash.HlUNpw2z.dpuf>.

[103] *Ibid.* See also United States Department of State Bureau of Oceans and International Environmental and Scientific Affairs, Executive Summary Draft Supplemental Environmental Impact Statement for the Keystone XL project Applicant for Presidential permit: TransCanada Keystone Pipeline (March 2013), online at: <https://keystonepipeline-xl.state.gov/documents/organization/205719.pdf>.

[104] "Northern Gateway pipeline: benefits vs. concerns" *CBC News* (11 January 2012), online: <www.cbc.ca/news/canada/story/2012/01/10/f-northern-gateway-pipeline.html>.

[105] *Ibid*.

[106] *Ibid*. The article does not provide any information on the project's operation costs.

[107] See TransMountain, *Proposed Expansion*, online: < https://www.transmountain.com/proposed-expansion>.

Political context and national and international concern

The U.S. and China have shown high interest in Alberta's oil. However, the U.S. has raised some environmental concerns, which include biodiversity loss, due to oil sands developments and exploitation methods. These concerns have been the focus of considerable debate and led to the U.S. rejection of the Keystone XL pipeline project announced by the U.S. president in November of 2015.[108] This project, has, however, gone ahead under the new U.S. elected president Donald Trump, who officially approved the Keystone XL pipeline project on March 24, 2017.[109]

Meanwhile in Canada, Prime Minister Justin Trudeau and his cabinet approved the Trans Mountain pipeline despite environmentalist groups' and First Nations' concerns, mostly regarding the project's impacts to climate, potential pollution of sensitive areas and water, and negative impacts to indigenous lands and rights.[110] Although not in Alberta, some First Nations, such as the Tsleil-Waututh Nation in B.C., said this project "could threaten their very survival" and announced future legal actions.[111] So far, there have been 11 judicial reviews over these approvals, and more court challenges, including indigenous, are expected.[112] These are some of the issues that oil sands projects might face if they somehow impact indigenous peoples' rights. Despite these concerns, Mr. Trudeau said that his decision was taken to respond to increasing Alberta's oil sands production and that Canada will remain a climate leader.[113]

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[108] See "US rejects Keystone XL pipeline from Canada" *BBC News* (6 November 2015), online: <http://www.bbc.com/news/world-us-canada-34751370>.

[109] See Ed Crooks, " Trump victory breathes life into Keystone XL pipeline" Financial Times (10 November 2016), online: <https://www.ft.com/content/4b6e6e0e-a708-11e6-8b69-02899e8bd9d1>. See "How Keystone XL, the pipeline rejected by Obama, went ahead under Trump" *The Guardian* (24 March 2017). The official approval of the U.S. presidential permit for the project was officially approved on March 24, 2017. See The White House – Office of the Press Secretary, Remarks by the President in TransCanada Keystone XL Pipeline Announcement" (24 March 2017).

[110] John Paul Tasker, "Trudeau cabinet approves Trans Mountain, Line 3 pipelines, rejects Northern Gateway", *CBC News* (29 November 2016), online: < http://www.cbc.ca/news/politics/federal-cabinet-trudeau-pipeline-decisions-1.3872828>, [Tasker]

[111] John Paul Tasker, "Trudeau cabinet to discuss Trans Mountain pipeline Tuesday as B.C. First Nation vows to oppose it", *CBC News* (28 November 2016), online: < http://www.cbc.ca/news/politics/trans-mountain-bc-pipeline-firstnations-1.3870838>, [Tasker a]

[112] See Tasker, *supra* note 110. See also Lisa Johnson, "First Nations, environmentalists vow 'long battle' on approved Kinder Morgan pipeline", CTV News (29 November 2016).

[113] *Ibid.*

The third project – the Northern Gateway – was not approved by the Canadian Prime Minister because it was not considered "in the best interest of the local affected communities, including Indigenous Peoples,"[114] and due to inadequate consultation with First Nations.[115]

The protracted and often visceral discussion, demonstrations and court challenges in the United States and Canada over the Keystone XL Pipeline, the Trans Mountain expansion and similar projects are examples of the concerns and trade-offs that arise in the countries attempting to meet rising energy needs and increase domestic energy security while simultaneously safeguarding the environment. Unless those operating Alberta's oil sands respond to environmental, indigenous rights and other social concerns, both current and future projects are likely to become the focus of debate of many national and international infrastructure and trade operations.

1.1.5. Planning process and regulatory biodiversity banking system on Alberta's public lands

Alberta is undergoing a regional planning process implemented through its Land Use Framework (*LUF*), which aims to address cumulative impacts in the province.[116] The *LUF*, which came into force in 2008, tries to balance and achieve economic, environmental and social goals, and determines where future development is likely to occur, and where lands with similar biodiversity values to those affected by development can be found.[117]

Within a regional planning approach, the *LUF* takes into account cumulative impacts and sets different strategies, including one for conservation and stewardship on both private and public lands. The *LUF* is supported by the *Alberta Land Stewardship Act* (*ALSA*),[118] which provides the legislative structure and authority to support Alberta's land use planning

[114] Tasker, *supra* note 110.
[115] The Federal Court had previously overturned the Harper government's approval of the project due to inadequate consultation. See Tasker, *Ibid*.
[116] Government of Alberta, *Land-Use Framework*, online: <https://www.landuse.alberta.ca/Documents/LUF_Land-use_Framework_Report-2008-12.pdf>,[*LUF*].
[117] *Ibid*.
[118] *Alberta Land Stewardship Act,* SA 2009, c A-26.8, [*ALSA*]. The *Act* will be considered in greater detail later in this work. It deals with *inter alia* conservation easements, conservation directives, biodiversity offsets.

process, for example, by mandating the creation of regional plans, which include development and conservation and consider cumulative impacts within Alberta's regions.[119] The fact that such plans might consider cumulative impacts suggests a fertile context under which a biodiversity banking system could operate.

The *LUF* creates seven management regions, and management plans for these regions.[120] Regional plans, one of which is discussed in the next section of this thesis, are key elements to help implement and operate biodiversity banks for lands allocated to different economic sectors through dispositions.[121] More about dispositions and property rights in Alberta is explained in the background section of this dissertation and in Part II chapter 2: *The role of property rights in the implementation and operation of biodiversity banks on public lands*.[122]

Furthermore, Alberta's *LUF* expressly identifies land conservation offsets[123] as one of its planning tools to address biodiversity loss arising from development both on private and public lands,[124] and opens, therefore, the doors to the implementation of a biodiversity banking scheme.

1.1.5.1 Regional plans in Alberta and their potential for biodiversity offsets – The Lower Athabasca Region Plan (*LARP*) Example

This section briefly describes the *LARP* as an example of planning that can lead to the use of biodiversity offsets in Alberta, more concretely in the Athabasca region where competing economic activities and different types of impacts to biodiversity occur. Furthermore, the *LARP* is an interesting plan to analyze because it was the first plan developed and approved to manage a region under *LUF*,[125] and because of the existence of oil sands deposits and oil

[119] Considering that the regional plans under the LUF are created under *ALSA*, these plans are called *ALSA* plans for the purpose of this dissertation.
[120] These plans are established under the *Alberta Land Use Stewardship Act* (*ALSA*) established the legal basis for the development of regional plans under the Land Use Framework. See *ALSA, supra* note 118.
[121] Monique Passelac-Ross, "Access to Forest Lands and Resources: The case of Aboriginal Peoples in Alberta" (2008) 23 *CIRL occasional paper* at 11.
[122] See "Property Rights chapter"
[123] As noted in the introduction to the dissertation, biodiversity offsets in Alberta are called conservation offsets.
[124] See *LUF*, supra note 116 at 34.
[125] The Lower Athabasca region plan was approved by the Government of Alberta on August 22, 2012 after a three year consultation process. See Government of Alberta, Environment and Resource Development, Lower Athabasca Regional plan, online: <http://environment.alberta.ca/03422.html>. The South Saskatchewan Regional Plan was the second plan approved under *ALSA*. It was approved by Cabinet on July 23, 2014, and

sands development, among other development activities in the region. From the totality of oil sands projects in Alberta (180), 84 are located in the Athabasca region. Nine of those oil sands projects are mining projects. [126]

This Plan sets the stage for economic growth and healthy environment and communities within the Athabasca region over the next 50 years, by aligning provincial policies at the regional level. It requires that all development activities undertaken in the region, including oil sands developments, align with regional priorities.[127]

Oil and gas development, forestry challenges, and the use of biodiversity offsets: the role of *LARP* outcomes and strategies to solve these challenges.

Considering that the region covered by the *LARP* includes a large portion of the Athabasca oil sands area, the *LARP* recognizes oil sands development as one of the dominant economic activities in the region, along with other economic activities such as mining, forestry and tourism. Within this context, the *LARP* identifies the expansion of oil sands developments as a driver creating challenges for the forestry sector, due to potential "reductions in the forestry land base…due to the long-time horizon for reclamation of oil sands areas."[128] As a result, the *LARP* identifies potential timber shortfalls as one of the main problems to be addressed.[129] This reduction is caused not only by the expansion of oil sands developments in forested areas connected to oil sands resources, but by the long term horizon needed to recover those forested areas through reclamation after the oil sands have been extracted.[130]

The *LARP* creates a set of seven provincial and regional economic, environmental and social outcomes and indicators for: i) a healthy economy supported by land and natural resources, ii) healthy ecosystems, and iii) people. For example, outcome No. 1 relates to the optimization of the economic potential of oil sands. Outcome No. 2 relates to the diversification of the region's economy and outcome No. 3 to managing landscape to

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became effective on September 1, 2014. ERSD, *South Saskatchewan Region Plan*, online: <https://landuse.alberta.ca/RegionalPlans/SouthSaskatchewanRegion/Pages/default.aspx>.

[126] See Alberta, Ministry of Energy, *Alberta's Oil Sands Projects and Upgraders,* (August 2016), online: < http://www.energy.alberta.ca/LandAccess/pdfs/OilSands_Projects.pdf>, [*OILSANDSPROJ*]. See also Alberta, Ministry of Energy, *Alberta's Oil Sands Projects and Upgraders- Athabasca,* (August 2016), online: < http://www.energy.alberta.ca/LandAccess/pdfs/OilSands_Projects.pdf>, [*OILSANDSPATHABASCA*].

[127] See *LARP1222*, *supra* note 88 at 3.

[128] *Ibid*, at 16.

[129] *Ibid*, at 15-16.

[130] *Ibid*, at 16.

maintain ecosystem functions and biodiversity. As demonstrated below, outcomes No.2 and 3 are especially relevant for the use of tools such as biodiversity offsets to address conflicting interests among different land users in the region.

To diversify the economy, outcome No. 2 of the *LARP*, encourages using an integrated land management approach to lands and resources, as well as enhancing forest management on public lands to address timber shortfalls in the region.[131] As further explained in the case study (2.2.2 Enabling Alberta's forestry sector to implement biodiversity banks under a regulated system), this thesis argues that forest operators will be able to implement and operate biodiversity offsets under biodiversity banks only if they diversify their current forestry services, and adopt a more comprehensive approach to forest management, which includes conservation activities.

Outcome No. 3 is also relevant for implementing and operating biodiversity offsets to balance development and conservation in the region. The reason for this is that the new Biodiversity Management Framework (*BMF*), and the Landscape Management Plan (*LANDMA*) developed to maintain ecosystem functions and biodiversity could help implement biodiversity offsets in the region.[132] For example, the *BMF*, which is aimed to be applicable to public lands in the Green area, will identify objectives and indicators and describe monitoring and reporting requirements on biodiversity elements that might be affected by land use activities in the region.[133] It provides therefore baseline information to assess how human activities impact biodiversity. Based on that information, the *BMF* will create management responses, if triggers are crossed.[134] One of these responses could be, for example, the use of biodiversity offsets to address residual impacts.

Once triggers are crossed, the *LANDMA* plan creates a set of management actions to manage the extent and duration of land disturbance and development footprint. It

[131] *LARP1222*, *Ibid*, at 39.
[132] Government of Alberta, *Landscape Management Plan-Overview* (October 2015), online at: <http://landman.ca/wp/wp-content/uploads/2015/09/Landscape-Management-Plan-Overview.pdf>, [LANDMA-OV].
[133] See *ibid*. See also Alberta, Ministry of Environment and Parks, *Lower Athabasca Plan, Regional Plan Strategies* at 2, online: < http://open.alberta.ca/dataset/0926637f-e18b-4878-931d-8c18249a27d3/resource/14f004b9-0e88-4d8c-8acf-5337549e0a91/download/2014-LARP-FactSheet-Strategies-Feb13-2014.pdf>, [*LARPFACT*].
[134] See *LANDMA-OV, supra* note 132.

reconciles development, conservation and cumulative effects and places special focus on oil sands and Woodland Caribou conservation.[135] The *LANDMA* plan identifies key pressures on biodiversity affecting each of its management areas (RMA)[136] as well as key areas for progressive reclamation and restoration and promotes the use of different management tools for Woodland Caribou habitat conservation and or restoration.[137] Similar to the *BMF*, the *LANDMA* plan also opens the door to the use of biodiversity offsets as a restoration or management tool for Woodland Caribou habitat and others. Although both BMF and LANDMA seem to be useful tools to manage biodiversity and address impacts to biodiversity in the management areas, both documents remain drafts, and have never been completed.[138]

Conservation under *LARP*

In addition to the *BMF* and the *LANDMA*, which are applicable to lands not designed as conservation lands, the *LARP* also includes the creation of six new conservation areas, with a total conserved area of two million hectares, which could become the benchmark to assess biodiversity offsets in Alberta. Conservation areas are legally protected areas with little to no industrial activity that have significant biological diversity and a size of about 4000-5000 km^2, and/or lands that support aboriginal traditional uses.[139] The *LARP* prohibits selling new petroleum and mineral tenures for conservation areas and establishes limits and restrictions to new oil and gas and mining developments through existing tenures.[140] While the *LARP* considers oil sands extraction activities and commercial forestry as non-compatible with conservation areas, it allows limited forestry operations in certain parts of [or zones within] the protected areas.[141] The LARP is currently being reviewed in response to a review request made by First Nations.[142]

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[135] See *Ibid*.
[136] The *LANDMA* plan further subdivides the Athabasca region into three management areas called resource area management *(*RAM), which include the South Athabasca Oil Sands RMA. See *LANDMA-OV, ibid.*
[137] *See Ibid.*
[138] D. Poulton's personal communication.
[139] LARP1222, *supra* note 88 at 30.
[140] *Ibid*. See also Bob Weber, "Alberta tries again to balance oilsands, environment in plan for lower Athabasca", *Financial Post*, (22 August 2012), online: <business.financialpost.com/2012/08/22/alberta-tries-again-to-balance-oilsands-environment-in-plan-for-lower-athabasca/>.
141 LARP1222, supra note 88 at 30.
142 D. Poulton's personal communication.

The Pembina Institute has raised a concern that one of the main gaps of the *LARP* is that its protected areas are limited to only about 11 percent of caribou habitat. Development, such as oil sands, forestry and mining carried out in the region could, therefore, keep impacting caribou habitat.[143]

To solve the gaps of the *LARP* regarding caribou conservation, the Pembina Institute and Alberta Caribou Committee have suggested "setting thresholds on maximum levels of development in caribou habitat and establishing biodiversity offsets in caribou habitat."[144]

Conservation mandate in non-conservation lands

As noted when describing the types of impacts caused by bitumen extraction either through in situ or mining operations, these types of activities can lead to impacts to biodiversity that require responses. The *BMF* and the *LANDMA* direct land users both on and off the conservation lands to adopt certain management actions to address impacts if triggers are surpassed. Although neither the *LARP*, nor *LANDMA* or its *BMF* includes anything specific regarding the use of biodiversity offsets, we assume biodiversity offsets could be used as one of the management actions to address impacts under *LANDMA*.[145] It is this kind of conservation mandate on non-conservation lands that drives the U.S. conservation banking system.[146] A similar conservation requirement on unprotected lands in Alberta could drive the development of a biodiversity offset market, whereby resource developers would only receive a development permit if they acquired a biodiversity credit that protected caribou habitat in another location.

[143] *SOLVPZL, supra note* 22 at 17.
[144] *Ibid.* See also Athabasca Landscape Team*, Athabasca Caribou Landscape Management Options Report* (Alberta Wilderness Association, 2009), at 49, 65, 69, online: <http://albertawilderness.ca/archive/caribou-archive/2009-05-athabasca-caribou-management-options>, providing examples of how to offset declines of woodland caribou populations in regions such as the Athabasca, [*LANDMAOP*].
[145] See *LARP1222*, *supra* note 88.
[146] See U.S. Mitigation Banking and U.S. Conservation Bank. More details on wetland mitigation banks and conservation banks are provided in the Conceptual Foundations section. See 2.1.3 Examples of International and National Biodiversity Banking systems

1.1.5.2 Beyond *LARP*: A step forward in the use of biodiversity offsets - Biodiversity offset framework

The government of Alberta is developing a biodiversity offset policy framework[147] (*BOPF*) to provide more certainty for the eventual implementation and use of biodiversity offsets in the province. At the time of writing, a final version of the *BOPF* is not publicly available yet. However, the policy framework has been circulated in draft form and might be approved soon.[148]

The latest draft of the *BOPF* indicates that the policy framework will be formed by a set of umbrella programs (e.g. wetland, habitat, water, and air) that directly or indirectly pursue biodiversity conservation.[149] While the content of the framework will be more general, specific directives, such as the wetland mitigation directive, will provide details on the implementation and use of offsets under each program.

A key element of the *BOPF* is the requirement of compensation for impacts caused to biodiversity either to wetland ecosystems, species or habitats.[150] As long as compensation for impacts to biodiversity is required, a biodiversity banking system and its biodiversity credit market become viable.[151] For example, the requirement to compensate for impacts to wetlands could be incorporated into the Alberta *Wetland Conservation Policy.*[152]

According to the drafters of the *BOPF*, the framework was initially planned to enable the use of biodiversity offsets in the province's settled areas or private lands and did not contemplate the development of biodiversity banks (where biodiversity credits can be

[147] Biodiversity offsets are called conservation offsets for the purposes of Alberta's framework.
[148] See Dave Poulton, *Conservation Offset Policy for Alberta: A Progress Report* (Edmonton: Alberta Land Institute, 2016), online:< http://www.albertalandinstitute.ca/public/download/documents/23030 >, [Poulton progress].
[149] Personal communication with Anish Neupane, Alberta Environment and Parks on 6 October 2014 and 18 October 2015. See Government of Alberta, *A Framework for Conservation Offset Design in Alberta* (Draft) April 28, 2016, [*BOPF*].
[150] Personal communication with Anish Neupane, Alberta Environment and Parks on 6 October 2014 and 18 October 2015.
[151] *Ibid.*
[152] Government of Alberta*, Alberta Wetland Policy* (Sept 2013), at 2 online: <http://bio.albertainnovates.ca/media/62357/alberta_wetland_policy.pdf>, [*WETPOL*].

traded).[153] However, the latest draft does not limit the use of offsets to private lands, suggesting that offsets could also be used on public lands.[154] Although it is still a draft document, the *BOPF* constitutes a vital step towards the creation and operation of a regulatory conservation-offset system. Both the framework and programs are still subject to several modifications and debate. However, they show an increasing interest in creating a biodiversity offset system, which includes biodiversity banks for Alberta.

The context described above shows that Alberta's planning process, through the *LUF*, its regional plans, and outcomes, is aligned with Alberta's draft offsets policy framework and regulations and that its regional planning process and instruments could lay the ground for offsets, and potentially for biodiversity banks to be implemented and operated on Alberta's public lands. Thus, biodiversity banks could become a planning tool towards achieving biodiversity conservation goals set by statutes and regulations and pursued within planning frameworks.

Furthermore, designing and implementing biodiversity banks in accordance with the *LUF* and its regional plans would allow bankers to implement them in areas where conservation and/or restoration is higher priority, such as wildlife corridors[155], or areas adjacent to bio-corridors. It would also allow advance planning for restoration or conservation activities focused on compensating for impacts anticipated to be caused by developments such as oil sands or mining.

As noted earlier, under the biodiversity banking system proposed by this dissertation, forest operators, as the main users of Alberta's public forests, could become one of the biodiversity bankers and suppliers of biodiversity credits, and oil and gas operators would

[153] See *supra* note 149 . The *BOPF* uses the term "conservation offset" when talking about biodiversity offsets. For purposes of this thesis, biodiversity offsets or conservation offsets will be indistinctly used when discussing the *BOPF* and its implications.
[154] See *BOPF*, *supra* note 149.

[155] Wildlife corridors are "protected routes that allow wildlife to move safely between areas of suitable habitat." Parks Canada, Banff National Park – Wildlife corridors – a 'moving' story, online: <https://www.pc.gc.ca/en/pn-np/ab/banff/info/gestion-management/enviro/faune-wildlife/corridors>.

become the buyers of biodiversity credits. Both sectors are already part of Alberta Association for Conservation Offsets (AACO).[156]

1.1.6. Alberta's environmental goals and objectives

Before implementing a potential provincial biodiversity banking system applicable to private and/or public lands (as suggested by the BBOP biodiversity offsets essential principles), it is necessary to determine whether such a system will contribute to achieving the environmental and policy goals pursued by the province.

As the conceptual section in Part I further explains, there is a direct connection between over-arching environmental goals and more specific environmental objectives.

Environmental goals include biodiversity conservation, species at risk protection, and pollution prevention. On the other hand, environmental objectives determine the magnitude in which the environmental goal will be protected. Most of the existing literature agrees that "the [policy] goal of biodiversity offsets is to achieve no net loss[157] and preferably a net gain [NG]."[158]

No net loss (NNL) is defined by the BBOP glossary as:

> a target for a development project in which the impacts on biodiversity caused by the project are balanced or outweighed by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset the residual impacts, so that no loss remains. Where the gain exceeds the loss, the term 'net gain' may be used instead of no net loss.[159]

In other words, NNL involves balancing losses and gains in such a way that there is no loss. Net gain involves not only the full avoidance of any net loss to biodiversity, but also

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[156] AACO is a non-governmental collaboration working on conservation and biodiversity offsets in Alberta. See AACO, online: <http://www.aaco.ca/ >, [AACO].

[157] *BBOPGLOS*, *supra* note 34 at 8.This concrete definition uses not net loss as a synonymous of net gain, however, most of the biodiversity offsets literature uses these terms independently. They mention for example, that the goal of the offset is "no net loss" and preferably "net gain." See Jo Treweek, *Scoping study for the design and use of biodiversity offsets in an English Context,* report to DEFRA (UK: Department for Environmental and Rural Affairs, April 2009) at 17-19, online: <https://www.cbd.int/financial/offsets/unitedkingdom-scoping.pdf>, [*DEFRA*].

[158] See *ibid* at 22-23.

[159] *BBOPGLOS*, *supra* note 34 at 30.

obtaining benefits or gains in favour of biodiversity through some conservation or restoration activities.

Different biodiversity banking systems around the world pursue different environmental goals and objectives.

Identifying the environmental goals and objectives that a biodiversity banking system should pursue should be the result of deep analysis and require input from a variety of stakeholders, such as scientists, academia, aboriginal peoples, non-profit organizations and others and the participation of different disciplines, including law.

Rather than discussing the technical details about the many elements needed to identify a policy goal, for the purpose of this dissertation, it is sufficient to describe the environmental objectives adopted in the biodiversity banking systems described herein.

Alberta does not yet have an overall biodiversity strategy for the province. The government still intends to consult with Albertans on a provincial biodiversity policy called "Maintaining Alberta's Natural Advantage."[160]

However, the province developed a *Species at Risk Strategy* (2009-2014).[161] The environmental goal pursued by the strategy was: "to ensure that populations of all wild species are protected from severe decline and that viable populations are maintained, and where possible, restored."[162] However, it does not specify whether it pursues NNL or Net gain.

All the elements of the Strategy such as protecting species from decline, maintaining population levels, and restoring populations could suggest that the Strategy pursues either a NNL policy goal or a NG policy goal. The difference between choosing NNL or NG would be in the amount and quality of the conservation results. Better environmental results could

[160] Carolyn Campbell, AWA Conservation Specialist, "Alberta's Biodiversity Strategy Needs to be Pushed Forward" Wild Lands Advocate 20(6): December 2012 14-17 at 15, online, <https://albertawilderness.ca/wordpress/wp-content/uploads/2015/08/20121219_wla_v20n6.pdf>.
[161] Alberta, Ministry of Sustainable Resource Development, Fish and Wildlife Division, *Species At risk Strategy (2009-2014)* (Edmonton: ESRD, 2008), online: <http://esrd.alberta.ca/fish-wildlife/species-at-risk/documents/StrategyManagementSpeciesRisk2009-14.pdf>.
[162] *Ibid*. Alberta, Ministry of Sustainable Resource Development, Fish and Wildlife Division, *Species At risk Strategy (2009-2014)* (Edmonton: ESRD, 2008).

lead to acquiring net gains.

Similarly, the environmental goal of the 2013 *Wetland Policy* is "to conserve, restore, protect, and manage Alberta's wetlands to sustain the benefits they provide to the environment, society and the economy."[163] Nevertheless, the province has not yet specified whether sustaining the benefits provided by wetlands implies a NNL goal.[164] Some environmental groups have claimed that the policy goal of the *WETPOL* is too vague and that it shows a lack of commitment to the NNL goal.[165]

One of the main limitations of the policy is that it does not apply to projects that were operating, approved and those seeking approval at the time the policy entered in force.[166] About 65% of the mineable oil sands area is covered by wetlands, and 99% of that area was leased at the time the policy entered into force. This means that many valuable wetlands of Alberta, including about 460,000 hectares of peatlands end up unprotected due to the limited scope of application of the *WETPOL*.[167] Despite this limitation, the *WETPOL* allows the use of offsets as a last resort, after all mitigation activities have been undertaken.[168] Offsetting activities such as replacing existing wetlands with other wetlands in the green area were expected to begin in July of 2016.[169]

Alberta Environment and Parks issued a *Wetland Mitigation Directive* (*WETMIDIR)* in July of 2016. The Directive aims to inform decision makers and project proponents how to mitigate

[163] *WETPOL*, *supra* note 152, s. 2c at 19.
[164] Dave Poulton, Alberta's New Wetland Policy as a Conservation Offset System (ABLawg.ca September 2013), online: <http://ablawg.ca/wp-content/uploads/2013/09/Blog_DP_Alberta_Wetlands_Policy_September-2013.pdf>,[Poulton wetlands].
[165] *Ibid*. See also Erin Flanagan, *Alberta's wetland policy another unnecessary gift to the oilsands industry*, (Pembina Institute, September 2013), online: < http://www.pembina.org/blog/750 >, [*Flanagan*].
[166] See Flanagan, *ibid*.
[167] *Ibid.*
[168] *WETPOL*, *supra* note 152, s 2 at 14.
[169] The *WETPOL* mandates the replacement of wetlands: "where an authorized activity results in the permanent loss of wetland area from the landscape, wetland replacement obligations are enacted." Alberta Environment and Parks, *Alberta Wetland Policy Implementation-Update- Jul4, 2016*, online: <http://aep.alberta.ca/water/programs-and-services/wetlands/alberta-wetland-policy-implementation.aspx>. Based on the Wetland Management in the Settled Area of Alberta: An Interim Policy (1993), *wetland replacement in the province was limited to wetlands in the White or Settled areas*. See Government of Alberta, Water Resources Commission, *Wetland Management in the Settled Area of Alberta: An Interim Policy* (1993). The new *WETPOL* policy opens the door, however, to wetland replacement in the green area as well. See WETPOL, *ibid* at 5.

the impacts caused by any proposed activity.[170] Therefore, it guides wetland replacement obligations. Section 5 of the *WETMIDIR* provides proponents who have replacement obligations with the option of purchasing credits from wetland banks.[171] Such an option is provided under the Wetland offset program (one of the *BOPF* programs) explained when describing the new *BOPF*.[172] However, the *WETMIDIR* does not specify whether biodiversity offsets under the *WETPOL* will pursue NNL.

Based on the discussion of environmental goals and environmental objectives in Alberta, we can conclude on a preliminary basis that establishing any biodiversity offset program, such as the wetland program under the *WETPOL,* requires clear environmental objectives to determine the level of wetland conservation pursued in the province, and therefore the specific amount of wetland degradation that would be accepted, or that needs to be recovered. A NNL goal for example could help biodiversity banking designers and regulators clearly define and determine the scope of biodiversity conservation or protection that individual offsets and the whole offset system have to achieve. Furthermore, clearly defined environmental objectives are important because as the conceptual section shows, they can be used as a benchmark to monitor whether biodiversity offsets and the systems they are part of have met their environmental goals and/or objectives.

1.2 An Overview of Property Rights and Property Right Status of Lands in Alberta.

The implementation of a biodiversity banking system on public lands requires clarity with respect to property rights. As noted in the hypothetical Star Wood Forestry Company example, explained in the introduction to the thesis, the existence of multiple users with different rights and interests over a tract of public land could threaten the permanence of biodiversity offsets, and could complicate the transferability of biodiversity credits emerging from biodiversity offsets.

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[170] Government of Alberta, *Alberta Wetland Mitigation Directive* (2015). Water Policy Branch, online: < http://aep.alberta.ca/water/programs-and-services/wetlands/documents/AlbertaWetlandMitigationDirective-Jul2016.pdf>[*WETMIDIR*].

[171] The *WETMIDIR* defines a wetland bank as a "wetland bank is a wetland, or collection of wetlands, that have been restored, enhanced or constructed for the explicit purpose of providing wetland replacement in advance of authorized loss of wetland area." See ibid at 6.

[172] See *supra* note 149.

This section provides a brief discussion of property rights, its components, characteristics and typology. It also identifies similarities and differences between private and public rights over lands and resources, and describes the property rights status of lands and natural resources in Alberta, where oil sands are developed. This discussion is introduced in this section to illustrate the role of property and access rights in the implementation and operation of a potential biodiversity banking system capable of working on public lands allocated to private entities. A more comprehensive analysis of the property rights to implement and operate a biodiversity banking system on public lands is found in the case study.

Property can be either real or personal.[173] Real property means rights in relation to land. They can be either corporeal, which provide possession to its holder, or incorporeal, which do not provide possession to its holder. Real property is for example, the property right I have over my house, which entitles me to exercise the bundle of rights described later in this subsection. As an owner, I can for example, preclude a stranger to get into my home, I can lease a room of the house, or sell it if I decide to do so. On the other hand, personal property is linked with rights to moveable things (tangible or intangible) that are not associated with the land.[174] Based on a personal right, I could for example, transfer and sell apples, as well as bonds and stocks within the market.

There are different methods to define and understand the different types of property, including public property. Two of these methods are for, example: i) conceptualism, and ii) instrumentalism. While conceptualism considers property as a category "worth analyzing and understanding for its own sake,"[175] instrumentalism views property as a "means to another end, such as economic efficiency."[176]

[173] Bruce Ziff citing Felix Cohen. See Bruce Ziff, *Principles of Property Law*, 5th ed., (Toronto: Carswell, 2010) at 6, [Ziff].
[174] *Ibid.*
[175] Jonnette Watson Hamilton & Nigel Bankes, "Different Views of the Cathedral: The Literature on Property Law Theory" In Aileen McHarg et al, *Property and the Law in Energy and Natural Resources* (Oxford Scholarship Online, 2010) at 3-4, [*WHB*].
[176] *Ibid*, at 4. This dissertation does not enter into a detailed analysis of each of these methods, and only provides a brief description of property rights as identified by the above-cited methods.

One of the initial and most famous definitions of property is the Blackstone theory, which links property to "things," referring to something (e.g. a car, a house, a book) that belongs to somebody.[177]

However, considering that the most valuable property rights can be in intangible goods such as technology and virtual property, the idea of property as a tangible thing significantly limits its scope. Another theory defines property rights as a bundle or a collection of rights enforceable against others.[178] This bundle of rights provides its holder certain rights, such as: "i) possession, management, and control; ii) income and capital; iii) transfer inter vivos and on death; and iv) protection under the law."[179] Beyond the bundle of rights, property rights also involve obligations and liabilities such as the right to own and use a car, and the obligation to pay taxes on the car, and to respect and follow driving rules.

According to Jonnette Watson Hamilton and Nigel Bankes,[180] following an instrumentalist view, economists have adopted the definition of property as a bundle of rights to natural resources, meaning that property is formed by a bundle of legal rights "to draw a benefit from a valuable resource."[181]

According to Felix Cohen, "property rights describe a relationship among people that allows an owner to exclude or include others from certain activities, and that in either case the law would back up that decision."[182] The type of property determines these exclusion and inclusion rights of property. Private property is usually characterized by rights of exclusion, such as the right to exclude third parties from entering your home, or using the fruits of your land. By contrast, public or common property is characterized by rights of inclusion,

[177] *Ibid*, at 4. See also Mary Jane Mossmann & Philip Girard, *Property Law- Cases and Comentary*, 3rd ed (Toronto: Emond Montgomery, 2015) at 1.
[178] See *Z*iff, *supra* note 173 at 2.
[179] Bruce Ziff provides a list of rights part of the bundle of rights identified by A.M. Honore. See *Ibid*. See also A.M. Honore, *"Ownership" in Making Law Bind,* (Cambridge: Oxford University Press, 1987) at 165.
[180] *WHB*, *supra* note 175 at 2.
[181] *Ibid*, at 9.
[182] See *Ziff*, *supra* note 173 citing Felix Cohen at 6.

where a State can include private entities in the use and management of lands.[183] Inclusion rights granted by the Crown or a State[184] are usually granted through dispositions.

Watson Hamilton and Bankes explain that the separation of the sticks or rights forming the bundle of rights is vital to the state granting rights over natural resources and to the operator who receives the rights. According to the authors, the most important sticks of the bundle of rights are the exclusivity of the right granted to the operator (which does not mean ownership of the public land but possession), and the transferability of the interest granted to the operator. In other words, the operator will have the right to engage in the desired activity, and to transfer to third parties the interests being granted, such as the right to extract oil and gas, and/or other fruits/products of its undertakings. The disposition will also determine whether and under what conditions the rights holder might transfer the fruits of its undertakings without governmental interest.[185]

Some of the questions that arise in the context of biodiversity offsets are, for example, whether provinces can grant rights over natural resources above and below the land to private entities, and what will be the scope of these rights. Other questions are whether private entities will have the rights to implement and operate biodiversity banks based on the granted rights, and whether they will have the rights to sell and transfer the biodiversity credits emerging from these banks.

To answer the first question it is necessary to briefly describe the Canadian Constitutional division of powers to determine if a province such as Alberta will have the right to implement a biodiversity banking system. It is also necessary to further explore the status of property rights in Canadian provinces such as Alberta, and to later analyze whether biodiversity credits produced by the banks under the banking system will be considered as property and, if so, whether they will be considered personal or real property. The next subsection provides a brief analysis of these questions. They are studied in greater detail in the analysis of the case study (the Property Rights chapter).

[183] *WHB*, *supra* note 175 at 7.
[184] For the purposes of denoting "State" ownership of a resource, the word "Crown" will be used in the context of the public ownership of land in Canada and its provinces. The Crown is called: the Crown in right of Canada, or, in the case of Alberta: the Crown in right of Alberta.
[185] *WHB*, *supra* note 175.

Will provinces have the right to grant rights over natural resources above and below the land to private entities, and what will be the scope of these rights? - Status of property of lands in Canada and in Alberta

1.2.1 Canadian Constitutional division of powers and the authority of provinces to implement a biodiversity banking system

Considering that the biodiversity banking system studied by this dissertation is a provincial system, before analyzing the status of property of lands in Canada and Alberta, it is necessary to determine whether a province such as Alberta has the constitutional power needed to implement and operate a biodiversity offset system on its public lands. To do so, this section briefly analyses the constitutional powers of the provinces.

In general terms, the Canadian Constitution grants certain legislative powers to the federal jurisdiction under section 91, and to the provincial jurisdictions under section 92.[186] For example, passing laws for defense and foreign policy, indigenous issues and territory, trade and commerce, criminal law and procedure, indirect taxation, navigation and shipping are national matters under federal jurisdiction. In addition to these specific national matters, the federal government has the residual power to make laws for the peace, order and good government of Canada.[187] On the other hand, provincial matters include matters of a merely local or private nature occurring in the province, local works and undertakings, direct taxation, municipal institutions, and property and civil rights in the province. [188]

1.2.1.1 Environment in the Canadian Constitution and the potential authority of provinces to implement and operate biodiversity banking systems

Environmental matters are not specifically granted either to the federal or provincial governments under sections 91 or 92, perhaps because the environment was not conceived

[186] See *Constitution Act*, *1867* (UK), 30 & 31 Vict, c 3, reprinted in RSC 1985, Appendix II, No 5, s 91 and 92. In addition to sections 91 and 92, there are also other sections of the Constitution assigning legislative jurisdiction to the federal and provincial legislatures. For example, jurisdiction over education is assigned under section 93. Similarly, jurisdiction over agriculture and immigration is assigned to both federal and provincial legislatures under section 95.
[187] *Ibid*, s. 91.
[188] *Constitution Act*, *1867* (UK), 30 & 31 Vict, c 3, reprinted in RSC 1985, Appendix II, No 5, s 92.

as an "independent matter of legislation under the *Constitution Act of 1867*."[189] Jurisdiction over environmental issues is, therefore, not always easy to determine.[190] It is considered a shared responsibility that can be constitutionally justified by the different levels of government under several different heads of power.[191]

Provincial authority to legislate environmental aspects has been justified in the jurisprudence under several heads of constitutional power contained in section 92, specifically: Property and Civil Rights (92[13]), and matters of a merely local or private nature in the Province (92[16]). The management and sale of public lands (92[5]) could be also another source of provincial constitutional authority over the environment.[192]

Perhaps the most relevant source of provincial constitutional authority to implement and operate a biodiversity banking system on provincial public lands is section 92A of the *Constitution Act, 1982*[193] (*Constitution*). As Jamie Benidickson writes, it grants each provincial legislature exclusive authority to make laws related to both renewable and non-renewable natural resources.[194] This authority includes the power to make laws related to:

> development, conservation and management of non-renewable natural resources and forestry resources in the province, including; laws in relation to the rate of primary production therefrom; and…..development, conservation and management of sites and facilities in the province for the generation and production of electrical energy.[195]

The biodiversity offset system examined in this dissertation:

i) Is a local private undertaking implemented, operated, and producing its effects within a province. It is, therefore, a matter of merely local nature (92[16]);

ii) Is implemented on public lands owned and managed by the province (92[5]).

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[189] Jamie Benidickson, *Essentials of Canadian Environmental Law* (Toronto: Irwin Law, 2009) 30-31 citing Judge La Forest of the Supreme Court of Canada discussing the difficulty for individuals seeking to identify responsibility for environmental matters, [*Benidickson*].
[190] *Ibid* at 37.
[191] See *Friends of the Oldman River Society* v. *Canada (Minister of Transport)*, [1992] 1 S.C.R. 3 at 64-63 and *R*. v. *Hydro -Québec*, [1997] 3 S.C.R. 213 at 286-287. See also Marie-Anne Bowden, "The Polluter Pays Principle in Canadian Agriculture" (2006) 59 *Okla L Rev* 53 at 58-59. See further *Benidickson*, *supra* note 189 at 30.
[192] *Benidickson*, *ibid* at 37.
[193] This clause of the Constitution Act, 1982 is also known as the natural resources amendment. See *Benidickson*, *ibid* at 37.
[194] *Ibid*.
[195] *Constitution Act, 1982*, being Schedule B to the *Canada Act 1982* (UK), 1982, c 11, s 92 (a).

iii) Aims to address biodiversity loss in forested areas caused by oil sands operations.

Renewable natural resources, such as forests, within a province are conserved, restored and managed in such a way that their services can be used to compensate for residual impacts caused by the exploitation of non-renewable resources within the same province.

Based on s.92A, provincial governments can control the use, access and management of natural resources, and forests and therefore, at least theoretically, they could manage the services their forests provide within their geographical jurisdictions.[196]

> The *Canadian Constitution* does not assign [an explicit] authority to legislate with respect to Ecosystem Services to either provinces or the federal government.[197]

An examination of the division of powers leads to the conclusion that provincial governments would have the authority to legislate aspects concerning the creation of potential regulatory biodiversity banking systems. This, because biodiversity offsets under biodiversity banks could be considered local undertakings producing effects within the province. Another reason for considering biodiversity offsets and biodiversity banking systems as under the provincial authority to legislate is that based on section 92 of Canada's Constitution, forestry, renewable and non-renewable resources are provincial matters, subject to provincial legislation. Biodiversity offsets under biodiversity banks are implemented to address biodiversity loss caused by oil sands development, forestry and other developments, which are subject to provincial authority.

A biodiversity banking system could be a federal system if it were implemented on federal lands, or if it were implemented primarily to address one of the federal governments' authorities such as fisheries, or migratory birds.[198]

A brief examination of the main characteristics of the biodiversity banking system analysed by this dissertation in relation to the heads of powers granting constitutional jurisdictions both to the federal and provincial governments confirms that Canadian provinces, such as

[196] *Anderson, supra* note 5 at 43-44.
[197] *Ibid* at 43.
[198] *Ibid* at 44.

Alberta, have the constitutional authority to create and operate a biodiversity banking system in their territories.

1.2.1.1.1 The Colourability test and biodiversity banking

Any provincial or federal biodiversity bank would need to be justified under an appropriate head of power, and avoid being a colourable attempt to legislate in other level's jurisdiction. The colourability doctrine applies when either the federal or any provincial or territorial government attempts to pass a law that seems to address a matter within the scope of its assigned power, but actually addresses something outside its jurisdiction.[199] For example, in *Re Upper Churchill Water Rights*,[200] the Supreme Court of Canada struck down a Newfoundland statute[201] that expropriated the assets of a hydro-electricity company in Labrador. Although the province had the power to expropriate property within its territory, the Court held that the law aimed to deprive the company of its capacity to meet a long-term contract to supply power to Hydro Quebec. The statute did not mention anything about contracting outside the province. However, the statute was held to be invalid as it was deemed to be a colourable attempt to interfere with the 1969 power contract between Quebec's Hydro-Electric Commission (Hydro Quebec) and the Churchill Falls (Labrador) Corporation Limited.[202]

This brief Constitutional overview shows that in order to be constitutional, a provincial biodiversity banking system would need to emerge from laws and regulations dealing with biodiversity located on land located within the province.

ii) Property rights status

Even if biodiversity loss caused by oil sands operations is a concern that affects both private and public lands, one unique feature of Canada, and of Alberta is that the majority of

[199] See *R. v. Morgentaler,* [1993] 3 SCR 463 at 469.
[200] See *Reference re Upper Churchill Water Rights Reversion Act*, [1984] 1 SCR 297.
[201] The statute was the *Upper Churchill Water Rights Reversion Act,* SN 1980, c 40.
[202] See *Reference re Upper Churchill Water Rights Reversion Act*, [1984] 1 SCR 297 at 332.

Canadian lands and forests (ninety percent of forests) are publicly owned and managed by the Crown in right of Canada and the provincial, territorial or federal governments.[203]

This means the Crown is the one who has a bundle of rights over these lands. However, the Crown has also obligations.

> When the Crown, in right of the Province, transfers land to the Crown, in right of the Dominion, it parts with no right. What takes place is merely a change of administrative control. [204]

Ownership of these forests includes not only the land, but also "the vegetation, soil and minerals on and under the surface of the land."[205] Based on its ownership and constitutional authority, the governments in Canada at either the provincial or federal levels are the ones having both: surface and mineral rights over the land. It means that they control the access, use and operation of Crown lands and the natural resources above and underneath them.[206]

As a general rule, surface rights to land apply to all that is above the surface of the land (e.g. trees and plants). These surface rights may also cover any minerals such as sand, gravel, peat, clay, on the surface of the land, but not those minerals underneath the surface of the land.

Based on its ownership of these public lands, the Crown (whether federal or provincial) may allocate rights on these lands in long-term leases or other legal instruments to different private operators. As a result, concurrent economic activities can be undertaken over a single tract of land.[207]

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[203] Roughly 90 % of forested lands are managed by provinces and territories. Of the lands on which Alberta's forests dwell, 89% is owned by the Crown in right of Alberta province, 8% are owned by the Crown in right of Canada, and the remaining 3% are owned by the private sector. See Natural Resources Canada, *The State of Canada's Forests – Annual report 2010* at 10, online: <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/31835.pdf>. In terms of lands (forested and/or non-forested, the province owns over 60% of lands of its territory. See AER Public Lands Act, <https://www.aer.ca/applications-and-notices/application-process/pla>.

[204] *Attorney-General of Canada v. Higbie*, [1945] SCR 385, at 404.

[205] Paul Muldoon, Alastair Lucas, Robert B. Gibson and Peter Pickfield in *An introduction to Environmental Law Policy in Canada* (Toronto: Emond Montgomery 2015)at 140.

[206] The Crown in right of Alberta owns about 81% of mineral rights (53.7 million hectares). Alberta Energy, *Let's talk royalties*, online: <https://letstalkroyalties.ca/did-you-know/ownership-of-albertas-mineral-resources/ > See also Alberta Energy, *About Mineral Ownership*, online: < http://www.energy.alberta.ca/minerals/4081.asp>.

[207] These activities, can be, for example, forestry activities and tourism.

Property rights in Alberta are governed by the common law and statutory law.[208]

The *Public Lands Act* of Alberta defines public lands of the Crown in right of Alberta.[209]

When public land is granted through dispositions to a private entity, the Crown can grant in fee simple all the rights to a "private land owner," (equivalent to a full transfer of ownership) or grant private operators one or more rights, such as surface right or mineral rights, and reserve for itself the rest of rights.[210] The manner in which the different rights are allocated to private entities on public lands is determined and regulated by different Statutes and their associated regulations.

Alberta's former Ministry of Environment and Sustainable Resource Development (ESRD), now Alberta Environment and Parks, for example, manages access to public lands for grazing, industrial, commercial and other economic activities, including oil and gas operations. Each of these activities is regulated by different Acts, such as the *Public Lands Act*,[211] the *Mines and Mineral Act*,[212] and the *Forests Act*.[213]

Alberta's *Public Lands Act*, for example, regulates all the dispositions regarding public lands (e.g. agricultural dispositions, grazing leases), except mines and minerals and forestry.[214] The *Forests Act* regulates all forest dispositions, and the *Mines and Minerals Act* regulates all mine and mineral dispositions, including oil sands. Alberta Agriculture and Forestry grants

[208] University of Alberta, Alberta Land Institute, *A Guide to Property Rights in Alberta*, at 9, online: <http://propertyrightsguide.ca/assets/a-guide-to-property-rights-in-alberta.pdf>, [*ABPropGuide*].
[209] *Public Lands Act*, RSA 2000, c P-40, s 1 (definitions).
[210] See *ABPropGuide supra* note 208 at 9.
[211] *Public Lands Act*, *supra* note 209.
[212] *Mines and Minerals Act,* RSA 2000, c.M-17.
[213] Government of Alberta, *Describing the Integrated Land Management Approach,* at 6, online: <aep.alberta.ca/lands-forests/integrated-land-management/documents/IntegratedLandManagementApproach-2010.pdf>,[*INTLANDMAPP*]. Recreation is also governed by the *Public Lands Act* and its regulation, but the SRD is responsible only for recreation on vacant lands. On the other hand, Recreation on agricultural leases (including grazing leases) is managed under the Recreational Access Regulation. See Government of Alberta Environment and Parks, *Public Lands Administration Regulation*, online: <http://aep.alberta.ca/lands-forests/public-lands-administration-regulation/default.aspx >.
[214] *Public Lands Act*, *supra* note 209, s 1(e), 1(k).

timber rights to forest tenure holders through specific forest dispositions such as Forest Management Agreements (FMAs), timber licences, and timber permits.[215]

There is no publicly available data on the exact percentage of public lands allocated to private entities in Alberta. However, public lands in the different regions of Alberta are allocated to private entities from different economic sectors. For example, as of Dec. 2013, a total of 23,380,065 hectares were allocated through Forest Management Agreements (FMAs) within Alberta's Green Area.[216] From all these forested lands, 11,426,693 hectares of land were available for harvesting, meaning the portion of the allocated land without lakes and rivers, non-forested lands, or protected areas.[217] More details on the forest tenure system in Alberta and forest dispositions are provided in the analysis of the case study.

As of September 30, 2013 Alberta's Lower Athabasca Region had 108 major projects, which were proposed, planned, under construction or recently completed, and whose combined value was estimated at $101 billion.[218] Of these projects, 49 were oil. Ninety-six percent of the projects' value was produced by oil sands projects.[219] Other regions such as the Upper Athabasca had 44 major projects as of September 30, 2013. Of these projects, only 4 were conventional oil and gas and 2 were forestry projects.[220]

More recent information indicates that as of February of 2017, the three oil sands areas of Alberta had a total of 126 operating projects, 7 under construction, 15 approved, 18 under application and 10 new projects announced.[221] The 10 announced projects as well as 17 of the 18 projects under application will be carried out in the Athabasca region.[222] However, it

[215] See Alberta, Ministry of Agriculture and Forestry, *Forest Management*, online: <http://www.agric.gov.ab.ca/app21/forestrypage?cat1=Forest Management >, [Forestman]. More details on the forest tenure system in Alberta and forest dispositions are explained in the property rights chapter of this dissertation.
[216] Government of Alberta, *Sustainable Forest Management 2013 Facts and Statistics*, at 2, online: https://open.alberta.ca/dataset/13c2e0cf-6083-4c9d-99fe-6684a6339592/resource/705508e6-9c84-4bc8-9dd0-faced5af56fc/download/AreaAvailableTimberHarvest-Factsheet-2013.pdf
[217] Government of Alberta, *Sustainable Forest Management 2013 Facts and Statistics*, at 2, online: https://open.alberta.ca/dataset/13c2e0cf-6083-4c9d-99fe-6684a6339592/resource/705508e6-9c84-4bc8-9dd0-faced5af56fc/download/AreaAvailableTimberHarvest-Factsheet-2013.pdf. *Ibid.*
[218] See Government of Alberta, *Inventory of major projects – Upper Athabasca Region,* online: <www.albertacanada.com/files/albertacanada/RD-LUREI-Lower-Athabasca-IMAP.pdf>, [*IMAP*].
[219] *Ibid*.
[220] *Ibid*.
[221] PROJUP 2017, *supra* note 101
[222] *Ibid.*

was not specified whether these projects were undertaken on private or on public lands.[223] This data shows the diversity of the development projects carried out in the province, and the importance of oil and gas, and oil sands operations in the different regions of Alberta, including the Lower Athabasca region.

Will private entities have the rights to sell and transfer the biodiversity credits emerging from biodiversity banks? - Personal vs. real property as the basis to transfer allocated rights

Beyond the property right status of the land and the natural resources above and under it, another aspect that biodiversity bankers need to know before implementing a biodiversity bank is whether they will be legally entitled to sell and transfer biodiversity credits produced by biodiversity offsets under biodiversity banks. The answer depends on whether the property they are dealing with will be considered real or personal property interest.

Knowing whether the credits produced through conservation or restoration activities on the land as part of biodiversity banks will be considered personal or real property is important to determine the way in which the transfer of these credits will be performed. A detailed discussion of the possibility that private entities will be able to transfer and sell biodiversity credits from biodiversity banks on public lands is included in the analysis of the case study.

Conclusions

This background foundations section of the thesis demonstrates that Alberta is an ideal case study to identify the legal questions and challenges that a biodiversity banking system could face on public lands allocated to private entities. This is not only because different economic sectors, including the oil and gas sector, undertake development activities on provincial lands, causing significant biodiversity loss, but also because the province is implementing a planning process that could support the use of biodiversity offsets, and biodiversity banks as tools to address its residual biodiversity loss issue caused by development.

This section showed that bitumen extraction poses a threat to biodiversity on Alberta's public lands, due to aggressive extraction methods. It also showed that despite the current oil and gas pricing crisis, these activities are expected to rebound, once the oil and gas crisis

[223] See *IMAP*, *supra* note 218 . See also *Ibid*.

ends. This section also demonstrated that although oil sands developers are required by law to undertake some mitigation activities, such as reclaiming the lands where their projects have been undertaken, in practice reclamation efforts have been lackluster and rather ineffective.[224] In fact, despite the obligation that oil sands developers have to deposit money into a Security Fund to ensure that reclamation is performed even if it is not personally performed by the developer, organizations such as the Pembina Institute and Alberta's Auditor General have decried the massive gap between the required clean-up deposits and the actual price of reclamation in practice.[225] Considering the lack of success of reclamation in Alberta, this section justified the use of other mitigation responses, such as biodiversity offsets and biodiversity banks in the context of Alberta's public lands. It also showed that the planning process the province is involved in provides an opportunity to test and experiment with the use of such instruments.

As this section highlights, Canadian provinces have the constitutional authority to implement biodiversity banking system on provincial lands. Implementing biodiversity offsets under biodiversity banking systems, especially on public lands, depends on a stable and clear legal regime, which in turn requires clarification of some important legal questions. Property rights, for example, is one of the challenges that must be considered at the time of implementing biodiversity offsets under biodiversity banks, as well as when transferring biodiversity credits emerging from them.

[224] See *Webfar*, *supra* note 84 at 4. See also *See OSLOU, supra* note 69 at 2.

[225] Lemphers, Nathan, Dyer, Simon, Grant, Jennifer, *Toxic Liability: How Albertans could end up paying for oil sands mine reclamation* (The Pembina Institute, 2010) at 7, online: https://www.pembina.org/reports/toxic-liability-report.pdf>. The authors argued that while the estimated cost of reclaiming disturbed lands was approximately from $220,000 to $320,000 per hectare, companies were depositing into the Security fund only about $12,000 per hectare.

2.0 CONCEPTUAL FOUNDATIONS: BIODIVERSITY OFFSETS, BBOP ESSENTIAL PRINCIPLES AND BIODIDIVERSITY BANKS AND THEIR TECHNICAL IMPLEMENTATION AND OPERATION CHALLENGES

This section offers a detailed discussion of biodiversity offsets, specifically biodiversity banks. It describes the different types of offsets, their characteristics, as well as some of the international experiences using them.

The section also identifies a set of essential principles that biodiversity offsets need to comply with in order to be effective, and the way these principles have been implemented in practice. It shows that although in theory, meeting or not meeting all of the essential principles could indicate whether the biodiversity offset system is effective or not, the effectiveness of these systems has been based on whether the offsets under the system achieved their environmental objectives, meaning NNL or NG goals. [226]

This section also pinpoints the challenges biodiversity banks still face in practice, and highlights some of the features that need to be included in laws and regulations to facilitate the development of biodiversity banking systems on public lands. A further discussion of how some of these principles, specifically additionality, are included in the design and implementation of biodiversity banks on public lands is analysed in the case study.

2.1 Biodiversity Offsets

Biodiversity offsets are conservation or restoration activities, designed to address residual, unavoidable impacts to biodiversity caused by development projects.[227] The compensation they provide is performed offsite, meaning that the conservation or restoration activities undertaken under the offsets "take place outside the geographic boundaries of a development site,"[228] where the impacts are caused.

As noted in the background section, the environmental goal of biodiversity offsets can be as general as biodiversity conservation, or as narrowly focused as the protection of a specific ecosystem type or vegetation. While, as explained earlier, their environmental objective can

[226] See Background section.
[227] *KBB*, supra note 36 at 9.
[228] *Ibid*.

be either NNL or NG of biodiversity with respect to different aspects of biodiversity, such as number of certain species specimens, or the quality and/or quantity of their habitats,[229] the environmental objective needs to be something measurable.[230]

As elaborated when discussing their essential principles, biodiversity offsets constitute an important element of mitigation, but they should only be considered as a last resort in the list of mitigation options (the mitigation 'hierarchy'). In addition, they should be used to offset only significant residual and unavoidable harms, as opposed to minor residual biodiversity impacts.[231]

According to the Canadian Environmental Assessment Agency, mitigation is:

> …the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through *replacement, restoration, compensation or any other means*.[232]

Furthermore, the U.S. Bureau of Land Management states that mitigation includes:

> … (a) avoiding; (b) minimizing the impacts by limiting the magnitude or degree; (c) rectifying the impact by repairing, rehabilitating, or restoring; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments.[233]

The environmental impact mitigation hierarchy is consequently formed by a set of mitigation activities, which need to be implemented and followed in a sequential order. Although the list of mitigation hierarchy activities varies depending on the author, most of the existing literature suggests that mitigation activities should be prioritized to: "avoid,

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[229] Business and Biodiversity Offsets Programme, *Biodiversity Offsets*, online: <bbop.forest-trends.org/pages/biodiversity_offsets>, *[BBOPOFF].*

[230] Within this context, institutions such as the Pembina Institute say that "the basic idea behind a biodiversity offset is that impacts associated with the disturbance of ecosystems and habitat loss are mitigated through either restoration or conservation of substitute forest areas so that no net loss of critical habitat is maintained in perpetuity." See *CTUP,* supra note 88 at 1.

[231] See Kerry ten Kate, Josh Bishop & Ricardo Bayon, discussing compensation as the last resort of the mitigation hierarchy. See *KBB*, *supra* note 36 at 13, 80. See also *BBOPOFF*, *supra* note 229 at 4. See further *DEFRA*, *supra* note 157.

[232] Canada, Canadian Environmental Assessment Agency, *Glossary Part 2. Explanations of Terms* (2014)*,* online: <www.ceaa-acee.gc.ca/default.asp?lang=En&n=B7CA7139-1&offset=3>.

[233] US, Department of the Interior, Bureau of Land Management, *Definitions,*(2005),online: <www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2005.Par.78609.File.dat/im2005-069attach1.pdf>.

minimise and mitigate"[234] residual[235], unavoidable harm.[236] While avoidance refers to "the act of refraining from something,"[237] in this case, from causing any biodiversity impact, "minimisation" implies reducing as much as possible the impacts caused by a project.[238] On the other hand, "mitigation" means alleviating the residual harm, to the extent possible. According to the mitigation hierarchy, biodiversity offsets must only be used as a last resort.[239] Thus biodiversity offsets are used "when on-site conservation measures are not practicable for a project or when the use of the [biodiversity] bank is environmentally preferable to on-site measures."[240]

Thus, based on the mitigation hierarchy principle, the developer of any oil sands project with potential impacts on forest biodiversity would have to avoid identified impacts such as clearing trees in sensitive areas where those trees were home to endangered species, and by implementing the development in less sensitive areas. If impacts cannot be avoided, the developer would need to undertake mitigation activities throughout the whole life of a project. Some mitigation activities could be, for example, clearing only certain trees and leaving those which are habitat to certain species, implementing sound barriers to mitigate noise disturbances to biodiversity close to the project, or carrying out deterrence actions to prevent birds from landing in tailing ponds.[241] After all these activities on-site, biodiversity offsets could be used to address residual biodiversity impacts not covered by avoidance

[234] See *KBB*, *supra* note 36 at 9.
[235] See glossary.
[236] This set of mitigation activities are modified and enhanced by Bishop et al in *Building Biodiversity Business*. The enhanced set of mitigation activities includes: i) avoid, ii) reduce, iii) rescue and iv) repair. See Joshua Bishop et al, *Building Biodiversity Business* (London: Shell International Limited & IUCN: 2008) at 75, online: <portals.iucn.org/library/efiles/documents/2008-002.pdf> [*JoshBish*].
[237] *Black's Law Dictionary*, 2nd pocket ed, *sub verbo* "avoidance."
[238] See *KBB*, *supra* note 36 at 9.
[239] See *KBB*, *supra* note 36.
[240] Nathaniel Carroll, Jessica Fox & Ricardo Bayon, eds., *Conservation and Biodiversity banking: A guide to Setting Up and Running Biodiversity Credit Trading Systems* (London, UK: Earthscan, 2008), at 228, [*CFB*]. See also US, Environmental Protection Agency, *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks*, (1995), 60 Fed Reg 58605, online: <https://www.gpo.gov/fdsys/pkg/FR-1995-11-28/pdf/95-28907.pdf>, [*MitBankGuide*]. See also US, Fish and Wildlife Service, *Guidance for the Establishment, Use and Operation of Conservation Banks*, (Washington, US: 2003) online: <www.fws.gov/endangered/esa-library/pdf/Conservation_Banking_Guidance.pdf>, [*ConsBankGuide*].
[241] In open-pit mining, bitumen is separated from the oil sands using hot water extraction methods. Once the bitumen is separated from sand, clay and water through separation vessels, the residual sand, clay and water is in tailing ponds. See Oil Sands Discovery Centre, *Facts about Alberta's oil sands and its industry* at 3, online: <history.alberta.ca/oilsands/resources/docs/facts_sheets09.pdf>. After this separation the residual mix is sent to a tailings pond, which contains a mixture of water, clay, sand and residual bitumen. See *OSASRC*, *supra* note 74 at 1.

and/or mitigation measures, and to compensate for biodiversity loss. Biodiversity offsets are, therefore, important to address residual and unavoidable harms,[242] in addition to on-site measures.

Biodiversity offsets are, however, not an excuse to make acceptable what is unacceptable. They are neither a "substitute" nor a justification to implement development projects in "no go"[243] areas such as lands with high biodiversity values, or lands with critical or endangered species and/or communities.[244] In those cases, the use of biodiversity offsets is not appropriate.[245]

2.1.1 Compensating for residual biodiversity impacts

Even if it is understood that biodiversity offsets should not be implemented in no-go areas, this still requires determining which areas are suitable to implement a biodiversity offset (the 'go' areas). Making this determination depends on answering the following questions: what is being impacted and for what the biodiversity offset is trying to compensate, where should the biodiversity offset be implemented, and how is it best to offset the residual impacts caused by the development project?

What will depend on the nature of the resources that are being impacted, whether these are wetlands or threatened species, and what is being offset or compensated. Once the environmental goal is determined, compensation can usually be carried out either "in-kind" or on an "out-of-kind" basis. While "an in-kind offset has the same structure and functions

[242] *BBOPOFF*, *supra* note 229. See also *KBB*, *supra* note 36 at 9.
[243] Kerry ten Kate, *"Biodiversity offsets: good for business and biodiversity?"* (Presentation delivered to the PIECA Biodiversity Working Group World Conservation Forum, June 2005), online: <http://www.cifor.org/pes/publications/pdf_files/KtK.pdf>, [*PIECA2005*]. See also Angus Morrison-Saunders "Reflections on the Use of Environmental Offsets", (presentation delivered at Murdoch University, 2007), online: <http://www.iaia.org/pdf/ConferenceDocuments/IAIA07/Morrison-Saunders,%20Reflections%20o%20the%20use%20of%20Environmental%20Offsets.pdf>, [AMS2007].
[244] "No go areas" are also called: "red flag areas" in the BioBanking system. See Australia, NSW, Department of Environment and Climate change, *BioBanking Methodology* (Sydney: DECC NSW, 2008) at 3, online: <www.environment.nsw.gov.au/resources/biobanking/08385bbassessmethod.pdf>, [BASSMETH2008]. This document has been superseded by the new policy of 2014. See Australia, NSW Office of Environment and Heritage, *BioBanking Assessment Methodology 2014* (Sydney: OEH NSW, 2014), online: < http://www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf>, [*BBASSMETH2014*].
[245] See KBB *supra note* 36 at 9.

as what is lost in the impacted area", "an out-of-kind offset has a different structure and function"[246] to those ones being replaced.

Where the offset should be implemented must also be determined. Although a biodiversity offset is not the same as mitigation on the specific site of the project where the impacts caused, "offset policies generally prefer on-site mitigation to off-site mitigation because compensation benefits accrue to the project affected area."[247] This on-site mitigation option implies the possibility of implementing offsets in "relatively close proximity to the disturbance site."[248] This option "is often used as a proxy to ensure that similar ecosystem forms and functions are being captured by the offset."[249] However, offsets may also be implemented further away and not close to the impacted area region. This second option is usually accepted only if the more distant location provides greater environmental benefits than those options provided by on site or closer to the impacted area mitigation options.[250]

The answer to the question of **how** to implement biodiversity offsets depends on the substitutability of the ecosystems or species the offset is trying to replace, and on the environmental objectives in place. Setting the target as NNL or NG will determine whether the offset will try to achieve "like-for-like" or "better" replacement or exchange. Like-for-like offsets are exchanges of same species for same species, same ecosystems for same ecosystems, or "areas with highly comparable biodiversity components."[251] Like-for-like should be the preferred option to pursue equivalence between what is being lost, and the environmental benefits or gains the offset is pursuing.[252] Any offset using a like-for-like approach should conserve or replace "biodiversity of at least as high significance as that

[246] See *CTUP*, *supra* note 88 at 15-16.
[247] *Ibid*.
[248] *Ibid.*
[249] *Ibid*.
[250] Bruce McKenney, *Environmental Offset Policies, Principles, and Methods: A Review of Selected Legislative Frameworks* (Biodiversity Neutral Initiative, 2005) at 33-35, online: <http://www.slu.se/Documents/externwebben/ltj-fak-dok/Landskapsarkitektur,%20planering%20och%20f%C3%B6rvaltning/Personal/CV/Jesper%20Persson/Projekt/Litteraturtips/McKenny_Environmental%20Offset.pdf>,[*McKenney*].
[251] IUCN Biodiversity Offsets Technical Study Group, *Biodiversity Offsets Technical Study Paper* (Gland, Switzerland: UICN, 2014) at 51, online: <cmsdata.iucn.org/downloads/final_biodiversity_offsets_paper__9nov2014_1.pdf>, [*BOTS*]. See also International Council on Mining & Metals & International Union for Conservation of Nature, *Independent report on biodiversity offsets* (2012) at 17, online: <www.icmm.com/document/4934>, [*ICMM-IUCN*].
[252] *ICMM-IUCN*, *ibid* at 20.

affected by a proposed development."[253] For example, a like-for-like approach would offset 10 hectares of high value wetlands with 10 or more hectares of high value wetlands, or moderate value wetlands with moderate value wetlands.

However, conserving or restoring biodiversity with similar values and functions is not always feasible, and can be difficult to achieve. On some occasions, when restoring or conserving similar or in-kind values is not feasible, a trading up, "out-of-kind," or "like-for-better" approach could be used. A like-for-better approach is usually adopted when there is no equivalent, or like-for-like biodiversity, to make the exchange. This approach uses higher-value biodiversity, in terms of ecosystems or species, to compensate for impacts on lower-value biodiversity or lower-conservation priority biodiversity.[254] Like-for-better could be used as long as it provides environmental benefits that outweigh the impacts caused on site.[255] A like-for-better approach would be, for example, to offset the loss of 1 hectare of 50% quality forest, with the gain of 1 hectare of 80% quality forest. More details on how biodiversity offsets, specifically biodiversity banks, should be implemented are further explained when discussing the biodiversity offset essential principles in the conceptual section of this dissertation.

As further explained in the analysis of the case study (Additionality chapter), some offset designers, environmental organizations (e.g. Pembina Institute), and even governments (including in the U.S.), have suggested the use of biodiversity offsets that last and produce their environmental benefits in perpetuity.[256] However, some biodiversity offsets designers, such as Weber et al., support the idea of temporary offsets that last for the duration of the impacts.[257] In other words, if there is a permanent loss of wetland, the biodiversity offset used to compensate for that loss should also be permanent. However, if the loss lasts for a specific number of years, the biodiversity offset used to compensate for that loss, should last for a similar period of time.

[253] See further *DEFRA*, *supra* note 157 at 22.
[254] See *BOTS*, *supra* note 251 at 21.
[255] See *McKenney*, *supra* note 250 at 32.
[256] See *CTUP*, *supra* note 88 at 1.
[257] See Marian Weber, Grant Hauer, and Dan Farr, "Economic-Ecological Evaluation of Offset Dynamic Offset Contracting in Alberta's Boreal Forest" (paper submitted to the 2014 Annual BIOECON Conference, Cambridge, UK, 31 May 2014, [Weber].

Imagine, for example, that 20 hectares of wetland will be polluted and cleared during the construction of access roads for bitumen extraction and that the vegetation, fauna, and water of the area would need 25 years to recover from the impact. In such an example, the biodiversity offset used to compensate for the impact could be temporary and last for the period of time the impact occurs, meaning for 25 years. The NSW government has adopted such an approach.[258] A similar approach has been incorporated in the draft of B.C.'s *EMP*[259] as well as in the latest draft of Alberta's *BOPF*.[260]

2.1.2 Voluntary vs. regulatory biodiversity offsets

The literature classifies biodiversity offsets as either voluntary or regulatory.[261] Voluntary biodiversity offsets are voluntarily implemented and not to comply with a legal mandate.

In many cases, voluntary biodiversity offsets have been implemented by private entities as pilot projects to "minimize the biodiversity loss resulting from their activities and to offset (compensate) for residual losses by restoring or enhancing comparable sites."[262] They have not been the result of a legal or mandatory condition to obtain the approval of the development project, which causes the impacts for which they are compensating. Rather, they have been implemented by companies to pursue different purposes that vary "from ethics and philanthropy to profit and consumption motives."[263] Clients and customers have often perceived these firms as being greener, or more environmentally responsible.

Another characteristic of voluntary biodiversity offsets is that these projects are not part of a regulatory system with a specific regulatory framework designed to support and regulate their implementation and operation, and thus they do not lead to the creation and operation of trading systems.

Regulatory biodiversity offsets, on the other hand, are required or at least facilitated by law or regulation. In other words, statutes and regulations such as those pursuing biodiversity

[258] See NSW Office of Environment & Heritage (OEH), *OEH principles for the use of biodiversity offsets in NSW*, online: <http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm>.
[259] For more information on the *BC OFFSET FRAMEWORK*, see EMPBEXP, *supra* note 29.
[260] See Government of Alberta, *A Framework for Conservation Offset Design in Alberta* (Draft April 28, 2016).
[261] United Nations Development Program (UNDP), *Biodiversity Offsets*, online: <http://www.undp.org/content/sdfinance/en/home/solutions/biodiversity-offset.html>.
[262] See JoshBish, *supra* note 236 at 12.
[263] *Madsen 2011 supra* note 24 at 3.

conservation or water pollution control can directly or indirectly require or at least facilitate the use of biodiversity offsets.[264] Regulatory biodiversity offsets can be imposed on a project-by-project basis or required as one of the conditions to the issuance of a permit for certain development approvals as part of the environmental permit process.[265]

Beyond a project-by-project basis, regulatory biodiversity offsets can also be part of a more complex system, which can lead or not to biodiversity banking systems. Biodiversity banking systems are therefore examples of regulatory biodiversity offset systems.

Biodiversity banking systems facilitate biodiversity banks' implementation and operation. As further explained when describing the biodiversity banking systems in place in section 2.1.3 of this thesis, such systems need to be supported by a legal framework, clearly stating the offsets implementation and operation rules, as well as trading rules.[266]

As further explained in the Additionality chapter, participation in the establishment and operation of regulatory biodiversity offsets is voluntary, but once the banker enters into a biodiversity banking agreement with the government, this initial voluntariness becomes mandatory. In other words, the banker would be required to undertake all committed conservation or restoration activities towards implementing and maintaining a biodiversity bank.

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[264] Legislation, such as Environmental Impact Assessment laws facilitate the use of biodiversity offsets, because they address impact mitigation. They can, therefore, set a framework for future implementation of biodiversity offset schemes in Central and South America, Asia and Africa. The level of development of these initiatives varies between continents and within continents. See Madsen et al, explaining how the Wetland Mitigation Banking system in the U.S. is driven by compliance to the *Clean Water Act*, or how the U.S. Habitat Conservation Banking is driven by the *Endangered Species Act*: Becca Madsen, Nathaniel Carroll & Kelly Moore Brands, *State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide* (Washington, DC: Ecosystem Marketplace, 2010) at vii-viii, online: <http://www.forest-trends.org/documents/files/doc_2388.pdf >, [Madsen].
See also Ricardo Bayon, "Paying for Nature's services: Banking on Biodiversity", in *State of the World 2008: Innovations for a sustainable economy* (Washington, DC: The Worldwatch Institute, 2008) at 123,[*BAYON*].
See also *CTUP*, *supra* note 88 at 9.

[265] For more examples of biodiversity offsets imposed by Canadian regulators see David W. Poulton, *Biodiversity Offsets: A primer for Canada*, Background Paper (Ottawa: Sustainable Prosperity & the Institute of the Environment, 2014) at 18-19, online: <www.sustainableprosperity.ca/sites/default/files/publications/files/Biodiversity%20Offsets%20in%20Canada.pdf>, [*Poulton primer*].

[266] The latter can create conservation banking. See *CTUP*, *supra* note 88 at 11.

2.1.2.1 Voluntary biodiversity offsets worldwide and in Canada

An increasing array of voluntary offset initiatives has been implemented around the world during the last few decades.[267] These voluntary initiatives include: Acres for America in the U.S., the Brisas Gold and Copper Project in Venezuela, and the Potgietersrust Platinums Limited (PPRust) in South Africa.[268] As described in this section, Alberta, Canada, has also explored voluntary offsets to address some of its biodiversity loss.

Acres for America is a project run by a partnership between Walmart stores and the National Fish and Wildlife Foundation,[269] whose purpose is to offset the footprint of Wal-Mart's domestic facilities on at least an acre by acre basis through land acquisitions.[270] Within this context, "at least one acre of priority wildlife habitat is permanently conserved for every acre developed by Wal-Mart."[271] In Venezuela, the "Brisas Gold and Copper Project in the Orinoco Basin is a voluntary compensatory conservation project creating and expanding a protected buffer zone adjacent to a national park, planting trees, creating agro-forestry and ecotourism projects, and establishing a biological reserve station."[272] In addition, the Potgietersrust Platinums Limited (PPRust) was a pilot project implemented by a mining company (Anglo Platinum) in South Africa. This project was designed to offset the negative residual impacts caused by the expansion of the existing mine for productivity enhancement purposes. Offset activities for this project included "a wildlife reserve with re-stocking of indigenous ungulate component, improved protection, active range management and rehabilitation."[273]

In Alberta, there have been some pilot voluntary initiatives implementing biodiversity offsets in the province. The Suncor-Winagami Lake Conservation Project is one example. It is

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[267] *Madsen 2011*, *supra* note 24. See also OECD 2016, *supra* note 1 at 23.
[268] *Madsen*, *supra* note 264 at 32.
[269] *Madsen 2011*, *supra* note 24 at 3.
[270] National Fish and Wildlife Foundation, "Acres for America" (not dated), online at <http://www.nfwf.org/acresforamerica/Pages/home.aspx>.
[271] See *CTUP*, *supra* note 88 at 18. According to the *ICMM-IUCN*, Acres for America is a stewardship program, rather than a not NNL biodiversity offset program, because offsets are not quantified in terms of biodiversity values, but in hectares. See *ICMM-IUCN*, *supra* note 251 at 9. However, as noted by this dissertation, well known and studied biodiversity offset programs such as the Wetland Mitigation Banking system in the U.S. also use an acreage approach as currency, and they are considered a regulatory biodiversity offset systems. See *Madsen*, *supra* note 264 at 7-14.
[272] See *Madsen*, *ibid* at 32.
[273] Anglo Platinum. 2009. *BBOP Pilot Project Case Study. Potgietersrust Platinums Limited (PPRust)*. Johannesburg, South Africa, at 3, online: <www.forest-trends.org/documents/files/doc_3121.pdf>.

a voluntary program, which aims to purchase and recover private lands in the province to partially offset oil sands environmental impacts, while creating wildlife habitat and biodiversity as well as recreational opportunities.[274] This program was initiated in 2003 at Winagami Lake (northwest of High Prairie) in Alberta through a corporate partnership between three main players: i) the Alberta Conservation Association (ACA), ii) Alberta Parks, and iii) Suncor Energy (Suncor).[275] The program was a pilot project and created what was called the *Boreal Habitat Conservation Initiative* in 2008.[276] This initiative involved the investment of $ 200,000 CAD to purchase 480 acres of private lands for protection and conservation. After the initial pilot, Suncor invested $3 million over three years to purchase 1,750 acres of ecologically sensitive private lands in Alberta.[277] Under this program, the company causing the impacts (Suncor) financed the purchase of lands previously identified and assessed by a third party (a land trust), which became the trustee and manager of these lands. Conservation easements were then registered on the land to ensure the permanence of the offset.[278] After purchasing the land, and paying for its permanent management and restoration, the project proponent (who caused the impact), could retire the specific offset, and hold no further liabilities emerging from the offset. From that moment all the responsibilities belonged to the land trust.[279]

This initiative was a first step towards establishing new conservation partnerships with other companies that could also use biodiversity offsets to compensate for their negative

[274] Warren Noga, and W.L. (Vic) Adamowicz, A *Study of Canadian Conservation Offset Programs: Lessons* learned from a Review of Programs, Analysis of Stakeholder Perceptions, and Investigation of Transactions Cost (Ottawa: Sustainable Prosperity, 2014) at 30, online: <www.sustainableprosperity.ca/sites/default/files/publications/files/Noga%20Adamowicz%20Conservaton%20Offsets%20Oct%202014.pdf>, [Nogadam].

[275] Chittenden, C., Kolodychuk, E. 2005. *The Suncor-Winagami Lake Conservation Project*, 2003-2004 (Alberta conservation Association, 2005), online: <http://www.ab-conservation.com/downloads/report_series/Suncor-Winagami-Lake-Conservation-Project.pdf>.

[276] Alberta conservation Association, "Winning for the Environment-Terrestrial Conservation Offset Partnership a First for Alberta", *Conservation Magazine* (Alberta conservation Association: Spring/Summer 2008) at 14-15, online: < http://www.ab-conservation.com/downloads/conservation_magazine/aca_conservationmagazine_v10.pdf>, [*WINENV*].

[277] See *ibid*.

[278] The land is actually acquired by the Alberta Conservation Association. See James Waterman, "All for the Boreal; Suncor and Alberta Conservation Association join forces to protect Alberta forests" *Pipeline News North*, (June 9, 2013), online: <http://www.pipelinenewsnorth.ca/news/industry-news/all-for-the-boreal-1.1122823>.

[279] Chad D. Croft, Todd Zimmerling & Karl Zimmer, *Conservation Offsets: A working Framework for Alberta* (Alberta Conservation Association: 2011), [Croft].

impacts. Subsequent to this initiative, ACA and other oil and gas companies operating in Alberta such as Shell Canada, and Total E&P Canada created other similar partnerships.[280]

These programs, which lasted five years, constituted an option for companies to partially offset their environmental footprint by allowing them to act as donors for the purchase and management of lands for conservation.[281] Under the Corporate Partners in Conservation Program in February of 2008, Shell Canada announced that the Athabasca Oil Sands Project (AOSP) was interested in investing $ 2 million CAD to purchase and conserve sections of Canada's boreal forest to offset the impact of land clearing for the AOSP expansion. This plan was materialized in 2012 with the purchase of 740 hectares of privately owned boreal forest habitat to create a conservation area jointly managed by Shell and ACA.[282] Total E&P Canada also partnered with ACA to purchase land in the Athabasca-Hubert Lake area in order to offset its SAGD operations southeast of Fort McMurray.[283]

These pilot initiatives have evolved over time. The Oil Sands Leadership Initiative is an alliance of oil sands producers, which aims to improve the environmental, economic and social performance of its companies (Shell Canada, ConocoPhillips Canada, Nexen, Statoil Canada, Suncor Energy, and Total E-P Canada). In 2012, the Oil Sands Leadership initiative undertook a five-year plan to voluntarily reclaim and enhance an area of 570 km^2 of boreal forest caribou habitat, which was previously disturbed by other operators.[284] The project includes restoration activities such as planting trees and mounding soil.[285] The project

[280] See Alberta Conservation Association, Gerard Fournier, Tree Canada; Andy Murphy, ACA, and Michele Curial- Hebert*, Corporate Partners in Conservation Program* (Alberta Conservation Association, Spring/Summer 2008) at 17, online: <http://www.ab-conservation.com/downloads/conservation_magazine/aca_conservationmagazine_v10.pdf>.
[281] *Ibid*.
[282]See Shell Canada, *True North Forest,* online: <http://www.shell.ca/en/environment-society/environment-tpkg/land-conservation/true-north.html>.
[283] *WINENV supra* note 276 at 16.
[284] The Environmental Priority Areas (EPAs) addressed by COSIA through its initiative are: tailings, water, land and greenhouse gases. See also Canada's Oil Sands Innovation Alliance, *Focus Areas*, online: <www.cosia.ca/focus-areas>.
[285] Canada's Oil Sands Innovation Alliance (COSIA) is an alliance of oil sands producers focused of improvement in environmental performance in Canada's oil sands through collaborative action and innovation. See Canada's Oil Sands Innovation Alliance (COSIA), About COSIA, online: http://www.cosia.ca/about-cosia. For more information about the caribou habitat restoration project see Canada's Oil Sands Innovation Alliance, *Caribou Habitat Restoration*, online: <http://www.cosia.ca/initiatives/land/caribou-habitat-restoration >.

explored how habitat reclamation and enhancement offsets could be used to offset oil sands impacts caused elsewhere in the region.[286]

Southeast Alberta Conservation Offset Pilot

The Southeast Alberta Conservation Offset Pilot (SEACOP) is another initiative implemented on Alberta's private lands. This initiative was requested by the Land Use Secretariat, Alberta Agriculture and Forestry "to test a voluntary, market-based approach to address temporary industrial impacts on southeastern Alberta's native prairie."[287] The initiative was materialized through term contracts with landowners to establish native perennial species on privately owned cultivated land.[288] The project aimed to offset industrial development impacts within lands designated as critical habitat for sage grouse recovery in southeast Alberta. Under the program landowners participated "in a reverse auction to provide the offset."[289] Once offsets were implemented, developers could purchase offsets from landowners.[290] Different from other voluntary initiatives, where private entities were the only participants, a private-public team was involved in the development and implementation of SEACOP, showing an increasing interest from the public sector in the use of offsets as part of its public policy tools. The SEACOP team included Alberta Agriculture and Forestry, Alberta Environment and Sustainable Resource Development (ESRD) Alberta Innovates Technology Futures (AITF) Alberta Conservation Association (ACA), and others.[291]

[286] See *Poulton primer*, *supra* note 265 at 16.
[287] Kimberly Good & Rachelle Haddock, *Southeast Alberta Conservation Offset Pilot-Linking Decisions and Assumptions with generally accepted Offset Principles* (Miistakis Institute, March 2014), online: <www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/sag14846/$FILE/seacop-gap-report-miistakis.pdf>, [SEACOP].
[288] *Ibid*.
[289] SEACOP, Ibid. at 11
[290] *Ibid* at 8.
[291] *Ibid* at 5. The Ministry of Environment and Parks (AEP) was created in May 2015 and initially assumed all the responsibilities of the former Ministry of Environment and Sustainable Resource Development (ESRD). However in 2016 the Ministry of Agriculture and Forestry was created and assumed all agriculture and forestry related responsibilities. See Alberta, Ministry of Environment and Parks (AEP) Corporate Documents, online: <http://aep.alberta.ca/about-us/corporate-documents/default.aspx>. See also Alberta Agriculture and Forestry, About the Ministry, online: <http://www.agric.gov.ab.ca/app21/ministrypage>.

Limitations of voluntary offsets

Voluntary offset initiatives confirm an increasing interest in the use of biodiversity offsets to address the oil sands environmental footprint and to deal with biodiversity loss issues. Due to their voluntary nature, voluntary biodiversity offsets have a number of limitations, including: i) lack of standardized rules, and ii) lack of service area.

Lack of standardized rules

Even though more sophisticated schemes, such as the Southeast Alberta Conservation Offset Pilot (SEACOP), are supported by *Alberta Land Stewardship Act (ALSA)*[292], and the *Species at Risk Act (SARA)*[293] materialized through contracts with offset implementers, most voluntary offsets are usually implemented without such legal frameworks, on a case-by-case basis. Voluntary offsets usually do not have a supporting legal framework to manage the parties to an offset and their respective powers; or to shape the terms and location of implementation and the terms and conditions of the potential creation, offer and sale of credits for services provided by the biodiversity offset. In a world where business leaders like predictability and stability, the lack of standardized rules may make it more difficult to attract more parties to participate in larger offsets schemes.

Lack of service area

Another limitation of voluntary offsets developed on a project-by-project basis is that they do not respond to any specific service area, meaning that their location does not always reflect the impacts for which they aim to compensate. In a biodiversity banking system, the implementation of offsets would be necessarily linked with a specific geographic area where the impacts occurred. As further explained in the next subsection, planning in advance where the development impacts will occur and where biodiversity offsets will be implemented to compensate for those impacts is an overall benefit of biodiversity offsets. This planning benefit could help governments better plan conservation and development and better address cumulative impacts in a specific region subject to development. A legal framework facilitating and supporting the use and implementation of biodiversity offsets

[292] See *ALSA, supra note* 118.

[293] While part 3, Division 1 states research and development, including pilot projects, of conservation stewardship will be supported, division 5 enables the use of conservation offsets as a conservation and stewardship tools. See *ALSA*, *supra* note 118. The *Wildlife Act* and *SARA* also support the program, because both of them require the protection of species at risk and their habitats. See *SEACOP*, *supra note* 287 at 5.

could standardize their use. Such a framework could, for example, allow developers to anticipate costs. It could also provide enough guidance to offset providers to implement their offsets in such a way that they achieve a specific environmental goal and that they compensate in advance for specific impacts.[294] More discussion about the legal framework needed to implement and operate a biodiversity banking system will be provided in the case study (the Legal framework chapter).[295]

Despite these limitations, the increasing use of offsets in Alberta demonstrates a growing interest in offset approaches in the province. However, scholars and practitioners indicate that biodiversity offsets supported by legal frameworks that facilitate offsets "as a matter of routine may be needed," and might be the direction the offset development movement is heading.[296] The following subsections describe the characteristics and potential for regulatory biodiversity offsets, specifically biodiversity banks as one potential tool to be used in Alberta.

2.1.2.2 Regulatory biodiversity offsets in Canada

Some Canadian regulators have been increasingly requiring biodiversity offsets as a condition of the issuance of permits for certain development approvals (as part of the environmental permit process).[297] For example, the National Energy Board has conditioned the issuance of permits for pipeline projects in caribou habitat to the design and provision of habitat compensation.[298] In 2013, the Federal Joint Review Panel applied 209 conditions for

[294] See *Poulton primer*, supra note 265 at 19.
[295] See the Legal Framework chapter.
[296] See *Ibid* at 19. See also David W. Poulton analyzing the role of *ALSA* and its regulations in biodiversity offsets implementation: Dave Poulton, "Biodiversity and Conservation Offsets: A Guide for Albertans" *Canadian Institute of Resources Law*, Occasional Paper #4 (8 May 2015) at 15-16, online: <prism.ucalgary.ca/retrieve/44155/BiodiversityOP48x.pdf>, [*PLTGUIDE*].
[297] For more examples of biodiversity offsets imposed by Canadian regulators see *ibid* at 18-19.
[298] *NOVA Gas Transmission Ltd - Application dated 19 February 2010 for the Horn River Project (Reasons for Decision)* (January 2011), GH-2-2010, online: National Energy Board <www.neb-one.gc.ca/ll-eng/Livelink.exe/fetch/2000/90464/90550/554112/590465/601085/665334/665172/A1X3T2_-_Reasons_for_Decision_GH-2-2010.pdf?nodeid=665173&vernum=0>;
NOVA Gas Transmission Ltd - Application dated 29 April 2011 for the Northwest Mainline Expansion (Reasons for Decision) (February 2012), GH-2-2011, online: National Energy Board <https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90550/554112/666941/685859/793577/793570/A2Q5J5_-_Reasons_for_Decision_-_GH-2-2011.pdf?nodeid=793571&vernum=0>;
NOVA Gas Transmission Ltd - Section 52 Application dated 15 July 2011 for the Lesimer to Kettle River Crossover Application (Reasons for Decision) (July 2012), GH-004-2011, online: National Energy Board <https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90550/554112/666941/704296/833910/833909/A2V3A0_-

the approval of the Northern Gateway pipeline project, which is a proposal by Canadian oil and gas company Enbridge which attempts to transport 525,000 barrels of Alberta's oil per day to British Columbia, and from there to international markets in Asia and the northwestern United States. The conditions included five different types of biodiversity offsets: caribou habitat; rare plants and ecological communities; wetlands, fish and habitat; and marine.[299] These are only some examples of regulators mandating the use of biodiversity offsets on a project-by-project basis. These decisions demonstrate an increasing interest in using biodiversity offsets as part of the decision making process to address the biodiversity loss issue caused by development in Canada.

The main limitation of the project-by-project approach currently in use is that the "offset work is initiated and led by the developer (entity whose economic activities have caused/will caused the damage)..., usually under the supervision of regulators."[300] These offsets might be costly, because it is usually more expensive to restore smaller parcels of land than larger tracts of land, and because there is no real market where biodiversity credits can be traded.

Biodiversity banks are "often larger than project-by-project biodiversity offsets because they often provide offsets for multiple development projects."[301] They might be therefore, cheaper to implement. Furthermore, project-by-project biodiversity offsets are usually local, and consequently, unable to produce environmental benefits beyond the local scale; they are not incorporated into the development and conservation plans of a whole province, or the regions in which the province is divided for development purposes.[302] The problem of biodiversity offsets on a project-by-project basis is clearly identified by the government of New South Wales in Australia (NSW): "Without a market framework, offset sites must be negotiated and established separately for each development. There is no incentive for the

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_Reasons_for_Decision_-_GH-004-2011.pdf?nodeid=834064&vernum=0>.

[299] National Energy Board & Canadian Environmental Assessment Agency, *Report of the Joint Review Panel for the Enbridge Gateway Project*, Volume 2: Considerations (2013), online: <http://gatewaypanel.review-examen.gc.ca/clf-nsi/dcmnt/rcmndtnsrprt/rcmndtnsrprt-eng.html>. See also See *Poulton primer*, *supra* note 265 at 19.

[300] See *Poulton primer*, ibid at 27.

[301] OECD2016 at 53.

[302] See *Poulton primer, supra* note 265 at *19*.

offset area to be better than the minimum required, and there are few options for ensuring the long-term management of such areas."[303]

For this reason, laws and regulations facilitating the use of biodiversity offsets, specifically under biodiversity banks, have usually led to markets where biodiversity credits are created in advance of impacts and then made available to developers.

Furthermore, because these systems are created by a legal framework stating clear rules to implement and operate them, they can be incorporated into the provincial planning process, and they are not limited to the merely local scale of project-by-project offsets.[304]

Over the years, the use of regulation leading to the implementation of biodiversity offsets has increased. As will be further explained, specific laws and regulations, such as the U.S. *Clean Water Act* [305]and the U.S. *Endangered Species Act*[306] opened the door to regulatory biodiversity offset programs, specifically to biodiversity banking systems in North America.

As noted earlier, no biodiversity banking system exists in Canada yet. However, provinces such as British Columbia and Alberta have taken a step forward towards creating biodiversity offset systems. B.C., for example, has developed an *Environmental Mitigation Policy* (EMP), which supports the use of biodiversity offsets among other mitigation tools to comply with mitigation needs when required under existing legislation.[307] However, the *EMP* does not support the use of biodiversity banks.[308] Furthermore, as noted earlier, Alberta is currently developing a Biodiversity Offset Policy Framework in support of the use of biodiversity offsets, including biodiversity banking in the province.

The use of regulatory biodiversity offsets is not exclusive to North America, where according to the *Business and Biodiversity Offsets Programme* (BBOP), "they are well developed."[309]

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[303] Australia, Department of Environment & Climate Change NSW, *BioBanking: Biodiversity Banking and Offsets Scheme-Scheme Overview*, (Sydney: DECCNSW, 2007) at 3, online: <*www.environment.nsw.gov.au/resources/biobanking/biobankingoverview07528.pdf>, [BBOSSO].*

[304] *See Alberta's planning process explained in section 1.1.5 of the background section.*

[305] *Clean Water Act*, 33 USC §1251 et seq (1972).

[306] *Endangered Species Act,* 16 USC §1531 et seq (1973).

[307] Government of British Columbia, *Policy for Mitigating Impacts on Environmental Values* (*Environmental Mitigation Policy) – Working Document – 13May 2014.*, online: <http://www.env.gov.bc.ca/emop/docs/EM_Policy_May13_2014.pdf >, [*EMP*].

[308] *Ibid.*

[309] *Madsen*, *supra* note 264 at vii.

Australia, Brazil, France and Germany constitute just some examples of countries implementing these types of mandatory policies.[310] The level of development of these initiatives varies between continents and within continents.[311] Despite the existence of many biodiversity-offset systems in place in different countries of the world, this dissertation focuses only on two American and one Australian biodiversity bank; the American Wetland Mitigation Banking and the Conservation Banking, and the Biodiversity Banking and Offsets Scheme (BioBanking) system in the Australian state of New South Wales (NSW). These systems are analyzed in this research because they are among the most developed regulatory offset systems, concretely biodiversity banking systems in the world. Moreover, in each case they are applied at the level or jurisdiction equivalent to a Canadian provincial government.[312] Therefore, they provide important lessons learned that could be used to create biodiversity offset systems in Canadian provinces.

2.1.3 Examples of International and National Biodiversity Banking systems

This sub-section first provides an overview of the three banking systems: i) U.S. Wetland Mitigation Banking, ii) U.S. Conservation Banking, and iii) the NSW BioBanking system. From the comparison between these three systems, it then identifies the main characteristics of a regulatory biodiversity offset system leading to biodiversity banking. It will also include an overview of Canada's Fish Habitat Compensation Program (FHCP), and of British Columbia Offset System as examples of regulatory offset systems, not part of any biodiversity banking system.

As the following subsections explain, the experiences with these biodiversity banking systems provide many lessons learned, that although focused on private lands so far, could be extrapolated and adapted to a potential provincial biodiversity banking system applicable to public lands.

[310] See generally *Madsen*, *ibid.* See also *JoshBish* note 236 at 75.
[311] See *Madsen*, *ibid* at vii.
[312] Even if the U.S., Wetland Mitigation Banking Program and the Habitat Conservation Banking Program are Federal programs, they are applied at the state level.

2.1.3.1 U.S. Wetland Mitigation Banking

Definition

A wetland mitigation bank is a wetland, stream, or other aquatic resource area (s) that has been i) restored[313], ii) established[314], iii) enhanced[315], or (in certain circumstances) iv) preserved[316] for the purpose of providing compensation for unavoidable impacts to aquatic resources."[317]

Goal(s)

The main purpose behind *Wetland Mitigation Banking* is to provide compensation for adverse impacts to wetlands and other aquatic resources in advance of impacts to similar resources.[318] In theory, this compensation should be done by replacing "the exact functions and values of the specific wetland habitats that will be adversely affected by a proposed project."[319] As of 2015, the use of wetland and stream mitigation banks in the U.S. had led to the recovery or protection of more than 652,846 acres.[320] Nonetheless, the degree to which these values are "exactly replaced" is more complicated to determine in practice,

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[313] See definition US, Environmental Protection Agency, *Wetlands Restoration Definitions and Distinctions,* online: < https://www.epa.gov/wetlands/wetlands-restoration-definitions-and-distinctions>.

[314] *Ibid*. Some definitions use "create" instead of "establish."

[315] *Ibid*.

[316] Wisconsin, Department of Natural Resources *Guidelines for Wetland Compensatory Mitigation in Wisconsin*; *Version 1*, (2013) at 43 online <http://dnr.wi.gov/topic/Wetlands/documents/mitigation/WetlandCompensatoryMitigationGuidelines.pdf>.

[317] *MITBANKFACT*, *supra* note 42. See also generally Wisconsin, Department of Natural Resources, *Starting a Wetland Mitigation Bank: What You Need to Know* (undated), online: <http://dnr.wi.gov/topic/Wetlands/documents/mitigation/StartingAWetlandMitigationBank.pdf>. Alberta's new Wetland Policy was released on September 13, 2013. It takes a similar approach towards wetland compensation. In other words, it states that wetland compensation can be achieved either through i) wetland restoration, ii) construction of wetlands, and through iii) Enhancement of existing wetlands. See *WETPOL, supra* note 152, s 2c at 17.
The new policy is complemented by tools for implementation of the policy on the White Area. The tools for the implementation of the policy on the Green Area were intended to be released by August of 2015. As of July, 2016, Alberta Wetland Policy is in effect province-wide, including in Alberta's Green Area. See also Alberta Environment and Parks, Alberta Wetland Policy Implementation (2014), online: <http://aep.alberta.ca/water/programs-and-services/wetlands/documents/WetlandPolicyImplementation-Sep2014.pdf>.

[318] *MitBankGuide*, *supra* note 240 at s I B). See also EPA, Wetland Compensatory Mitigation- Compensatory Mitigation Factsheet, online: <https://www.epa.gov/sites/production/files/2015-08/documents/compensatory_mitigation_factsheet.pdf>.

[319] *Ibid* at 3.

[320] See Regulatory In-Lieu Fee and Bank Information Tracking System, *RIBITS database*. Calculations made by the author of this dissertation based on RIBITS database.
Regulatory In-Lieu Fee and Bank Information Tracking System, *Approved Conservation banks*.

considering the heterogeneous character of biodiversity, and the fact that there is a lot about ecosystems and their services that is not yet known by science.

Implementers

Mitigation banks can be implemented by any government agency, corporation, non-profit organization, or other entity, that enters into a formal mitigation agreement with a regulatory agency to undertake activities to implement a conservation bank.

Legal roots

The *Wetland Mitigation* Banking system in the U.S. has its roots in the *Clean Water Act* (CWA), section 404.[321] The *CWA* has a direct anti-pollution goal, specifically "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[322]

In order to achieve this goal, the *Act* creates pollution control permit programs to regulate and control the discharge of pollutants and dredged materials into U.S. waters.[323] For example, section 404 of the *Act* requires construction and development projects, which will discharge dredged or fill materials into waters of the U.S., to apply for a permit issued by the Army Corps of Engineers or authorized State for the discharge of dredged or fill material into the waters or wetlands of the U.S.[324]

For every authorized discharge, impacts must be avoided and minimized first. If there are unavoidable residual impacts, they need to be mitigated in accordance with guidelines to regulate discharges, and potential mitigation options.[325] As noted earlier, the *CWA* does not create any biodiversity banking system. Section 404 (b)(1) mandates the development of guidelines to set the criteria to carry out the authorized disposals on specific disposal sites. The guidelines developed by the U.S. Environmental Protection Agency (EPA) and the Army Corps of Engineers in 1980 introduced the compensatory mitigation requirement for the unavoidable impacts caused by activities requiring a section 404 permit.[326] The Guidelines

[321] *Clean Water Act*, 33 USC 1251. The Clean Water Act is also known as the Federal Water Pollution Control Act or FWPCA Pub. L. 92–500, as amended by Pub. L. 95–217, 33 USC 1251 et seq.
[322] *Clean Water Act,* 33 USC §1251 (a).
[323] *Clean Water Act,* 33 USC §1342 (a).
[324] *Clean Water Act*, 33 USC §1344, See also US, *Environmental Protection Agency, Clean Water Act* (CWA) *and Federal Facilities*, online: <www2.epa.gov/enforcement/clean-water-act-cwa-and-federal-facilities>
[325] *Clean Water Act*, 33 USC §1344 (b) (1).
[326] 40 CFR §230.91 (c)(2).

established standards for the use of compensatory mitigation and developed three mechanisms or options to achieve compensatory mitigation.[327]

Mitigation banking is one of those mechanisms[328] and it has existed for over 35 years. Indeed its implementation and operation is governed by regulations that are over two decades old: the *U.S. Federal Guidance on Wetland Mitigation Banking* from 1995[329] and revised regulations.[330]

Applicability of wetland banking on public lands

In the context of this thesis it is appropriate to ask whether offsets under mitigation banks can be implemented on public lands? The answer is clearly affirmative, given that

Section 2 of the U.S. Federal Guidance on Wetland Mitigation Banking, states that "banks may be sited on public or private lands."[331] Depending on the circumstance offsets under these banks need to be established on Federal, state or tribal lands such as public parks or state forests.[332]

2.1.3.2 Conservation banks

Definition, and legal roots

As explained by the US Fish and Wildlife Service, a conservation bank is:

> a parcel of land containing natural resource values that are conserved and managed in perpetuity, through a conservation easement held by an entity responsible for enforcing the terms of the easement, for specified listed species

[327] See 40 CFR §230.
[328] The other compensatory mitigation mechanisms are: on site and off site permitee-responsible mitigation, and in-lieu fee mitigation to offset unavoidable impacts. See 40 CFR 230.91 (a) (1). See also *ConsBankGuide*, *supra* note 240 .
[329] See *MitBankGuide*, *supra* note 240.
[330] See US Environmental Protection Agency, *Compensatory Mitigation for Losses of Aquatic Resources*; Final Rule (2008) 73 Fed Reg 19594, online at <https://www.gpo.gov/fdsys/pkg/FR-2008-04-10/pdf/E8-6918.pdf>. For a brief description of the guidelines see US, Environmental Protection Agency, *Compensatory Mitigation,* online: <https://www.epa.gov/cwa-404/compensatory-mitigation>.
[331] *MitBankGuide, supra note* 240*,* at s II B) 2.
[332] *Ibid.* More about where to implement biodiversity offsets under biodiversity banks (also called biodiversity bank sites) is further explained in section 1.2.5.1. of the Legal Framework chapter.

> and used to offset impacts occurring elsewhere to the same resource values on non-bank-lands.[333]

Conservation banks have also been defined as "an area of habitat that has been conserved and managed for the conservation of identified natural resource values, the benefits of which are used to offset negative impacts to the resource occurring on other areas from land use activities."[334]

The U.S. Conservation banking system emerged from the *Endangered Species Act (ESA), concretely from its prohibitions of actions* likely to jeopardize endangered or threatened species, or adversely modify their critical habitat, and the taking of endangered or threatened species, either on public or on private lands.[335]

> Although the federal *Endangered Species Act* does not mention conservation banking, the general provisions of section 10 implicitly authorize the U.S. Fish and Wildlife Service to approve conservation banks as part of the agency's general authority over habitat conservation plans. Individual field offices of the agency have approved conservation banks since the mid-1990s without any official agency guidance. No one has mounted a legal challenge to these banks, and it is considered unlikely that any challenge mounted would succeed.[336]

Despite the lack of legal challenges to the banks, the US, Department of the Interior, Fish and Wildlife Service, developed the *Guidance for the Establishment, Use and Operation of Conservation Banks* to guide the implementation and operation of conservation banks.[337] Such guidance provided details on how to implement and operate conservation banks. However, in December of 2016, the U.S. Fish and Wildlife Service published the *Final Endangered Species Act Compensatory Mitigation Policy (FESAPOL)*, which is "the first comprehensive treatment of compensatory mitigation under ESA."[338] The *FESAPOL* provides

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[333]ConsBankGuide, supra note 240 s 1 at 2. See also US, Department of the Interior, Fish and Wildlife Service, *Guidance for the Establishment, Use, and Operation of Conservation Banks*, Notice of Availability, (2003) 68 Fed Reg 24753 online: <https://www.gpo.gov/fdsys/pkg/FR-2003-05-08/pdf/03-11458.pdf>[*CB2003].*

[334] J.B. Ruhl et al, "A Practical Guide to Habitat Conservation Banking Law and Policy" (2005) 20:1 *Nat Resources & Env't* 26 at 26, online: <papers.ssrn.com/sol3/papers.cfm?abstract_id=1357707>, [*JBRUHL*].

[335] See *Endangered Species Act* 16 USC §1531 et seq (1973) sections 7 (a) (2), 9 (a) (1)(b), 9 (a)(2)(b), 10 (a).

[336] See Michael J. Scott, *The Endangered Species Act at Thirty : Conserving Biodiversity in Human-Dominated Landscapes*, vol 2 (Washington: Island Press, 2006) at 233. See also *Endangered Species Act, ibid.*

[337] *CB2003*, *supra* note 333.

[338]US, Department of the Interior, Fish and Wildlife Service, *Endangered and Threatened Wildlife and Plants; Endangered Species Act Compensatory Mitigation Policy*, Notice of Availability (2016*),* 81 Fed Reg 95316, [*FESAPOL*]. See also *Interim Guidance on Implementing the Final Endangered Species Act Compensatory Mitigation Policy* Memorandum (17 JAN2017), online: <https://www.fws.gov/sacramento/es/Conservation-Banking/Home/Documents/Interim_Guidance_Implementing_Endangered_Species_Act_Jan_2017.pdf>[*INTES APOL*].

consistency in the use of compensatory mitigation, including biodiversity banks under the ESA.[339]

The new compensatory mitigation policy shifts from a project-by-project basis to a landscape approach, which goes beyond conserving individual species in isolation. It does so by addressing not only the species in question, but also their relationships to the ecosystems they depend on. Conservation planning and mitigation, including biodiversity banks under the *ESA* are part of the new conservation approach adopted by the US.[340] This policy and replaces the 2003 guidance.[341]

Activities that can be used to establish a conservation bank

Conservation banking can be implemented through five different methods:"(1) acquisition of existing habitat; (2) protection of existing habitat through conservation easements; (3) restoration or enhancement of disturbed habitat; (4) creation of new habitat (in some situations); and (5) prescriptive management of habitats for specified biological characteristics."[342]

The main difference between conservation banking and wetland banking is that conservation banking pursues species conservation.[343] For example, conserving boreal forest would be a secondary or complementary goal, needed to achieve the main goal of conserving a particular species, such as Woodland Caribou, which depends on this type of habitat. This is the reason why in order to comply with its species conservation goal, conservation banking favours conservation actions over habitat restoration actions.[344]

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[339] *FESAPOL, ibid.*

[340] Other compensatory mitigation tools under the policy are: i) Permittee- responsible Mitigation, which do not produce credits that can be used in other projects such as those produced by a bank, ii) in- lieu fee programs where permittees pay funds to a governmental or non-profit organization to meet its compensatory mitigation requirements, and iii) Habitat Credit Exchanges, which are a new concept. HCE create a market operating as a clearinghouse, where an exchange administrator manages credit transactions. Credits for federally listed species under the HCE will be approved by the Service and the exchange administrator. See *INTESAPOL*, supra note 338 at 3.

[341] See *ibid* at 2.

[342] See *ConsBankGuide*, *supra* note 240 s 1 at 2.

[343] *Ibid*, s 2 at 2.

[344] *Ibid.*

On the other hand, mitigation banking aims to conserve a particular type of habitat such as wetland, independently of the species living on this type of habitat. This explains why Wetland Mitigation Banking pursues restoration of wetlands as a preferred option for wetland protection.

Considering the environmental goal of conservation banking, conservation is the best option for conservation banking as compared to restoring or establishing new habitats to preserve habitats and species intact in certain areas to compensate for residual damages in other areas. However, habitat restoration is still a valid option that could be and has been implemented within conservation banks, and that could also be used in the context of public and private lands in Alberta.

Implementers

Conservation banks can be implemented by any government agency, corporation, non-profit organization, or other entity, that enters into a formal conservation agreement with a regulatory agency to undertake activities to implement a conservation bank.[345]

Applicability of conservation banking on public lands

Considering that the ESA prohibits activities that jeopardize species both on private and public lands, it is understood that offsets could be implemented both on private and/or on public lands. The Conservation Banking Guide confirms that biodiversity offsets under biodiversity banks can be implemented on tribal, local, private or state lands.[346]

[345] See US Department of the Interior (DOI) office of policy analysis, *Conservation Banking overview and suggested area for future analysis* – (September 2013) at 7, online: < https://www.fws.gov/endangered/landowners/pdf/Conservation%20Banking%20Overview%20DOI-Sept2013.pdf>.

[346] *ConsBankGuide, supra* note 240, s II B) 4. More about where to implement biodiversity offsets under biodiversity banks (also called biodiversity bank sites) is further explained in section 1.2.5.1.

2.1.3.3 New South Wales BioBanking system

Another well-known biodiversity banking system is in place in the Australian state of New South Wales (NSW).

Definition

NSW defines BioBanking as "a market-based scheme that provides a streamlined biodiversity assessment process for development, a rigorous and credible offsetting scheme as well as an opportunity for rural landowners to generate income by managing land for conservation."[347]

Activities that can be used to implement a BioBank

An NSW BioBank can be established through different management actions to improve a site's biodiversity values. These activities include: "grazing for conservation, control of weeds, management of human disturbance and retention of dead timber."[348]

Implementers

Under the NSW system, landowners implement and operate biodiversity offsets on their lands by enhancing and protecting biodiversity values. Biodiversity credits are generated through the landowners' restoration and conservation activities.[349] This system enables 'biodiversity credits' to be generated by landowners who commit through a biobanking agreement to enhancing and protecting biodiversity values on their land. These credits can then be sold, generating funds for the management of the site.

Goal(s)

This system aims to create a biodiversity market that provides economic incentives and new opportunities to protect biodiversity values and it achieves this by encouraging landowners protect or conserve biodiversity, including both native and threatened species, in one area to compensate for development in another. Landowners or managers implement biodiversity conservation activities on their land and the land that is set-aside for this

[347] Australia, NSW, Office of Environment & Heritage, *BioBanking: a market-based scheme,* online: <www.environment.nsw.gov.au/biobanking/>, [*NSWBIOB*].
[348] Australia, NSW, Office of Environment & Heritage, *Biodiversity Banking: Biodiversity Banking and* Offset Scheme - *Guide to establishing a biobank site* (Sydney: DECCNSW, 2007) at 4, online: <www.environment.nsw.gov.au/resources/biobanking/09336establishingbiobangsite.pdf>, [*NSWGEBS*].
[349] See *NSWBIOB*, supra note 347.

purpose is known as an offset or a BioBank. The conservation activities carried out through the offset to protect biodiversity values produce biodiversity credits before the development project is even implemented. These credits can be used to mitigate or compensate for biodiversity impacts caused in specific development areas with similar biodiversity values to the ones conserved by the offset. In order to obtain the permit to carry out their projects, developers can purchase a certain number of credits to mitigate for their residual impacts. [350]

Legal roots

The NSW BioBanking system emerged from a biodiversity conservation regulation, specifically part 7 A of the *Threatened Species Conservation Act of 1995,* which established a BioBanking framework.[351] The *NSW Environmental Planning and Assessment Act 1979* also had a role in the use of biodiversity banks in NSW. As further explained in the case study (Legal Framework chapter), developers whose activities might cause negative impacts to biodiversity are required by the *Environmental Planning and Assessment Act* to undertake an assessment of the significance of an environmental impact on threatened species. The Act allows them to acquire biodiversity credits from BioBanks to compensate for residual impacts caused by the development instead of undertaking conservation or restoration activities themselves.[352] The Act expressly states that:

> The consent authority is not required to take into consideration the likely impact of the development on biodiversity values if: a biobanking statement has been issued in respect of the development under Part 7A of the Threatened Species Conservation Act 1995.*[353]*

[350] See *NSWGEBS*, *supra* note 348, at 20.
[351] Part 7A of the *Threatened Species Conservation Act of 1995 No 101* (NSW), online: <http://www.legislation.nsw.gov.au/inforce/b7b85c46-520e-40b3-9439-b9d3108df6f5/1995-101.pdf>, [*Threatened Species Conservation Act*].
[352] Part 4 of the *Environmental Planning and Assessment Act 1979 No 203* (NSW) online: <http://www.legislation.nsw.gov.au/inforce/8e4e6d49-4f1c-e1e3-981d-d42d72d8bb80/1979-203.pdf>, [*EP&ANSW*] establishes a framework for the assessment and approval/consent of developments. Under part 4 of the act, developments such as the use of land, subdivision of land, carrying out of work are required to undergo an assessment and to obtain consent in order to be implemented. Section 79 C (b) of the Act requires development proposals to evaluate "the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality." Part 5 of the *Act*), requires certain activities such as the subdivision of land, to undertake an environmental assessment.
[353] See *EP&ANSW*, *ibid*, s. 79 c (1) Evaluation.

The BioBanking system is regulated by the *Threatened Species Conservation (Biodiversity Banking)* 2008 regulation.[354] It regulates everything concerning the implementation and operation of BioBanks in NSW, as well as regarding the creation and transfer of biodiversity credits. The regulation facilitates, therefore, the trade and transfer of biodiversity credits issued to a biodiversity banker.[355] NSW is undergoing a legislative review of its biodiversity conservation and native vegetation management legislation. As a result of the review, the government proposed and approved a new Biodiversity Conservation Bill 2016 (*BIOBILL2016*),[356] which focuses on conserving biodiversity at a bioregional or state scale.[357]

The Bill aimed to simplify the current NSW biodiversity framework into a single *Biodiversity Conservation Act*. This means that Acts such as the *Threatened Species Act*, the *Native Vegetation Act*, and the *Threatened Species Conservation* (Biodiversity Banking) Regulation 2008 were repealed and replaced by a single Act.[358] The proposed bill created a single and more uniform biodiversity offset scheme applicable to all development proposals, including state significant development and state significant infrastructure projects, which also need to comply with the *NSW Biodiversity Offsets Policy for Major Projects.*[359] More about the scope and legal details of the BioBank system and its proposed legal changes will be further discussed in the case study (Legal Framework chapter).

Applicability of BioBanking on public lands

According to the *Threatened Species Conservation Act*, there are some restrictions regarding where to implement biodiversity banks. For example, biodiversity banks in the NSW system

[354] *Threatened Species Conservation (Biodiversity Banking) Regulation 2008 No 291* (NSW), online: <http://www.austlii.edu.au/au/legis/nsw/consol_reg/tscbr2008610/>, [*BioBanking regulation 2008*].
[355] *Ibid.*
[356] *Biodiversity Conservation Bill 2016*, public consultation draft (NSW), online: <https://biodiversity-ss.s3.amazonaws.com/Uploads/1462186512/Biodiversity-Conservation-Bill-2016.pdf> [*BIOBILL2016*].
[357] The *Biodiversity Conservation Act 2016* was passed in November of 2016. See *Biodiversity Conservation Act 2016* No 63 (NSW), [*BioConsAct2016*]. For more information on the Act and NSW's legislative review, see Office of Environment & Heritage (OEH), *Biodiversity legislation review*, online:<http://www.environment.nsw.gov.au/biodiversitylegislation/review.htm>.
[358] Independent Biodiversity Legislation Review Panel, *A review of biodiversity legislation in NSW- Final Report,* (State of NSW and OEH, 2014) at iv, v, online: <http://www.environment.nsw.gov.au/resources/biodiversity/BiodivLawReview.pdf>,[*REBILE*].
[359] See i*bid* at 7. See also the *NSW Biodiversity Offsets Policy for Major Projects since 1 October 2014*, online: <http://www.environment.nsw.gov.au/resources/biodiversity/140672biopolicy.pdf>,[*BIOFFMA*].

cannot be established on Crown lands or in Crown-timber lands, unless the consent of the Minister of the area is acquired.[360]

2.1.3.4 Regulatory offset systems not part of biodiversity banking systems

There are some instances where regulatory offset systems are not part of any biodiversity banking system. Two examples of this are the federal Fish Habitat Compensation Program (FHCP) and the B.C. offset system in Canada. Where the US and the NSW biodiversity banking systems are discussed in the case study, the FHCP and the B.C. offset system is only explored in this section of the dissertation.

2.1.3.4.1 Canada Fish Habitat Compensation Program

The FHCP is driven by the *Fisheries Act.*[361] This Act prohibits serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.[362] It defines "serious harm" as the "death of fish, or permanent alteration to or destruction of fish habitat."[363] A fish habitat is only protected "if the work or undertaking causes a "permanent alteration" or "destruction" of habitat of fish in one of the three protected fisheries (or a fish that supports one of those fisheries)."[364]

The *Act* allows the Minister of Fisheries and Oceans to enter into agreements with third parties, such as aboriginal organizations, recreational fishing and angling groups, conservation groups, provinces, and industry to undertake measures and make investments to enhance fisheries protection.[365] The *Act* directs that money collected from fines be used to fund restoration projects addressing damages caused by certain incidents.[366]

Pursuant to the *Act*, proponents of activities that may cause harm to fish must seek an authorization under paragraph 35 (2)(b) of the *Act* to carry on their proposed activities.

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[360] *Threatened Species Conservation Act*, *supra* note 351, s 127 F (regarding biobanking agreements). More about where to implement biodiversity offsets under biodiversity banks (also called biodiversity bank sites) is further explained in section 1.2.5.1.
[361] *Fisheries Act*, RSC 1985, c F-14, online: <http://laws.justice.gc.ca/PDF/F-14.pdf>, [*FAC85*].
[362] *Ibid*, s (35) (1).
[363] *Ibid.*
[364] Jana McLean, "Major Amendments to *Fisheries Act* in effect soon", *Mondaq* (11 November 2013), online: <www.mondaq.com/canada/x/274116/Environmental+Law/Major+Amendments+To+Fisheries+Act+In+Effect+Soon>.
[365] *FAC85*, *supra* note 361, s. 4.4.
[366] *FAC85*, *ibid*, s. 40 (6).

Offsetting is one of the measures that the proponent can use to address residual impacts after the application of avoidance and mitigation measures.[367] Thus the *Act* facilitates the creation and use of habitat banking, implemented in advance of the impacts, to compensate for residual impacts from a large project, or from a number of small projects.[368] Biodiversity offsets under biodiversity banks can be created by the proponent or by specialized parties, such as universities, ENGOs, and others, on behalf of the proponent. However, the project's proponent is responsible for implementing and maintaining the bank.[369] As explained in guidance issued by the Department of Fisheries and Oceans:

> A proponent-led habitat bank is a section of lake, river, or ocean designated and managed to enhance or improve fisheries productivity. These benefits may be achieved through the creation or enhancement of aquatic areas to provide for sustainability and ongoing productivity of commercial, recreational, and Aboriginal fisheries. The benefits accumulated in the habitat bank are counted as credits, while *serious harm to fish* caused by a project or projects are considered debits. A proponent that has established the bank may "*withdraw*" credits from the habitat bank to offset the *serious harm to fish* resulting from their project. When the balance of habitat credit in the habitat bank reaches zero, the bank is closed and no more "*withdrawals*" can be made.[370]

The above quotation confirms that the habitat bank does not constitute a market; credits can be used only by the proponent and cannot be sold and transferred to third parties.

Although Canada has no experience dealing with regulatory offsets in a market context, the possibility of creating a banking system for a developer's own use might provide a path to evolve the system to a market system, where developers and environmental experts would have the incentive to restore previously impacted habitats through offsets to have the opportunity to sell unused biodiversity credits, and participate in a new market niche. Such a system would not only benefit habitats in need for restoration. This would be a small measured step towards the creation of a tradable market. Such a possibility is not yet

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[367] See Canada, Ministry of Fisheries and Oceans, *Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting,* (Ottawa: DFO November 2013)**,** at 7, online: <http://www.dfo-mpo.gc.ca/pnw-ppe/offsetting-guide-compensation/offsetting-guide-compensation-eng.pdf>, [*DFOPGO*].

[368] *Ibid* at 13. See also Canada, Ministry of Fisheries and Oceans, *Fisheries Protection Policy Statement,* (Ottawa: DFO November 2013) online: <http://www.dfo-mpo.gc.ca/pnw-ppe/pol/PolicyStatement-EnoncePolitique-eng.pdf>.

[369] *DFOPGO*, *supra* note 367, at 13.

[370] *DFOPGO*, *ibid* at 13.

identified in the *Act* or its regulations, but developments in other countries confirm that it is an initiative worthy of further consideration.

2.1.3.4.2 Biodiversity offsets in B.C.

As noted above, the use of regulatory biodiversity offsets in B.C. emerges from the *EMP* and *its* procedure*s*. The *EMP* aims to guide decision makers, provincial staff and developers in the assessment of impacts, and in selecting mitigation options legally required by different statutes.[371] The *EMP* is complementary to existing legislation and does not create any offsetting requirement.

> Neither the policy nor procedures establish new legal requirements, they establish a framework for mitigation planning to support existing processes, specifically where proponents are already required by a particular authorization process to mitigate impacts of their proposed development activities on environmental values or are voluntarily considering mitigating impacts.[372]

Unlike the other biodiversity banking and or offset systems, the EMP exclusively applies to public lands.[373] Under the *EMP* biodiversity offsets can be used as the last mitigation resort to compensate for residual impacts caused by large scale projects that are required to complete an environmental impact assessment and mitigation plan.[374]

Biodiversity offsets can be created through restoration, rehabilitation, remediation, land transactions (e.g. land purchase or lease) and conservation management actions (e.g., habitat management, restoration). These activities can be either directly carried out by the project developer or by the Province if the developer pays for the mitigation.[375]

B.C. government has suggested that although biodiversity banking is not an option under the policy, it is open for future consideration. "Proponents and/or third party organizations may propose or provide opportunities for mitigation banks."[376]

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[371] Government of British Columbia, *Environmental Mitigation Policy - Frequently Asked Questions*, online: http://www.env.gov.bc.ca/emop/faq/ [EMPFAQ].
[372] *Ibid.*
[373] *EMPFAQ*, *supra* note371.
[374] See *EMP*, *supra note* 307, s. 6.1(d). See also *Ibid*
[375] See *ibid*, s *307,* s. 7.3.
[376] *EMPFAQ*, *supra* note 371.

2.1.4 Similarities and differences among international biodiversity banking systems

This section offers a comparison of the three systems which feature officially recognized biodiversity banks, namely U.S. Wetland Mitigation Banking, U.S. Habitat Conservation Banking and NSW BioBanking.

The description of these three systems shows that they have specific similarities and differences. Among their similarities, experience demonstrates, for example, that most of these systems emerge from a prohibition (e.g. to pollute, or to harm habitat or species). It also demonstrated that the demand for biodiversity credits and, consequently, for biodiversity banks and biodiversity conservation markets is stimulated indirectly by laws and regulations. In other words, the legal frameworks, as a result of certain prohibitions against environmental harm, indirectly create a "need" for biodiversity banks, and with that biodiversity credit markets. TABLE No 1: *Comparing biodiversity banking systems* highlights some of the major comparisons and differences between the systems considered here.

Table 1: Comparing biodiversity banking systems and biodiversity offset systems

`	U.S. Wetland Mitigation Banking	U.S. Habitat Conservation Banking	NSW BioBanking	Canadian Fish Habitat Compensation Program	BC Environmental Mitigation
What is the goal of the system?	To compensate in advance for the adverse impacts development projects might cause to wetland ecosystems and other aquatic resources	To compensate in advance for the unavoidable harm to species caused by a development project	To create a biodiversity market that provides economic incentives and new opportunities to protect biodiversity values (native vegetation or threatened species, populations, ecological communities or their habitats)	To provide for the sustainability and productivity of commercial, recreational and Aboriginal fisheries	To compensate for residual impacts caused by large scale projects
Which activities can be used to establish biodiversity offsets under biodiversity banks?	(1) Restoration, (2) establishment, (3) enhancement and (4) preservation of a wetland, stream or other aquatic resources	(1) acquisition of existing habitat, (2) protection of existing habitat through conservation easements, (3) restoration or enhancement of disturbed habitat, (4) creation of new habitat (in some situations), and (5) prescriptive management of habitats for specified biological characteristics.	Management actions to improve the site's biodiversity values (e.g., grazing for conservation, control of weeds, management of human disturbance and retention of dead timber).	(1) Habitat creation, (2) Habitat enhancement (3) restoration	(1) restoration, (2) rehabilitation, (3) remediation, (4) land transactions (e.g. land purchase or lease) and conservation, (5) management actions (e.g., habitat management, restoration)
Who can implement the biodiversity banks?	Any government agency, corporation, non-for-profit organization, or other entity that enters into a formal mitigation agreement with a regulatory agency	Any government agency, corporation, non-for-profit organization, or other entity, who enters into a formal conservation agreement with a regulatory agency	Landowners, interested in conserving, restoring or enhancing biodiversity values, who enter into a BioBank agreement with the government	The project's proponent, universities, ENGOs, and others, on behalf of the proponent	The project's proponent, the Government, or a third party on behalf of the proponent.
What are the legal roots of the system?	*Clean Water Act*, section 404	U.S. *Endangered Species Act* sections 7 (a) (2), 9 (a) (1)(b), 9 (a)(2)(b), 10 (a)	*Part 7A of the Threatened Species Conservation Act 1995*	*Fisheries Act*, sections (35) (1), and (35) (2) (b)	Environmental Mitigation Policy and legal framework requiring Environmental impact assessments and mitigation
Does the legal root directly or indirectly create a biodiversity banking system?	Indirectly -It creates a permit system for the discharge of dredged or fill material into navigable waters or wetlands	Indirectly - It prohibits the taking or harm of species, unless authorized	Directly - It creates a biodiversity banking system	Neither directly nor indirectly - It does not create a biodiversity banking system, but an offset system that can be used to compensate for serious impacts to fish, if authorized by the government - It identifies proponent-led habitat banks as one of the mitigation options, but no banking system	Neither directly nor indirectly No banking system is created
Does the system enable the use of tradable credits?	Yes	**Yes**	Yes	No - Credits from the habitat banks can be used only by the project's proponent, who also is responsible for creating and maintaining the bank.	No
Can offsets under the system be implemented on public lands?	Yes	**Yes**	Only if authorized.	Yes	Yes.
Does the system create a biodiversity market?	Yes – indirectly	Yes – indirectly	Yes – directly	No	No

2.1.4.1. Similarities

This subsection identifies and discusses the following similarities among the three biodiversity banking systems:

i) Biodiversity banks emerge from a prohibition or a mandate created to pursue a specific environmental goal.

The two U.S. biodiversity banking systems showed that the use of biodiversity banks and the creation of biodiversity credit markets emerge from prohibition against certain activities with the objective of achieving a specific environmental goal. These goals can be as general as biodiversity or water protection, or as specific as wetland or endangered species conservation on private lands. Based on these environmental goals pursued by the laws, laws prohibit certain activities. For instance, the *U.S. Clean Water Act* prohibits polluting wetlands and the *Endangered Species Act* prohibits jeopardizing or the taking of endangered species. In principle, these laws are blanket prohibitions of all activities and developments that pollute navigable waters, including wetlands, or harm species at risk.

However, development always causes certain pollution. These Acts tolerate a certain level of impacts, meaning water pollution or jeopardizing certain species, either on private or public lands, if a permit is issued. For example, the *CWA*[377] and the *ESA*[378] require developers to obtain a permit if their projects will harm wetlands or species at risk, respectively. The conditions of the permits may require the developer to mitigate for the impacts caused where the project and impacts take place, as well as compensate for impacts elsewhere.

Neither of these laws requires the acquisition of biodiversity bank credits to mitigate residual impacts. However such credits are one of the options created by regulations. These credits represent the biodiversity benefits obtained through conservation or restoration activities offsite to compensate for biodiversity loss caused by development activities, such as bitumen extraction elsewhere.

[377] *Clean Water Act*, 33 USC §1344 requires a permit from the Corps or authorized State for the discharge of dredged or fill material into the waters of the USA.

[378] The Act prohibits both: federal actions likely to jeopardize endangered or threatened species, or adversely modify their critical habitat, and the taking of endangered or threatened species, either on public and/or on private lands: *Endangered Species Act* 16 USC §1531 et seq (1973) (7 (a) (2), 9 (a) (1)(b), 9 (a)(2)(b), 10 (a).

The NSW BioBanking system is distinct from the U.S. systems because the possibility of using biodiversity banks does not emerge from a prohibition to pollute, but rather from a legal mandate. As noted earlier, the *Threatened Species Act* and the *BioBanking regulation* explicitly provide developers in need of a permit with the option to acquire credits from a biodiversity bank instead of complying with the mandate of compensating themselves for the biodiversity loss caused by their projects.

Biodiversity banks are officially recognized.

Both the U.S. Wetland Mitigation Banks and the U.S. Habitat Conservation Banks are registered with the U.S. Army Corps of Engineers' *Regulatory In-Lieu Fee and Bank Information Tracking System*,[379] and therefore both their existence and their progress can be confirmed by the public. This gives them a much more formal status than a bilateral contract between a project developer and an environmental conservation group. The NSW BioBanking system goes even further, allowing for the trade and transfer of biodiversity credits,[380] and creating a biodiversity credit market.

2.1.4.2 Differences

The three systems described by this section also have differences. They differ, for example, in terms of the goals they pursue, and whether or not they were designed as market systems since their conception.

i) Goals

As already noted, banking systems can pursue different environmental goals and objectives, which can be either as broad as biodiversity conservation or as narrow and specific as the conservation of a specific species.

The U.S. experience with biodiversity banking shows that the environmental goals pursued by the systems in place target different objectives, which contribute directly or indirectly to biodiversity conservation. For example, the U.S. *Clean Water Act*, which is the legal driver behind the creation of wetland credits, and therefore of the *Wetland Mitigation Banking*

[379] See Regulatory In-Lieu Fee and Bank Information Tracking System, *List of Approved Mitigation Banks* and also *Approved Conservation banks,* online: <https://ribits.usace.army.mil/ribits_apex/f?p=107:2>.
[380] Division 4 of the *Threatened Species Conservation Act* regulates all concerning the trading in of biodiversity credits. See *TSCNSW*, *supra* note 351.

system, has a goal of pollution prevention rather than of species conservation. This pollution prevention goal indirectly leads to wetland conservation by aiming to "restore and maintain the chemical, physical and biological integrity of the Nation."[381]

In contrast, the *U.S. Conservation Banking* program focuses directly on species and habitat conservation pursuant to the *Endangered Species Act*. That *Act's* goal is to:

> provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.[382]

In sum, the Act confirms that any program, including offset or banking system emerging from the Act, should also pursue the environmental goal of conserving species and their habitat.

On the other hand, as opposed to the U.S. approach, which differentiates the goals pursued by the *Wetland Mitigation* systems, and *Habitat Conservation* systems, the NSW BioBank system makes no such distinction. Accordingly, the system is applicable to both species and ecosystems, and aims to protect species, and wetlands and other ecosystems. As further discussed in the analysis of the case study, if Alberta decided to implement biodiversity offsets that do not apply exclusively to the protection of an ecosystem type, such as wetlands, it could follow a broader approach, such as the one used in NSW. Having such a broader approach could provide more flexibility to the system to simultaneously protect different ecosystems and species such as wetlands and forests. A biodiversity banking system pursuing a goal such as biodiversity protection could offset impacts to species and to different ecosystem types, without the need to create a different banking system for each of them.

In terms of environmental objectives, many countries around the world have adopted either a "NNL" or a "NG" policy in regards to biodiversity offset systems.[383] The U.S. Wetland Mitigation Banking system and the Conservation banking system, for example,

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[381] *Clean Water Act*, 33 USC §1251 et seq (1972).
[382] *Endangered Species Act*, supra note 335, s 4 (b).
[383] For more examples, see *Madsen*, *supra* note 264 at 1.

pursue no net loss as an environmental objective, while in Australia, the NSW and the Victoria schemes pursue NG.[384] However, most of these jurisdictions do not clearly define NNL, or NG, and what exactly that would mean in practice, which can be an issue when assessing the effectiveness of these systems.

ii) **Direct and indirect creation of biodiversity credit markets**

Another difference between the U.S. biodiversity banking systems and the NSW BioBank system is the way in which biodiversity credit markets were created. Of the three examples identified above only the NSW BioBanking system was foreseen as a market since its design. The NSW BioBanking system is a market-based scheme that directly creates a biodiversity credit market. The mandate to compensate for residual impacts, the biodiversity banking system, and the possibility to trade and transfer biodiversity credits through biodiversity banking were directly incorporated into the *Threatened Species Conservation Amendment (Biodiversity Banking)*, and regulated through the Biodiversity Banking Regulation.[385]

The creation of biodiversity credit markets in the U.S. has been different than in Australia. Despite the environmental goals pursued by the *U.S. Clean Water Act* and the *Endangered Species Act*, the U.S. Laws did not directly mandate the creation of any biodiversity banking system or a biodiversity credit market, or impose a duty to acquire biodiversity credits to compensate for the impact of development. However, as noted earlier, these Laws provided some exceptions to their prohibitions to pollute and to jeopardize endangered species, respectively. These exceptions as well as the need to compensate for residual impacts caused by developers were drivers for the use of biodiversity banking, the trade and transfer of biodiversity credits, and to the indirect creation of biodiversity credit

[384] The BioBanking scheme in NSW pursues to " enhance and protect biodiversity values." See *Native Vegetation Act (2003) No 103* (NSW) [*NVA2003*]; See also *Threatened Species Conservation Amendment (Biodiversity Banking) Act 2006 No 125*(NSW), online: <http://www.austlii.edu.au/au/legis/nsw/num_act/tscaba2006n125626.pdf>.

[385] *Threatened Species Conservation Amendment (Biodiversity Banking) Act 2006* and *BioBanking regulation 2008, supra* note 354.

markets.[386] Biodiversity banking was, however, included in the *2008 Regulations governing Compensatory Mitigation for Losses of Aquatic* Resources.[387]

2.1.5 General characteristics of a biodiversity market emerging from a biodiversity banking system

Based on the description of the three international biodiversity banking systems and the analysis of their similarities and differences, this subsection concludes that biodiversity banking systems have the following common characteristics:

- Biodiversity banking systems emerge from regulation and are supported by a regulatory framework,
- both demand and supply are created through regulation,
- biodiversity banking systems are linked with development,
- biodiversity banks are linked with a specific service area,
- they are created in advance of impacts,
- biodiversity banks transfer liabilities,
- they lead to a type of hybrid market (partly regulated and partly free), viii) participation in these systems is voluntary.

i) Biodiversity banking systems are created by laws and regulations and are supported by a regulatory framework

As noted earlier, regulatory biodiversity offsets, specifically biodiversity banks emerge from legislation. Without government permission to create, offer, sell and trade biodiversity credits, biodiversity banks do not exist.

With the possible exception of pilot-project scenarios, regulatory offsets are structured

[386] All these aspects were regulated through specialized regulations, such as the U.S. *Guidance for the Establishment, Use and Operation of Conservation Banks,* and the *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks*. See US, Fish and Wildlife Service, *Guidance for the Establishment, Use and Operation of Conservation Banks*, (Washington, US: 2003). See also *FESAPOL*, *supra* note 338.
[387] See 2008 Mitigation Rules, *supra note* 330.

systems supported by clear rules under legal frameworks. Consequently, they can be applied on a broader scale. Having clear rules enables greater flexibility in project management and costs, because there is more certainty, which encourages specialized parties, such as biodiversity bank implementers and operators, to participate in the system. Their use can reduce for developers the cost and time associated with implementing biodiversity offsets in order to comply with the legal conditions to obtain permits for their projects.[388]

Within this context, once a prohibition limiting a specific environmental harm is created by the government and incorporated into laws and regulations, the government can create a set of regulations to provide the legal framework to support the system. This framework determines aspects such as which habitat restoration or compensation is subject to be traded; it authorizes takings, meaning impacts to species and habitats in certain circumstances, and it mandates compensation. It also stipulates the amount and type of credits to be issued for the services emerging from a specific bank, and the amount of credits needed by a development to compensate for its own impacts.[389] In addition, the government determines the location and extension of the service area, and authorizes development in certain areas. The impacts on biodiversity caused to this area will be compensated by acquiring credits from one or more biodiversity banks directly working in that service area.[390]

ii) Law creates both the demand and supply of this system

Within these types of systems, both demand and scarcity are created through law and regulation. Demand emerges most of the time because law prohibits "taking" certain species, or the affectation or impacts to a specific ecosystem, such as wetlands, unless otherwise authorized by a permit.[391] Therefore, it is the law which requires the developer

[388] See *BBOSSO*, *supra* note 303 at 8. See also *Poulton primer, supra* note 265 at 19.

[389] Section 3(18) of the *Endangered Species Act* defines 'take' or 'taking' as the actions "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Some takings can be authorized, while other are strictly prohibited. See *Endangered Species Act, supra* note 335.

[390] See *CFB*, *supra* note240, at 25 and 95. See also *ConsBankGuide*, *supra* note 240 at 8.

[391] See for example *Clean Water Act* and *Endangered Species Act* in the USA. Both acts prohibits certain actions negatively impacting either wetlands or species respectively.

of a project to compensate for damages to biodiversity. One of the compensation possibilities to comply with this legal mandate could be, for example, by purchasing a certain number of conservation credits from a bank operating in the area. Within this context, a bank or banks are created before the implementation of a project.

Because of the existence of supply, developers can choose from a set of biodiversity bankers. Thus, the transaction costs should be lower, resulting in attractive options for developers to compensate for their residual impacts.[392] Within biodiversity banking systems, services can be provided by a wide variety of parties, including private mitigation bankers, not-for-profit organizations, and government agencies running mitigation banks for commercial or their own use, and government and non-profit organizations collecting funds and providing active programs.

A housing development project, for example, is required to obtain a permit to implement the project. In order to obtain this permit, the developer will be required to mitigate the environmental impacts caused by the project. For example, if the project would be impacting 30 hectares of wetlands, the developer could either mitigate for significant residual impacts of the project on site by restoring 30 or more hectares of wetlands on the project's site, depending on the ratio adopted to compensate for the impacts[393] or it could purchase a specific number of biodiversity credits from an approved biodiversity bank serving the area to be impacted by the housing project. Based on a mitigation agreement between the banker and the governmental agency, the biodiversity bank should have undertaken the required restoration activities in advance of the occurrence of the impact and should be serving the "service area" where the developer plans to implement the housing development project.

iii) Biodiversity Banking systems are linked with development

Biodiversity banking systems arise primarily in areas subject to development as understood to be economic growth, population growth and infrastructure expansion.[394] The subject areas are environmentally sensitive in terms of biodiversity and are susceptible to be

[392] See *BBOSSO*, *supra* note 303 at 8.
[393] Ratios can be 1:1, 2:1, 3:1, etc., meaning to restore or conserve 1 hectare for each hectare impacted; 2 hectares for each hectare impacted, or 3 hectares for each hectare impacted.
[394] See *CFB*, *supra* note 240 at 113.

negatively impacted by development projects.[395] For example, all of America's biodiversity banks focus on dealing with the impact of development on the environment. The majority of these specific banks in the U.S. are located in California followed by Oregon, Texas and Florida.[396] According to the Species Banking Project, one of the aspects that these states have in common, beyond being coastal states, is that they are states with rapid development.[397] California, home to a very important agro-industry sector and other economic sectors, was the earliest adopter of biodiversity banking. It is one of the world's largest economies. California's economic growth and its need for new infrastructure and development projects, in particular, highways, energy and housing, has led to the creation of biodiversity credit markets through the use of biodiversity banks as a way to balance both its development needs and its biodiversity conservation requirements.[398]

The implementation of biodiversity banks depends, however, on the type of development or on the growth that a state, province or city is experiencing. A state, province or city which plans its growth in such a way that it will expand its infrastructure in a vertical way, by adapting its already constructed area or ecological footprint is less likely to participate in a BioBank system than a city or province which needs land use changes to horizontally expand their housing and/or services infrastructure by changing forested lands to houses and to roads.[399] In the latter situation, species and habitats would be possibly negatively impacted by the implementation of infrastructure and houses in areas, which were previously home to species at risk, for example. In this circumstance, developers or public infrastructure agencies would be required to compensate for their damages to biodiversity, and would, therefore, have the possibility of purchasing conservation credits from a BioBank to compensate for their damages.[400]

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[395] Astrid Van Teeffelen, Paul Opdam & Claire Vos "Ecotrade – Investigating the suitability of tradable permits for biodiversity conservation in changing landscapes", (Paper delivered at the 6th European Conference on Ecological Restoration Ghent, Belgium, 8-12 September 2008) at 1, [Van Teeffelen].
[396] Ecosystem Marketplace, Species Bank Project, online: <http://us.speciesbanking.com/pages/dynamic/species.landing_page.php?category=species>.
[397] *Ibid*.

[398] *CFB*, *supra* note 240 at 6.
[399] *Ibid*.
[400] *Ibid*.

Another factor to take into consideration is that the creation of biodiversity banking systems depends more on development and impact than on a specific species. The existence or lack of existence of a market depends on the expansion of development projects impacting certain species habitats[401] or ecosystems. In other words, the market's creation is not driven by the need to conserve a certain number of specimens of a specific species at risk, but by the need to compensate for its loss due to development. Nonetheless, conservation goals can be obtained as a consequence. [402]

As noted earlier, Alberta is home to native species such as the wood bison or the woodland caribou, which are currently threatened.[403] These species "require large areas of continuous tracts of undisturbed habitat rich in mature to old-growth forest."[404] However, their habitats are subject to fragmentation and other impacts that lead to biodiversity loss caused by industrial activities such as the oil and gas sector, forestry and others. These circumstances are ideal for implementing a biodiversity banking system in Alberta, as a tool to balance development and conservation. Further analysis of the role of biodiversity banks in balancing economic development and conservation is included in the case study, in Part II of this dissertation.

iv) Linked with a service area

Most of the guidelines and regulations to implement and operate biodiversity banks and biodiversity offsets under them emphasize strict linkage with a specific service area, where the project which is requesting the permit will eventually be implemented, and where potential impacts will occur.[405] For example, the *Guidance for the Establishment, Use and Operation of Conservation Banks* of the U.S., states that:

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[401] Van Teeffelen, *supra* note 395 at 1.
[402] *Ibid*.
[403] Canadian Environmental Assessment Agency, *Species of Concern in the Prairie Region, Appendix A* at 2, online: <http://www.ceaa.gc.ca/050/documents/2221/2221E.pdf >. Both species are considered threatened,
[404] Government of Canada, Species at Risk Public Registry, *Recovery Strategy for the Woodland Caribou, Boreal population in Canada*, online: http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=33FF100B-1#_Toc337193637. See also Government of Canada, Species at Risk Public Registry Species Profile- Wood Bison, online: <http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=143>.
[405] In that case, according to the above mentioned Guidance "the project proponent would have the option of using any of the Banks or perhaps even more than one bank." A service area is an area "(e.g. recovery unit,

> If projects fall within a specific conservation bank's service area, then the proponents of those projects may offset their impacts, with the U.S. Fish and Wildlife Service's approval, by purchasing the appropriate number of conservation credits from that bank.[406]

In other words, a developer cannot buy conservation credits from any bank, but only from a bank or banks serving the area of development or service area where the project will be later implemented. The reason for the above mentioned restriction in the biodiversity credit options respond to environmental criteria. This geographical limitation is to ensure that the conservation credits purchased in a bank are ecologically equivalent to those impacted somewhere else. For example, a development impacting coastal ecosystems in California could be compensated through biodiversity credits purchased in a bank operating in another coastal zone with similar ecological values as those impacted by the project, preferably in proximity to the area where the impacts occurred. It means that those coastal zone impacts in California could not be compensated through credits from a biodiversity bank producing credits for grizzly bear habitat restoration in Alaska.

v) Biodiversity banks are created in advance of impacts

Biodiversity offsets, not implemented under a biodiversity bank, can be implemented either once a development project is approved, or when it has been implemented and impacts have occurred. In other words, biodiversity offsets can be created as needs arise.

However, biodiversity banks and the biodiversity credits emerging from them do not have an ex-ante relation to or dependency on a specific development project. In other words, their creation as compensation tools does not emerge from the implementation of a development project. Consequently, biodiversity offsets under a biodiversity bank are implemented before projects are implemented and even approved, and therefore, before the development project causes any impacts to biodiversity. The reason for creating biodiversity banks before development projects is that biodiversity credits need to be ready to compensate for impact at the moment the developer is requesting the approval of the project. If biodiversity offsets under biodiversity banks are implemented before the

watershed, county) in which the bank's credits may be used to offset project impacts." See *ConsBankGuide*, *supra* note 240 at 8. One or more Banks can co-exist in the same service area.

[406] *ConsBankGuide*, *supra* note 240 at 8.*Ibid*.

development project, there will be no time lag between the time when the impact occurs and when the environmental benefits are created. Consequently environmental benefits produced by the offset in the form of credits will be ready to be traded.

A biodiversity offset, under a bank created in advance of the impacts caused in a specific geographic area could provide credits to impacts caused by a project years after the bank has been implemented. In a hypothetical example, the biodiversity bank "Caribou Forever" was created and started producing and selling credits in January 2014. The oil and gas development project for "Gas4you," is required to obtain a permit to implement the project in August 2017. The projects will be impacting 20 kms of caribou habitat, and a total of 50 caribou living in the area. In order to obtain this permit, the oil and gas developer will be required to mitigate for the environmental impacts caused by the project. One of the options of the project developer is to purchase a specific number of mitigation credits from the biodiversity bank Caribou Forever or any other approved biodiversity bank serving the impacted area.

vi) Biodiversity banking transfer liabilities

As noted when explaining when to use biodiversity offsets,[407] developers have the mandate to follow the mitigation hierarchy. They are legally mandated to avoid, minimize and mitigate on site impacts caused by their projects. If after all these activities, impacts still exist; developers have the liability or mandate to compensate for them. In theory, biodiversity banking leads to a transfer of liabilities from the project developer to the biodiversity banker. This means that "debit holders can retire their regulatory "debt" by purchasing an offsetting number of credits from an owner of a bank located within a specified geographic area.[408] This means, for example, that oil and gas company AX which caused impacts to biodiversity in an area of the Athabasca region would be considered no longer liable for the impacts caused if it acquires a specific number and type of biodiversity credits needed to compensate for its significant residual impacts. Considering that the biodiversity represented by the biodiversity credits needs to be equivalent to the one negatively impacted by the development project, these credits would be produced by

[407] See Section 2.1 Biodiversity Offsets
[408] See JBRUHL, *supra* note 334 at 26.

conservation activities in the same region within the province where the impacts occurred. Liability could be transferred permanently, such as in the U.S. biodiversity banking systems, or for a specific period of time, such as 20 or 30 years if the offsets were to be temporary.

Nonetheless, there are jurisdictions, such as France, where legislation specifically states that there is no such transfer of liabilities, and that the developer retains liability, meaning that if biodiversity credits do not last or do not compensate as required by the authority, the developer would need to take the necessary actions to compensate for them.[409] In such a situation the liability of a project developer such as the Company AX would also remain with the company. Thus, according to biodiversity bank designers and implementers, it is necessary to clearly determine where liability rests, otherwise the lack of clarity with respect to legal liabilities "would be a major failing of an offset system."[410]

vii) Biodiversity banking leads to hybrid biodiversity credit markets

Biodiversity markets emerging from regulatory biodiversity banks have the relevant characteristics of regulated markets. They emerge from a specific regulatory mandate, and they have a legal framework that supports their implementation and operation. It means that laws and regulations may condition the approval of a project to taking certain actions to avoid and minimize impacts, and to compensate for residual harm. Thus, to meet the compensation requirements, laws and regulations can provide developers with the option of acquiring a certain type and amount of conservation credits from a conservation bank.[411]

[409] See Coralie Calvert, Claude Napoleone & Jean-Michell Sales, "The Biodiversity Offsetting Dilemma: Between Economic Rationales and Ecological Dynamics" (2015) 7 *Sustainability* 7357 at 7365, online: <www.mdpi.com/2071-1050/7/6/7357/pdf>. See also, Coralie Calvet et al, « La Réserve d'actifs naturels : Une nouvelle forme d'organisation pour la préservation de la biodiversité en France » in Harold Levrel et al, eds, *Restaurer la nature pour atténuer les impacts du développement* (Versailles: Quae, 2015) 139–156. Habitat banking has been selling credits in France since 2008. See European Commission & Business and Biodiversity Offsets Program, *Minutes of the Joint Workshop on Biodiversity Offsets between the Business and Biodiversity Offsets Programme and the European Union No Net Loss Working Group,* Brussels, Belgium (22 May 2013) Session 3, online: <bbop.forest-trends.org/documents/files/eunnlwg_cop_minutes.pdf>, [*EUNNLWG*].

[410] See *EUNNLWG*, *ibid*.

[411] ELI 2008 at 8.

As noted earlier, within these types of systems, regulations affect both supply and demand of biodiversity credits.[412] Regulations create demand by mandating the compensation for residual impacts. They also create the supply for these credits, for example by determining how many sellers will be participating in such a market, as well as regulating details about the number and types of credits subject to transaction. However, not every aspect of these markets is regulated. For example the value of biodiversity credits within this biodiversity credit markets is not regulated. Their price is determined by supply and demand laws dynamic and not by a governmental imposition.[413] Biodiversity credit markets emerging from biodiversity banking systems are, therefore, what Ricardo Bayon identifies as "hybrid markets." [414]

As noted earlier, wetland mitigation banks and species or conservation banks in the U.S. emerge from the *Clean Water Act* (CWA) and from the *Endangered Species Act* (ESA).[415] The banks' requirements and implementation criteria are determined by regulations issued by federal agencies, but the biodiversity credits prices are determined by supply and demand.[416]

In contrast with the U.S. biodiversity banking systems, the NSW BioBanking system was designed from the outset as a market.

The NSW system is considered a biodiversity credit market. It creates i) demand for credits, ii) a financial incentive to create credits, and iii) a trading system supported by a public registry where buyers and sellers can find each other. This system is supported by a legal framework that provides all the guidelines and legal and technical rules for its functioning and operation. [417]

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[412] See *CFB*, *supra* note 240 at 114.
[413] A free market is "free" because it has little or no governmental control. See Investorwords, *sub verbo* "free market", online: <www.investorwords.com/2086/free_market.html> (last visit October 21 2015). See also Investopedia, *sub verbo* "free market" online: <www.investopedia.com/terms/f/freemarket.asp>. See Bayon, *supra* note 264 at 123.
[414] See BAYON, *ibid* at 124.
[415] *Clean Water Act*, 33 USC §1251 et seq (1972), *Endangered Species Act*, 16 USC §1531 et seq (1973).
[416] These regulations are for example, the *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks*; the *Guidelines for the Establishment, Use and Operation of Conservation Banks, Criteria for use of Conservation Bank*, respectively. See *MitBankGuide*, *supra* note 240.
[417] *Madsen*, *supra* note 264 at 51.

As distinct from the international biodiversity banking systems studied by this dissertation, the Canadian biodiversity offset system and the biodiversity credits created through banks are for the use of the project's proponent only, and do not yet create any "hybrid" biodiversity credit market, where credits are sold to third parties.[418]

viii) Participation in the system is voluntary

Another characteristic of biodiversity banking systems is their optionality. It means that despite the fact that biodiversity banks are regulated tools, meaning that laws and regulations regulate their implementation and operation, implementing a biodiversity bank and/ or purchasing credits from a bank, are usually optional. In other words, they exist among other policy options for both the implementer of the biodiversity bank and the developer responsible for the impacts to biodiversity on the site.

Within this scenario, the biodiversity banker has the option to voluntarily implement a biodiversity bank and their biodiversity offsets by carrying on restoration activities to compensate for certain impacts to biodiversity caused in the service area. On the other hand, the developer has a mandate to compensate for its impacts. As noted earlier, in order to comply with such mandate it has the option to carry on activities to compensate for the loss itself or to purchase biodiversity credits from a particular banker or several bankers participating among all the bankers serving the service area of the developer's project.

There are, however, some instances when acquiring credits from a bank is not an option but a mandate (for example, if a project has been approved with the condition of acquiring a certain number and type of credits from a particular bank). In such an example there would not be optionality.

Despite the optional participation of both the banker (bank implementer) and the developer purchasing biodiversity credits, once a biodiversity banker implements its bank, the responsibilities or liabilities of the banker to conserve or restore the land where its

[418] This might change in the future. A hybrid biodiversity credit market refers to a market that is partly regulated and partly free. See 2.1.5 General characteristics of a biodiversity market emerging from a biodiversity banking system

bank operates remain in perpetuity or as agreed by the banker and the governmental agencies in their respective agreement.

Table 2: General Characteristics of both voluntary and regulatory biodiversity offsets leading to biodiversity banking

Biodiversity offsets in general – characteristics	VOLUNTARY	REGULATORY
Last resort within the mitigation hierarchy	√	√
Compensates for residual impacts (after all on-site mitigation measures have been implemented)	√	√
Participation in the system is voluntary (an option)		√

Table 3: General Characteristics of regulatory biodiversity offsets leading to biodiversity banking only

Biodiversity offsets in general – characteristics	REGULATORY
Conservation or restoration activities are undertaken before the impacts they compensate for	√
May lead to a transfer of liabilities (from whoever caused the impact to whoever restores it)	√
Are linked with development	√
Are linked with a specific service area	√
Needs a supporting legal framework to regulate its implementation and operation, as well as the trade of biodiversity credits	√
May lead to biodiversity banks	√

2.2 BBOP Essential Principles and Effectiveness of Biodiversity Banking: Technical Aspects to be considered by the Law Supporting a Biodiversity Banking System.

Research has identified a set of essential criteria that any biodiversity banking system should have to be effective in achieving their biodiversity objectives. These elements have been articulated as a set of essential "principles" by the BBOP.[419] These principles describe the elements necessary to assess the types of impacts for which offsets, and therefore biodiversity banks, could compensate. In addition, they inform the design and operational aspects needed to ensure the correct operation of these types of instruments.

Some countries have expressly adopted the BBOP biodiversity offsets principles and have adapted them to their national contexts. For example, the Department for Environment, Food and Rural Affairs (DEFRA) of the United Kingdom adopted a specific set of biodiversity offsets principles that follows most of the principles developed by the BBOP.[420]

As noted earlier, the NSW government also has adapted the BBOP essential principles to its own context and has created its own set of 13 principles for the use of biodiversity offsets. These principles include aspects such as: compliance with the mitigation hierarchy and with existent regulatory requirements, permanence, equivalency, location, and enforceability.[421]

Similarly, the government of Alberta has incorporated its own set of principles for offset design into its draft offset policy framework. These principles include some of the BBOP essential principles, such as equivalency and additionality. They also include supplemental principles, such as consistency, auditability, inclusiveness, and regulatory certainty to support a potential biodiversity offset system in the province.[422]

Although each principle is relevant to the implementation and operation of any offset system, this dissertation does not provide a comprehensive assessment of all the principles

[419] See *BBOP essential principles, supra* note 54.
[420] See further *DEFRA*, *supra* note 157 at 15.
[421] See *OEHPRIN*, supra note 55.
[422] *BOPF*, *supra* note 149.

needed to set a biodiversity banking system or evaluate the effectiveness. Rather, this section briefly describes the principles and assesses whether the foreign banking systems studied in the thesis complied with them. The section later focuses on additionality which, along with the legal framework supporting a biodiversity banking system in the context of Alberta's public lands, is further analysed in Part II of the thesis when analysing the case study.

2.2.1 Biodiversity banks, mitigation hierarchy, environmental and environmental objectives

As earlier explained, biodiversity banks are policy tools that should be used only after all on-site avoidance, minimization and mitigation activities have been carried out.[423] In other words, they are the final choice in a menu of mitigation options (the mitigation hierarchy). This is to ensure that they contribute appropriately to achieving specific environmental and environmental objectives.

2.2.1.1 Achieving environmental objectives and biodiversity banking effectiveness

If the goal is achieved, the system is said to be effective. On the contrary, if the goal is not met, the system is said to be not effective. However, the exact meaning of NNL or NG is usually not clearly determined.

Either NNL or NG should be pursued "with respect to species composition, habitat structure and ecosystem function and people's use and cultural values associated with biodiversity."[424] NNL or NG requires identifying the protected element such as a specific species at risk and its habitat, or a specific type of ecosystem, such as wetlands. Once the specific protected element is identified, there is a need for accurate baselines to know the values of what is subject to be impacted, the values of the impacts to be produced, and values that could be used to compensate for those impacts. In other words, as Salzman and Ruhl suggest, it would imply assessing them integrally, not only ecologically, but also

[423] For an explanation of the mitigation hierarchy and the use of biodiversity offsets, see *KBB*, *supra* note 36 at 9-12.
[424] *BBOPGLOS*, *supra* note 34 at 8.

socially and economically, by adopting a broad approach at the time of finding a currency to trade biodiversity losses and gains.[425]

The lack of clear environmental goals defining exactly what we are trying to protect, and clear environmental objectives specifying to what extent the environmental goals will be protected, makes it difficult to verify if the "environmental objective" is being met in practice or not. The uncertainty constitutes a barrier to the implementation of regulatory biodiversity offsets. The reason is simple: without clarity we would not know what to protect, or the scope of protection, or how to do it, as well as which baselines and benchmarks would verify its achievement or lack of achievement.[426]

2.2.1.2 Environmental goals and objectives in Alberta

The description of Alberta's context showed that Alberta has articulated biodiversity conservation as an overall environmental goal. However, at least in regards to wetland protection, this environmental goal has not been clearly defined and is not supported by a clear environmental objective. In other words, it is not clear if potential biodiversity offsets under the *WETPOL* should pursue No Net Loss (NNL). As already noted, the lack of clarity of the environmental objective could lead to difficulties to measure the effectiveness of the offsets and the banking system.[427]

The draft of Alberta's *BOPF* says that offset programs must meet defined environmental objectives. However, those environmental objectives have yet to be defined, so it is not known whether or not the framework will pursue a NNL environmental objective. In order to protect biodiversity from oil sands activities and from other industry related activities causing biodiversity loss on Alberta's public lands, Alberta should consider adopting a NNL objective for its public lands, as further elaborated upon in the case study contained in the Part II of this dissertation.

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[425] See James Salzman and J.B. Ruhl, "No Net Loss- Instrument Choice in Wetlands Protection", in Jody Freeman & Charles D. Kolstad eds., *Moving to Markets in Environmental Regulation: Lessons from Twenty Years of Experience* (New York: Oxford University Press, 2007) 323. Also available as a single chapter, online: <web.mit.edu/ckolstad/www/Salzman.pdf>, at 3. All cites from online chapter, [*SALZRUHL*].

[426] See *Ibid* where Salzman and Ruhl discuss the lack of definition of NNL.

[427] For more details on the discussion of environmental objectives and effectiveness, see Conceptual Foundations section, s. 2.3 Effectiveness of biodiversity banking systems in practice .

Notwithstanding their importance as environmental objectives, even if NNL or NG is well defined, they are not always easy to achieve. As the next subsection explains, achieving a NNL or NG goal requires appropriate methodologies and other design related aspects such as currencies and ratios.

2.2.2 Implementing biodiversity banks – baselines and design related principles

A number of important design and implementation features should be incorporated into any biodiversity offset or biodiversity banking system to ensure effectiveness. For instance, biodiversity offsets need to be targeted, quantifiable and verifiable.[428] They need to target the same type of vegetation or species impacted by the development and those impacts need to be reliably quantified and subject to verification.[429] The Alberta Offset Policy Framework (BOPF) identifies the need for quantifiable and verifiable offsets as one of the offset eligibility requirements. However, quantifying the losses caused by development and the benefits produced by offsets is not a simple task. Tools such as assessment methods are key to helping biodiversity bank designers accurately measure both the biodiversity being lost, as well as the compensatory measures. Similarly valid currencies such as hectares or species population help biodiversity designers and implementers trade losses and gains.[430]

Considering the non-fungibility and unique characteristics of biodiversity, some forms and elements of nature are not substitutable, therefore not compensable.[431] This is the main reason why a limit to what can be offset is one of the BBOP's essential principles.[432] As noted earlier, biodiversity offsets should not be an excuse to make acceptable what is unacceptable, or a justification to enter into "no go" areas,[433] where non replaceable ecosystems, or species, exist. In such cases, the use of biodiversity offsets is not appropriate.

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[428] See principles 9 and 10, OEHPRIN *supra* note 55. See also *BOPF*, *supra* note 149 at 5.
[429] See principles 9 and 10 OEHPRIN *supra* note 55.
[430] Similar to using dollars to pay for a product, a valid currency could be for example the use hectares of forests to compensate for habitat loss. There are different types of currencies. More about currencies is explained both in the conceptual section of this dissertation, and in its case study.
[431] Andrew Dobson, *Justice and the Environment: Conceptions of Environmental Sustainability and Dimensions of Social Justice*, (Oxford Clarendon, 1998) at 48.
[432] BBOP e*ssential principles, supra* note 54.
[433] See *PIECA2005* and *AMS2007*, supra note 243.

However, to determine which areas are "no go" areas, there is a need to understand biodiversity values and the ecosystems and landscape context in which these environmental losses and gains take place. Baselines have not been concretely identified as part of the biodiversity offsets essential elements developed by the BBOP. However, the Australian experience suggests that clear baselines and databases are relevant in identifying the type of vegetation or species that the offset is intending to protect, and to measure success once the offset is implemented and operated. Victoria and NSW in Australia have developed comprehensive native vegetation databases, baselines and maps identifying areas to be impacted by future development, and those with potential to be enhanced and/or conserved.[434]

The latest draft of the *BOPF* identifies baselines as one of the components of an offset program. Considering the type and status of vegetation, species, habitats and ecosystems, connectivity and other biodiversity priorities and needs existing in Alberta's boreal region, and the modeling studies developed in Alberta, the Australian experience could be replicated in that province.[435]

In general terms, biodiversity-banking systems around the world have thus far favoured the like-for-like approach. The U.S. *Wetland Mitigation* Banking system, for example, prefers like-for-like mitigation. In theory, NSW, Australia also favours such an approach. In both systems a like-for-like approach addresses vegetation losses of higher significance, while biodiversity losses of lower significance can be mitigated by like-for-better mitigation.[436]

2.2.2.1 Currency

Even if like-for-like mitigation is the preferred option, its use must be based on a solid understanding of all the biodiversity values and functions that are being damaged or lost by the development, and the proposed replacements. How can one ensure that these

[434] The NSW Office for Environment & Heritage, for example, has developed a Vegetation Information System (VIS), which creates a central repository for native vegetation data. The VIS includes a classification database, a flora survey database and maps. See NSW Office of Environment & Heritage (OEH), *Databases*, online: <http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm>.
[435] Marian Weber, *Offsets in Canada*, presentation delivered at the Biodiversity Offsets in Canada: Getting it Right Conference, University of Ottawa and Sustainable Prosperity, Ottawa Feb, 13-14-2014, [*WEBPR*].
[436] See *McKenney*, *supra* note 250 at 32. See also *BBASSMETH2008* and *BBASSMETH2014*, *supra* note244.

functions are equivalent? An adequate currency and assessment method are relevant to reflect exactly what is being lost, and the conservation that is needed to compensate for the losses. [437]

The currency in a biodiversity offset under a biodiversity bank aims to ensure that the conservation or restoration achieved though the biodiversity offset and reflected through biodiversity credits is equivalent to the potential losses caused by the development projects.[438] In theory, an adequate currency ensures that there is equivalency.[439] Biodiversity offset currencies should be precise and measurable. Examples include acres, habitat function, habitat hectares/acres, area of ecological community, and species population size.[440] Central to the currency is, for example, the ability to measure and compare an acre lost with one that is restored or conserved. A report on biodiversity offsets released by the International Council on Mining & Metals & International Union for Conservation of Nature (IMM-IUCN) in 2012 showed that the most commonly used currency is "Extent+Condition," or "quantity-quality" such as habitat hectares (which measures the number of hectares needed to support the habitat of certain species).[441] A lack of a common currency within a biodiversity banking system makes it difficult not only to ensure a "like-for-like" exchange of biodiversity, but also to know the potential costs and benefits emerging from the use of offsets.[442]

Finding a currency that works well and facilitates the exchange of biodiversity losses and gains is not easy, because of the heterogeneous context of biodiversity.[443] In many circumstances it may require comparing apples and oranges, because of the significant differences and non-fungibility of ecosystems, their functions and elements both in the

[437] Currency is the basis "to measure both the loss of biodiversity caused at a development site and the conservation that is needed to offset it elsewhere" See *KBB*, *supra* note 36 at 7.

[438][438] See *KBB*, *supra* note 36 at 7, 76. See also *SALZRUHL*, *supra* note 425 at 9.

[439] *SALZRUHL*, *supra* note 425 at 9-14. See also See also T. Jonathan Davies and Marc W. Cadotte, "Quantifying Biodiversity: Does It Matter What We Measure?", in Frank E. Zachos & Jan Christian Habel, eds, *Biodiversity Hotspots, Distribution and Protection of Conservation Priority Areas* (Berlin: Springer, 2011), online: <http://biology.mcgill.ca/faculty/davies/pdfs/Davies&Cadotte%202011.pdf>, [*Cadotte*].

[440] *Ibid.* See also *ICMM-IUCN*, *supra* note 251 at 20, 43. See also Government of BC, S.11.3

[441] *Ibid*.

[442] International Council on Mining and Metals, *Biodiversity Offsets - A Briefing Paper for the Mining Industry* (2005), at 7, online: <www.icmm.com/document/25>.

[443] *BOTS*, *supra* note 251.

place of the impacts and where the restoration or conservation is performed.[444] As Salzman and Ruhl have stated, these non-fungibility aspects can arise from space, type and time. All these aspects need to be considered at the time of designing any biodiversity banking system, and the biodiversity offsets under banks that will be implemented to compensate for the impacts caused by developments on specific geographic areas; otherwise they can lead to significant environmental externalities. For example, because of the non-fungibility of type, a destroyed wetland could have had a higher capacity of service provision than one of the restored wetlands. Even though the restored wetland or habitat will provide the same type of functions and services as those provided by the lost wetland or habitat, due to the non-fungibility of space, the restored wetlands may deliver ecosystem services to fewer people, while the lost ecosystem could have delivered the same type of services to many more people. In terms of the non-fungibility of time, the destruction of the wetland may have been carried out before knowing the real value or quality of the restoration, or the restored wetland or habitat may need a longer time to achieve the maturity needed to become a suitable habitat for a species that lost its habitat.[445] A clear example of this issue would be the cutting down of 5 hectares of old-growth forest that is the habitat to an endangered species and planting 5 hectares of seedlings to replace it. Considering, for example, that the endangered species needs mature forest to survive, the exchange of losses and gains described in the example would not be appropriate to compensate for what is being lost.

Finding an adequate currency which reflects all these variations and differences in ecosystem types, elements, and functions, which incorporates biodiversity values that represent the "overall" biodiversity being restored, and which can be accurately quantified and traded in different time frames and spaces with the one being lost[446] depends on adequate assessment methods.[447] These methods need to be capable of measuring

[444] See *SALZRUHL*, *supra* note 425 at 9-14.
See also Cadotte, *supra* note439. This paper discusses the need to prioritise conservation efforts to address the biodiversity loss problem, and identifies currencies as necessary elements towards that prioritization. It concludes that the way we value these different currencies might influence global conservation strategy and resource allocation.
[445] *SALZRUHL*, *supra* note 425 at 11.
[446] See further *DEFRA*, *supra* note 157 at 13.
[447] *SALZRUHL*, *supra* note 425 at 12.

impacts, and of establishing accurate baselines or benchmarks incorporating values associated with ecological functions to determine the conservation or restoration needed to compensate for them.[448]

2.2.2.2 Assessment methods and ratios

Assessment methods

Assessment methods are vital to determine the concrete values being lost and those that need to be created, restored or conserved. They involve using knowledge to create a valid and adequate currency which reflects ecological, social and economic aspects in the trade of biodiversity credits.

Assessment methods for offsets implementation vary significantly in terms of types of habitats being assessed, targets of assessments, and the functional and social values studied by the assessment.[449]

For example, the U.S. Wetland Mitigation Banking system has over forty different wetlands assessment methods.[450] These assessment methods vary significantly in terms of depth of the analysis. Some of the methodologies used within this system are: i) simple, ii) narrowly tailored and iii) broadly tailored.[451]

i. Simple Assessment

The simple assessment is a quick and easy observation of an environment's characteristics. This assessment uses simple methods such as counting acres, which is a quantitative method. Although this method is less costly, it usually fails to provide a thorough assessment of values and functions.

ii. Narrowly tailored assessment.

[448] *Ibid* at 9-14.
[449] Christensen, M. and Lloyd, A., 2007 talking about the assessment methods of the U.S. Wetland Mitigation Banking System.
[450] Business and Biodiversity Offsets Programme, *Biodiversity Offset Design Handbook Appendices* (Washington, DC: BBOP, 2009) Appendix A, at 11, online: <http://www.forest-trends.org/documents/files/doc_3127.pdf>, [*BAPP*].
[451] *SALZRUHL*, *supra* note 425 at 13. See also *BAPP*, *ibid.*

The narrowly tailored method is a more qualitative approach, which directly assesses a limited range of wetland services (e.g., wildlife habitat for a single species). Because it is so narrowly designed, it usually cannot be used to produce a currency that could be used across non-fungible features. It could not be used, for example, to trade different wildlife habitat types on different spaces, or their cumulative impacts to species, including humans.[452]

iii. Broadly tailored assessment

On the other hand, the broadly tailored method can be a mixture of quantitative and qualitative approach, which assesses a range of wetland functions, including biological, social and economic aspects. Biological aspects include, for example, benefits to aquatic life and wildlife. Social aspects could be different environmental services such as flood control to a surrounding population. Economic aspects include the cost of groundwater replenishment, which in the absence of the wetland would probably require costly mechanisms and technologies to provide these types of services.[453]

Another aspect that needs to be taken into account when choosing an assessment method is the purpose of the system. Moreover, wetland mitigation banking favours wetland restoration, in contrast with habitat conservation, which favours conservation over restoration. A broadly tailored assessment is the ideal to be used both in wetland mitigation and in habitat and species conservation, because of its integral analysis, which includes biological, social and economic variables. However this method requires more technical resources and knowledge and is more costly. As a consequence, its use in practice has been more limited.[454] Despite the advantages of the broadly tailored assessment, systems around the world, including the Wetland Mitigation Banking in the U.S., has favoured the simple assessment method and the narrowly tailored assessment method over the broadly tailored method. As a result, there has been a preference to use currency such as acreage units, and/or specific habitat or species units, instead of habitat acreage currencies.

[452] *SALZRUHL*, *supra* note 425 at 13.
[453] See BAPP, *supra* note 450 at 7.
[454] *SALZRUHL*, *supra* note 425 at 14.

However, there have been some circumstances in which hybrid methods have been used. Both Victoria and NSW, for example, developed assessment methods in which the type of mitigation to be applied depended upon the importance of biodiversity to be impacted and compensated for.[455] The Victoria's and the NSW's biodiversity banking systems have adopted an assessment method which is partly simple and partly narrowly tailored. Under this method, the Australian systems use quantitative currencies such as hectares or acres to compare for example the number of hectares or acres of wetland lost due to development, with the number of hectares of wetland to be recovered through the offset. They also use a qualitative approach to assessing the types of habitats needed to support species, ecosystem values and functions. Under this method, 10 acres of mature native vegetation could not be replaced by 10 acres of new-growth non-native vegetation, because even though the number of hectares of the offset was similar to the number of hectares impacted by development, the quality of the vegetation lost was not equivalent to what was lost. Thus, simple-narrowly tailored assessment methods need to take into account the types of habitats, sizes, connectivity and quality of what is being lost and what the offset. For example, the hybrid methods adopted by Victoria and NSW basically use "units of measurement that take into account the impacted area, and the quality of the vegetation impacted (determined by the quantities of a number of chosen attributes related to the structure of that habitat)." [456]

This hybrid qualitative-quantitative approach emerges from a benchmark approach. Within Victoria's and NSW systems, the quality of vegetation and species is mapped and scored based on a table of attributes, and the maximum attributes act as a benchmark.[457] For example, in Victoria, this approach is based on the comparison of the existing "native vegetation to a reference site having the same vegetation type in a mature and long-

[455] As noted earlier, the NSW has developed databases to identify and classify native vegetation. This information is used to assess the state of current vegetation and to identify and assess biodiversity loss. See OEH, *Databases*, *supra* note 434.

[456] *BAPP*, supra note 450 at 20.
See also *BBOP* discussing the approaches to loss/gain calculations in existing law and policy. Business and Biodiversity Offsets Programme, *Biodiversity Offset Design Handbook* (Washington, DC: BBOP, 2009) Appendix A, at 70, online: <http://www.forest-trends.org/documents/files/doc_3126.pdf>, [*BBhandbook*]. See also BBASSMETH2014, supra note 244, Table 2: Scoring and weighting of the site attributes at 13.

[457] See Ibid. See also BBASSMETH2014, *ibid*.

undisturbed state."[458] Within this method: i) vegetation communities likely to be impacted or disturbed are identified, ii) the vegetation communities' characteristics are measured based on the comparison to the benchmark, iii) where benchmarks are not found, benchmark values are developed based on "historical information and a knowledge of how similar vegetation types have been affected by human disturbance regimes," iv) determining a biotope score through "recording and tallying condition scores for key biodiversity attributes."[459] Thus, the "Habitat hectare" is the result of multiplying the biotope score by area. "For example, 10 hectares of mature, fully natural (100% score) wet heathland could be counted as 10 'habitat hectares', whereas 10 hectares of this EVC with a 'habitat score' of 50% would be scored as 5 habitat hectares."[460] This means that using lower quality vegetation to compensate for impacts to higher quality and higher scored vegetation would require more hectares or of lower scored vegetation to compensate for those impacts. In other words, the lower quality vegetation used in the offset, the more hectares needed to compensate for the impact.

As further explained in the analysis of the case study, the NSW methodology is relatively similar to the methodology used by Victoria. Under NSW's method, vegetation communities likely to be impacted or disturbed by development projects are first identified. Once they are identified, biodiversity values of both the vegetation communities and zones where the development site will be implemented and the impacts will be caused, and the vegetation zones on the biodiversity bank sites are assessed on the comparison of 10 attributes.[461] These attributes include, for example: native plant species richness, native over-storey cover, native ground cover, weediness and others.[462] A score is

[458] See *BAPP*, *supra* note 450 at 19.
[459] See *Ibid*.
See also BBASSMETH, supra note 244.
[460] See BAPP, *supra* note 450 at 19.
[461] The NSW assessment methodology defines vegetation zone as "an area of native vegetation on a development site or biobank site that is the same PCT and has a similar broad condition state." See *BBASSMETH2014*, *supra* note 244, s 5.2.2. For more details on assessing site values and vegetation conditions, see s 5.3., and Table 2: Scoring and weighting of the site attributes at 13. The plant community types (PCT) in vegetation zones (areas of native vegetation on a development site or biobank site) can be classified in areas that are in low condition, moderate and good condition. Vegetation formations in these vegetation zones can be for example: grasslands, heathlands, Alpine complex, freshwater wetlands, saline wetlands, and arid shrublands.
[462] See *Ibid* at 13.

produced for each attribute, as well as a total score for the whole vegetation zone.[463] Similar to Victoria's example, a habitat-hectares currency is used by the NSW BioBank system. It means that 10 hectares of mature, fully natural (100% score) freshwater wetlands could be counted as 10 'habitat hectares", while 10 hectares with 50% habitat score could be counted as 5 habitat hectares in the NSW BioBanking system.

No matter which assessment method is used, the last draft of the *BOPF* suggests that to ensure equivalency between losses and gains, the same methods and tools must be used to assess both impacts and benefits emerging from the offset.

Ratios

Replacement ratios are numeric expressions of the ratio of the area replaced through restoration to biodiversity area lost.[464] For example, Victoria has adopted a ratio that "...ranges from at least 2x the calculated loss of habitat hectares for very high conservation significance offsets to partially address risk of some level of offset failure (regarded as 'substantial net gain'), a 1.5x multiplier for high conservation significance and a 1x for medium to low conservation significance." [465]

The 2013 provincial *Wetland Policy* in Alberta adopted a fixed set of ratios, in which the minimum ratio is 3:1 (3 hectares of gain x 1 hectare of loss), and the highest ratio is 8:1 (8 hectares of gain for 1 hectares of loss).[466] Ratios depend upon the value of the wetland being impacted. Ratios are subject to increase as distance increases from the impacted site.[467] Thus, a higher ratio of 8:1 would be applied if the biodiversity offset were located far away from the impact site.

[463] A vegetation zone with 100 percent score would be for example, one that has 25 points for having the benchmark native plant species richness, 10 points for native overstorey cover, 10 points for native midstorey cover, 2.5 points for native ground, 5 points for having 0-5 percent of exotic plant cover, 20 points for number of trees with hollows, etc. See *Ibid*.
[464] See Alberta, Ministry of Environment, Environmental Partnerships and Education Branch*, Provincial Wetland Restoration/Compensation Guide* (Edmonton: Alberta Environment, 2007) at 7, online: <srd.alberta.ca/water/education-guidelines/documents/WetlandRestorationCompensation-Guide.pdf>, [*APWRCG*].
[465] See BAPP, *supra* note 450 at 19.
[466] See *APWRCG, supra* note 464.
[467] See *WETPOL*, *supra* note 152 at 19.

None of these examples uses a broad assessment method. They strictly focus on acreage, species, or habitat values. They do not take into account the relations between these values and other biodiversity, social and economic factors.

2.2.3 Additionality

Additionality refers to an effort that is supplemental to the business-as-usual (BAU) scenario. It means something that is "additional," implying that the benefits emerging from certain activities promoted by a program or project would not otherwise have happened in a BAU scenario. On the contrary, the lack of additionality means that conservation would have occurred anyway or that there is no threat to the element of biodiversity being protected.

Additionality is a concept initially linked with the international climate change legal regime,[468] which emerged from the *United Nations Framework Convention on Climate Change* (UNFCCC)[469] and the *Kyoto Protocol* (Kyoto).[470] However its use has been expanded to biodiversity offsets. It is currently identified as one of the essential principles of biodiversity offsets. Thus, additionality is necessary for the valid existence and operation of any biodiversity offset and banking system, considering that each offset under the system needs to be additional.

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[468] The United Nations Framework Convention on Climate Change and the Kyoto Protocol were adopted as part of the international legal framework to address the climate change issue caused by Green House Gas (GHG) emissions. Both documents had the main objective of "stabilizing the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." These documents establish concrete emission reduction targets that need to be complied by the Kyoto protocol's signatory developed countries during the Protocol's first commitment period (2008-2012). Parties under the Kyoto Protocol are divided in Annex I and Non Annex I parties. Annex I parties have mandatory emission reduction targets, while non-annex I parties are developing and least developed countries, which had no emission reduction targets during the primary term of the Protocol. Canada withdrew from the Protocol on December 15, 2011. This withdrawal took effect on December 15, 2012. See United Nations Framework Convention on Climate Change, *Compliance Committee Canada's withdrawal from the Kyoto Protocol and its effects on Canada's reporting obligations under the Protocol*, CC/EB/25/2014/2, 20 August 2014, online: <unfccc.int/files/kyoto_protocol/compliance/enforcement_branch/application/pdf/cc-eb-25-2014-2_canada_withdrawal_from_kp.pdf>. However, the new Canadian government signed on to the Paris Agreement on 22 April 2016 and ratified it on 5 October 2016. See United Nations*, United Nations Treaty Collections, Status as* at 27-10-2016, online at: <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en>.

[469] *United Nations Framework Convention on Climate Change,* 9 May 1992, 1771 UNTS 107.

[470] *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 11 December 1997, 3202 UNTS 148, s 1.3.

Despite a lack of specific definition, it has been identified as one of the requirements of the different *Kyoto* flexibility instruments. The climate change regime recognizes different types of additionality, namely: mitigation, financial, and legal. The additionality element within the climate change regime is briefly described in this subsection to identify common elements that could be also applicable to biodiversity offsets under biodiversity banks on public lands.

Mitigation, technical or environmental additionality

Mitigation, technical or environmental additionality aims to ensure that GHG emissions are actually reduced. As its name infers, GHG emissions reductions have to be "additional" to what would have been attained through any other conservation activity performed in the absence of carbon finance supporting that activity.[471]

Mitigation or environmental additionality is incorporated into *Kyoto*'s flexibility instruments through sections 3.4, 6.1 and 12.5. Section 3.4 introduces additionality into land use-emission reductions to offset industrial emissions in developing countries. This additionality requirement is also incorporated into the joint implementations instruments through section 6.1; and into the Clean Development Mechanisms (CDM's) and transferable emission reductions emerging from projects implemented in developing countries through section 12.5.

In addition to the mechanisms described above, the UN has created a programme, Reducing Emissions from Deforestation and Forest Degradation (REDD),[472] to reduce emissions from deforestation and forest degradation and land-use changes such as

[471] Charlotte Streck, "The Concept of Additionality under the UNFCCC and the Kyoto Protocol: Implications for Environmental Integrity and Equity" (Paper presented at the Climate Change Governance After Copenhagen conference, University of Hong Kong, 2010) at 1, online: <www.researchgate.net/publication/265276527_The_Concept_of_Additionality_under_the_UNFCCC_and_the_Kyoto_Protocol_Implications_for_Environmental_Integrity_and_Equity> [*Streck*].

[472] REDD was initially proposed by Papua New Guinea and Costa Rica in 2005 and was later included in the Climate Change Legal regime through the Bali Action Plan (COP-13) in 2008. The decision encouraged the exploration of actions and options to address deforestation, and support for developing countries to reduce emissions from deforestation and degradation. See UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing countries, *FAO, UNDP, UNEP Framework Document* (20 June 2008) at 2, online: <www.un-redd.org/Portals/15/documents/publications/UN-REDD_FrameworkDocument.pdf>.

agriculture, conversion to pastureland, infrastructure, forest fires logging.[473] The program supports REDDs and REDD+ in developing countries.[474]

REDD has been, however, one of the most controversial issues of the climate change legal regime. One aspect of the debate about adopting REDD centred on the difficulty of ensuring that REDD and REDD+ were additional to BAU scenarios.[475] Identifying which emission reductions are additional "requires comparison of actual emissions with a reference level scenario or baseline."[476] This comparison to determine what is additional requires state of the art technologies both to create a reliable reference level scenario, and to determine which emission reductions through conservation activities are in fact additional. One of the problems in obtaining this data is that tropical deforestation is caused by different agents, and results from both natural and human causes. It is therefore, difficult to model and predict what conservation activities have been additional.[477]

[473] REDD's was incorporated into the Cancun Agreements in December of 2010 (cop-16). REDD activities include: a) reducing emissions from deforestation; (b) reducing emissions from forest degradation. REDD+ activities include: c) conservation of forest carbon stocks; d) sustainable management of forests, e) enhancement of forest carbon stocks. These activities were identified and adopted by Decision 1/CP.16. The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long –term Cooperative Action under the Convention, section c policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; add the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries. See United Nations Framework Convention on Climate Change, *Framework Convention on Climate Change Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010*, FCCC/CP2010/7/Add 1, Part III C, s 70, online: <unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf>.

[474] The UN-REDD programme defines Reducing Emissions from Deforestation and Forest Degradation (REDD) as "an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development." The programme differentiates between REDD and REDD+. According to the UN-REDD programme "REDD+ goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks." UN-REDD Programme, *About REDD+,* online: <www.un-redd.org/aboutredd>.

[475] Other factors considered in this debate were: potential leakages, how to ensure permanence of the emission reductions and how to measure the actual reductions.

[476] Romain Pinard, *Reducing Emissions from Deforestation and Degradation in non-Annex 1 countries,* briefing paper (The Climate Group, 2008) at 7, online: <www.theclimategroup.org/_assets/files/reducing-emissions-from-deforestation.pdf>.

[477] *Ibid*.

Financial additionality in the climate change context

Some authors such as Streck define financial additionality as: "the price that developing countries demand for their participation in resolving global environmental problems in the context of the UNFCCC and the *Kyoto Protocol*."[478] In other words, developed countries are requested to provide, "new and additional" "climate change financing to developing countries."[479] It means that developing countries would not have been able to participate in climate change projects, such as reducing GHG emissions from their industry, without financial support from developed countries.[480] This type of additionality is expressly required in different legal climate change documents. The UNFCCC, for example, requires financial additionality in its section 4.3. A similar requirement is included in section 11.2 of *Kyoto*, in para 1e of the *Bali Action Plan*,[481] and in para 8 of the *Copenhagen Accord*[482] and Article 9 (3) of the *Paris Agreement*.[483]

Legal Additionality in the climate change context

Although there is not much written on legal additionality, we can say that in order to be legally additional an offset does not have to be the result of a legal mandate. If it is the result of a legal mandate, it has to produce additional environmental benefits to those required or mandated by law. For example, the use of a hypothetical reforestation project in Brazil to offset GHG emissions in Germany could be considered additional, only if it was not implemented as a mitigation requirement imposed by Brazilian laws. In other words, the developer, who reforested the land, could not use the same restoration activities to

[478] Streck, *supra* note 471 at 1.
[479] Athena Ballesteros & Remi Moncel, Additionality and Climate Finance (World Resources Institute, 2010) at 1, online: <www.un-ngls.org/IMG/pdf/WRI_-_Additionality_of_Climate_Finance.pdf>.
[480] Financial additionality usually shows "causality between international financial support for an activity and the extent to which the activity would have happened in the absence of such support. Streck*, ibid.*
[481] *The Bali Action Plan to the United Nations Framework Convention on Climate Change,* decision 1/CP.13 of 13-15 December 2007. See Report of the Conference of the Parties on its thirteenth session, online: <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf >.
[482] The *Copenhagen Accord Plan to the United Nations Framework Convention on Climate Change, d*ecision 2 CP.15, 7-19 December 2009, online: <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf>
[483] The *Paris Agreement to the United Nations Framework Convention on Climate Change*, decision -/CP 21, Paris 30 November to 11 December 2015, online: < http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf >, and < https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf >.

offset GHG emissions in Germany, because they would not be considered additional (as they were already used to meet a national obligation). However, if the developer was mandated by law to restore 20 hectares of forest and reforested 50 instead, the 30 hectares reforested beyond the 20 mandated by law could be considered additional.

2.2.3.1 Lessons from climate change additionality for biodiversity offsets

The climate change legal regime experience shows that achieving additionality in practice is still difficult, especially due to technical and capacity limitations in developing accurate baselines and measures to determine which reductions are additional, and differentiate them from the reductions that would have happened in a BAU scenario. Lack of additionality in the climate change measures could lead to the creation of credits that do not relate to real emission reductions, either at source or through conservation efforts, and to situations where environmental commitments are not met in practice, even if they do so apparently. It is necessary; therefore, to ensure that additionality does not remain a theoretical requirement, and that additionality, whether technical, financial, or legal, is better studied and achieved in practice.

To address the additionality and other technical limitations faced by REDDs, the UN–REDD programme has focused part of its efforts in developing reliable methods to monitor, assess and verify changes in forest carbon emissions and removals.[484]

The difficulties of achieving and measuring additionality in practice faced by the land-use-change and forestry measures under Kyoto could be also faced by biodiversity offsets. This dissertation has not found studies assessing the additionality of biodiversity banks under any of the U.S. or the Australian biodiversity banking systems studied in this research. Because of the importance of the additionality principle for the effectiveness of a biodiversity offset, and the limited number of studies analysing it, this dissertation focuses on the additionality of biodiversity banks, and studies it in the context of Alberta's public lands.

[484] UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing countries, *FAO, UNDP, UNEP Framework Document* (20 June 2008) at 2, online: <www.un-redd.org/Portals/15/documents/publications/UN-REDD_FrameworkDocument.pdf>.

2.2.3.2 Financial, technical or environmental, and legal additionality of biodiversity offsets

The public lands context generates concrete questions regarding assessing and achieving additionality. Some of these questions are, for example: how can additionality be achieved on lands that are subject to multiple uses, and are allocated to multiple users? Considering that the Crown in right in the province is the owner of public lands, and that its government, as parens patriae, has the mandate to conserve the province's lands and natural resources, would conservation or restoration activities be considered additional? Would a regulatory biodiversity banking system created and regulated through laws and regulations achieve a legal surplus? Further considerations of these and other additionality questions are studied in the Additionality chapter.

This subsection will briefly describe the financial and environmental additionality that biodiversity offsets under biodiversity banks need to achieve. Legal additionality is analysed in chapter 3 of the case study.

i. Financial additionality

Similar to the climate change context, financial additionality of a biodiversity offset implies a dependence of offsets on financial resources provided by a third party. In other words, such an offset project would not have been implemented without those external funds or contributions. This element shows a link or relationship between economic contributions and the feasibility of implementing an offset. Within the Climate change regime, a developing country would often depend on an external financing source to support offset projects or activities towards emission reduction in their territory. Offset activities in developing countries account only for about one percent of the total carbon reduction activities carried out under the carbon market.[485] As a result, this requirement is one of limited applicability. It applies only to certain flexible instruments, in which funding of offset projects is necessary to implement them in developing countries.

[485] This does not consider countries such as China and India, which are growing exponentially, and emitting CO2, but, which due to their developing countries categorization, were not part of the Climate change legal regime - UNFCCC Annex I countries, which is applicable only to developed countries, historically responsible for CO2 emissions.

This theoretical financial additionality element has a different meaning in the biodiversity banking system context. Within biodiversity banking systems, financial additionality is not about financing offset projects in developing countries. As opposed to the climate change legal regime, financial additionality is not a prerequisite of a biodiversity banking system. Biodiversity offsets under biodiversity banks do not depend upon external contributions or donations from a developed country, but most of the time on private funds, provided either by the offset implementer or by investors.

The initial funds for the implementation of biodiversity banks usually come from investments of the biodiversity offset supplier or bank implementer interested in generating biodiversity credits either to compensate for its own impacts, or to sell them. It is an investment, usually materialized through an agreement between the biodiversity banker and the government.

Initial funds are necessary to implement the offset and to operate it for a certain period of time. As noted above, in theory these funds are additional, because they are private funds coming from forestry investors or third parties who become biodiversity bankers, and because these types of offsets would probably not have been implemented without these funds or investments.

In addition to the implementation of a biodiversity bank, its operation and maintenance depends on the existence of demand for biodiversity credits. If there is demand for biodiversity credits produced by biodiversity banks and there is a market, biodiversity bankers (e.g., private investors, or actors from the forestry sector) could sell their services (biodiversity credits). The money obtained through the purchase of biodiversity credits could support the maintenance and operation of the system. More details about the funding of a biodiversity banking system on public lands will be addressed in the case study (Legal Framework chapter).

Financial additionality, as was initially considered by the climate change regime (developed countries funding the implementation of mechanisms such as REDD and CDMs in developing countries) is not included within the discussion of the Additionality chapter, as it is not relevant to biodiversity banks.

ii. Technical or environmental additionality

As noted earlier, biodiversity offsets and, therefore, biodiversity banks are usually created as policy tools to achieve environmental goals, and their environmental objectives. The technical or environmental additionality of biodiversity offsets or biodiversity banks refers to the additional environmental outcomes that a biodiversity offset must produce. These environmental benefits or outcomes should be additional to other conservation activities that would have occurred in a BAU scenario. In other words, a biodiversity bank would be considered technically additional if the environmental outcomes produced by the biodiversity bank would have not occurred in the absence the biodiversity bank project.[486]

As noted earlier, within the climate regime, this environmental additionality refers to the environmental additionality or GHG emission reductions that have to be additional to those achieved in a BAU scenario. In our case, if a biodiversity bank was created to pursue conservation of an endangered type of wolf, it could be considered technically additional if it helped increase the population of those wolves in the jurisdiction where the biodiversity bank was implemented and operated, and only if the increase of the wolf population was not a direct effect of other policies or mechanisms.

iii. Legal or regulatory additionality

This type of additionality responds to the question of whether the project is required by existing law or regulation or not.[487] In theory, a project would only attain a regulatory surplus if it were not a response to a legal condition or requirement imposed by any existing law, policy, statute, or other regulatory framework. Therefore, the project would need to be additional to what the legal framework required. There is no doubt regarding the legal additionality or surplus of a voluntary offset system, which has been implemented without being legally required. It is clear, if they were not required by law, their implementation would be considered a legal surplus, because they would be going beyond

[486] Global greenhouse warming, *Additionality-Carbon Markets,* online: <www.global-greenhouse-warming.com/additionality.html> ,[*GGWADD*].
[487] See Christopher Sherry, "Landfill Gas Offset Projects in the Regional Greenhouse Gas Initiative" (Presentation delivered at the 12th Annual LMOP Conference Baltimore, MD, 13 January 2009), online: <www.epa.gov/lmop/documents/pdfs/conf/12th/sherry.pdf>.

what law requires, or in this case what law does not require. There might be, however, some doubts regarding the additionality of regulatory biodiversity banks. The question that arises is whether biodiversity offsets and biodiversity banks emerging from a regulatory program supported by specific laws and regulations could comply with the "legal additionality" requirement, as one of the essential principles of any biodiversity offset and if they could produce a legal surplus.[488] This question will be further elaborated in the case study (Additionality chapter).

2.3 Effectiveness of biodiversity banking systems in practice

How effective have the biodiversity banking systems described by this dissertation been in practice? Have these systems followed all the essential principles determined to be essential to effective offsets? Have they contributed to conservation outcomes? This subsection tries to answer these questions.

Despite all the benefits provided by offsets in general, and biodiversity banks in particular, like other market based approaches, these instruments constitute only one of several policy options. Biodiversity banks cannot be used to solve all existing environmental problems. Because they deal with non-fungible elements, their effectiveness has been sometimes jeopardized, mostly due to technical and methodological limitations, which, although beyond the scope of this dissertation, will be briefly described here.[489]

It is important to question the effectiveness of the biodiversity banking systems in place and further our understanding of what constitutes effectiveness for biodiversity banking.

Different studies have measured the effectiveness of some of the biodiversity banking systems in place such as the U.S mitigation banking system, and the conservation banking system,[490] which are two of the oldest biodiversity banking systems.

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[488] *GGWADD*, *supra* note 486.

[489] Technical and methodological aspects, such as the analysis of the design of metrics and ratios to measure achievement of environmental goals and environmental policy goals are beyond the scope of this dissertation, because their study would require further expertise in areas such as Biology, and environmental sciences.

[490] See for example Richard F. Ambrose, "Wetland Mitigation in the United States: Assessing the Success of Mitigation Policies" (2000) 19 *Wetlands (Australia)* 1-27, online: <http://ojs.library.unsw.edu.au/index.php/wetlands/article/viewFile/264/319>, [*Ambrose*]. See also Rebecca

The BioBank system in NSW, Australia is a much newer system, which started operations in 2008-2009. This system was subject to a formal review process under the *Threatened Species Conservation Act.*[491] This review, which started in 2012, aimed to identify weaknesses and strengths of the NSW BioBanking scheme and the effectiveness of the BioBanking Assessment Methodology.[492] Furthermore, as noted earlier, the Government of NSW has proposed a new *Biodiversity Conservation Act*, which proposes a new Biodiversity Offsets Scheme, based on a more scientifically robust Biodiversity Assessment Method (BAM)[493] to assess biodiversity values both at the BioBank site, and where future development and infrastructure projects will be implemented. The assessment will determine aspects such as effectiveness of management actions proposed to be carried out on site, the number and types of biodiversity credits that a bank will create, as well as the impacts caused by the development as well as the number and type of biodiversity credits needed to compensate for the residual impacts.[494]

One of the limitations of the studies measuring the success or effectiveness of the biodiversity banks systems is that their effectiveness has been measured based on the achievement or lack of achievement of the environmental objectives pursued by the systems. Both U.S. biodiversity banking systems use acreage as currency, which is suboptimal for measuring biodiversity values.

Furthermore, the US studies are old studies, which do not include further analysis regarding the implementation or even consideration of the other biodiversity offsets principles, such as additionality or other design related aspects, or a deeper analysis of

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L. Kihslinger, "Success of Wetland Mitigation Projects" (2008) 30:2 *National Wetlands Newsletter* 14, online: <http://www.tetonwyo.org/compplan/LDRUpdate/RuralAreas/Additional%20Resources/Kihslinger%202008.pdf>, [*Kihslinger*].

[491] See *Threatened Species Conservation Act*, *supra* note 351.

[492] Australia, NSW, Office of Environment and Heritage, *Review of the BioBanking Scheme*. online: <www.environment.nsw.gov.au/biobanking/bbreview.htm>, [*RevScheme*].

[493] See Australia, NSW Office of Environment and Heritage, *BioBanking Scheme: Statutory Review Report* (Sydney: OEH NSW, 2014), online: <http://www.environment.nsw.gov.au/resources/biobanking/140695BBRev.pdf >, [*NSWBBREV*]. See also Clayton UTZ, *Sweeping biodiversity and native vegetation reforms proposed for NSW*, online: <http://www.lexology.com/library/detail.aspx?g=c8aa1d3a-1704-48a4-90d8-406d49f272a5>.

[494] See New Biodiversity Conservation Bill 2016, *supra* note at Part 6, division 3, s.s 6.11, 6.12 and 6.13

assessment methods.[495] Some of these essential principles were, however, analysed in the context of the NSW BioBanking system.

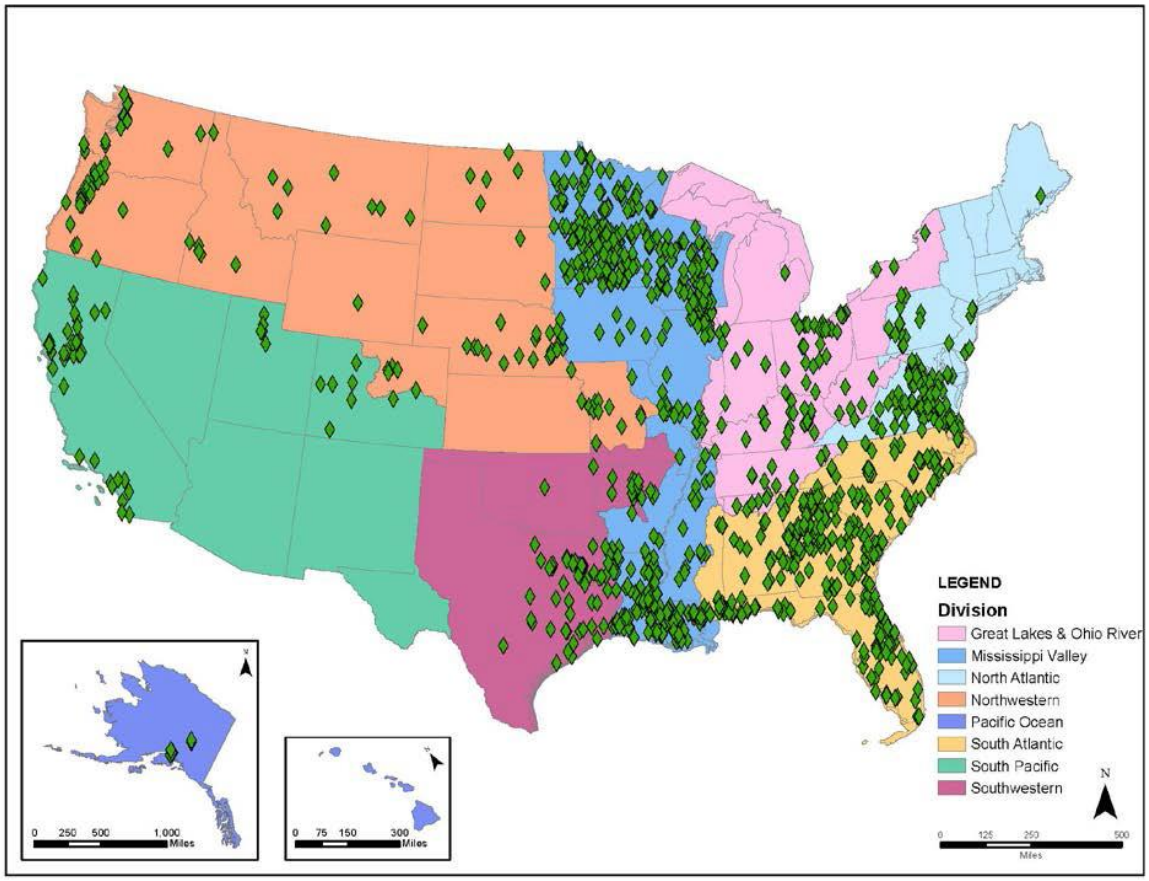
Despite the limitations of these studies, this section briefly describes some of the achievements of the three biodiversity banking systems, such as their use, their environmental outcomes, and their cost efficiency.

2.3.1 Wetland Mitigation Banks

The first banks under the Wetland Mitigation Program were initially implemented in the early 80's. However the first banks designed to sell credits to developers were implemented in the 90's, with only 46 banks permitted. Since then, the use of mitigation banks has exponentially increased to over 1,800 approved mitigation banks by August of 2013.[496] The rise in number of wetland mitigation banks is a result of clearer mitigation rules,[497] increasing requirements to use compensatory mitigation and the cost efficiency of these instruments, which becomes an incentive for bankers and developers to participate in the system.[498]

[495] See *Ambrose*, *supra* note 490 at 9.
[496] MITBANKFACTS**,** *supra* note 42.
[497] The Institute for Water resources indicates that the use of mitigation banks has increased since the creation of the 1995 and 2008 rules, suggesting that the increase in use of biodiversity banks was encouraged by the rules. Institute for Water Resources (IWR), *The Mitigation Rule Retrospective: A review of the 2008 regulations Governing Compensatory Mitigation for Losses of Aquatic Resources* (IWR, 2015) at 59, online: http://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/2015-R-03.pdf, [IWR2015].
[498] *CALCONSMIT*, *supra* note 41.

Figure 3: Locations of all approved mitigation bank sites through 2014.



Source: Institute for Water Resources (IWR).[499] *The Mitigation Rule Retrospective: A review of the 2008 regulations Governing Compensatory Mitigation for Losses of Aquatic Resources* (IWR, 2015) at 60.

Biodiversity credits as an option to meet mitigation requirements

A study conducted by the Institute for Water Resources showed that "an average of 49 percent of standard permits issued during 2010-2014 required compensatory mitigation."[500] Of the totality of authorizations required to undertake compensatory mitigation, the majority of developers used mitigation bank credits to meet their residual mitigation obligations.[501]

[499] *Ibid*, at 60.
[500] *Ibid*, at 31.
[501] 41% used mitigation bank credits. Their use increased since 2012. 11% used in-lieu, 37% did on site permittee-responsible mitigation, and 10% conducted off-site permittee-responsible mitigation. Institute for Water Resources, *The Mitigation Rule Retrospective: A Review of the 2008 Regulations governing*

Cost efficiency of biodiversity banks

The cost efficiency of biodiversity banks has been mostly linked with shorter waiting times in permit approvals,[502] and not to the cost of biodiversity offsets construction, and/or to the profits obtained by the biodiversity banker, due to the lack of studies analysing the two latter considerations.[503] However, as the OECD 2016 report shows, acquiring credits from a mitigation bank can be cheaper than implementing the offset itself. An anecdotal example provided by the report showed that a developer, who purchased credits for USD 60,000, saved USD 240,000, because implementing the offset itself would have had a cost of around USD 300,000.[504] Although the report did not say anything about the reasons for these savings, it can be argued that the developer saved money because it did not need to incur any unexpected charges. Other reasons are that it is cheaper per unit for it to restore larger parcels of land than smaller tracts, and the waiting times to obtain the project's permits are shorter, so the developer can begin to work and to produce profits sooner.

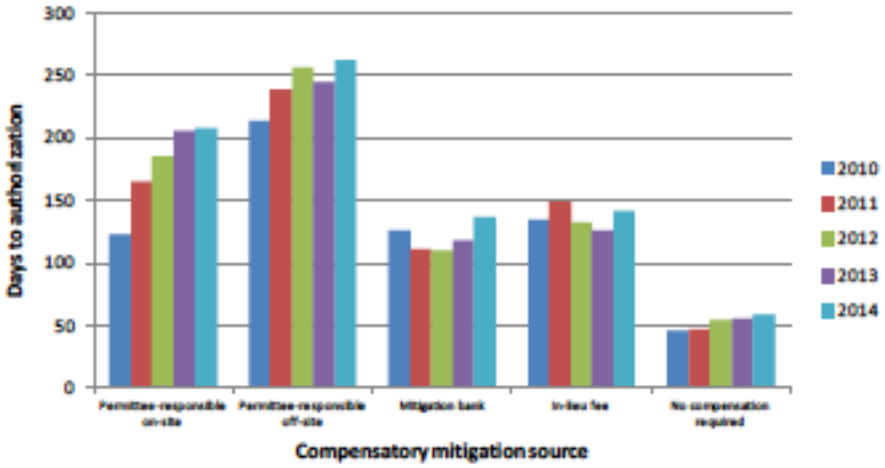
Compensatory Mitigation for Losses of Aquatic Resources (Oct., 2015), online: http://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/2015-R-03.pdf>.

[502] 120 days vs. offsite compensatory mitigation 243 days if the permittee wants to conduct the mitigation measures itself. *Ibid* at 12.

[503] Prices of biodiversity credits are not usually a result of market research, or negotiations between bankers and clients but are usually long-term standard prices set for a given region. Such a price follows a "cost-plus" approach and covers the cost of implementing the offsets under the bank and some profits high enough to be an incentive for bankers to implement them, but without taking advantage of developers. See OECD report, 157.

[504] See also OECD 2016, supra note 1 at 157-158. Morgan Robertson and Nicholas Hayden, "Evaluation of a market in wetland credits: Entrepreneurial wetland banking in Chicago" (2008), 22/3 Conservation Biology, 636-646.

Figure 4: Average processing times for permit authorizations, 2010-2014



Source: The Institute for Water Resources, *The Mitigation Rule Retrospective: A Review of the 2008 Regulations governing Compensatory Mitigation for Losses of Aquatic* Resources (Oct, 2015)

Environmental outcomes

An inventory performed by the Environmental Law Institute (ELI) in 2001 identified 219 approved banks, 95 under review, and 40 approved "umbrella banks" (i.e., banks developing multiple compensation sites under a single instrument),[505] which restored, enhanced, or conserved about 173,000 acres of wetlands. The OECD 2016 report stated that assessing the equivalence between what is lost at the impact site and the environmental outcomes provided by biodiversity offsets should be science based. However, according to the OECD report evaluations of the magnitude of the functions lost at the proposed sites and at the offset site have not followed thorough assessments. Such situation has led to difficulties in measuring equivalency, and therefore the overall success of the program in practice. [506]

[505] While the 219 approved banks restored, enhanced or conserved about 139,000 acres, the 95 banks under review restored about 8,000 acres, and the 40 umbrella banks provided environmental benefits for approximately 26,000 acres. See ELI, *Bank and fees: The status of Offsite Wetland Mitigation in the United States,* (Washington, DC: Environmental Law Institute, 2002), [ELI2002].
See also *MITBANKFACTS*, *supra* note 42.
[506] OECD 2016, *supra* note 1 at 161.

Despite not knowing the exact environmental outcomes provided by biodiversity offsets under biodiversity banks, the OECD report showed that the annual wetland loss decreased from 458,000 acres per year in the 70's to 13,000 acres per year in 2009. Such an improvement in achieving environmental goals is probably linked with clearer rules, specifically with the *CWA* and its mitigation instruments. [507]

In terms of economic efficiency of the system, the wetland mitigation market injects an important amount of money into the U.S. economy. This market generated, for example an estimate of $1.3 - $2.2 billion for the year 2008. Of this total, wetlands account for $1.1 - $1.8 billion and streams accounted for $240 - $430 million.[508]

Effectiveness of Mitigation banks according to studies

Some of the general limitations affecting the effectiveness of biodiversity banking systems in the US were identified in 2001 by the U.S. National Research Council report "*Compensating for Wetland losses*."[509] The report concluded that the Wetland Mitigation program in the U.S. was not complying with its NNL policy. In 2002, Richard Ambrose discovered that many Wetland Mitigation projects were not fully successful "from both a compliance standpoint and a function standpoint."[510]

According to the results of the studies described below, the lack of success of the U.S. mitigation banks have had to do with: i) use of inadequate currencies and ii) inadequate assessment methods. Each of these aspects is explained below.

i. Use of inadequate currencies – focus on quantitative currencies

A study published by Rebecca L. Kihslinger and the Environmental Law Institute in 2008 showed that "approximately 47,000 acres of Wetland Mitigation are required under the s. 404 programs of the U.S. *Clean Water Act* to compensate about 21,000 acres annually."[511] These banks would produce, at least in theory, a NG, from the acreage standpoint.

[507] *Ibid* at 132-133.
[508] Ecosystem Market Place, *State of Biodiversity Markets Report Compendium: Methods Appendix* at 5 (undated), online at: <http://www.ecosystemmarketplace.com/wp-content/uploads/2015/09/sbdmr_methods.pdf>.
[509] US, National Research Council, *Compensating for Wetland Losses under the Clean Water Act* (Washington: NRC 2001) online: <http://www.nap.edu/read/10134/chapter/1 >.
[510] See *Ambrose*, *supra* note 490 at 20.
[511] *Kihslinger*, *supra* note 490 at 14. See also *Clean Water Act*, 33 USC §1251 et seq (1972).

However, not even the NNL policy was achieved in practice.[512] A survey of projects implemented under the above mentioned section of the *Clean Water Act* revealed a high rate of non-compliance with permit conditions.[513] However even where projects were deemed to be compliant this was often due to poor regulatory assessment of the compliance.[514] Thus even though permittees met 73% of their permit conditions in 2007[515] the measurement of this compliance focused on management rather than performance standards. As a consequence, success was evaluated in terms of acreage instead of a real NNL environmental goal and was achieved in the majority of cases. [516] In 2015, a study of the Institute for Water Resources identified that the average annual authorized impacts to wetlands were 13,338 acres per year between 2007 and 2014. During that time the compensation ratio increased compared to the early 2000's. Instead of compensating one acre of wetland gain with one acre of loss, the compensatory mitigation required was almost 3:1, or 29,624 acres of wetland gain to compensate for 13,338 of wetland loss.[517] However, the report does not say whether that amount of lands was actually restored or mitigated in practice.

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[512] *Ibid*.

[513] *Ambrose*, *supra* note 490 at 8 reports that only a minority of permits issued under section 404 of the *Clean Water Act* actually required compensation mitigation. This requirement varied in different places. Before 1992, in Louisiana about 41 % of the permits required mitigation, only 3 % of the permits in Oregon required them, and 13 % of them required mitigation in Orange County. See Sifneos et al, 1992, Kentula et. al. 1992, and Sudol 1996, cited by Ambrose. The result of these permits and projects had varied. While some had failed to obtain no net loss, others had succeeded. California State, for example registered a net gain of wetlands (about 0.06 %). However, some other wetland mitigation banks never became fully operational. See Shelley Burgin "Mitigation banks for wetland conservation: a major success or an unmitigated disaster?" (2010) *Wetlands Ecol Manage*, 18:49-55 at 52, online: **<**https://www.researchgate.net/publication/225823040_'Mitigation_banks'_for_wetland_conservation_A_major_success_or_an_unmitigated_disaster>, [*Burgin*]. See also R. Eugene Turner, Ann M. Redmond and Joy B. Zedler "Count it by acre or function—mitigation adds up to net loss of wetlands" (2001) *NatWetl News* 23(6), online: <http://files.ali-cle.org/files/coursebooks/pdf/Ck081-ch18.pdf>.

[514] See Ambrose, *ibid* at 9.

[515] See Richard F. Ambrose et al, California State Water Resources Control Board, 2007, *An Evaluation of Compensatory Mitigation Projects Permitted under the Clean* Water Act, section 401 by the California State Water Resources Control Board, 1991-2002 at ii. online: < http://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/mitigation_finalreport_full081307.pdf>, [*Ambrose2007*].

[516] See *ibid* at 11.

[517] See IWR 2015, *supra* note 497 at 26.

Nevertheless, acres fail to replace the values and functions of wetlands. The main problem is that wetlands and other ecosystems are not exactly the same, and their values are, therefore, not always equivalent.[518]

The acreage currency is not a conclusive indicator of the wetland or habitat banking success. Wetland banks did not achieve a NNL of wetland functions and process, because in-kind habitat values were not replaced.[519] "If acres alone were the criteria, low–function mitigation wetlands could replace highly functioning natural wetlands, and this would be contrary to the overall goal of protection wetland functions and values. Therefore, the current interpretation is there should also be no net loss of wetland functions and values."[520] Based on this idea, a "highly functioning mitigation wetland could replace a low-function natural wetland using a smaller area."[521] According to the 2008 Mitigation Rules, the protection and replacement of wetland function and values has to follow a watershed approach and can lead to achieving NNL or net gain, depending on the activities undertaken under the bank.[522]

Despite the historical focus on acreage instead of on functions, a study developed by Kihslinger confirmed that as late as 2007 neither acres, nor functions were fully replaced in practice, suggesting that s. 404 of the *Clean Water Act* was failing to replace both elements.[523]

ii. Inadequate assessment methods

Another problem has been that using broader and more comprehensive assessment methods to determine or value ecosystem services are more expensive and require greater technical expertise. This reduces the feasibility of incorporating ecosystem services in the design of any biodiversity-offset system. Regulations in place do not indicate methods to be used. The Wetland Mitigation regulation, for example, states that the method of

[518] For an exhaustive review of the complexities in ensuring NNL or NG is actually achieved see generally *Ambrose 2007*, *supra* note 515 at 263-270, Appendix 9 Mitigation Bank Analysis.
[519] See *Ambrose 2007*, *ibid* at iv. See also *Burgin*, *supra* note 513 at 53. It says that "the outcomes frequently fall short of "like-for-like."
[520] *Ambrose*, *supra* note 490 at 3-4.
[521] *Ibid* at 4.
[522] Restoration activities such as reestablishing wetlands can lead to net gains in aquatic resource area and functions. See also US Army Corps of Engineers, IWR2015, *supra* note 497 at 23.
[523] *Kihslinger*, *supra* note 490 at 15.

assessment will be determined based on "best professional judgment." However, it does not specify how this judgment will be made, and this can lead to the use of inadequate currencies, and as a consequence to externalities.[524]

2.3.2 Conservation Banks

Although the Conservation Banking system is still a much smaller program than the Wetland Mitigation Banking system, the number of conservation banks has also increased since the creation of the program in the 90's. [525]

While the program began by approving one bank in 1994, the annual approval rate has grown to between 5 and 10 per year since 2005.[526] As of March 2013, there were 105 approved conservation banks, mostly located in California.[527] Ninety-three of these banks were active, and the remaining twelve were sold-out.[528] Conservation banks covered nearly 75,000 acres, and conserved over 35 species, including vernal pool species, the California tiger salamander, and the San Joaquin kit fox.[529] U.S. conservation bank credits generated USD200 million in 2009.[530] Since 2013, the number of conservation banks has grown. By May 2016 this research found 140 registered conservation banks,[531] and which had protected an estimated 168,324 acres. [532]

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[524] Salzman and Ruhl explain how inadequate assessment methods can lead to inaccurate currencies and therefore, to a lack of compliance with the policy goals pursued by the bank. However, the US Army Corps of Engineers, the EPA and state agencies have improved their assessment methods, and have adopted more refined functional assessment methods. In other words they have adopted more qualitative assessment methods instead of purely quantitative methods to measure ecological losses and gains: See *SALZRUHL*, *supra* note 425 at 13. See also J.B. Ruhl, James Salzman & Iris Goodman, "Implementing the new ecosystem services mandate of the section 404 compensatory mitigation program – A catalyst for advancing science and policy" (2009) 38 *Stetson Law Review* 251, at 266, online: < https://discoverarchive.vanderbilt.edu/bitstream/handle/1803/5902/Implementing_the_New_Ecosystem.pdf?sequence=1>.

[525] See DOI, *Conservation Banking Overview and suggested areas for future analysis* (2013), at 7, online:< https://www.fws.gov/endangered/landowners/pdf/Conservation%20Banking%20Overview%20DOI-Sept2013.pdf>.

[526] From 1995 to 2011. See DOI, *Ibid* at 10.

[527] *Ibid,* at 10

[528] *Ibid,* at 9

[529] *Ibid,* at 11 -12

[530] Madsen, *supra* note 264 at 18.

[531] Regulatory In-Lieu Fee and Bank Information Tracking System, *Approved conservation banks*, online: <https://ribits.usace.army.mil/ribits_apex/f?p=107:2>.

[532] *Ibid*.

Achieving NNL

In 2004, Jessica Fox and Ana Maria Nino-Murcia conducted an study on 76 banks, covering 15,987 ha, which were home to more than 22 listed species in the U.S. at the time of the study.[533] From this, only 35 were official banks, implemented through agreements approved by the U.S. Fish and Wildlife Service (USFWS). This study did not analyse whether or not each of the existing conservation banks achieved their NNL goals. According to the study the official Banks did "not necessarily meet the ideal ecological profile outlined in federal and state guidance."[534]

Conservation banks face similar issues to those ones faced by wetland mitigation banks such as use of inadequate assessment methods. Other issues faced by the system were substitutability and technical issues, and bureaucratic and administrative problems. Each of these issues is explained below.

i. Used of inadequate assessment methods – more focus on quantity

The analysis of conservation banks did not include broad and integral analysis methods. The Banks focused on NNL, without explaining what it meant. As a result, the assessment of NNL did not include a qualitative analysis to conserve the most relevant biodiversity values for species and their interactions with social and economic aspects. From the ecological perspective, Fox and Nino-Murcia stated that some of the ecological failures of the conservation banks in the United States were aspects related to their extension, location, type and credit ratios.[535] In terms of extension, conservation banks should be large enough to maintain ecological integrity in perpetuity. In terms of location, conservation banks must be located adjacent to existing managed areas in order to increase the benefits for species. In terms of credit ratios, biodiversity banks need to show that impacts are ecologically equal to mitigation.[536] As the authors mentioned, the needs

[533] Jessica Fox & Ana Maria Nino-Murcia, "Status of Species Conservation Banking in the United States" (2005) 19:4 *Conservation Biology* 996 at 996, online: <faculty.jsd.claremont.edu/emorhardt/159/pdfs/2006/Fox.pdf>, [*FNM*].
[534] *Ibid* at 1005.
[535] *Ibid* at 1005-1006.
[536] *Ibid* at 1005.

of the species must to be taken into account "in conjunction with the overall size of the bank and proximity to preserves."[537]

ii. Substitutability, technical aspects and limited use

Most studies analysing the effectiveness of conservation banks had certain limitations in their scope. They are old, and did not discuss aspects such as the challenge of biodiversity substitutability, or technical aspects needed to validly and adequately determine what is being lost, and the conservation or enhancement activities needed to be carried out to compensate for that loss. These aspects will not be analysed in this section because they are beyond this author's area of expertise.[538]

One question that we can ask is why the use of conservation banks has not increased as much as wetland mitigation banks?

As noted earlier in this section, the amount of operating conservation banks is still small compared to the wetland mitigation banks. Considering all the technical challenges to implement them, one of the reasons for the small number of conservation banks might be the need for clearer rules to help implementers implement and operate them in a more effective and secure way. As already noted, data provided by the Institute for Water Resources in 2015 showed a rapid increase in the use of wetland mitigation banks since the creation of their 2008 regulations.[539] The creation of the new *FESAPOL* and its interim guidance could also improve the conservation banking system.

2.3.3 Effectiveness of the NSW BioBanking system in Australia

The NSW BioBanking review found that BioBanking has been effective from the environmental standpoint. "Over the six years that BioBanking has operated, almost 5000 hectares of native vegetation has been set-aside under BioBanking agreements to be

[537] *Ibid*.
[538] One of the few reports that considered these issues was a 422-page report on Compensatory Wetland Mitigation for the California State Water Resources Board prepared by Dr. Richard F. Ambrose and six colleagues in the Environmental Science and Engineering Program and in the Department of Environmental Health Sciences at the University of California, Los Angeles and five colleagues at the Department of Environmental Science of the University of San Francisco. See *Ambrose 2007*, *supra* note 515.
[539] IWR 2015, *supra* note 497 at 631.

managed in perpetuity for conservation purposes."[540] Furthermore, the NSW BioBanking program is estimated to collect AUD 337.9 million over a 30-40-year period to implement the Growth Centre's Biodiversity Offset Program.[541]

Different from the U.S. and the Canadian effectiveness studies briefly described in the previous sub-sections, the NSW BioBanking review process has been a comprehensive one based on consultation with stakeholders. As a result of this review, the existing NSW BioBanking methodology[542] was revised and updated, and a new NSW Biodiversity Offset Policy for Major Projects was developed. The policy aimed to clarify, and standardize biodiversity offsetting for major project approvals under the NSW planning process. More about this new policy will be explained in the case study (Legal Framework chapter).

The NSW review does not provide a succinct description of the level of achievement of the systems in regards to each of the offsets essential principles. However, it provides a series of recommendations to improve the overall functioning of the BioBank system and make it more appealing such as through improving landowner and developer participation, having a more standardized methodology, and clear rules. These recommendations indirectly addressed most of the biodiversity offsets essential principles including metrics, the targeted harm, environmental and environmental objectives, and additionality.

i. Compliance with mitigation hierarchy

Regarding the targeted harm, the NSW review recommends the issuance of specific guidance for demonstrating that a development has undertaken all reasonable measures to avoid, minimize, and mitigate its impacts to biodiversity before acquiring biodiversity offsets to compensate for those impacts.

ii. Compliance with the environmental goals and objectives

With regards to the environmental and environmental objectives pursued by the NSW BioBank system, the review indicates that as a result of the six years of work of the system, there has been a net gain, delivered through restored or conserved "areas supporting 15

[540] Australia, NSW, Office of Environment and Heritage, *BioBanking Review: Findings and recommendations*, online: <www.environment.nsw.gov.au/biobanking/bbfindings.htm>, [*BioBanking findings*].
[541] See *Madsen 2011*, *supra* note 24 at 23.
[542] The BBASSMETH became the BBASMETH2014. See supra note244.

different endangered and critically endangered ecological communities, and providing habitat for a range of threatened species, including the spotted-tailed quoll and woodland birds such as the swift parrot."[543]

iii. Additionality

Concerning additionality, the NSW review specifies that when biodiversity banks are established on lands subject to an existing conservation obligation, the conservation measures or actions that are already required to be carried out on the land have to be discounted, and only those restoration or conservation activities that are additional to those mandated activities should be considered "additional." The additionality of each biodiversity bank is calculated based on an additionality guideline developed by the Office of Environment and Heritage (OEH).[544]

Perhaps because the NSW BioBanking scheme has thus far been mainly a private scheme, which was applied to private lands, with the participation of landowners as biodiversity bankers, the review of the NSW BioBanking system found that "there is a lack of clarity around the level of additionality applied to public lands" even though their use is a possibility in the system.[545] Currently, the level of additionality that applies to a particular parcel of council (public) land depends on various factors, including whether a plan of management is in place, what the conservation and restoration obligations are under that plan of management, and the way additionality is calculated by the OEH. The review found that these additionality guidelines needed further clarity in determining the level of credit discounted from the conservation or restoration activities already in place, and consequently in more accurately and clearly determining which of the conservation and restoration activities undertaken as part of a biodiversity bank were additional.[546]

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[543] See *BioBanking findings*, *supra* note 540.

[544] See the Additionality guidelines, see *BBASSMETH*, *supra* note 244, at clause 12.10.

[545] Part 2, Section 4 (e) of NSW's *Threatened Species Conservation (Biodiversity Banking) Regulation 2008* specifies certain requirements to create biodiversity credits on lands subject to existing conservation obligations. The requirements also apply to publicly owned lands. Part 2, section 4 (3) of the same regulation states "Publicly owned land means land owned by, or, under the control of, the State, the Commonwealth or a public authority, other than land that is the subject of a perpetual lease or land that the Minister is satisfied is being managed by a person or body (other than the State, the Commonwealth or a public authority under a long term lease, licence or other arrangement." See *BioBanking regulation 2008*, *supra* note354.

[546] See NSWBBREV supra note 493 at 18.

As opposed to the U.S. and the Canadian systems, the NSW BioBanking scheme follows a hybrid quantity-quality approach. The biodiversity banks implemented and operated under the system aim therefore to compensate not only for a specific number of hectares impacted, but for the type and quality of biodiversity (either ecosystems, or species) impacted.[547] The system focuses therefore on replacing biodiversity values. These biodiversity values are measured based on the percent of native vegetation cover and ecological communities in the landscape, connectivity value, patch size, area to perimeter ratio, and strategic location of biodiversity offsets under a biodiversity bank.[548] As noted earlier, the quality of vegetation and species is mapped and scored based on a table of attributes. The maximum attributes act as a benchmark.[549]

The methodology followed by the NSW BioBanking system has, however, some limitations. The review identified some inconsistency in the methods used to assess the impacts of development on biodiversity, and state-federal duplication and inconsistency in environmental approvals.[550] As noted earlier, the review led therefore to a new, and improved BioBanking methodology.

2.3.4 Lessons learned from the effectiveness of biodiversity banking systems

Despite the lack of up to date studies analyzing the effectiveness of biodiversity banking systems in place, this section shows that although the systems have not been perfect in practice, their experience provide some valuable lessons. For example, quantity currencies are not enough to achieve NNL, simple or narrow assessment methods can be cheaper, but not as viable to achieve NNL, and the development of specific science - based methodology needs to be taken into consideration and somehow included into the legal framework supporting the implementation and operation of biodiversity banks, either on private or on public lands.

Beyond these technical challenges, one of the more important lessons learned from these systems is that they need clear rules to be effective. Clear rules can help biodiversity bank

[547] See Australia, NSW, Department of Environment and Climate change, *BioBanking Methodology and Credit Calculator Operational Manual* (Sydney: DECC NSW, 2009) at 3, online: <http://www.environment.nsw.gov.au/resources/biobanking/09181bioopsman.pdf>

[548] See BBASSMETH, supra note244.

[549] See *Ibid*.

[550] See NSWBBREV supra note 493 at 6.

designers and implementers guide the implementation of long lasting and technically viable offsets under the systems. They can also guide the production of credits and the creation and operation of consistent trading systems. In addition, clear rules can help to increase the perceived legitimacy of the arrangements and increase public confidence that environmental values are being adequately respected in development decisions. All these elements have helped biodiversity banking designers and managers to improve their own systems, as well as design better and more reliable future biodiversity banking systems.

Conclusions

The conceptual section demonstrated that biodiversity offsets, including biodiversity banks have been increasingly used in an attempt to balance development goals and the residual biodiversity loss problem caused by development in different jurisdictions of the world. Biodiversity offsets have evolved from voluntary instruments used on a project-by project-case, to regulatory systems characterized by standardized rules that facilitate their use by several participants simultaneously.

Regulatory biodiversity offset systems with several participants, such as biodiversity banking systems require clear rules and regulations to ensure, for example, that biodiversity offsets implemented under a bank are permanent, as well as to achieve their environmental goals, such as species at risk conservations and environmental objectives, such as NNL of species at risk.

As noted in this section, the increasing use of biodiversity banking systems is probably linked with their cost efficiency. Although this research did not find much available information regarding how cost efficient the different biodiversity banking systems studied by this dissertation have been, some examples identified while studying the effectiveness of these systems indicate that it is cheaper for a developer to buy biodiversity credits from a biodiversity bank than to engage in restoration activities. This is not only because the developer will not need to be responsible for carrying out all the required restoration activities, and have unexpected expenses, but also because the waiting time to obtain a project permit is much shorter than if the developer would have mitigated the damage

itself. This situation has encouraged more developers to buy credits from biodiversity banks, creating demand for biodiversity credits, and consequently a market for them.

The demand for credits offers an incentive for private parties such as conservation organizations or others to become bankers and implement biodiversity offsets under each biodiversity bank. The price of biodiversity credits within biodiversity banking systems is valued up to USD 300, 000 per credit, and is estimated to be worth around USD 3 Billion per year.[551]

However it is not clear yet whether the U.S. and the NSW biodiversity banking systems have been effective in practice and whether they have achieved their environmental goals and outcomes. As this section showed, one of the limitations of the studies analysing the effectiveness of the systems is that they exclusively linked their effectiveness with achieving their environmental objectives, such as NNL. According to the studies, for example, "acreage gains" have been attained. However the studies did not measure whether the other essential principles such as assessment methods and additionality were achieved or even taken into account at the time of designing, implementing and operating biodiversity offsets.

Lessons learned from the biodiversity banking experience in the U.S. showed that assessment methods, ratios, and even currencies could be better identified and used if biodiversity banks under biodiversity banking systems followed clear environmental goals and objectives. Furthermore, knowing what is being protected and the scope of the protection could help assess whether or not the biodiversity banks in place achieve their pursued goals, and consequently, whether they are effective. However, the additionality of biodiversity banks has not been evaluated.

The analysis of the inclusion of the biodiversity offsets essential principles into the biodiversity banking systems in place helps to identify areas of improvement for the existing biodiversity banking systems as well as areas to consider in the design,

[551] OECD 2016 at 23.

implementation and operation of future biodiversity systems. One of these areas is the need for clear rules to incorporate the BBOP essential principles and make the biodiversity banking systems and the offsets under them more environmentally effective.

Lessons learned from the U.S. banking systems, have led to creating new guidelines and regulations that have tried to address the challenges of meeting the essential principles in practice. This in turn has led to improvements in the use of biodiversity banks in the U.S. For example the Institute for Water Resources found that wetland mitigation banks had exponentially grown since the creation of the 2008 regulations. On the other hand, the issuance of a new U.S. Endangered Species Act Compensatory Mitigation Policy and new and more standardized guidelines is expected to increase the use of conservation banks among other mitigation measures. Furthermore, the experience obtained though these systems and their ongoing improvement encourages the replication of these systems in other jurisdictions of the world. The NSW scheme in Australia, for example, has significantly evolved, becoming a more technical system, with clear rules emerging from a scientific methodology and a strong legal and institutional framework, which will be further analysed in the case study. The issue of obtaining effective biodiversity offsets and biodiversity banks on public lands have not been part of the studies identified and analysed as part of this research.

Despite all its limitations, Canada has shown increasing interest in the applicability of biodiversity offsets and banking in relation to development on public lands. The Government of Alberta, through its planning process, has taken an important step forward in designing and implementing a potential biodiversity offset system for the province. Such a system could facilitate the use of biodiversity banks on public lands. The challenge is how to make these systems incorporate the BBOP essential principles and work effectively and efficiently.

As the government of Alberta has expressed through its requirement for offsets to rest on clear legal foundations, law and regulations play a vital role when designing, implementing and operating biodiversity banking systems on public lands. Within such a context, constitutional law, and property rights could ensure that the provincial government has

the right to implement and regulate such systems, and that private entities could implement and operate biodiversity offsets and banks on public lands.

The next part of the thesis provides more information about the potential challenges emerging from designing, implementing and operating biodiversity banks and biodiversity offsets under them on provincial lands allocated to private entities. It analyses, through a case study focused on Alberta, challenges concerning the type of legal and Institutional framework needed to support a biodiversity banking system; the property or use rights needed to implement the biodiversity offsets, and to transfer the credits emerging from them; and their additionality. Although additionality was not the only principle, which was not incorporated into the analysis of effectiveness of biodiversity banking systems, the next chapter focuses on additionality. The analysis of the other essential principles in laws and regulations supporting the implementation and operation of biodiversity banks and biodiversity offsets under them might be the subject of future studies.

PART II – CASE STUDY

CHAPTER 1: LEGAL FRAMEWORK SUPPORTING A BIODIVERSITY BANKING SYSTEM ON ALBERTA'S PUBLIC LANDS

1.1. Introduction

As noted in the conceptual section of the dissertation, voluntary offsets are usually developed on a project-by-project basis. Voluntary biodiversity offsets usually provide lessons learned, and can become precursors to biodiversity banking systems. Although a legal framework can support voluntary offsets, voluntary offsets usually lack a legal framework providing concrete rules and guidelines to specifically facilitate their implementation and operation. This lack of rules regarding the implementation and operation of biodiversity offsets makes it complicated to engage more participants in biodiversity offset schemes, and to monitor the schemes to ensure that the goals pursued by the offsets are met.

Laws and regulations are important elements of biodiversity banking systems because they provide clear rules to guide the implementation and operation of biodiversity banks.

The review of international experiences in the conceptual section did not identify concrete legal features that exclusively apply to offsets on public lands. As shown in the previous section, the discussion of challenges facing biodiversity offsets on public lands has not been a priority in the debate concerning offsets design and implementation. This is perhaps because, as noted earlier, biodiversity offsets have been mostly applied on private lands.

As shown in the conceptual section, the experience with the three international banking systems does not make any distinction between whether biodiversity offsets and banks are implemented on public lands or on private lands. However, drawing upon lessons learned from these systems, we can argue that certain key legal features need to be taken into consideration at the time of designing, implementing and operating biodiversity banking systems. Key features of a legal framework to implement and operate a regulatory biodiversity banking system are, for example: i) clear rules to establish biodiversity offsets

under biodiversity banks, based on adequate assessment methods to measure biodiversity losses due to development and gains on the proposed biodiversity offsets under a biodiversity bank, ii) rules to create biodiversity credits, iii) rules regarding the creation and operation of biodiversity credits trading schemes, including all the financing mechanism of the system, and iv) rules for the creation and operation of the financial and institutional framework to operate the system[552] In addition, it is important that there exists a legal mandate creating the demand for biodiversity offsets, which creates the incentive to implement and operate biodiversity banks.

This chapter aims to determine whether Alberta has the legal framework with the rules or elements necessary to implement and operate biodiversity banks on its public lands, and if not, what changes would be required in order for biodiversity banks to contribute to mitigating biodiversity loss in the province.

To answer this research question, this chapter analyses the extent to which the criteria identified above are incorporated into the legal and policy frameworks of provinces such as Alberta and the way in which the three international experiences with biodiversity banking systems have incorporated these features into their legal framework.

Based on this analysis the chapter concludes that the current legal and institutional framework of Alberta incorporates most of the key legal features identified herein. It also found that the province does not need to amend its laws and regulations to enable biodiversity banks on public lands. Alberta's current legal and institutional framework provides therefore a solid basis to create and operate a biodiversity banking system applicable to public lands. It also found that creating a biodiversity banking system in a public land context has unique challenges which are not applicable with respect to private landowners. This is because the long-term tenure on public land is less certain as policies may change and the use of public land is also less exclusive, as different parties may make competing claims to various benefits of the land, with respect to surface use, or access to below-surface mineral rights. In order for a biodiversity banking system to be successful it needs long-term and clear rights to the land in question.

[552] See Australia, NSW, Office of Environment & Heritage, *BioBanking framework*, online: <www.environment.nsw.gov.au/biobanking/biobankframework.htm>, [*NSWBIOBFRWK*].

Despite these types of challenges, the chapter shows that acquiring credits from biodiversity banks would not be an extra burden for developers, but an opportunity, because it could be provided as an alternative, or an option to compensate for a part of their existing legal obligations, and could be therefore appealing for developers.

1.2 Legal Framework – Extrapolating the Key Features (components) of a Legal and Policy Framework to implement and Operate a Regulatory Biodiversity Banking System in Alberta

As noted above this subsection analyses whether Alberta's legal framework has incorporated each of the key legal features needed to support a biodiversity banking system.

1.2.1 Creating the demand for biodiversity credits, and biodiversity credit markets

As noted in the conceptual section, one of the characteristics of biodiversity banks is that they create markets for biodiversity credits, by providing the venue and the methods to trade them. Laws and regulations regulating the use of biodiversity banks and biodiversity offsets under them do not necessarily create the demand for biodiversity credits. However, biodiversity credit markets depend on the existence of demand for biodiversity credits. If there is no demand, there is no reason to create biodiversity banks, and of course, no reason to have a market. This is why it is necessary to talk about the demand for biodiversity credits and the role of direct or indirect regulation in creating it to better understand the markets for biodiversity credits.

The demand for biodiversity credits is usually linked with a permitting process, which establishes conditions before a development permit will be issued. This is the creation of a legal mandate for mitigation and compensation activities to offset the impacts of a proposed development project. Legislation can also allow project proponents to comply with permit conditions by acquiring biodiversity credits produced by biodiversity banks. Offsetting the biodiversity impacts with such a purchase is usually one of several options for complying with the permit requirements.

As noted earlier, the U.S. *Endangered Species Act* prohibits actions likely to jeopardize endangered or threatened species, or adversely modify their critical habitat, as well as the

takings of endangered or threatened species, either on public and/or on private lands. This indirectly creates demand for biodiversity credits. Similarly, the *Clean Water Act* creates demand for biodiversity credits to offset the impacts of pollution on wetlands. As noted earlier, both of these Acts serve as drivers for the creation of biodiversity banking systems under other more specialized regulations.[553]

Different from the U.S. biodiversity banking systems, the NSW BioBanking system, a combination of both an indirect law, and the law creating the system per se, create the demand for biodiversity credits, and consequently for biodiversity banks.[554]

The EP&A establishes measures to avoid damage to biodiversity caused by major development projects, by mandating a threatened species assessment for development projects that could have a significant effect on threatened species, populations or ecological communities, or their habitats.[555] Parts 3, 4 and 5 of that *Act* require development projects and other activities that may have negative impacts on species to undergo an assessment process to obtain a Species Impact Statement,[556] which is a condition to obtaining the development consent.[557] The NSW BioBanking scheme was created as an alternative to the threatened species assessment process mandated by the EP&A. Under this alternative, a development project, which will not cause serious and irreversible impacts on biodiversity,[558] has the option of using biodiversity banks to address its significant residual impacts and obtain the development consent or approval. Within this context, the project's proponent can acquire biodiversity credits from a BioBank (s) site

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[553] See section 2.1.4.2 of this dissertation.

[554] Under the NSW BioBanking system, the *Threatened Species Conservation Act* and the *Environmental Planning & Assessment Act* create the demand for biodiversity credits in NSW. While Section 7A (d) of the *Threatened Species Conservation Act* creates a direct demand for biodiversity credits produced by the NSW BioBanking scheme, the *EP&ANSW* indirectly leads to that demand.

[555] *EP&ANSW*, *supra* note 352.

[556] See *Ibid*. While Part 3, of the *EP&ANSW*, specifically s 34 A, regulates consultation procedures concerning threatened species, Part 4 regulates the development assessment and Part 5 regulates environmental assessment. Pursuant to the *EP&ANSW,* the definition of "land" includes a "building" and the definition of "development" includes "(c) the erection of a building, (d) the carrying out of a work, and (e) the demolition of a building, and (f) any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument."

[557] *Ibid.*

[558] According to s 6.2 (i) of the *Biodiversity Conservation Act 2016*, State significant developments are the only developments that could be approved even if they cause serious and irreversible impacts on biodiversity. See *BioConsAct2016*, *supra* note 357.

(s) instead of undergoing the threatened species process mandated by the *EP&ANSW*. Thus it would have to comply with the specifications in terms of number and type of credits stated in the specific BioBanking assessment or BioBank statements.[559]

Although no biodiversity banking system exists in B.C., the government of this province creates demand for biodiversity offsets using indirect legislation. The *EMP* does not create the new obligation of using offsets, but it supports existing Acts and regulations requiring large development projects to mitigate for their impacts as part of an authorization process. Laws mandating mitigation for the projects' impacts therefore indirectly create demand for biodiversity offsets.[560]

Creating the demand for biodiversity credits in Alberta

Section 2 of the *BOPF* states that:

> the requirement for conservation offsets must be specifically enabled and approved by a statute, a policy or a regional plan.

Given this, Alberta could create demand for biodiversity credits through the permit approval process, and/or through an Act or regulation creating and regulating the biodiversity banking scheme.

1.2.2 Creating demand for biodiversity credits through indirect regulation

Based on the analysis of the U.S. and NSW biodiversity banking systems, it could be concluded that demand for biodiversity offsets in Alberta, and therefore markets for biodiversity credits, could be created by requiring oil sands developers to acquire a specific number and type of biodiversity credits as a requirement to obtain a permit to operate.

Demand for biodiversity credits could be created indirectly, using already existing Acts that require the use of mitigation measures. It could be created, for example, through the *Environmental Protection and Enhancement Act* (*EPEA*).[561] Part 2, section 39 of *EPEA* establishes an environmental assessment process applicable to some development

[559] *Threatened Species Conservation Act, supra* note 351, Part 7 A, Division 6, s 127 ZK.
[560] Government of BC, *EMP-Frequently Asked Questions*, online: http://www.env.gov.bc.ca/emop/faq/
[561] *EPEA*, *supra* note 81.

activities. Naturally, oil sand mines and commercial oil sands developments are specifically identified by *EPEA*'s regulation as activities, which have to mandatorily undergo an Environmental Impact Assessment process, and to produce an Environmental Impact Assessment (EIA) in order to be approved.[562]

Oil sands developments and operations require an operation permit from the Alberta Energy Regulator (AER), formerly the Energy Resources Conservation Board,[563] and Environmental Assessments under *EPEA* are an integral part of this sectoral approval process.[564] This means that in order to obtain a permit to implement the development project, the developer also needs to undertake an EIA as part of the approval process. The EIA identifies environmental impacts that might be caused by the proposed development project. It requires developers to avoid the impacts through alternatives to the activities causing the impacts, and requires mitigation activities to reduce the potential impacts if they cannot be avoided. Within this context, both the AER approval process and the *EPEA* EIA process can lead to imposing mitigation and compensatory measures to address impacts of oil sands developments. Just as in the U.S. and in the NSW examples, Alberta's oil sands permit approval process could provide the option of acquiring biodiversity credits from a biodiversity bank serving the area where the impacts are caused, in order to offset residual impacts caused by the proposed development project. Consequently, the approval process could lead to creating demand for biodiversity credits as a way to compensate for residual impacts to be caused by oil sands development projects.

As noted earlier, the NSW *Environmental Planning & Assessment Act* (EP&ANSW) requires the project developer to either undergo a Threatened Species Assessment or to acquire

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[562] For a complete list of activities subject to an EIA in Alberta, see *Environmental Assessment (Mandatory and Exempted Activities Regulation*, Alberta Regulation 111/93, online: <http://www.qp.alberta.ca/documents/Regs/1993_111.pdf>. The EIA forms an integral part of the regulatory approval process.

[563] On June 17, 2013 the Alberta Energy Regulator became the successor of the Energy Resources Conservation Board (ERCB) See AER, "Alberta Energy Regulator to ensure efficient, comprehensive energy regulation", online: <https://www.aer.ca/documents/news-releases/AERNR2013-01.pdf>. The release states "The Alberta Energy Regulator ensures the safe, efficient, orderly, and environmentally responsible development of hydrocarbon resources over their entire life cycle. This includes allocating and conserving water resources, managing public lands, and protecting the environment while providing economic benefits for all Albertans."

[564] See AER, *Introduction to Oil Sands Regulatory Processes* at 6, online: <http://www.energy.alberta.ca/OilSands/pdfs/Introduction-to-Oil-Sands-Regulatory-Processes-Final.pdf>.

biodiversity credits from a biodiversity bank, regulated by the *Threatened Species Conservation Act*, as an alternative to the assessment. Similarly, demand for biodiversity credits could be created in Alberta by requiring the project developer, through the *EPEA*, to consider the use of biodiversity banks as one of the conservation and stewardship tool options described under the *Alberta Land Stewardship Act*, (*ALSA*).[565] To do so, no legal changes to *EPEA* would be required, as elaborated below. Thus, acquiring biodiversity credits from biodiversity banks could even be one of the possibilities to be used without affecting the additionality of the tool, because the biodiversity credits will be provided as an option. Additionality will be explained in the Additionality chapter.

1.2.3 Advantages and disadvantages of creating demand for biodiversity credits through *EPEA*

The main advantage of creating demand for biodiversity credits through the AER permit approval process and the EIA assessment process mandated by *EPEA* is that it depends on the use of statutes and regulations already in place; it does not require the additional work of creating new statutes.

At the time of issuing the EIAs, Alberta Energy and Parks (AEP) could simply require the developer to acquire certain number and types of biodiversity credits to offset any significant residual impact from the development project. For example, one might mitigate the loss of 10 hectares of wetlands with 10 biodiversity credits representing the recovery of 20 hectares of wetland. Such an action would not necessarily need any amendment to the *EPEA* assessment and the AER approval process. However, in order to provide more certainty, an amendment to *EPEA* could include a concrete provision in the *EPEA* clearly stating that projects subject to the EIA assessment could have the possibility of acquiring credits from biodiversity banks. As noted earlier, oil and gas developers who will become the main buyers of these biodiversity credits are already subject to the EIA assessment process. Thus, including this provision in *EPEA*'s EIA regulation would not be an extra burden for developers, but an opportunity, because it would be provided as an alternative, or an option to compensate for a part of their existing legal obligations.

[565] *ALSA, supra* note 118.

It could be argued that one of the negative aspects of creating demand for biodiversity credits as part of the EIA process is that using biodiversity credits as an alternative to restore or conserve in situ could be considered as a legal driver to justify non-compliance with the developer's restoration or in situ restoration obligations through reclamation. This is why biodiversity credits from biodiversity banks should not be used to replace the other mitigation and restoration legal mandates and obligations, such as mitigation and reclamation on site, but should be the last option.

To avoid non-compliance with legal conservation or restoration obligations on site, the scope of possibility of acquiring biodiversity credits to compensate for certain residual impacts caused by the development should be regulated. Both the reclamation mandate and the creation of demand for biodiversity credits would emerge from the same statute, the *EPEA*. As noted above, an amendment to the *EPEA* could specify that biodiversity credits could be acquired to offset significant residual impacts caused by development projects and to comply with mitigation obligations needed to acquire environmental licences and operation permits. This could facilitate determining the scope of use and applicability of each of these policy tools. For example, *EPEA* could expressly state through regulation that acquiring biodiversity credits from a biodiversity bank to address residual impacts would not be a replacement of in situ restoration or of reclamation obligations. This is the approach taken in the U.S.[566] Credits would, as a consequence, only account for a certain percentage of impacts caused by development projects. They would, therefore, target only those significant residual impacts not targeted by reclamation. For example, if 100 hectares of forested land would need to be reclaimed on site, but in practice, 20 hectares of this total amount could not be mitigated on site, because there is a permanent structure on the land, or the impact would be very long term, the 20 hectares could be mitigated by acquiring 20 biodiversity credits representing the restoration of 20 or more hectares of the same type of forested land.[567] If 100 hectares of the same forested land

[566] In the US schemes, no net loss (NNL) is the environmental policy goal. These impacts target residual impacts. This aspect means that biodiversity credits emerging either from wetland mitigation banks or conservation banks would target these types of impacts.

[567] As noted earlier, the amount of hectares needed to compensate for a loss or impacted hectare depends on the currency used and the policy goal pursued. For example if a NNL goal is pursued, 1 hectare could be replaced with 1 hectare of the same type of vegetation (as the impacted vegetation). However if a NG policy

were offset instead, it would go against the mitigation hierarchy principle that mandates the use of biodiversity offsets as a last resort, and only when all other on–site mitigation activities have been used.

1.2.4 Creating demand through the Act or regulation creating the biodiversity banking system – Joint creation - direct and indirect regulations

Biodiversity credit markets, the demand for biodiversity credits and consequently, the establishment of biodiversity banks, can also be created directly, whether through new or existing legislation.

The *ALSA* specifically opens the door to using biodiversity banking.

The *Act* deals with cumulative impacts, conservation and stewardship tools, and conservation plans. Although the *Act* does not expressly regulate the use of biodiversity banking, it could lead to its use. Section 47 (3) (a) states that regulations may require a decision-maker to "impose terms and conditions on an existing or proposed statutory consent to counterbalance the effect of an activity or proposed activity."[568] Those terms and conditions could include the use of biodiversity credits from biodiversity banks to compensate for the impacts of the proposed activity. *ALSA*, therefore, could not only create demand for biodiversity credits, but also support the creation and operation of the biodiversity banking system in Alberta.

The statutory consent that a developer would need to implement its project could be, for example, the EIA assessment process under *EPEA*, and the AER approval process to which oil and gas projects are subject before being implemented. Within this scenario, the role of *ALSA*'s regulation would be to reinforce the creation of demand for biodiversity credits by conditioning oil sands and other development activities subject to the *EPEA*'s EIA process to acquire or create biodiversity credits to counterbalance negative effects caused by development projects. There would be, therefore, a joint creation of demand for biodiversity credits (*ALSA*-*EPEA*). While *EPEA*'s regulations could open the door to requiring biodiversity credits to comply with their environmental legal requirements to obtain their

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goal is pursued, more hectares per impacted hectare would need to be offset to mitigate for the impacts caused by the project.

[568] *ALSA*, *supra* note 118, s 47 (3) a.

requested approval, *ALSA* could reinforce the need for biodiversity credits and enter in detailed aspects to connect impacts to biodiversity benefits, or into identifying specific types and amount of biodiversity credits.

Beyond the terms and conditions applicable to an approval process to counterbalance the effects of a development project, *ALSA* expressly includes the possibility of using biodiversity offsets and biodiversity or conservation offset-programs with the same purpose of counterbalancing the effect of an activity (Division 4, section 47 (1). As further explained below, using conservation offsets, and conservation offset programs could also lead to the creation of biodiversity banks and a biodiversity banking system in the province. However, *ALSA* has not yet created regulation for conservation offsets. The lack of regulation offers an opportunity to include the joint creation of demand for biodiversity credits in the new regulation of *ALSA*'s biodiversity offsets and potential biodiversity banks.

1.2.5 Creating and operating a biodiversity banking system applicable to Alberta's public lands

If developers decide to either implement their own biodiversity banks or purchase biodiversity credits from biodiversity banks operated by other biodiversity bankers in Alberta, they would need to follow the set of provisions constructed under *ALSA*'s regulations, which would contain details regarding the scheme and the establishment of biodiversity offsets under biodiversity banks, biodiversity credits, and the trade of biodiversity credits.

1.2.5.1 Establishing biodiversity offsets

Determining the location where biodiversity offsets will be established is important to ensure that biodiversity banks will be able to restore and/or conserve the biodiversity values needed to compensate for a given type of impacts to biodiversity. For example, considering property rights and use rights at the time of choosing a site to implement offsets under a biodiversity bank could help bankers design banks in such a way as to ensure that conservation values or services produced by the bank will be permanent, or at

least last for the time agreed by the parties to the banking agreement.[569] In contrast, if biodiversity banks are located on lands not suitable to implement a bank, such as on public lands, where long–term mining operations are already underway, biodiversity banks could not be implemented, or if implemented their benefits would probably not last, because mining operations on-site are likely to impact them. Consequently biodiversity banks might not produce the associated biodiversity benefits. As a result, setting concrete provisions to guide the selection and establishment of biodiversity offsets under bank sites is important to ensure the viability of any biodiversity banking system, and to ensure the permanence of biodiversity offsets.

The three systems described by this Chapter: the NSW BioBanking scheme; the U.S. *Wetland Mitigation Banking*; and the U.S *Conservation Banking* system have specific statutory and/or regulatory provisions to guide where and how to establish biodiversity offsets under biodiversity banks. Such provisions are an essential feature of any statute that would support the establishment of biodiversity offsets under biodiversity banks.

As noted and explained in more detail in Chapter No. 2 of this case study: *The role of property rights in the implementation and operation of biodiversity offsets on public lands*, the lands able to support biodiversity banks are classified differently in the various jurisdictions considered here.[570] Acts and regulations establishing biodiversity banks in the U.S. and in Australia have not adopted a universally accepted guideline on choosing the location of a biodiversity bank site, and the offsets that would be carried out under them. These elements are very flexible, probably to adapt to the different circumstances and regions under which these types of instruments could be implemented.

There is nothing, in theory, to prevent biodiversity offsets under biodiversity banks from being located on public lands. For example, the *U.S. Guidance for the Establishment, Use, and Operation of Conservation Banks*[571] links the location of the biodiversity bank with the

[569] More about the property rights needed to implement and operate biodiversity banks on public lands is discussed in the next chapter (Property Rights chapter).
[570] For more details about biodiversity bank site selection process and its legal provisions under the biodiversity banking schemes described by this section, see Property Rights chapter.
[571] *ConsBankGuide*, *supra* note 240.

type of impact for which the offset is trying to compensate.[572] Biodiversity banks in this system can be, therefore, implemented on a variety of lands, such as tribal, local, private or state lands,[573] as long as biodiversity banks on these lands achieve similar biodiversity values to the ones impacted on site. [574]

In the U.S., the site selection of biodiversity banks mostly depends on the ecological suitability of the proposed site. The suitability of the proposed biodiversity bank site, and its offsets is often determined by aspects such as the location, size, and configuration of the proposed bank and its biodiversity offsets, plus other aspects such as habitat quality, compatibility of existing and future land uses surrounding the bank, and species use of the area.[575]

No pre-defined methodology is used in site selection, apparently to make it easier to adapt to a constant evolution of science.[576] The methods used to identify and implement biodiversity bank sites depend, therefore, on the region and the types of impacts caused in these regions, and on the environmental objective pursued by the scheme.[577] For example, the U.S. Conservation Banking system has aimed to establish biodiversity banks in conserving large, un-fragmented habitats areas or between two large areas in corridors that will help maintain connectivity.[578] The ultimate decision regarding where to implement the biodiversity offset(s) under a specific biodiversity bank is the discretion of regulatory agencies. Such decision is formalized through a biodiversity banking agreement.

On the other hand, the NSW's *Threatened Species Conservation Regulatio*n does not necessarily focus on where to locate a biodiversity offset under a biodiversity bank. Although it does favour the idea of connecting corridors, the Act states that a biodiversity bank site, and the biodiversity offsets under it could also be implemented on non-

[572] *ConsBankGuide*, *supra* note 240, s 5 at 11 (relations of the bank to the mitigation requirements). See also *MitBankGuide*, *supra* note 240, at s II B) 4.
[573] *Ibid*.
[574] The permanence and additionality of biodiversity offsets under systems like this one is discussed in the Property Rights, and in the Additionality chapters, respectively.
[575] *ConsBankGuide, supra* note 240 s 5 at 6.
[576] The Wetland Mitigation Bank Guide states that the techniques (part of the methodology of the scheme) must be carefully selected since science is constantly evolving. See *MitBankGuide*, *supra* note 240 at s II B) 3 (planning considerations).
[577] See I*bid*.
[578] See *ConsBankGuide, supra* note 240 s 2 at 5.

connected areas belonging to a single landowner, as long as conservation objectives are achieved. To better choose where to implement a biodiversity offset under a biodiversity bank, the Act employs technical methodologies. It has established a specific BioBanking assessment methodology (BBAM), which was updated and entered into force on Oct. 1st, 2014[579] and which is currently under review and consultation. This methodology defines important offset rules, which might be used to guide the location of a biodiversity offset site. As mandated by section 3 the Biodiversity Banking regulation, one of the objectives of this methodology is to identify biodiversity conservation values on land subject to development or land subject proposed as a biobank site.[580] The methodology quantifies biodiversity impacts caused by a proposed development. Based on this valuation, the government tells developers the number and type of credits that they need to acquire to compensate for the residual impacts caused by their projects. Neither this Act nor the draft *Biodiversity Conservation Bill 2016* establishes any details regarding what type of land would be ideal for establishing biodiversity banks. The Act in force just mentions that regulations "may set criteria for land to be determined as a biodiversity (offset) site."[581] As noted when comparing the three biodiversity banking studied by this dissertation, the *NSW Threatened Species Conservation Act* states, however, that biodiversity offsets under biodiversity banks can be established on most lands in NSW, including land subject to the *Native Vegetation Act 2003*.[582] There are, however, some limitations. As noted when comparing biodiversity banking systems, biodiversity banks and their offsets in the NSW system cannot be established on Crown lands or in Crown-timber lands, unless the consent of the Minister of the area is acquired.[583] The draft Bill states that the eligibility of land to become a biodiversity stewardship site, and therefore a biodiversity bank, may be set out through regulations.[584]

[579] See BBASSMETH, supra note244.
[580] See *BioBanking regulation 2008, supra* note 354 Part 3*,* s 3(1),(2). See also BBASSMETH, supra note244, s 2.1.
[581] *Threatened Species Conservation Act*, *supra* note 351, Division 2, s 127D (3).
[582] *NVA2003, supra* note 384.
[583] *Threatened Species Conservation Act*, *supra* note 351, s 127 F (regarding biobanking agreements).
[584] *Biodiversity Conservation Bill 2016*, public consultation draft (NSW)*,* online: < https://biodiversity-ss.s3.amazonaws.com/Uploads/1462186512/Biodiversity-Conservation-Bill-2016.pdf>.

In addition, based on the NSW methodology, a biodiversity offset site cannot be established on land that, in the opinion of the Minister, is inconsistent with biodiversity conservation or, which is already the subject of offsets or other specific protection or conservation efforts, such as those lands already constituting national parks protected under the *National Parks and Wildlife Act 1974;*[585] flora reserves and special management zones, or that are offsets already under any other Act.[586] Part of lands already protected could constitute biodiversity offset sites, only if the conservation activities are considered additional.[587] Additionality will be discussed in detail in the Additionality chapter.

Either for ecosystems or species, biodiversity banks in NSW follow a "like-for-like" principle, which should be translated not only in vegetation types but also in habitats suitable for threatened species. In terms of location of the bank site, this would imply to implement biodiversity offsets in places where the same vegetation to the impacted one exists, or another vegetation type "that is more scarce (with a lesser percentage cleared) and is within the same 'vegetation formation'" [588], and which constitute a "suitable habitat for all threatened species impacted" by developments.[589] This suitable habitat requirement implies that "an offset site must be suitable, not only in terms of vegetation types for each species, but also in terms of other habitat requirements, such as patch size and vegetation condition."[590] On the other hand, for species credits "an offset must contain known or likely habitat (for fauna) or individuals (for flora) for all threatened species impacted."[591]

Different from the U.S. system, where, as noted in the first part of this dissertation, an acreage metric is applied, within this 'like-for-like' principle, the NSW BioBanking scheme follows a combination of quantity-quality approach. A key element in choosing the location of a biodiversity offset under a biodiversity bank, therefore, is not only the quantity of land that needs to be recovered or conserved, but mainly the distributions of the threatened

[585] *National Parks and Wildlife Act 1974 No 80* (NSW), online: < http://www.austlii.edu.au/au/legis/nsw/consol_act/npawa1974247/>, [*National Parks and Wildlife Act*].
[586] *BioBanking regulation 2008*, *supra* note 354, Part 3, s 11.
[587] *Ibid*, Part 2, s 4 (1).
[588] EDO NSW, *Farming & Private Land Management, BioBanking Factsheet* (2013) at 10, online: <d3n8a8pro7vhmx.cloudfront.net/edonsw/pages/704/attachments/original/1430201465/BioBanking.pdf?1430201465>.
[589] *Ibid*.
[590] *Ibid*.
[591] *Ibid*.

species impacted by developments (for species biodiversity banking), or the quality of the impacted ecosystems (for ecosystem biodiversity banking).[592] For example, this distribution of species will determine what types of credits can be created to respond to the demand from development. The determination of the most appropriate location would be based on the type of species and their distribution.

For example, "if a development impacts on habitat for the Cumberland Plain land snail, which only occurs on the Cumberland Plain, credits can only be purchased from BioBank sites located on the Cumberland Plain. However, if a development impacts on a threatened species that occurs in all coastal areas from northern to southern NSW, credits can be purchased from biodiversity bank sites that contain suitable habitat for that species along the coast of NSW."[593]

In B.C., the *EMP* procedures apply to both private and public lands. The procedures specify that the location of any biodiversity offset needs to follow a "like-for-like" approach, and should be on site or in proximity. The *EMP* procedure specifically states that an offset should be located "as close to the impacted habitat or ecosystem as possible"[594] on areas with similar ecological characteristics and that provide equivalent goods and services to those to be impacted at the development site.[595] However, if those characteristics do not exist on lands close to the development, the offset could be implemented on lands that are further located as long as it is designed to achieve better environmental outcomes.[596]

Where and how to implement biodiversity offsets under biodiversity banks in Alberta could be covered by specific provisions either under *ALSA*'s future regulations or by future offset program rules under *BOPF*. The reason for them to be covered by *ALSA*'s regulations and not by other regulations emerging from other *Acts* is that *ALSA*[597] establishes the possibility of using biodiversity offsets, also called "conservation offsets" in the province and creating or certifying credits emerging from these activities intended to

[592] *Ibid*.
[593] *Ibid* at 10-11.
[594] Government of British Columbia, *Environmental Mitigation Procedures EMP Procedures*, s 11.3., online at: < http://www.env.gov.bc.ca/emop/docs/EM_Procedures_May27_2014.pdf>, [*EMPpro*].
[595] *Ibid.*
[596] *Ibid.*
[597] See *ALSA*, *supra* note 118, Division 4, section 47.

counterbalance negative impacts from development.[598] Section 47 can constitute the basis for what could become a biodiversity banking system for the province. Section 2 of the latest draft of the *BOPF* states that while the policy framework will provide overarching principles and common system design elements, as well as guidance for implementing offsets and banks in Alberta, the specific requirements and specifications to implement and operate biodiversity offsets and banks will be determined through offset program rules.[599]

This means that either *ALSA*'s future regulation or the program rules under the *BOPF* could become an opportunity to regulate the establishment and implementation of a regulated biodiversity banking system for Alberta. The future regulation and/or program rules could provide specific guidance about how and where to establish biodiversity offsets under a biodiversity banking scheme.

The examples described above show that deciding exactly where to implement biodiversity banks has to do with the type of impact the offset is trying to compensate for. As a result, it would depend on different aspects, such as i) specific indicators or legal provisions in the legislation, ii) the link between development and conservation plans, and ii) the methodologies in place. In addition to these aspects, biodiversity offsets designers and implementers such as Marian Weber have suggested the use of accredited third parties with experience in conservation and environmental planning such as Ducks Unlimited, in coordination with the provincial government, to identify areas that need to be prioritized and conserved or restored. These lands would link impacts with conservation or restoration needs, and could be used to identify biodiversity bank sites.[600] Guidance on how to identify offset sites should be incorporated into the laws and regulations regulating the establishment of biodiversity banks and all concerning the implementation and operation of a biodiversity banking system.

In sum, it can be said that the specific indicators or legal provisions in the Acts, policies and regulations might indicate aspects such as what type of lands are suitable to implement

[598] *ALSA*, supra note 118, s 47 (3) (c).
[599] *BOPF, supra* note 149 at 1.
[600] Personal communication with Marian Weber, September 2015.

biodiversity offsets under biodiversity banks. This suitability refers either to a legal suitability, which concerns mostly the legal status of the land (tribal, local private or state – provincial lands), such as in the U.S. Habitat Compensation Banking system; or to a biological suitability, which refers to specific biological conditions such as un-fragmented lands, connecting corridors, or lands having specific biodiversity values,[601] which help determining where biodiversity offsets under biodiversity banks can be established.

The legal suitability to select and establish the biodiversity offsets under biodiversity banks also refers to expressly legal prohibitions, which determine where not to establish a biodiversity banking system such as national parks, where already conservation efforts exist, unless additional conservation is obtained through the biodiversity banking system. Within this context, the NSW BioBanking scheme, for example, expressly prohibits establishing biodiversity banks on lands already constituting national parks protected under the *National Parks and Wildlife Act 1974;*[602] flora reserves and special management zones, or where there are offsets already under any other Act.[603] However, as further explained in the Additionality chapter, the U.S. Wetland Mitigation Banking system allows biodiversity offsets to be established on public protected lands, as long as the conservation activities undertaken by the government or by private entities through public funds do not count towards creating a biodiversity bank.[604] More details about these aspects are provided in the Property rights and in the Additionality chapters.

On the other hand, Alberta's regional plans, which are based on *ALSA*, determine where development would probably occur and where lands with similar biodiversity values to those affected by development can be found. As noted earlier, the Forests Act[605] and *EPEA*[606] are connected to *ALSA*, and its regional plans. These Acts expressly mention a connection between these *Acts* and these plans. This is why regional *ALSA* plans, most of

[601] See *ConsBankGuide*, *supra note* 240 at s II B) 5.
[602] *National Parks and Wildlife Act*, *supra* note 585.
[603] *TSCNSW*, *supra* note 351 Reg 11.
[604] *MitBankGuide, supra* note 240 at s II B) 2.
[605] The *Forests Act* is responsibility of the Alberta Ministry of Agriculture and Forestry. See Alberta Agriculture and Forestry, *Legislation*, online: <http://www.agric.gov.ab.ca/app21/ministrypage?cat1=Ministry&cat2=Legislation >.
[606] *EPEA*, *supra* note 81.

which are still under development, could become an important tool to determine where to establish biodiversity bank sites under the scheme. As part of Alberta's Land-Use Framework (*LUF*), *ALSA* plans include both private and public lands. Similar to the U.S. system, assuming criteria relating to additionality and issues relating to property rights are developed, Alberta's system could be applicable to both: private and public lands.

Determining where to establish the biodiversity bank site would, however, not only depend on the existence of provisions stating which lands are or are not legally suitable to establish a biodiversity bank site, or where the regional plans identify conservation and development areas, but on the existence of a methodology, able to determine with greater precision what areas are causing more impacts to biodiversity, and what types and amount of biodiversity credits would be needed to offset those impacts. This methodology could be a fixed one incorporated into the regulations, such as the approach adopted by the NSW scheme, where the importance of the methodology is defined within the *NSW Threatened Species Conservation Act and regulatio*n. It could also be a variable methodology, such as that adopted by the U.S. schemes, to be more easily adapted to the different impacts and biodiversity values types. The ultimate choice of methodology will depend on the environmental objective such as no net loss, net gain, through biodiversity value replacement, or just to offset adverse impacts pursued by the scheme. As noted earlier, NG is the environmental objective followed in Australia, while NNL is the one followed in the U.S. systems. Biodiversity value replacement is the approach taken by the NSW as well as by the Wetland Mitigation scheme. Offsetting adverse impacts without replacing exact values has been the approach followed by the Conservation Habitat Banking in the U.S.

Precisely determining the environmental objective of a biodiversity bank in Alberta will be necessary to identify whether or not a specific methodology will be required for the scheme. As noted earlier, impacts caused by oil sands developments could affect both private and public lands, and even impact both types of lands at the same time. Similar to the U.S. and the Australian systems, the legal and the biological suitability of the land where the biodiversity banks will be included is something to consider before establishing the banks.

The distribution of species and richness of biodiversity does not always concentrate either on private or public lands; because species do not obey property rights boundaries. Consequently, offsets could be implemented on both private and public lands. This integration should ideally be expressly included in *ALSA*'s future regulations. *ALSA*'s regulations could specify, for example, that biodiversity banks could be established both on private and/or public lands, depending on the suitability of the lands to compensate or mitigate the impacts caused on the development-site. Furthermore, a methodology could expressly provide more details about the biodiversity suitability.

1.2.5.2 Stewardship sites and Stewardship Units

The NSW draft offset scheme identifies stewardship sites as the basis of biodiversity offsets and biodiversity banks. Biodiversity banks are thus created through stewardship agreements between the biodiversity bankers and the Minister for the Environment.[607] Although *ALSA* does not mention anything about how to establish a conservation offset or a biodiversity bank site, the Act links conservation offsets created through stewardship units to the act of counterbalancing an activity. In other words, conservation or restoration activities that are part of a stewardship unit can be used to counterbalance the negative effects on species or the environment, human health or safety caused by an activity or development.[608] The Act does not define what a stewardship unit is. It says, however, that there might be different types or classes of stewardship units, which might be further described and regulated through specific regulations.[609] Because the scope of the stewardship units seems to be broad, including different types or classes, it would seem that conservation or restoration activities implemented by biodiversity banks (conservation offset programs) to counterbalance the negative effects of development could be considered stewardship units. Section 47 (3)(c) states that:

> Regulations under this section may establish, certify, credit or accredit anything that is suitable as a stewardship unit to counterbalance an activity.[610]

[607] *BioConsAct*, *supra* note 357, s 6.2(a).
[608] *ALSA*, *supra* note 118, s 47 (3) (a).
[609] *Ibid*, s 46 (1) (c).
[610] *Ibid*, s 47 (3) (c).

Within this context, the stewardship unit could become the basis to establish biodiversity banks as part of a regulated conservation offset program, or a regulated biodiversity banking system in Alberta.[611] Although it is not expressly stated in the Act, the stewardship units are in the same section as the conservation offset programs and the exchange system.[612] It leads to the conclusion that they were designed with the purpose of feeding potential biodiversity offsets for Alberta.[613]

Based on *ALSA* and on the draft of the *BOPF*, future regulation and program rules can, therefore, specifically identify and describe a stewardship unit that is meant to counterbalance the effect of a specific activity, connecting a specific biodiversity bank to the residual impacts of a specific development project, undertaken in a specific area. The link between counterbalancing the effects of an activity and impacts caused by a development is, therefore, not only casual, but also concrete. This means that compensation actions undertaken on a given tract of land with particular values responds to a specific type of impact caused on a specific type of land, affecting certain ecosystems and values. This link should be established by regulation that "provides a means of assigning to a stewardship unit an attribute with respect to an investment or project indicating its benefits or obligations measured against the effect of an activity."[614] Within this context, adopting a methodology to deal with these linkages could be crucial. In addition, the future regulation could also "prohibit an activity without the extinguishment of all or part of a stewardship unit,"[615] and to determine "the period of time within which the stewardship unit must be used or extinguished."[616]

1.2.5.3 Producing biodiversity credits

The *U.S. Guidance for the Establishment, Use and Operation of Conservation Banks* describes biodiversity credits as "the quantification of a species or habitats conservation

[611] *Ibid*, s 47 (3)(b)(i).
[612] Exchange systems will not be addressed by this dissertation, because of their technicalities and complexities, this topic requires further analysis, and could be the subject of a thesis by itself.
[613] See *ALSA*, *supra* note 118, Part 3 Division 4: The Exchange, Stewardship Units and Conservation Offset Programs.
[614] *Ibid*, s 47 (3) (d).
[615] *Ibid*, s 47 (3) (b) (iii).
[616] *Ibid*, s 47 (3) (b) (ii).

values within a bank."[617] In other words, biodiversity credits represent or reflect the biodiversity values conserved or restored through specific management actions (or obligations) determined under each biodiversity banking agreement.[618] These values are represented by a fixed number and type of biodiversity credits, which are usually measured in the same manner, in terms, for example, of acreage or number of specimens of affected species, as the impacts caused by the development they attempt to offset.[619]

Biodiversity credits are strictly linked with the relationship between the biodiversity impacts caused by the development project and the values that need to be recovered offsite. Once the impacts are assessed and quantified, the types and number of biodiversity credits that a specific development project needs to compensate for their impacts, needs to be specified.[620] In general terms, the biodiversity banker can request the creation of these credits.

Details about the specific type and number of biodiversity credits that each implemented and operating biodiversity bank under a biodiversity banking system can produce is usually determined through specific biodiversity banking agreements subscribed between the government and the biodiversity banker.[621]

In Alberta, *ALSA* does not mention anything about how to create biodiversity credits emerging from management activities under biodiversity banks. Nevertheless, *ALSA* states that a certification program might be created to certify activities as stewardship units.[622] Such a program might determine: how and when a credit might be granted, and what activities such as transferring, selling or leasing a certification entitles the holder of the certification to do.[623] If restoration and conservation activities are certified as stewardship units, they might be able to become credits if emerging from a biodiversity banking system.

[617] See *ConsBankGuide*, *supra* note 240, Paragraph II C) 3.
[618] See *Threatened Species Conservation Act*, *supra* note 351, Part 7A, s 127 B (5).
[619] See *ConsBankGuide*, *supra* note 240, Paragrah II C) 3.
[620] See *Threatened Species Conservation Act*, *supra* note 351, Part 7 A.
[621] *Ibid*, s 127 Z.
[622] See *ALSA*, *supra* note 118, s 47 (3) (e).
[623] *Ibid*, s 46 (1) (e).

Other jurisdictions, such as NSW, have concretely included the possibility of creating a credit program within their Acts and regulations. As noted earlier, the creation of credits is a key element of the legal framework supporting a biodiversity banking system to facilitate the creation of biodiversity credits, its trade and the participation in the system either as bankers or credit buyers. Experience has shown that the scope of the rights to produce credits is usually specified in the biodiversity banking agreement, which regulates the relationship both in terms of rights and obligations between the parties, usually government and biodiversity bankers, involved in the biodiversity banking scheme. Similarly, in Alberta, the scope of the rights of the banker to certify its conservation or restoration activities and produce biodiversity credits will depend on the regulation and the concrete agreements between the biodiversity banker and the government as owner of the land and its resources.

1.2.5.4 Establishing and operating biodiversity credit trading systems

As noted in the conceptual section, one of the main characteristics of biodiversity banks is that they create a trading system where biodiversity credits produced in advanced of the impact can be traded and transferred to compensate for development impacts caused off-site. The trade of biodiversity credits needs the support of clear legal provisions.

The NWS scheme creates biodiversity credits trading systems through Acts and/or regulations facilitating the transfer of biodiversity credits to developers in need of compensating for their residual impacts, and to ensure that they are purchasing these credits from individuals legally entitled to sell them.[624] For example, part 6, division 6 of the *NSW Biodiversity Conservation Act* 2016 regulates all aspects concerning biodiversity credits creation and transfer.[625]

Another important aspect of establishing a credit trading system is the creation of biodiversity bank registries. They register biodiversity bank agreements, biodiversity credits once created and biodiversity credit trade transactions.[626] Within this context, both

[624] See *BioConsAct2016, supra* note 357 s 6.17 - 6.26.
[625] *Ibid.* The transfer of biodiversity credits is regulated through s 6.19.
[626] See Ibid, s 6.20 See also OEH, BioBanking, BioBanking public registers, online: < http://www.environment.nsw.gov.au/bimsprapp/SearchBiodiversityCredit.aspx?Start=1 >.

credit trading systems and their registries provide transparency to the system by providing an instrument to inform developers of the ownership of these credits and those in a legal position to offer them for sale. Clear credit trading systems also ensure that the same credits cannot be sold more than once, by specifying the retirement of biodiversity credits, type of transaction, the type and number of credits sold, and availability of remaining credits.[627]

Section 127 ZZC of the NSW *Threatened Conservation Act*, and s. 6.18 of the draft *BIOBILL2016*, for example, require a register of biodiversity credits. The registry contains information regarding the agreement, management actions in respect of which credits were created, class and number of credits, name of holders, and status of the biodiversity credit (e.g., active, suspended, cancelled, retired and or transferred).[628]

In the U.S., neither the Guidance for the Establishment, Use and Operation of Conservation Banks nor the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks require biodiversity bankers to register biodiversity credits. However, the U.S. Army Corps of Engineers created the *Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS)*, which is a database to better track mitigation banking and its credits.[629]

Alberta has not determined yet how a biodiversity credit trade system could work for the province. The certification program mentioned in *ALSA*'s sections (47) (3) e ii, and iii) and the disposition possibilities over biodiversity credits as described by section 46 (1) (e) could provide an idea of how such a biodiversity credit system could work. The certification program could determine and regulate key aspects of this trading system, mostly by determining the scope of rights the credit holder has and therefore the possibility to transfer and/or to take other disposition actions over them. Like the NSW BioBank regulation, *ALSA* supports transfers and purchases over biodiversity credits, by supporting

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See also Threatened Species Conservation Act, supra note 351, s 127 ZZC requires a Register of biodiversity credits.

[627] See *Threatened Species Conservation Act*, *Ibid*, s127 W (8), 127 ZB.

[628] The transfer of biodiversity credits is effective only when registered in the register of biodiversity credits. See *BIOBILL2016*, *supra* note 356 s 6.20 (1)

[629] RIBITS Regulatory In-Lieu Fee and Bank Information Tracking system, *About RIBITS*, online: <https://ribits.usace.army.mil/ribits_apex/f?p=107:2 >.

the "… sale, trading, exchange, lease, assignment and disposition, including disposition by will or on death without a will of stewardship units."[630]

However, the NSW regulation clearly excludes biodiversity credits from other transactions, such as mortgages, assignments, leases or charges, beyond biodiversity credit transfers and purchases.[631] The reason behind limiting approved transactions to sales and transfers in NSW is probably to avoid frauds, and to limit the function of the trade system to facilitate the transfer of liabilities from developers to biodiversity bankers. The NSW regulation might attempt to ensure that bankers carry on managing activities to counterbalance the negative impacts of a development in the manner and time agreed in the biodiversity banking agreement. Leases and other disposition actions over the same credits that have already been sold could lead to double dipping from a single conservation activity. This aspect could have implications for ensuring additionality.

In Alberta's biodiversity banking system the environmental service provided by the conservation and/or restoration activities carried out by a biodiversity bank could be certified as a stewardship unit, and therefore, produce biodiversity credits. These certified stewardship units/credits could be also traded within the credit trade scheme proposed for the system. The transfer of the credit would imply the transfer of liabilities from the developer to the Banker after paying a determined amount of money. As a result the developer could comply with his/her conservation obligations while the banker continues with conservation obligations instead of the developer. These obligations should run with the land, and should be therefore registered.

1.2.5.5 Financial and institutional infrastructure

Financial Component

Beyond all the aspects concerning the creation of demand for biodiversity credits and the establishment and operation of biodiversity banks, the financial component is another key element of a biodiversity banking system. The financial component enables the biodiversity banking system to exist.

[630] See *ALSA*, *supra* note 118, s 46 (1) (e).
[631] See *Threatened Species Conservation Act*, *supra* note 351, s 127 ZC.

By purchasing biodiversity credits, oil sands developers would pay for the services provided by the biodiversity bank. The payment for these services does not only make the biodiversity banker obtain an economic benefit or incentive for the environmental services its biodiversity bank provides, but also helps the bio-banker maintain the conservation or restoration activities in the manner and for the period of time agreed in the biodiversity bank. The payment for the purchase of biodiversity credits is usually a one time-payment done by the buyer of the credit for acquiring or retiring a biodiversity credit or credits from the biodiversity bank. However, the biodiversity bank requires economic resources to ensure its endurance. It is essential that the one-time purchase of biodiversity credits provides sufficient revenue to ensure that the biodiversity bank can maintain its environmental service for the time agreed.

NSW is probably the jurisdiction which has more clearly addressed the way to finance biodiversity banks and its biodiversity banking system. Its regulation states that once a biodiversity credit is transferred through purchase to another person, a specific amount of this purchase is deposited into a BioBanking Trust Fund. "The Total Fund Deposit is the net present value of all management actions and other recurring costs (worked out using the biodiversity credits pricing spreadsheet) and is specified in each BioBanking agreement."[632] Changes to the Act are proposing that such amount has to be paid into the Fund before the first transfer of the credit is registered.[633] Later on, the Fund provides annual payments to the biodiversity banker for performing management activities.[634] These payments are done in perpetuity in NSW.[635]

Following the NSW example, it could be argued that financing biodiversity banks and the biodiversity banking system in Alberta could be ideally done through a fund, to be created by legislation. As noted above, the fund should operate with a percentage of the money received from the purchase of biodiversity credits produced by each biodiversity bank. The sum of all the percentages coming from the purchase of the different credits from different biodiversity banks would constitute the fund. This fund would, in theory, provide enough

[632] Australia, NSW, Office of Environment and Heritage, *BioBanking Trust Fund*, online: <www.environment.nsw.gov.au/biobanking/trustfund.htm>, [*NSWTrustFund*].
[633] *BIOBILL2016*, *supra* note 356, s 6.21
[634] *Threatened Species Conservation Act*, *supra* note 351, Part 7A, s 127 ZW.
[635] *NSWTrustFund*, *supra* note 632.

money to make periodic payments to finance the ongoing operation of biodiversity banks, and ensure that their activities and, consequently, the benefits they provide, endure for the time agreed by the parties to the biodiversity bank. For example, each biodiversity banking agreement could require each biodiversity banker to deposit 60-70 percent of the money acquired through the sale of biodiversity credits into the fund. Considering that biodiversity banks would be established on public lands by private entities, where rights usually last for a limited period of time, the annual payments to the banker could ensure that banks are managed to produce permanent services, even if the biodiversity banker no longer has rights to the land, and consequently, to manage the biodiversity banks for a longer period of time. In such a situation, the new land rights holder, operating the land would become the new biodiversity banker, and even if all the biodiversity credits had been sold, the new land right holder would become responsible for ensuring that the management activities on the land where the bank operates are provided in perpetuity or for the period of time indicated in the biodiversity banking agreement.

In Alberta, there are some operating funds already created under certain Acts and regulations and these funds could provide the infrastructure to finance the management activities within the biodiversity banks. These funds could work, more concretely, as a connector between the buyer and the seller, to ensure management actions in the biodiversity banks established under the Alberta biodiversity banking system.

EPEA, for example, has different Funds: i) an Environmental Protection Security Fund, and ii) an Environmental Protection and Enhancement Fund.

The Environmental Protection Security Fund operates under the authority of section 32(1) of the *EPEA*. The fund holds security deposits in the form of cash, bonds, or letters of credit from operators mandated by law to undertake land reclamation activities. The security deposits are collected before the project begins to ensure that reclamation activities in practice meet reclamation commitments as mandated in the approval for Conservation and Reclamation.[636] The Environmental Protection Security Fund Annual report showed

[636] Alberta*, The Environmental Protection Security Fund Annual Report (April 1, 2014 to March 31, 2015),* online: < http://esrd.alberta.ca/lands-forests/land-industrial/programs-and-services/reclamation-and-remediation/documents/SecurityFundReport-Jan13-2016A.pdf >, [SecurityFundrep]. See also Alberta,

that the total cash deposits of the fund plus interest, bonds and guarantees as of March 31, 2015 was $ 1,740,772,444.[637] The amount of the security is used only in case the operator is unable to fully or partially complete reclamation as committed.

Environmental Protection and Enhancement Fund (EPEF)

Considering that the Environmental Protection Security Fund should be used for reclamation purposes only, in other words to ensure that reclamation is performed by whomever caused the impacts, it could be argued that it could not be used for biodiversity banking purposes. This is the reason why if a biodiversity banking system is implemented in Alberta, *the Environmental Protection and Enhancement Fund*, and its already created infrastructure could be used to materialize the financial component of the scheme. To support this idea, section 30(2) of *EPEA* states that "the Environmental Protection and Enhancement Fund shall be used for the purposes of environmental protection and enhancement and emergencies with respect to any matter that is under the administration of the Minister."[638]

The money of the fund comes from securities and money recovered by the government, money advanced from the General Revenue Fund, or payments made by any person or the government of another jurisdiction.[639] Neither *EPEA* nor its regulations determine who are the persons or entities which have to contribute or deposit securities into the fund. There are several questions regarding the use of this fund for biodiversity banking purposes. Considering that biodiversity banks could be implemented entirely or partly on public lands[640] allocated to private sector operators for a specific period of time, one of the questions is how to ensure the endurance of the system if the implementer and operator of the bank on public lands loses his/her rights to manage the land. Consider a biodiversity bank operated by a forestry rights holder, which manages the land, acquires biodiversity

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Ministry of Environment and Parks, *Security for Land Reclamation Performance*, online: <esrd.alberta.ca/lands-forests/land-industrial/programs-and-services/reclamation-and-remediation/security-for-land-reclamation-performance.aspx>.

[637] SecurityFundrep, *ibid*.

[638] *EPEA*, *supra* note 81, s 30 (2).

[639] *EPEA*, *supra* note 81, s 5.

[640] As noted earlier, the biodiversity values and or habitats for species that biodiversity banks aim to restore or conserve can exist either on private or public lands exclusively, or across both public and private lands. However, this dissertation studies only those either partially or entirely established on public lands.

credits for the banks services, trades and sells the credits. What happens when the forest disposition ends? Are biodiversity offsets insurable?

We assume that the forest disposition holder who becomes a biodiversity banker could request a renewal of his rights to the land, and maintain his banker status, with the same rights and obligations as before. However, what would happen if the biodiversity banker no longer has the right to manage the lands where the biodiversity bank was implemented? Why would a new rights holder be interested in continuing with the conservation commitments made by another under the bank if it did not participate in the economic benefits from the sale of the biodiversity credits emerging from the biodiversity bank?

Thus, in order to ensure the permanence of a biodiversity bank implemented on public lands a certain percentage of money from the purchase of the biodiversity credits should be reserved. This money would represent both the implementation cost of the bank, including the payment of insurance coverage and the profit generated through the sale of the biodiversity credits. To create an economic incentive to new disposition holders, and to whomever is managing the land where a biodiversity bank exists, an annual inflation-protected payment would be paid to whoever is operating the biodiversity bank. This money could be, for example, a percentage of the money from the purchase of the biodiversity credits. A percentage of the profits obtained through the sale of the biodiversity credits could be granted to new land managers or new banker in a one payment, as an incentive to participate in the operation of the biodiversity bank. Similarly, a percentage for the maintenance of the biodiversity bank could be deposited into the fund, and be provided to the new land manager yearly, during the committed time or validity of the bank and its credits. This would avoid a situation where a new entity acquires a disposition over the same tract of lands where the biodiversity banks are operating, and where credits have been sold, and thereby faces a burden of conserving a land from which that person did not initially participate in any economic benefit. Even though this would help ensure the financial resources are there, it would not guarantee that a subsequent holder of rights on the land in question would conserve the land. It is important to consider therefore legal instruments to ensure the protection of the offset by the new holder of rights.

The scenario would be different if there were unsold credits. In such a case, the new disposition holder, who would also become the banker might also receive, negotiate, and sell unsold credits, and have, therefore, the economic incentive to participate in the scheme and to keep operating the biodiversity bank. If the credits from the unsold banks were already produced, the new banker could receive partial benefits from the trade of these credits. For example, he could have a smaller percentage such as 10-15% in the profits obtain from the sale of biodiversity credits produced through restoration activities, while if it is a conservation credit, he could have a larger share in the profit such as 30%, because conservation is an ongoing process. Thus, the new banker would receive a percentage of the money from unsold credits as an incentive to become a new banker. Furthermore, the new banker would keep receiving the annual payments from the Environmental Protection and Enhancement Fund to perform operation/maintenance activities of the bank. Considering that *EPEA* section 30 (4) enables the Minister to make payments out of the *Environmental Protection and Enhancement Fund* (*EPEF*) for environmental protection and enhancement activities, biodiversity banking operating payments could be taken out of this fund.[641]

In regards to the insurability of biodiversity offsets, as David Pearce explains, environmental risks can be insured as long as they meet certain conditions, such as whether the risk is pooled or shared by a significant number of people, and whether the loss is clear and definable.[642]

The existence of a market for biodiversity credits and the possibility of identifying potential threats to their permanence make us assume that, like any other risks, the loss of biodiversity offsets and their benefits could be also insurable. Therefore, having insurance would not be an issue. Laws and/or regulations regulating biodiversity banking systems could include having an insurance as one of the requirements of the offset approval. As explained earlier, a percentage of the price of each biodiversity credit could be used to obtain a biodiversity insurance that will last as long as the offset needs to provide its services.

[641] See *EPEA*, *supra* note 81, s 30 (4).
[642] David Pearce, *The Insurance Industry and the Conservation of Biological Diversity-An Analysis of the Prospectus for Market Creation* – Draft- (EOCD-WGEAB, 2000) at 4.

If biodiversity credits were not sold, we assume that the banker and biodiversity offset implementer could become the claimant. However if biodiversity credits were already sold, for example, at the time a fire occurred, the government could become the claimant. This, to ensure that the money from the insurance would somehow ensure that the impacts the biodiversity offset was compensating remain compensated. This could be done, for example, by buying biodiversity credits from banks serving the same service area of the impacted biodiversity offset. The permanence question is further addressed in the next chapter. However, the insurability of biodiversity offset under biodiversity banks is an issue identified as material for future research and will not be not further analyzed by this research.[643]

Why use the Environmental Protection and Enhancement Fund (EPEF)?

The EPEF under *EPEA* could be used to provide annual payments to biodiversity bankers for carrying out management actions. Such an approach offers: i) the existence of legal and institutional infrastructure, and ii) implementation and operation costs reduction.

The fund created by *EPEA* is already established. It has the legal and institutional infrastructure to deal with financing aspects towards environmental protection and enhancement including emergencies. Furthermore, as explained in the Institutional Framework section of this chapter, Alberta's Ministry of Environment and Parks is not only in charge of environmental matters, but is also in charge of wildlife, and forest management and protection matters. The conjunction of these areas could empower this new Ministry to use the EPEF to finance the biodiversity banks under the biodiversity banking system, because it is part of its current jurisdiction. Furthermore, AEP will not need to incur additional costs to create a new fund, and to create institutional capacity to operate and manage it.

[643] For more information on the insurability of biodiversity offsets see Institute for European Environmental Policy (IEPP) and ICFConsulting Services, Study on specific design elements of biodiversity offsets: Biodiversity metrics and mechanisms for securing long term conservation benefits (ICF/IEEP, 2014), online: http://ec.europa.eu/environment/nature/biodiversity/nnl/pdf/Biodiversity%20offsets%20metrics%20and%20mechanisms.pdf

Institutional Framework - Role of the government and of other stakeholders in the creation and operation of a biodiversity banking for Alberta

Beyond rules creating the demand for biodiversity credits, creating credits, a trading system and financing the system, the operation of a biodiversity banking system requires clear rules regarding the institutional framework supporting it. As noted in the latest draft of the *BOPF*: "A system of governance is required to ensure that there is consistent development and implementation of conservation offsets."[644] Alberta's provincial government has different roles in the creation of demand, the implementation of a regulatory provincial biodiversity banking system, and the management of these types of schemes in Alberta. These roles are: i) the government's role as a regulator, and ii) its role as a manager of the regulated scheme, or system if implemented. This section briefly discusses the potential role of the Government of Alberta in the creation of demand for biodiversity credits, in the establishment of biodiversity banks, in the creation of biodiversity credits and in the creation and operation of a biodiversity credits trading system.

1.2.5.6 The Government as a regulator of the biodiversity banking scheme

The role of the Government as a regulator of the biodiversity banking scheme implies its participation in the market either as a creator of the demand for biodiversity credit markets, and/or as a regulator and policy creator, who will either directly or indirectly determine conditions for the parties to participate in these types of systems and the way these systems will work.

The Government as a manager of the regulated scheme – general considerations

An important characteristic of biodiversity banking systems is that they require the involvement of the government as manager and operator of the schemes to ensure their transparency and accountability.

Governments can provide their institutional infrastructure and capacity to operate and manage these types of schemes. The need for a strong institutional capacity and structure is vital for these schemes and for the markets emerging from them. This is the reason why

[644] *BOPF, supra* note 149 at 3.

these types of systems have been implemented mostly in developed countries, with strong rule of law traditions, developed institutional infrastructures and comprehensive accountability and transparency regimes.

Who would be in charge of creating demand, and managing a biodiversity banking system in Alberta?

Different governmental institutions have specific functions regarding a biodiversity banking system and regarding the concrete biodiversity banks created under the scheme. To determine, or at least to identify, who might be in charge of creating demand, and managing a biodiversity banking system in Alberta, this subsection borrows from the NSW experience. As noted earlier, the BioBanking system in NSW is a state or provincial scheme and not a federal one, which can provide valuable lessons learned to be extrapolated to the Alberta's context.

1.2.5.7 Biodiversity banking experiences in the creation of demand for biodiversity credits

In NSW, the regulatory approval process requires development projects to undergo a threatened species assessment process. Developers have, however, the option of acquiring biodiversity credits from biodiversity banks to offset their impacts. If developers choose this option, the Department of Planning, which is the Department in charge of providing the regulatory approval for the development project, incorporates a condition in the permit granted that requires the retirement of credits in accordance with a BioBank statement. This is why, as a first step in this process, the Department of Environment, Climate Change and Water (DECCW) issues BioBank statements, which set out the credit requirements. This BioBank statement is an integral part of the development application.[645]

Alberta has a similar approval process. There, once a development project needs to be approved, depending on its type and scope, it is subject to an EIA, and it is also subject to a regulatory or sectoral approval process, of which the EIA is an integral part.

[645] See *BBOSSO, supra* note 303 at 4-5. See also Australia, State of NSW & Department of Environment and Climate Change NSW, *BioBanking HandBook for Local Government* (Sydney: DECCNSW, 2008) at 4, online: <http://www.environment.nsw.gov.au/resources/biobanking/08526bblocalgovhb.pdf>.

The Alberta Energy Regulators (AER) is the institution in charge of approving the oil sands development projects. EIAs are required as part of this process. On the one hand, the Ministry of Environment and Parks (AEP) manages EPEA and the EIAs under this Act. On the other hand, AER manages the approval process for oil sands. Furthermore, Alberta's *BOPF* draft identifies AEP as the authority in charge of enabling and approving conservation offset programs.[646] Based on their powers, it would be reasonable for both AEP and AER to participate in the creation of concrete demand for biodiversity credits in Alberta. The AEP has a role in the creation of concrete demand for biodiversity offsets by performing the EIA, which like the NSW BioBank statement could determine the amount and type of credits that a specific oil sands development process needs to acquire to compensate for its residual impacts. This EIA, with the biodiversity credits specifications, would later accompany the regulatory approval process. On the other hand, the AER could reinforce the demand for biodiversity credits, by incorporating the BioBank statement, into the EIA, and ultimately in the permit approval process managed by the AER. Thus both the AEP and the AER could basically have co-responsibility in the creation of demand for biodiversity credits for oil sands development in Alberta.

Biodiversity banking experiences in managing the banking systems

In terms of management of the scheme, the Ministry in charge of managing the biodiversity banking system is usually the one in charge of administering the Act supporting or leading to the establishment of the system.

In NSW, the Office of Environment and Heritage, which administers the *Threatened Species Act* (the Act which establishes the BioBanking scheme), is the Ministry in charge of managing the scheme.[647] Taking a similar approach, in Alberta, a regulatory biodiversity banking system could be created and regulated through *ALSA*. The Ministry of Environment and Parks administers *ALSA*. This Ministry would, probably, as a consequence, be in charge of managing the biodiversity banking system established under *ALSA* and its future regulations.

[646] *BOPF, supra* note 149 at 3.
[647] See *BBOSSO*, *supra* note *303* at 4.

Following the key features of a biodiversity banking system, managing the system would imply activities regarding establishing biodiversity bank sites, credits, trading schemes, and the financial infrastructure of the scheme.

All these aspects need the participation of the government.

Establish biodiversity bank sites.

The Establishment of biodiversity bank sites, specifically of biodiversity offsets under biodiversity banks could be done through biodiversity banking agreements, in which the government would be one of the parties. In NSW, for example, the proposed Biodiversity Conservation Bill suggests the use of Stewardship Agreements for the establishment of biodiversity banks.[648]

Through these agreements, Alberta government, through the AEP, would be able to approve the biodiversity bank site selection.

By establishing a specific methodology to be followed, the Provincial Government could have a fundamental role in linking the impacts identified in the EIA to the biodiversity values of a proposed biodiversity bank site. This expertise and technical advice to help biodiversity bank implementers and operators establish biodiversity bank sites where appropriate could be really useful for selecting biodiversity bank sites that would actually be able to compensate for residual impacts and to achieve the environmental and environmental objective pursued by the scheme. Not having all the technical expertise to select biodiversity bank sites could represent a major problem for the scheme. If biodiversity banks were established without the technical knowledge to determine which lands are feasible to implement biodiversity offsets under biodiversity banks, they could be implemented on sites that do not have similar or better values to those impacted by the development, and would consequently not produce the environmental benefits the scheme is aiming to produce. NSW *Biodiversity Conservation Bill* proposed a new methodology to assess the biodiversity values on the site where the biodiversity bank will be implemented before and after implementing the bank, and biodiversity values of the

[648] *BIOBILL2016*, *supra* note 356.

site where development and impacts will occur before and after the impacts are caused.[649]

Knowing the biodiversity values that exist both where development will occur and where biodiversity offsets under a bank will be implemented helps the biodiversity banker identify the type and magnitude of biodiversity losses caused by a development project, and match them with biodiversity benefits provided by a concrete biodiversity bank.

Thus, it provides more certainty and reliability to the system. The draft of the *BOPF* has identified the provincial policy as a key element to identify where impacts will occur and the tools and actions to address them.[650]

In practice, the AEP is familiar with oil sands impacts and with development projects that choose the option of buying biodiversity credits, and with their types of impacts, because the AEP would have performed their EIAs. This knowledge would give this Ministry enough information and expertise to help in the selection process of future biodiversity bank sites responding to oil sands impacts. In addition, this Ministry is also in charge of *ALSA* and its regional plans. This aspect would give this Ministry an integral approach of development, and natural resources management and conservation, which would also be important in identifying where to establish biodiversity bank sites.

On specific occasions where there is a lack of the necessary expertise, this ministry could consult and request the advice of other Ministries or authorities. In NSW, for example, the Department of Environment, climate Change and Water NSW (DECCW) approves the site selection, and requires the opinion of other institutional authorities, such as Catchment management authorities and the Department of Primary Industries, when necessary.[651]

i) Biodiversity credits creation

The government has different roles regarding credits, which vary depending on the applicant: i) regarding the biodiversity credits owner, ii) regarding the biodiversity credits buyer or potential buyer.

[649] *BIOBILL2016*, *supra* note 356, s 6.7, 6.8, 6.11, 6.12, 6.13.
[650] *BOPF, supra* note 149 at 3.
[651] *NSWGEBS*, *supra* note 348 at 9.

Regarding the biodiversity credits owner, the role of the provincial government would not be limited to determining through regulation and later through a biodiversity banking agreement the conditions for a biodiversity bank to provide biodiversity conservation services. Its role would also be to verify the compliance with these conditions and approve the credits if the applicant complies.

On the other hand, regarding the biodiversity credits buyer or potential buyer, as noted earlier, the government, in this case, the Alberta Ministry of Environment and Parks (AEP) would be the one in charge of determining the types and number of biodiversity credits needed by a specific oil sands development project to offset its residual impacts. As explained earlier, this Ministry has expertise not only in environmental matters but also in sustainable development and planning, and the EIA process. The governmental knowledge of these topics not only provides it with a concrete idea of the impacts caused by each development project looking to offset its residual impacts, but of the cumulative impacts of these projects, and others which do not choose this option. This Ministry has therefore valid and important knowledge to identify the exact number and type of biodiversity credits that a concrete oil sands project needs to retire in order to compensate for its residual impacts.

In addition, similar to the U.S. biodiversity banking systems, the government of Alberta could also become either a banker or a buyer of biodiversity credits to offset impacts caused by some of the development projects undertaken by its departments and agencies.[652]

ii) Credit trading system

In terms of the credit system, *ALSA* enables the establishment of a biodiversity credit trading system. The AEP, which would be in charge of managing the scheme, would also be the most appropriate Ministry to manage the credit trading system under the scheme. One of the reasons for this power is that this Ministry already has administrative power over public lands and forested lands due to its administration of the *Public Lands Act* and

[652] US, Environmental Protection Agency, *Mitigation Banking Factsheet EPA,* online: <https://www.epa.gov/cwa-404/mitigation-banking-factsheet>.

the *Forests Act*. Because of these powers, it could also have the power to order the registries to register not only the agreements creating the biodiversity bank sites, but also to register the credits emerging from these instruments. It could, therefore, easily include this trading registry under its functions, combining the information regarding the biodiversity banks, their biodiversity credits and other activities and legal features which also run with the land, and which could have an impact on the permanence of the instrument. Having all the concerning features in a single or at least in coordinated registries would allow greater transparency. The task of the Ministry would be to make it easier for buyers and sellers to meet and acquire the products and services they are looking for, while avoiding double dipping or creating biodiversity credits without additionality where there are already conservation efforts in place. This aspect will be discussed in more detail in the Additionality chapter.

The Government as a manager of the Financial Component

Another role of the government could be to establish and to operate the BioBank Fund. As noted earlier, Alberta has an EPEF fund, which could be used for depositing money from the sale of biodiversity credits. This fund would provide annual payments to biodiversity credits operators, who have transferred some or all of their credits, so that they can continue carrying out management actions over the long term or in perpetuity, as agreed. Thus, the funds to carry on management actions in accordance with the biodiversity bank agreement would contribute to the permanence of the offsets under a biodiversity bank.

The existence of this Fund under the Ministry of Environment and Parks could imply using the already existing institutional infrastructure, which is already operating this fund. Expanding this fund in favour of biodiversity banks would, therefore, not imply additional institutional resources for its operation.

Conclusions

As noted in the conceptual section, implementing and operating an effective biodiversity bank on public lands does not only depend on meeting all the essential principles identified by theory (including additionality), but on the existence of a legal framework, somehow

incorporating those principles, supporting the system, and on the property rights/ use rights needed to implement and operate biodiversity banks.

The chapter did not analyse how the BBOP essential principles were incorporated into laws and regulations supporting a biodiversity banking system. However, it identified and described the characteristics that a legal system would need to have in order to be able to support a biodiversity banking system applicable to public lands, specifically in Alberta. Property rights related challenges to implement biodiversity offsets and operate biodiversity banks, as well as biodiversity offsets permanence challenges are discussed in the next chapter.

Based on the review of international legal frameworks supporting biodiversity banking schemes, this chapter argued that the primary features of a legal framework supporting a biodiversity banking system include rules creating demand for biodiversity credits, regulating the implementation and operation of biodiversity banks and the biodiversity offsets under each bank. Laws and regulations regulating the production, trade and exchange of biodiversity credits are also needed. All these aspects need to be included in any legal and policy framework supporting any biodiversity banking system applicable either to private and/or to public lands. Interestingly the analysis of the legal frameworks supporting biodiversity-banking systems in international jurisdictions showed that there is no major distinction between the legal requirements applicable to biodiversity banks either on public or on private lands, except with regards to legal mechanisms to ensure their permanence on public lands. In other words, any legal framework supporting a biodiversity banking system, either on public or on private lands needs to have clear rules in regards to the key elements described above (implementation of offsets, demand for biodiversity credits, trade), no matter where they are implemented.

The questions that arose in the particular context of Alberta and that this chapter addressed were:

1. whether Alberta has the legal framework to support a biodiversity banking system on its public lands;

2. whether that legal framework has already implemented these key features identified by this chapter; or
3. whether it is likely to implement these features into the legal framework supporting a potential biodiversity banking system on Alberta's applicable to public lands.

The answer to the first question is: YES. Alberta has the legal and institutional framework to enable a regulatory biodiversity banking system in the province. This legal framework is formed by a combination of different Statutes, specifically *ALSA*, *EPEA*, the *Forests Act and* the *BOPF*'s draft.[653]

In addition, as will be further discussed in the Property Rights chapter, the *Forests Act* also plays an important role in the operation of this potential scheme on public lands, by enabling the Forestry sector to participate as biodiversity bankers, depending on the rights granted to them by their specific dispositions.

In response to the second and third questions, the review of international biodiversity banking systems showed that the key features of a legal framework necessary to support a biodiversity banking system have been incorporated into the legal frameworks supporting international experiences with biodiversity banks, specifically, in the U.S. and in NSW. Furthermore, it demonstrated that Alberta has incorporated most of these key elements into its legal framework, and could incorporate the missing ones in future regulations and offset program rules.

Regarding the creation of demand for biodiversity credits, and biodiversity credit markets for example, the review of international biodiversity banking schemes and their supporting legal frameworks demonstrated that the demand for biodiversity credits can be created either directly or, indirectly, or through a combination of both direct and indirect laws and regulations.

Demand for biodiversity credits is usually linked with an operating permit process, and its legal requirements, such as environmental impact assessments. As a result, a combination

[653] See *Alberta Land Stewardship Act,* SA 2009, c A-26.8*, Environmental Protection and Enhancement Act*, RSA 2000, c E-12, and *Forests Act*, RSA 2000, c F-22, *BOPF*..

of direct and indirect legislation through the use of *EPEA-ALSA, and* the draft of the *BOPF* could lead the creation of demand for biodiversity credits in Alberta. *ALSA* and *EPEA*, and the link between them could be the basis for the creation of demand for biodiversity credits and therefore of biodiversity banks in the province. This could be done by using the already existing EIA and the AER approval process to identify impacts caused by oil sands projects, and by conditioning oil sand development approvals to the possibility of acquiring biodiversity credits from a biodiversity bank.

Regarding the elements or rules supporting the creation and operation of the biodiversity banking system on Alberta's public lands, the chapter found that establishing and operating biodiversity banks depend on legal provisions and on the existence of a methodology to clearly determine where and how to establish biodiversity banks and operate them.

In Alberta, the *BOPF* has been drafted to provide a framework for biodiversity offsets design and to provide guiding principles to implement and operate biodiversity offsets. Beyond the *BOPF*, *ALSA* provides the planning umbrella under which a biodiversity banking system could be implemented. Its section 47 enables the use of offset programs and the establishment of biodiversity banks under regulated biodiversity banking systems. Although biodiversity banks are not yet regulated in Alberta, section 47 and *ALSA*'s future regulations as well as offset program rules under *BOPF* could support the creation and operation of such a system, and no amendments or major legal changes are required. All these rules and regulations should be in accordance with the *ALSA* regional plans. Furthermore, with regards to the creation of biodiversity credits, and establishment of biodiversity credits, and the creation of trading schemes, the lack of regulation of *ALSA* in terms of these conservation offsets could facilitate the inclusion of all of these aspects into future regulation.

In terms of financial and institutional infrastructure needed to implement and operate a biodiversity banking system, this chapter concluded that Alberta's legal framework has the financial tools and the institutional framework to support a biodiversity banking system in the province.

Alberta's government will have an important role both regulating and managing a

biodiversity banking system in the province. Because of its institutional capacity, and knowledge regarding the environment and development, the current AEP could ideally become the institution centralizing the administration and operation of a potential biodiversity banking system, at a lower cost. This centralization would not imply a lack of coordination or consultation with other Ministries and Agencies, when necessary. Furthermore the *EPEA* could provide the funds necessary to operate a potential biodiversity banking system.

Although there is not much discussion on the topic, the analysis of Alberta's legal framework and its experience designing and implementing biodiversity offset systems and a potential biodiversity banking system indicates that legal rules to support biodiversity banking systems on public lands do not face extra challenges compared to private lands. In fact, it might be still early to determine the exact manner in which a legal framework would work to enable the implementation and operation of a biodiversity banking system in Alberta. Despite this fact, the story of biodiversity banks in Alberta is being developed and might evolve and become a well-structured system such as the international examples studied by this dissertation. Meanwhile, the current legal and institutional framework provides a solid basis to believe that a biodiversity banking system applicable to public lands could incorporate the key supporting elements of a legal framework. A biodiversity banking system applicable to public lands could be therefore implemented and operated in the province.

The chapter that follows analyses the property rights related challenges that emerge from operating and implementing a biodiversity banking system in the context of Alberta's green, or public lands, and analyses the type of property and/or use rights that private entities, specifically forest operators would need to have, not only to successfully enter the land, but to implement and operate biodiversity banks. It also discusses how to ensure the permanence of offsets under biodiversity banks implemented in the public lands context.

CHAPTER 2: THE ROLE OF PROPERTY RIGHTS IN THE IMPLEMENTATION AND OPERATION OF BIODIVERSITY BANKS ON PUBLIC LANDS.

2.1 Introduction

The previous chapter showed that a potential biodiversity banking system on public lands needs to be supported by a legal and policy framework with clear rules that provides certainty to its participants. Such framework could standardize the implementation and operation of biodiversity offsets under banks, and regulate the creation of biodiversity credits and their trade. A legal framework formed by *ALSA*, *EPEA* and the *Forests Act* could support a biodiversity banking system applicable to both private and public lands in Alberta.

As noted in the conceptual section, similar to the biodiversity banking systems in the U.S. and NSW, private landowners could implement biodiversity offsets under biodiversity banks on their private lands, and become biodiversity bankers. Biodiversity banks on private lands by private landowners have been studied in detail by literature. However, implementing biodiversity banks on public lands has not been the focus of much research. The reason for this limited analysis is the private focus of most international experiences. In these systems, biodiversity offsets have been mostly implemented on private lands, where private entities have complete rights to implement and operate these types of instruments.

This second chapter aims, therefore, to analyze the type of property rights or use rights needed to implement and operate biodiversity banks on public lands.

As explained in the Star Wood Forestry Company example described in the introduction to the thesis and when introducing property related challenges on public lands in the background section, biodiversity bankers face different challenges at the time of implementing and operating biodiversity offsets under biodiversity banks in a public lands context. Some of these challenges identified through the example were: What rights do private entities need to implement biodiversity offsets on lands that belong to the Crown? How to ensure permanence of biodiversity offsets under biodiversity banks in a context of multiple resources users with different rights over the resources above and under the

land? What are the potential impacts to the creation and transferability of biodiversity credits in a public lands context?

To better understand these challenges, let's go back to the Star Wood Forestry Company example. In the cited example, if the company which invested an important amount of money in restoration activities towards implementing biodiversity offsets under a biodiversity bank on public lands did not have clear rights to establish and/or maintain the offset and its environmental services, other land users might access part or the totality of the biodiversity offset to extract underground resources from the land, clearing vegetation in the offset area and/or polluting watercourses. These extraction activities could negatively impact all or some of the environmental benefits produced by the biodiversity offset, and therefore impact the permanence of the biodiversity bank under which the offset was implemented.

The transferability of biodiversity credits could be also negatively impacted. As briefly explained in the background section, if the coal miner damaged part or the totality of the biodiversity offset after credits from the offset were produced but not sold, these credits might not be valid for trading purposes any more. If credits had already been sold, the developer that bought the credits to offset its own significant residual impacts would be negatively impacted, because the credits it bought would no longer produce the intended environmental benefits.

Clear property rights or use rights are therefore important. They provide security to the biodiversity banking system throughout their implementation, operation, and trading phases.[654] In a perfect scenario, biodiversity bankers implementing biodiversity offsets would ideally have complete property rights and clear land tenure to be implemented and to endure.[655] The reason for this requirement is that "complete property rights are

[654] See Thomas Greiber ed., *Payments for Ecosystem Services: Legal and Institutional Frameworks,* IUCN Environmental Policy and Law Paper No. 78 (Gland, Switzerland: UICN, 2009) at 157, [*Greiber*].

[655] See for example P.H. Pearse, "Property Rights and the Development of Natural Resource Policies in Canada" (1988) 14:3 *Canadian Public Policy* 307 at 308. See also S.A. Kennett et al, "Property Right and the Legal Framework for Carbon Sequestration on Agricultural Land", (2005) 37:2 *Ottawa L Rev* 171, [*Kennett*].

exclusive, enforceable and transferable."[656] Once biodiversity credits are created, clear property rights provide certainty to the buyers regarding the origin and reliability of the biodiversity credit they are acquiring. On the other hand, they provide the biodiversity banker the entitlement to implement biodiversity offsets and operate them without third party disturbances. As a result, clear property rights have a double purpose. They do not only help avoid fraud by providing certainty to the buyer that it is acquiring a product or service from a person or entity who has the right and who is legally entitled to sell it, but they also provide the biodiversity banker the certainty that its investment is protected from third parties claiming better rights over the land where the offset is implemented.

Beyond clear rights to implement biodiversity offsets on public lands used by multiple users, the anti-fraud role of property rights, and the entitlement to sell certain products or services from biodiversity offsets located on public lands, property rights and clear land tenure rights also provide certainty to the biodiversity banking system. This means that if biodiversity banks are properly managed, their conservation activities will endure by ensuring, for example, that biodiversity offsets implementers have all the required permits to implement their projects, and to make conservation last for a committed period of time. Property rights provide biodiversity bankers the possibility of recovering the cost of their operations and of gaining profits from selling biodiversity credits, once the offsets are operating.

If biodiversity banking systems were created in Alberta, offset providers would be either public or private entities, or individuals interested in conserving certain public or private lands to offset impacts occurring on lands, such as lands subject to oil sands development, which would become the offset service areas.

One of the assumptions of Marian Weber et al. in the paper: "Experimental Economic Evaluation of Offset Design Options for Alberta – Research Report" is that Alberta's forestry sector might become the implementer of biodiversity banks on public lands allocated to the sector. This study, which tried different models to implement biodiversity offsets in Alberta, argued that if such a banking system were created, this sector could

[656] *Black's Law Dictionary*, 2nd pocket ed, *sub verbo* "property right." See also *Anderson*, *supra* note 5 at 34-32.

become the primary provider of biodiversity offsets and biodiversity credits in the province.[657] This dissertation supports this idea. Considering that Alberta's forestry sector, along with the oil and gas sector are among the main users of Alberta's public forested lands, this chapter analyses whether the forestry sector could become the potential implementer of biodiversity banks under a potential regulatory biodiversity banking system in the province. The chapter addresses two research questions: one related to the implementation rights and permanence of biodiversity offsets under a biodiversity bank, and another one related to the transferability rights over biodiversity credits.

i) Would the forestry sector and/or other private entities would have the rights to implement and maintain long-lasting biodiversity offsets under biodiversity banks on public lands?

ii) Would biodiversity credits be subject to property, and if so, would private entities would have the necessary rights to transfer the biodiversity credits created within biodiversity banks?

To answer the research questions, this chapter begins by providing a brief description of the forest tenures and allocation system in force in Alberta. This description is done to identify potential challenges faced by the forestry sector in order to participate in these systems, as well as the potential solutions to overcome any potential challenges.

It then analyses Alberta's legal framework, concretely the *Forests Act* and *ALSA* to determine whether Alberta's legal framework will either support or preclude the participation of the forestry sector in biodiversity offsets under biodiversity banks on public lands, as well as the transfer of biodiversity credits emerging from individual biodiversity banks.

This chapter concludes that Forest Management Agreement (FMA) holders are the only forest operators who could implement and operate biodiversity offsets under the *Forests*

[657] Marian Weber et al, *Experimental Economic Evaluation of Offset Design – Options for Alberta: A Summary of Results and Policy Recommendations,* report prepared for the Alberta Land Use Secretariat (November 2011) at 16, 21, online: <www.landuse.alberta.ca/Documents/LUF_Experimental_Evaluation_of_Offset_Design_Options_Summary_Report-2011-11.pdf>, [Weber2011].

Act in force. The chapter also finds that medium and small forest operators could also participate in the implementation and operation of biodiversity offsets on public lands under combined harvesting-conservation dispositions, and in the transfer of biodiversity credits as long as a sustainability approach to forest management were used in the province. This sustainability approach would require some amendments in the *Forests Act* to ensure that forest operators with different tenures could participate in the system, and that progressive reforestation would be the basis for biodiversity banks.

The chapter also finds that beyond amending the *Forests Act*, another option to enable forest operators implement biodiversity offsets on public lands would be to modify existing forestry dispositions in accordance with section 47(3) (a), which as noted in section 1.2.4 of the Legal Framework chapter, can lead to modifying existing dispositions to counterbalance the effect of an activity or proposed activity, and therefore to implement and operate biodiversity offsets.[658]

With regards to the transfer of biodiversity credits, the chapter concludes that laws supporting a biodiversity banking system can determine whether biodiversity credits are subject to property or not, and if so, the type of property rights they are.[659]

Based on the analysis of Alberta's *Forests Act*, this chapter shows that although forest operators implementing and operating biodiversity offsets under biodiversity banks would not acquire any interest in the public land where the offset would be implemented, forest operators could be considered owners of the biodiversity credits produced by the offsets, and have the right to sell and transfer them.[660]

2.2 Implementation and Operation of Biodiversity Banks by the Forestry Sector in Alberta – Allocation System

As noted in the background and contextual section of this dissertation, Alberta's public lands are managed by different governmental institutions, and are regulated by different laws and regulations, such as the *Public Lands Act*,[661] the *Mines and Minerals Act*[662] and

[658] *ALSA*, *supra* note 118, s 47 (3).
[659] See section 1.2.4 of the Legal Framework chapter.
[660] *Forests Act*, *supra* note 46, s 16(2), and 28(4).
[661] *Public Lands Act, supra* note 209.

also under the *Forests Act*.[663] The allocation of rights to public lands and to their natural resources is done through dispositions. Dispositions are materialized, for example, through leases, licenses, permits and land tenure or cooperative management agreements.[664] However, the scope of these rights significantly varies depending on the statutory consent or disposition instrument the Crown uses to grant access and/or other rights over its public resources. For example, a lease grants more rights than a license, which is revocable.[665]

The forestry sector acquires its timber rights and the rights to access and exploit public forests through i) forest management agreements (FMA), ii) timber quota licences and iii) timber permits issued by Alberta's Ministry of Agriculture and Forestry.[666]

These dispositions depend on the area of the land, volume of the timber harvested and the operational capabilities of the disposition's applicant.[667] Although it is not expressly mentioned in the *Forests Act*, these dispositions offer different types and levels of rights to their holders. More comprehensive rights are granted to larger operators with more operational capability, while more restrictive or at least limited rights are granted to smaller operators. For example, FMAs, which are more comprehensive in terms of the rights granted to their holders, are granted to larger operations. These operators are forestry companies, which enter into these agreements with Alberta's government. Their activities are subject to a management plan approved by the government.[668]

On the other hand, small to medium operations and community-use operators have more limited rights. They obtain access and certain timber-harvesting rights through certificate

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[662] See *Mines and Minerals Act, supra* note 212.
[663] See *INTLANDMAPP*, *supra* note 213.
[664] Passelac-Ross, supra note 121 at 11.
[665] See Ziff, Bruce, Principles of Property Law, 6th ed, (Toronto: Carswell, 2014) at 290 and 318, [*Ziff a*].
[666] There are three types of forest tenures in Alberta: Forest Management agreements, timber quota and timber permits. Dispositions are granted based on tenure types. See Alberta, Agriculture and Forestry, Forest Tenure, online: < http://www.agric.gov.ab.ca/app21/forestrypage?cat1=Forest%20Management&cat2=Forest%20Tenure > [*Forest Tenure*]. See also *Forests Act*, *supra* note 46 at s1 (m), 16, 17 and 21.
[667] Area based tenure provides the tenure holder "right to harvest a specified volume of timber from a specified area or all the timber in a specified area (e.g. FMA). The volume based tenures "give the tenure holder the right to a percentage of Annual Allowable Cut (AAC; measured in timber volume) within a specific area or a specified volume from a specific area. Coniferous timber quotas and timber permits are examples of volume-based tenures." *Forest Tenure*, *ibid.*
[668] *Forests Act*, *supra* note 46, s 16 (1), 21 (1).

quotas, timber licences and timber permits, respectively.[669]

As an example of the differences in the level of rights granted to the different disposition holders, FMAs grant their holders a right to enter into crown forest lands to: i) establish, ii) grow or iii) harvest timber. In contrast to the FMAs, licenses or quota certificates do not provide their holders any right to establish or grow timber. Similarly, the timber permit grants its holder the right to harvest timber on a specific location for a specific period of time, in accordance with an allocation title.[670] In other words, operational capabilities determine the level or amount of rights granted to a disposition holder to operate forest resources.

Alberta's legislation makes it clear that dispositions do not grant any interest or property rights on the forested land to which the disposition holder has been granted access or where it is pursuing its forest harvesting activities. Within this context, the *Forests Act* states in section 28 (1) that:

> A timber quota holder, whether or not the quota holder holds a timber license, and a holder of a timber permit does not acquire any right or interest in the forest land that is the subject of the quota, license or permit, but may enter the land for the purpose of doing or complying with those things specified in the license or permit or in this Act or the regulations.[671]

Based on these aspects, it can be said that from all the types of existing forest dispositions, FMAs are the only dispositions that do not only and exclusively focus on harvesting timber, but which expressly facilitate other forest related activities, such as establishing and growing timber, meaning "all trees living or dead, of any size or species and whether standing, fallen, cut or extracted."[672] This could include the possibility of establishing or growing timber, considered as trees and vegetation, which are not standing only for harvesting purposes. This could imply the possibility of enabling forest companies to enter into biodiversity banks under the current *Forests Act* and Forest regulations, unless otherwise expressly prohibited in each FMA. In other words, this could be the only disposition type that would not need major amendments to enable forest operators to

[669] *Forests Act*, *supra* note 46 , s 17, 21 and 22.
[670] *Forests Act*, *ibid*, s 16 (1), 21 (1).
[671] *Ibid,* s 28 (1).
[672] *Ibid*, s 1 (1).

implement biodiversity offsets under biodiversity banks. However, ideally new FMA dispositions would expressly provide forest operators with the right to implement and operate biodiversity offsets under biodiversity banks. Such an inclusion would provide more certainty to the system.

As further explained in subsection 2.2.2.1, a sustainable approach to forest management could enable medium, small and even community-based operators to implement biodiversity offsets under biodiversity banks on public lands. The possibility of aboriginal peoples becoming biodiversity bankers under the system has not been studied by this dissertation, but it is a relevant issue that can be the subject of future research in the area of aboriginal rights, environmental law and the use of economic instruments to address biodiversity loss.

2.2.1 Dispositions limitations: non harvesting, non-compliance and limitations to establishing biodiversity banks

Even if the broader scope of the FMAs would allow large forest operators to participate in biodiversity banks' implementation and operation, the Province has adopted an almost "purely timber harvest approach", which mandates harvesting in the amount, manner and time specified in the disposition.[673] This approach reflected throughout Alberta's *Forests Act* and regulations might preclude medium and small operators from participating in the establishment and operation of biodiversity offsets under biodiversity banks on public lands.[674] Because of the important economic resources that this industry contributes to Alberta's economy, not harvesting as programmed could be seen as a major decrease in the productivity of the province's forestry sector.

As noted earlier, implementation of biodiversity offsets under a biodiversity bank implies carrying out certain conservation, re-vegetation and establishment of forests or other conservation activities. Carrying out these activities under a timber disposition could lead to reducing either the whole or part of the amount authorized to be harvested under a timber disposition. However, not harvesting an authorized volume of timber as stated in

[673] This approach is found throughout the *Forests Act.* It is characterized by limiting the scope of forest operations to harvesting operations only. See *Forests Act* s 16, 17, 21 and 22
[674] *Ibid*, s 25 (1).

the forest disposition could be considered non-compliance under s 25 (1) and (2) of the current *Forests Act* that states:

> the director may, with respect to a timber quota, timber licence or timber permit, (a) suspend it indefinitely or for a fixed period, (b) cancel it, (c) reduce its term or (d) realize on the security deposited by the hold (1) if the holder of a timber quota, timber licence or timber permit …(a) fails to cut the authorized volume of timber or the timber on the authorized amount of forest land during a quadrant (25 (2) (1) (a).[675]

This situation could lead to "corrective" or punitive actions, such as suspension, cancellation and/or reduction of the term of the disposition.[676] In other words, conservation or restoration activities that could lead to implementing a biodiversity offsets biodiversity bank could be considered a non-compliance with the forest disposition because of a potential reduction of the timber harvesting, and the forest operator's rights could be cancelled. This situation could impose a significant limitation or restriction to the participation of medium and small forest operators in the establishment of biodiversity banks on public lands.

2.2.2 Enabling Alberta's forestry sector to implement biodiversity banks under a regulated system

To address the potential issue of considering biodiversity offsets as no-compliance with forest dispositions and therefore subject to corrective actions, the latest draft version of *BOPF* has included the possibility of using deferred projects, or not exercising active resource rights as an eligible action to create an offset. In theory, such a section could lead to considering implementing biodiversity offsets on areas subject to timber dispositions as being in compliance with the disposition and therefore with the *Forests Act*. The question is: will deferred forest projects be considered in compliance with the *Forests Act*?

This chapter argues that a more comprehensive approach to forest management and therefore the implementation of deferred projects as biodiversity offsets and banks under Alberta's Forest legal framework is supported by the sustainability principle pursued by the *Forests Act*. A sustainability approach to forest management could address the limitation

[675] *Forests Act*, supra note 46 , s 25 (1) and (2)
[676] *Ibid,* s 25 (1).

imposed by the purely harvest approach, and the potential non-compliance with Alberta's *Forests Act*, if biodiversity offsets under biodiversity banks were to be implemented by forest operators in the Province. It would justify the use of combined dispositions that would enable large, medium and small operators implement and operate biodiversity offsets on public lands as well as amending the *Forests Act* to enable such participation, if necessary.

2.2.2.1 Sustainable forest management

This chapter argues that the primary element to support the use of a more comprehensive approach to forest management and therefore the implementation of biodiversity banks under Alberta's forest legal framework is sustainability.

The Brundtland Commission created the concept of sustainability or sustainable development[677] in *Our Common Future* in 1987.[678] It states *"sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*[679]

Although a discussion of sustainability and sustainable development is beyond the scope of this dissertation, it can be said that based on the three main pillars of sustainability — economy, environment and society — sustainable forest management is a type of forest management that is formed by integrating economic, ecological and social elements.

Authors such as Victor Adamowicz and Philip Burton state that sustainable forest management "embraces the notion of multiple values being maintained over generations."[680] According to these authors and to Nathalie Chalifour,[681] sustainable forest

[677] In 1983, the United Nations Secretary-General created a World Commission on Environment and Development, chaired by Norwegian Prime Minister Gro Harlem Brundtland. In 1987 it produced the report "Our Common Future" which launched the "sustainable development" concept. The report was a call for action that analysed common global concerns and challenges, such as food security, population, energy and environmental issues.

[678] World Commission on Environment and Development, *Our common future* (Cambridge: Oxford University Press, 1987) at 43, online: <www.un-documents.net/our-common-future.pdf>.

[679] *Ibid*.

[680] Viktor L. Adamowicz & Philip J. Burton, *Sustainability and Sustainable Forest Management*, in Philip J. Burton et al, eds., *Towards Sustainable Management of the Boreal Forest* (Ottawa: NRC, 2003) 41, 46 [*Adamowicz*].

[681] See the Doctoral dissertation of Nathalie Chalifour: *Paying for nature conservation with tax dollars? An evaluation of the role of fiscal policy reform in promoting biodiversity conservation in Canada through legal,*

management is characterized by having social, economic and ecological aspects, which should guide the development of the forestry sector. These elements should be equally balanced, without favouring one element over the other ones.[682]

Based on the equality of the sustainability pillars, it is clear that sustainable forest management should not only pursue an economic benefit from the forest, but should also equally promote social participation and ecosystems integrity.[683] This is arguably the reason why sustainable forest management, as already incorporated into Alberta's *Forests Act,* could support and even promote the use of biodiversity banks in that province, as a way to pursue sustainable forests, beyond the purely economic element of sustainability.

Alberta's forest legislation and regulations impose a mandate to comply with sustainable forest management.[684] Sustainable forest management has been adopted by Alberta's *Forests Act* through section 16 (1) which states that FMAs have to "*establish, grow and harvest timber in a manner designed to provide a yield consistent with sustainable forest management principles and practices*." [685]

Although it does not explicitly mention how to attain this sustainability, this legislation clearly states that FMAs and timber dispositions in general have to be performed in a manner consistent with sustainable forest management principles and practices.[686] As a result of this requirement, sustainable practices would need to be reflected in management and operating plans governing forestry operations emerging from timber dispositions.

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economic, ecological, fiscal and political lenses (LL.D. Thesis, Stanford University School of Law, 2005), online: <https://law.stanford.edu/publications/paying-for-nature-conservation-with-tax-dollars-an-evaluation-of-the-role-of-fiscal-policy-reform-in-promoting-biodiversity-conservation-in-canada-through-legal-economic-ecological-fiscal-and-pol/>.

[682] The need to balance and integrate the three pillars of sustainability has had a growing recognition since the 1987 Brundtlandt Report. See UN Environment, Our Planet, *The Three Dimensions of Sustainable Development: Is an Integrated Approach beyond our Reach?* online: <http://web.unep.org/ourplanet/march-2015/unep-work/three-dimensions-sustainable-development>.

[683] See *Adamowicz*, *supra* note 680 at 41, 46. See also A.J. Hansen et al, "Conserving Biodiversity in Managed Forests" (1991) 41 *Bioscience* 382.

[684] See *Forests Act*, *supra* note 46, s 16 (1).

[685] See *Forests Act*, *supra* note 46, s 16 (1).

[686] *Ibid*.

A sustainability approach to forest management, which goes beyond timber harvesting and which promotes conservation, re-vegetation and restoration activities, could be incorporated into the current disposition system under Alberta's *Forests Act* and regulations. This would deliver not only economic benefits, but also ecological and social ones. This sustainability approach in the legal framework could justify amendments to the *Forests Act* to expressly enable large, small and medium forest operators to enter into forest dispositions that go beyond timber harvesting. Within this context, implementing biodiversity banks under the *Forests Act* could be justified by the ecological, economic and social components of sustainable forest management.

Sustainable Forest Management – ecological component

In theory, the ecological component of sustainable forest management includes an ecosystem based management approach, which should ideally pursue a forest ecosystems integrity goal.[687] In practice, this goal could lead to maintaining and recovering forest ecosystems or conservation activities.

Although Alberta's forest legal framework should ideally follow ecosystems integrity as part of its sustainable forest management, Alberta's *Forests Act* and its regulations also pursue a sustained-yield management goal.[688] This concept is strictly connected to timber harvesting. Sustained-yield management means "the total volume available from a tree or group of trees at a time when it is considered mature or available for harvest."[689] Although also linked with timber harvesting, sustained-yield timber management is a broader concept, part of sustainability. It pursues the maintenance or sustainability of the forest where timber-harvesting activities are carried out. The concept of sustained-yield timber

[687] Ecological integrity means —"[W]ith respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic [non-living] components and the composition and abundance of native species and biological communities, rates of change and supporting processes." Office of the Auditor General of Canada, *Report of the Commissioner of the Environment and Sustainable Development, Chapter 7 – Ecological Integrity in National Parks* (Ottawa: OEGC, 2013), online: <www.oag-bvg.gc.ca/internet/English/parl_cesd_201311_07_e_38677.html#def2>.

[688] Alberta Centre for Boreal Studies, *Forest Management in Alberta: Provincial Forestry Policy – Fact Sheet* (May, 2001), online: < http://web.archive.org/web/20110826100424/http://borealcentre.ca/facts/forestry.html >.

[689] Alberta Sustainable Resource Development, *C5 Forest Management Plan 2006–2026*, Appendix 1: Glossary and Acronyms, online: <http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/formain15761/$file/FMU-C5-FMP.pdf?OpenElement>.

management implies maintaining the health and balance of Alberta's forests by "managing the net forest land base in a defined area for continuous timber production where the aim is to achieve, at the earliest practicable time, a balance between net growth and harvest."[690] This balance could be translated both in the amount of trees that could sustain the harvest of timber in the long term, and in the participation and use of the forest by large, medium and small users. The problem in practice is that forest operators and the Province have adopted a purely timber harvest approach that seeks economic gains from timber production. One of the limitations of the current approach to forest management is that although forest operations aim to maintain the health of the forest to be able to continue producing wood, other forest services, such as ecological services, have not been considered as part of the forest products portfolio.

If sustaining the health and balance of Alberta's forests is the goal behind the sustained-yield timber management concept, this concept could support offset practices such as sustainable forest management activities on Alberta's public lands. The reason for this statement is that harvesting is promoted under the *Forests Act* and regulations, as long as it does not affect the health of a forest and does not impact its sustainability.

The sustained yield concept could help achieve the ecological or environmental sustainability component, while the participation of all the categories of forest operators in the harvesting of timber and the restoration of forests through biodiversity banks could help achieve the social sustainability component. Furthermore, biodiversity banks could help obtain the ecological, economic and social benefits pursued by Alberta's Forest legal framework.

There might be a concern that conservation activities could reduce the amount of harvesting activities, with a negative impact on the sector. However, as explained in the next subsection, a diversification of the sector could lead to ecological, economic and social benefits.

[690] *Ibid*.

Diversification from an ecological and legal context

In theory, the full extent of the sustainable ecological component of the *Forests Act* should allow FMAs to pursue not only harvesting purposes, but also conservation and restoration activities, designed to maintain the health and balance of Alberta's forest. These activities could include for example establishing and growing timber. For the purpose of this disposition, an integral part of timber is comprised of live forests and standing trees.

As part of this sustainability objective to maintain healthy and balanced forests, the *Forests Act* and its regulations impose a mandate to progressively reforest and/or afforest the areas of land that were harvested, or an equivalent amount of forest.[691] "Reforestation" within this context means any operation involving seed management, seedling production, site preparation, tree planting, seeding, regeneration or reforestation surveying, stand cleaning, stand tending, stand thinning, tree improvement, fertilization, drainage, pruning or site analysis that is carried out in the course of forest renewal."[692] All forest dispositions are subject to this requirement.[693]

If a forest disposition were to expressly allow for the implementation of a biodiversity offset, a specific area of the disposition could be directed to conservation activities to offset impacts from the oil and gas sector, while the other part would be directed to harvesting at least the minimum timber quotas mandated by the disposition.

In terms of management practices, each timber disposition responds to an operating or a management plan. Operating plans set the activities that need to be performed during a specific year. For example, in the case of timber quota certificate holders, forestry activities must be carried out in five-year quadrants. In addition to these five-year plans, an operating plan guiding the yearly operations must be approved by the Alberta government and complied with by the disposition holder. Given that FMAs are longer-term instruments, they have to follow ten-year forest management plans. Reforestation activities must be foreseen and described in all operating plans. The plans guide the

[691] *Forests Act*, *supra* note 46, s 21 (5) (b), 22 (5) (b).
[692] *Timber Management Regulation*, Alta Reg 60/1973, Part 6, s 122.1 (1) (a.2).
[693] *Forests Act*, *supra* note 46, s 21 (5) (b), 22 (5) (b) and 29 (2).

reforestation required by law. This reforestation needs to be done progressively.[694] Both the timber harvesting and the progressive reforestation have to follow the terms and conditions of the specific timber disposition and its operating plan.[695] As a general rule, there is an obligation to reforest a harvested area within two years of the harvest.[696]

Although the obligation and responsibility to progressively reforest concerns all forest operators, FMA holders are the only ones required by the *Forests Act* to personally undertake these activities.[697] FMA holders are as a result, already performing the progressive reforestation[698] in their quadrants. To date this progressive reforestation "relies on regeneration requirements and penalties to promote reforestation following harvesting."[699] As noted earlier in the conceptual section of this thesis, biodiversity banks provide an opportunity to act preventively and avoid penalties such as fines and even criminal sanctions for environmental damages and also compensate for residual environmental impacts through biodiversity offsets.

A sustainability approach to forest management under the current *Forests Act*, beyond the purely timber-harvesting approach, would enable FMA holders to implement biodiversity offsets under biodiversity banks by carrying out conservation or re-vegetation activities on the quadrants of land subject to their dispositions. These conservation, restoration and reforestation activities should be additional, and go beyond their legal progressive reforestation requirements. These activities would need, for example, to reforest a larger area of land, or include other conservation efforts, beyond those mandated by the disposition and its operating plans.

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[694] *Timber Management Regulation*, *supra* note 692, s 100 (1) (a), (b), (c).
[695] *Ibid.*
[696] For details see Alberta Government, *Reforestation Standard of Alberta, Effective May 1, 2015 to April 2016*, online: < http://open.alberta.ca/dataset/f8b19d0a-4d8a-45ca-b904-11a19a207cf4/resource/5164e74f-20d1-41e4-91c2-dac891a04d84/download/2015-05-ReforestationStandardAlberta.pdf>.
[697] *Forests Act*, *supra* note 46, s 21 (5) (b), 22 (5) (b).
[698] Smaller operators, who might not have the "capability" to personally undertake the required progressive reforestation, also have the option of paying a reforestation levy or charge in lieu of their reforestation responsibility. In such cases, the Ministry in charge of forest management activities in the province undertakes restoration activities. See Forest Resource Improvement Association of Alberta, *Community Reforestation program,* online: < http://friaa.ab.ca/friaa-programs/forest-resource-improvement-program/program-summary >. See also, *Forests Act*, *ibid,* s 21 (5) (a), 22 (5) (a).
[699] Marilea Pattison Perry et al, "Calculating penalties for reforestation failures: an Alberta Case study", (2005) 35:3 *Canadian Journal of Forest Research* 557, online: <connection.ebscohost.com/c/articles/16760135/calculating-penalties-reforestation-failures-alberta-case-study>.

As explained in more detail when explaining the sustained yield and the economic component of the sustainable forest management in Alberta, FMA holders and other forest operators could be motivated for economic reasons to engage in re-vegetation activities and establish biodiversity banks as part of their dispositions. Participating in the establishment and operation of biodiversity banks could provide them the opportunity to obtain profits and gains for the provision of other forest services beyond timber.

There are different ways to ensure that timber dispositions will follow a sustainability approach, and that they allow the conservation and restoration activities. One possibility is to expressly state in the dispositions that they are not harvesting dispositions only, and that they allow conservation activities as indicated in their approved management and operating plans. The management and operating plans would need to specify the minimum and maximum timber quotas, as well as the activities that were required to be performed to implement and operate a biodiversity bank.

Another way to allow the implementation and operation of biodiversity banks could be through creating by regulation a new type of FMA, which would keep the timber establishing and growing powers granted under s.16 (1) of Alberta's *Forests Act*.[700] This new FMA[701] could be, for example, a timber-conservation license or permit, which could be either parallel to an existing timber harvesting disposition, or which could be a combination of both a timber harvesting disposition and a conservation initiative.

Based on these ideas, Alberta's forest legal framework could offer two different types of dispositions types granted to the different forest users: i) harvesting only and ii) combination harvesting-conservation. The latter could enable forest operators to comply with timber requirements while implementing and operating biodiversity banks. This type of disposition would be more attractive and sustainable because it would avoid detriments to the timber harvesting industry, and would promote a balance between harvesting and non-timber harvesting activities. However, if the *Forests Act* is amended, and a sustainability approach is adopted towards forestry operations, biodiversity banks could be implemented by the medium and smaller forest operators too, namely by the timber quota

[700] See *Forests Act*, *supra* note 46, s 1(m), 16 (1) – Forest Management Agreement.
[701] *Ibid.*

and timber permits holders.[702] An amendment to the *Forests Act* would probably be necessary to expressly enable this new disposition type, and to allow medium, small and community-based forestry dispositions to participate in progressive reforestation activities, and consequently to implement and operate biodiversity banks. If the *Forests Act* were not amended, another option to enable all types of forest operators participate in biodiversity offsets under biodiversity banks could be by modifying existing forestry dispositions based on section 47(3)(a) of *ALSA*. As noted earlier, under this section existing forestry dispositions could be modified in such a way that they enable forest operators to conduct not only timber harvesting activities, but also conservation and reforestation activities in compliance with the terms and conditions under the disposition.

Beyond the forest operators, other types of entities could engage in biodiversity banking though conservation-only dispositions. These dispositions would emerge from other laws beyond the *Forests Act*. Conservation-only dispositions could, for example, emerge from *ALSA*[703], and potential future regulations (regulating the creation and operation of biodiversity banking systems in Alberta), and be complemented by the biodiversity banking agreements between bankers and the government.

Section 47 (1) of *ALSA* provides the opportunity to establish conservation offset programs, but it does not provide details on who the bankers could be or the types of dispositions needed to implement these banks. However, it mentions that regulations could be made to counterbalance the effect of an activity.[704]

Thus, private entities with experience in biodiversity conservation or restoration such as NGOs or conservation groups would probably be able to participate in the biodiversity banking system in Alberta. More details on their participation could be regulated by *ALSA* regulations.

[702] See types of dispositions under Alberta's *Forests Act*, *ibid*, s 1 (m), 16, 17, and 21. See also *Timber Management Regulation*, *supra* note 692.
[703] *ALSA, supra* note 118.
[704] *Ibid,* s 47 (1).

Sustained yield and sustainable forest management – economic component

Would a more comprehensive approach towards forest use be economically sustainable?

Although, in theory, sustainable forest management is pursued by the *Forests Act*, (meaning that forest operations should pursue economic, social and environmental goals), in reality, the economic sustainability component of the sustainable forest management concept has been the one dominating forestry operations in Alberta. The timber harvesting approach, focused on harvesting follows economic interests over the social and ecological aspects. This approach focuses on the amount or quota of timber harvested under a disposition, instead of on other services provided by forest (e.g. scenic, wildlife conservation or water and climate regulation). This economic focus of forest operations in Alberta has been justified by the traditional and current needs of our societies to have wood for construction and other purposes.

However, the sustained yield pursued by the *Forests Act* and its regulations that underpin sustainable forestry in Alberta could facilitate the use of biodiversity banks in the province if a sustainable approach to forest management were adopted. This approach should not focus on the economic benefits from timber harvesting only; it could also include other economic benefits as well as the social and ecological services that could be obtained from other forest services, such as growing, restoring and conservation activities, either in certain or in all areas subject to a disposition. As a result, the products offered by the forestry sector could be diversified. This diversification could entitle disposition holders to enter into biodiversity banks, and to produce tradable biodiversity credits from their services.

Experience shows that conservation banking has already created a new niche, or new market area. This new niche has had significant economic gains for parties to the market. For example, "credit prices ranged from AUD 2,563 (2010) to AUD 8,000 (2011) in the NSW BioBanking system in Australia."[705] These credits had a "total value of AUD 2.8 million (or USD 2.5 million)."[706] In the U.S. conservation-banking system, credit prices range from

[705] See *Madsen 2011*, *supra* note 24 at 23.
[706] See *Ibid*.

$2,500 to $300,000, with an average of $ 31,683. These prices, which varied in the different states, accounted for $ 200 million in 2009.[707] However, this thesis could not find any concrete indication of the economic benefits that biodiversity banks could provide to forest operators participating in biodiversity banks in Alberta. It could not demonstrate, either, whether participating in these systems would be more appealing than entering into harvesting-only dispositions.

If the economic role of forestry operations were the main driver behind justifying the focus of the sector dispositions on timber, it could be argued that forest–timber conservation dispositions enabling biodiversity banks could become an attractive source of revenue for the disposition holders, the forestry sector as an industry, and for the provincial government.

A sustainable approach to forest management would grant disposition holders both the right to harvest timber and the right to implement and operate biodiversity banks. Biodiversity credits from their conservation efforts could be sold to the oil and gas industries, or to third parties, or governmental agencies. The transfer of biodiversity credits will be, however, further discussed later in this chapter.

Sustainable forest management – social component

Diversifying the products offered by Alberta's forestry sector could also be justified from a social sustainability perspective. As noted earlier, biodiversity banks could provide an opportunity to diversify forest products and to participate in new markets. This diversification of forest products and their economic benefits could become an attractive incentive for forest operators to participate in these new activities. This would make the forestry sector more attractive, not only to large but also to medium and small operators.

Participation in these activities is, however, restricted. Based on the current *Forests Act*, FMA holders would be the only forest disposition holders entitled to enter into other activities beyond timber harvesting under the Act.[708]

[707] See *Ibid*.
[708] See *Forests Act*, *supra* note 46.

As noted earlier, if the *Forests Act* were amended or if current dispositions were amended based on s. 47 (3) (a) all forest operators could implement and operate biodiversity offsets. These changes could open the door for small and medium forest operators to enter into activities to establish or grow timber, similar to what forest operators with FMAs currently have, and to undertake conservation, restoration and timber harvesting activities.

In order to participate in the biodiversity banking system, small and medium operators would probably need to obtain the capacity necessary to engage in conservation activities and to implement progressive reforestation, instead of acquiring it from the government. Transferring the progressive reforestation activities to the forest operators could lead to benefits for the government because it could represent less money, less capacity building and a reduced economic burden for the government.[709]

2.3 Rights to Implement and Operate Biodiversity Banks: Property Rights over Land, Surface and Minerals - Risk to Permanence

There are different risks that might affect the permanence of a biodiversity bank on public lands. These risks are mostly related to property rights or use rights to implement and operate these types of instruments. This aspect is particularly problematic, considering that biodiversity banks will be implemented on crown lands, which have users with different rights on these lands and underneath them.

2.3.1 Property right risks: different estates

As noted in the background section of this dissertation, whoever will implement a biodiversity bank needs to have clear property rights over the land where biodiversity banks will be established, or at least well defined use rights in order to implement and operate it.

> At common law, ownership of the surface extends to the airspace above and to the subsurface below. Ownership of land even includes the mines and minerals beneath the land with the exception of gold, silver and any other resource reserved by the Crown. Any interest held by the landowner may be sold. For

[709] See *Ibid,* s 21(5) (a) for timber licenses under quotas; 22 (5) (a) for timber permits.

> example, an owner may choose to retain the surface and subsurface, but sell or lease any or all of the minerals.[710]

Depending on the legal system and the property rights system in place in each country, surface rights and mineral rights can be either bundled or separated. Although mineral or mining rights are often linked with subsurface rights, mineral rights can also be found on the surface of the land.[711] This means that despite the rights of the surface estate owner over his/her piece of land, his/her rights would be limited, because as a general rule, mineral rights pre-empt, unless he/she is also the owner of the mineral rights.[712] There is, however, a possibility of owning the two types of rights: the surface rights and the mineral rights.[713]

The interplay between ownership and use rights is different in the context of public lands, and this has implications with respect to the implementation and operation of biodiversity banking systems on public land. In particular, given that surface and mineral rights are separated in Alberta, could this negatively affect the implementation and operation of biodiversity banks on Alberta's public lands?

2.3.1.1 Surface and mineral rights

Mineral rights below the surface are presumed to be owned by whoever has the fee simple ownership of the land.[714] However, "the mineral estate may be severed from the surface estate."[715] Different countries around the world, including Canada, separate ownership over the land (surface rights) from ownership over mineral rights and over oil and gas. Under different systems, including Alberta's, each of these rights — surface or mineral — are separated and, therefore, owned by different owners. [716]

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[710] ABPropGuide, *supra* note 208, at 10.
[711] See discussion of surface mineral rights in Texas, in Judon Fambrough, "Minerals, Surface Rights and Royalty Payments" (Texas A&M University; 2009) at 2-3 online: <https://assets.recenter.tamu.edu/documents/articles/840.pdf>.
[712] Alberta Energy, *About Mineral Ownership*, online: < http://www.energy.alberta.ca/OilSands/4081.asp>.
[713] *Ibid.*
[714] *Kennett*, *supra* note 655 at 180.
[715] *Ibid* at 181.
[716] Government of Alberta, *Surface and Mineral Rights*, online: <www.servicealberta.ca/589.cfm>

Furthermore, on some occasions, ownership over minerals can be even separated into smaller rights. In such a scenario, "someone who owns mineral rights to land may own one specific mineral, several minerals or all of the minerals (except gold and silver, which, with few exceptions, are the property of the Crown)."[717] There are different drivers behind this separation of rights. One of them is the interest of governments in retaining rights over mineral rights and oil and gas. Under a system of separated estates over surface, provincial governments usually grant surface rights to some right holders, and minerals rights to other people through dispositions and other titles. The way these rights are granted is further described in the following section.

2.3.1.1.1 Surface and mineral rights in Alberta – separate estates and biodiversity banks in the province

To determine whether the separation of property right estates in Alberta could negatively affect the implementation and operation of biodiversity banks, it is necessary to provide a brief overview of surface and mineral rights in this province.

In Alberta, "severance depends on whether the original Crown grant reserved mines and minerals (or some minerals) to the Crown."[718]

Between 1670 and 1869, the Hudson's Bay Company owned mineral rights in Alberta. The company surrendered most of its land to the Dominion of Canada in 1869.[719] In practice, Alberta has reserved most of the mines and minerals to the Crown.[720] In sum, the provincial Crown, through Alberta's Department of Energy, owns 81 percent of mineral rights in Alberta.[721] The remaining 19 percent are managed and held by the federal crown and by some "freehold rights" holders (e.g. successors of the Hudson's Bay Company, the national railway companies, and others).

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[717] *ABPropGuide*, *supra* note 208, at 10.
[718] The *Alberta Land Stewardship Act* established the legal basis for the development of regional plans under the Land use Framework. See *ALSA, supra* note 118. The Government of Alberta approved the Lower Athabasca Regional Framework on Aug 22, 2012.
[719] See HBC, *Our History: Business: Fur Trade: The Deed of Surrender*, online: <http://www.hbcheritage.ca/hbcheritage/history/week/the-deed-of-surrender>.
[720] See Alberta, Service Alberta *An Introduction to Alberta Land Titles*, at 10, online: <http://www.servicealberta.ca/pdf/lt/Land_Titles_Introduction.pdf >.
[721] Alberta, Ministry of Energy, *Petroleum and Natural Gas Tenure in Alberta* (September 2016), at 2, online: <http://www.energy.gov.ab.ca/Tenure/pdfs/tenure_brochure.pdf> [*Tenure 2009*]

Although in Alberta the Crown always retains title to minerals (e.g. coal, including oil sands), the private sector can acquire access tenure to Crown mineral and oil and gas rights in accordance with Alberta's *Mines and Minerals Act*.[722]

Access to mineral rights – oil and gas rights

Alberta's *Public Lands Act* specifies that the manner to obtain certain rights or privileges over public lands is through "dispositions." Dispositions are constituted by any instrument: whereby (i) any estate or interest in land of the Crown, or (ii) any other right or privilege in respect of land of the Crown that is not an estate or interest in land, is or has been granted or conveyed by the Crown to any person, but does not include a grant.[723]

Mineral and oil sands dispositions are regulated under the *Oil Sands Tenure Regulation* under the *Mines and Minerals Act*.[724] These types of rights might be transferred or disposed by agreements. As noted earlier, 19% of mineral rights in Alberta are owned by the Federal government and by some private entities.

Alberta Oil Sands Tenure Guidelines state that when mineral rights are owned by a person or entity who is not interested in exploiting mineral rights by him/herself, but does not want to transfer them or to sell them, "the owner of mineral rights may lease them to oil and gas companies in exchange for a royalty—a share of production or equivalent revenue."[725] In the case of Crown rights, the Crown also receives "a bonus and an annual rent payment when the rights are leased."[726] In terms of oil sands, under the *Oil Sands Tenure Regulation* a lease "means an agreement issued in the form of a lease that grants rights in respect of oil sands."[727]

Accordingly, whoever will undertake oil and gas activities on Alberta´s public lands needs to acquire mineral rights through a competitive auction process. Oil and natural gas agreements with the province might emerge as a result of the bid process. In the case of oil

[722] *Ibid* at 1.
[723] *Public Lands Act, supra* note 209, s 1 e.
[724] *Mines and Minerals Act*, *supra* note 212.
[725] Alberta, Ministry of Energy, *Alberta oil sands tenure guidelines*, August 2009, at 2-1, online: <http://www.energy.alberta.ca/OilSands/pdfs/GDE_OST_2009_Ch2.pdf>, [*Tenure Guidelines*].
[726] *Oil Sands Tenure Regulation*, Alta Reg 196/2010 at s 1(1) q., [*Oil Sands Tenure Regulation*].
[727] *Ibid.*

sands, these agreements convey the right to drill for, win, work, recover and remove oil sands that are the property of the Crown within the location of the agreement, or if the agreement relates to one or more zones, in the specified zone or zones within the locations, in accordance with the terms and conditions of the agreement."[728] Two types of oil sands agreements exist in the province: permits and leases.[729]

Permits mean agreements that grant rights in respect of oil sands.[730] Permits are issued for a term of five years. Leases are issued for a term of 15 years.[731]

The permit is the original or primary agreement. It provides the permittee the opportunity to request leases to proceed to exploit oil sands in the location expressly covered by the permit.[732] Aside from obtaining a lease through application, leases can also be obtained through a sale by public tender process conducted by the Ministry of Energy. The process is an "auction in which companies or individuals submit bids and then a petroleum and natural gas agreement (P&NG) is issued to the highest bidder for each parcel."[733] The Department of Energy has an average of 24 sales each year. Although the process refers to a "sale", the rights are leased and not sold, since the Crown retains property over the minerals.[734]

A permittee can acquire a single lease or more under a specific permit to enter and to exploit oil sands in the location of a permit. These leases are subject to renewal if requested in a timely manner (before the last term year of the lease), and of course if the Minister approves such a renewal.[735] A maximum area of 9,216 hectares can be granted under these agreements.[736]

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[728] *Oil Sands Tenure Regulation*, *ibid,* s 4, 4 (a) and (b).
[729] *Tenure Guidelines*, supra note725, chapter 2 at 1. See also Alberta, Ministry of Energy, *Tenures*, online: <www.energy.alberta.ca/OurBusiness/tenure.asp>; *Mines and Minerals Act*, *supra* note 212, s 16. Also see Alberta Energy, *Oil Sands 101*, online: <http://www.energy.alberta.ca/OilSands/1714.asp>.
[730] *Oil Sands Tenure Regulation*, *supra* note726, s 1 (1) x.
[731] Government of Alberta, Energy, *About Oil Sands Tenures*, online: http://www.energy.alberta.ca/OilSands/1705.asp
[732] *Oil Sands Tenure Regulation*, *supra* note726, s 8 (1).
[733] See Tenure 2009, *supra* note 721 at 12.
[734] See *Tenure 2009*, *ibid.*
[735] *Oil Sands Tenure Regulation*, *supra* note 726, s 13 (1).
[736] *Oil Sands Tenure Regulation*, *ibid*, s 5.

In theory, if there are two different owners, one for the surface rights, and another one for the mineral rights, each one of them has rights of access to the surface. The surface owner can access the surface in order to develop or to maintain it; and the mineral rights owner or holder can also have access to the surface and use parts of it, or all of it, as needed to access and exploit the minerals over which it has mineral rights. The latter rights prevail. The implications of the pre-emption of mineral and oil sands rights over the implementation and permanence of an offset will be explained in the following subsection.

Access to surface rights where mineral rights exist – ensuring the permanence of biodiversity offsets

Once a mineral or oil and gas development will be carried out in Alberta, the mineral or oil and gas rights holder can access the surface, even if it does not have the surface estate.[737]

Alberta promotes the negotiation of an agreement with the surface rights holders such as the forest operators to enter and use the land for mineral right development purposes. Nevertheless, if a negotiation is not successful, the mineral rights holder can solicit a "right of entry order" from the Surface Rights Board.[738] This quasi-judicial board provides rights of entry to mineral and oil and gas operators onto private and Crown lands for natural resource development, after determining landowner compensation.

A right of entry order under Alberta's *Surface Rights Act* enables the mineral holder to enter into the land and use it, or parts of it, to carry out its mineral or oil and gas development activities.[739] A right of entry is granted only after operators have received approval to explore for subsurface resources or have been granted the rights to develop these resources."[740] "The operator through the right of entry order obtains all rights to the surface to conduct its operations other than a right to a certificate of title or the right to take resources owned by the surface owner, such as sand, gravel and clay. The operator

[737] See Alberta, Employment and Immigration, *Surface rights and the Land Agent – A Guide for Landowners and Occupants* at 1, online: <https://work.alberta.ca/documents/surface-rights-and-the-land-agent.pdf>.
[738] The Surface Rights Board is an independent adjudicative tribunal established by the Province of Alberta. See, the Surface Rights Board, *About Us*, online:< https://surfacerights.alberta.ca/AboutUs.aspx>. See also the *Surface Rights Act,* RSA 2000, c S-24, s3, [*Surface Act].*
[739] See Alberta Energy Regulator for more information regarding power to develop, or to avoid development and conserve, online: <https://www.aer.ca/>.
[740] LUF, *supra* note 116.

also has the right to excavate and disturb the land as necessary for the operations."[741] If activities carried out by mineral rights holders cause damage to the surface such as loss of trees or damage to the soil, the affected party can seek compensation through a procedure before the Surface Rights Board.[742]

For the particular case of oil sands, if the surface is still owned by the Crown, surface rights to access the oil sands underneath need to be obtained through a surface lease.[743] However, if surface rights were allocated to private entities, a right of entry would be the only requirement to access the surface.

2.3.2 Biodiversity offsets and permanence

As noted earlier, one of the questions that this chapter aims to answer is how to ensure permanence on lands used by multiple users with different rights on and underneath the land.

Considering that mineral rights prevail over surface rights in Alberta, implementing offsets or conservation activities on surface land where mineral rights exist could be risky. As noted in the Star Wood example, implementing a biodiversity offset on lands with mineral rights underneath could be risky, considering that if the mineral rights holder decides to extract minerals, the whole area where an offset has been implemented could be lost, and along with it the investment of the biodiversity bank implementers.

In a context of multiple land users, permanence depends on who has better rights to the land. If the implementer of the offset does not have a prevailing right, and there is another surface user with prevailing rights over the land where the offset was implemented, the offset might be at risk.

Alberta has important amounts of mineral and oil and gas resources underneath its lands. Therefore, there might not be sufficient land without mineral rights available to implement

[741] Alberta Surface Rights Board, *Rights of Entry*, online: <www.surfacerights.gov.ab.ca/rightsofentry/default.aspx>.

[742] Section 30 of the Surface Rights Act enables the Surface Rights Board to solve disputes between surface and Rights of Entry Orders. See Alberta Surface Rights Board, *Damages,* online: <surfacerights.alberta.ca/ApplicationTypes/Damages.aspx>. See also *Surface Rights Act*, RSA 2000, c S-24, s 30.

[743] *Tenure Guidelines*, *supra* note 725 at 3.

biodiversity offsets under biodiversity banks. However, one aspect to consider is that the existence of mineral rights under the land where a forest operator aims to implement a biodiversity bank does not necessarily imply the impossibility of implementing and operating biodiversity offsets under a biodiversity bank.

There are different ways to ensure the permanence of offset implemented on lands subject to different land uses and developments. One option, for example, is to obtain the consent of the mineral rights holder. The Australian State of New South Wales has addressed this issue by conditioning the authorization of the biodiversity bank on the acquisition of written consent from the mineral rights holder committing to respect part or the whole area of land where the biodiversity bank would be implemented. This consent would probably have a monetary value and be purchased by the biodiversity banker. This way, even if the mineral right holder had the right to request the right to entry to the land where the BioBank would be implemented, such an entry should be done in a manner that would not affect the permanence of the biodiversity banking scheme and the environmental services provided by it. Such an approach has been adopted by the *BOPF*'s draft in Alberta, which specifies that when mineral rights exist where biodiversity offsets will be implemented, an agreement with both the disposition holder and the crown department responsible for the disposition of mineral rights is required.[744]

Something to take into account and further analyse is whether purchasing part of the mineral rights would imply a non-compliance with the mineral right holder disposition, and if based on the disposition, the mineral holder could enter into such consent. In Alberta, the proposed clause of the *BOPF*'s draft could be used to provide that consent of the mineral holder and to sell part of its rights with the consent and approval of the Government.

Another way to ensure permanence of biodiversity offsets in a multi-used public lands context could be through land withdrawals.

Some Canadian jurisdictions have used land withdrawals to set aside or exclude mineral rights from development for a specific period of time. It could be argued that a public land

[744] *BOPF, supra* note 149 at 3.

with minerals underneath could be "withdrawn" from minerals extraction and development while conservation/restoration obligations under biodiversity offsets exist. In such a scenario, land withdrawals could last, for example, for a period of time equal to the duration of the impacts biodiversity banks are trying to compensate for.

This possibility depends on the manner in which laws and policies supporting land withdrawals define their scope. In Northern Ontario, for example, under subsection 35.1 (8) of the *Mining Act*[745], the Minister may issue an order withdrawing the mining rights from prospecting, staking, sale and lease.[746] However, land withdrawals are subject to certain limitations. Withdrawals in Ontario, for example, only apply to future mineral rights and not to existing dispositions, claims, leases or licences.[747] This means that if a biodiversity offset were implemented on lands where mineral dispositions had been already granted, a land withdrawal would not ensure the offsets' permanence. It means that mineral operations could be undertaken at any time, accessing part or the totality of the surface where biodiversity offsets were implemented, threatening their permanence.

In Alberta, section 17 of the *Mines and Minerals Act* says that the Minister can withdraw any or all minerals or pore space from disposition.[748] It is not clear, however, whether withdrawals only apply to future rights or whether they also apply to existing dispositions.

In sum, land withdrawals could be a useful tool to ensure permanence of biodiversity offsets on public lands with mineral rights underneath if rights over them have not yet been granted.

2.3.3 ALSA, ALSA plans

Another option to ensure permanence of biodiversity offsets on public lands allocated to multiple users is the use of *ALSA* and its regional plans. Part 2.1, section 45.1 (1) of Alberta's *Forests Act* grants prevailing status to *ALSA*'s regional plans. This power is granted to *ALSA*'s regional plans when it states that if there are conflicts "between either a timber

[745] *Mining Act* R.S.O. 1990, subsection 35.1(8, 11).
[746] See Policy G.A. 701-6, of February 2, 2011.
https://www.geologyontario.mndm.gov.on.ca/mines/lands/policies/general_administration/ga701-6_e.html
747 Ontario's Mining Act, R.S.O.1990, c.M14, s 35.1(8).
[748] *Mines and Minerals Act*, *supra* note 212, s17.

disposition or a timber quota and the provisions of any applicable *ALSA* regional plan, the *ALSA* regional plan prevails to the extent necessary to resolve the conflict."[749] Furthermore, the *Forests Act* specifically mentions that: "the provisions or conditions of timber dispositions or timber quotas issued under this *Act* must be in accordance with the provisions of any applicable *ALSA* regional plan,"[750] and that all these dispositions have to comply with *ALSA* regional plans. Otherwise their conditions and provisions can be subject to modifications or cancellations.[751]

Furthermore, as noted earlier section 47 (3) (a) could provide the basis to modify other land users' existing dispositions to ensure biodiversity offsets last as required. This could imply, for example, that if the mineral holder provided consent to the offset and committed not to impact the offset through its mining operations, its disposition could be modified or subject to conditions to ensure it respects the biodiversity offset, either by committing not to develop for a certain period of time, or reducing its area of development.

2.4 Transferring Biodiversity Credits

As noted earlier, biodiversity banking systems are based on the principle of transfer of liabilities.[752] This transfer of liabilities is done through the payment of a specific amount of money for acquiring a specific number and type of credits to offset residual environmental impacts caused somewhere else. Biodiversity credits represent the conservation or restoration performed in a specific location,[753] and therefore, the conservation and restoration activities are carried out as part of the offset.

Once the ability to create and own biodiversity credits has been settled, it is important to determine who has the right to sell and transfer them. While the transferability right of the biodiversity credits might become a property right of the biodiversity banker, there is the possibility that it might remain a right of the government. Ideally, the ownership over the biodiversity credit and its transferability should be clearly stated in the acts and regulations

[749] *Forests Act*, *supra* note 46, s 45 (1).
[750] *Ibid,* s 45.1 (2).
[751] See *Ibid*, s 45.1 (5).
[752] *JBRUHL*, *supra* note 334.
[753] *Ibid*.

regulating the creation and operation of these types of regulated systems.

In a manner similar to the operation of Costa Rica's Payment for Ecosystem Services,[754] where the government is the owner of environmental credits, the Crown would become the owner of the biodiversity credits emerging from the biodiversity bank. It would need, however, to pay a fee to the biodiversity bank site manager, who would still be in charge of performing the conservation and forest management activities. It is too early to say whether the forestry sector would be interested in such an approach and further analysis and fine-tuning of the system might be required before the system's final design could be adopted.

If the government does not reserve for itself the property and right to sell and transfer biodiversity credits, the experience of biodiversity credit markets in foreign jurisdictions indicates that private bankers can expressly or indirectly be recognized as owners of biodiversity credits. Within these markets, biodiversity credits from offsets on private lands are sold and transferred by private biodiversity bankers every day.[755]

However, in theory, the property rights over biodiversity credits have not been clearly determined as this has not been subject of much discussion. This issue is not even contemplated in the regulations establishing legal conservation biodiversity banking systems. These rights have been, however indirectly, implicitly recognized by regulations supporting these types of systems.

Within this context, neither the U.S. Guidance for the Establishment, Use and Operation of Conservation Banks, nor the *Threatened Species Conservation Act* in NSW discuss anything related to property rights or rights to transfer and sell biodiversity credits. Considering that biodiversity banks under the above cited systems have been created on private lands, there is an implicit recognition of private landowners as the owners of the biodiversity bank site, as long as biodiversity credits emerge from biodiversity offsets approved and authorized by the appropriate Agency. This implicit recognition of the property rights over the biodiversity offset also extends to the ownership over the biodiversity credits emerging

[754] See Organization of American States, Department of Sustainable Development, *National Payment for Environmental Services Program*, online: <oas.org/dsd/PES/Programs.htm>.
[755] See Wetland Mitigation Banking; NSW BioBanking system.

from biodiversity banks. In NSW, for example, this recognition is manifested by the fact that the *Threatened Species Conservation Act* specifies that the owner of the biodiversity bank site is the one entitled to request the creation of biodiversity credits from conservation actions or inactions carried out on the biodiversity bank site.[756] This piece of legislation also creates a credit transfer system under which the owner of the biodiversity bank who has requested the creation of biodiversity credits can negotiate the price of these credits in force and sell them to a third party interested in acquiring them either to comply with its compensation requirements or for philanthropic purposes.[757]

Although not specifically mentioned in the laws leading to the use of biodiversity banking, their regulations and biodiversity agreements between the governments and biodiversity bankers have also identified ownership over biodiversity credits and have regulated the creation and transfer of their credits.[758]

In sum, the existence of biodiversity banking systems shows that the lack of express recognition of the property right over a biodiversity credit has not precluded the transfer of credits by private entities. The question is whether biodiversity credits emerging from biodiversity offsets on Alberta's public lands would be considered as property and therefore transferable. If so, what type of rights would they be considered?

2.4.1 International jurisdictions and statutory determination of biodiversity credits as subject to property

To answer the question of transferability of biodiversity credits by the forestry sector in Alberta, it is helpful to consider certain international jurisdictions. An analogy with credits under different environmental markets, such as the ones emerging from carbon markets and the review of different jurisdictions in the U.S. has shown that whether a carbon or a biodiversity credit is or is not considered subject to property right depends on what the legislation supporting the system says.[759]

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[756] *Threatened Species Conservation Act*, *supra* note 351*,* s 127 W (1).
[757] *Ibid*.
[758] See *ConsBankGuid*, *supra* note 240 Part II, C, 7.
[759] See John Monterubio, "Recognition of Property Rights in Carbon Credits Under California's New Greenhouse Gas Cap-and-Trade Program." Sustainable Development Law & Policy 12, no. 2 (2012): 32, 64-65,

For example, the laws supporting carbon markets in California expressly state that these types of credits are not a property right.[760] In Florida, the *Administrative Code* also states that: "*the general permit provided for preservation of environmental resources* [which is similar to biodiversity credits] *does not convey or create any property right or interest in* real property."[761]

Based on these experiences with carbon and other environmental credits, it can be concluded that the law supporting a biodiversity banking system could concretely determine whether biodiversity credits under biodiversity banks either on private or on public lands would be considered subject to property. If so, they could also determine who would own these rights and who might be entitled to transfer them.

Authors such as M. Gehring and C. Schreck argue that the reason for not considering credits as property rights in some of the U.S. jurisdictions is that the government aims to "avoid implications of the Taking Clause[762] under the cap-and-trade market,"[763] which could lead to the potential need to compensate the owner of a carbon credit, if credits were revoked.[764].

However, such an approach might change if litigation arises. In Roseland Plantation LLC v. United States Fish and Wildlife Service et al., a federal court in Louisiana held that "right to

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online: http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1513&context=sdlp, [*Monterubio*]. See also Michael D. Minton, and Christine L. Weingart, *Legal and Tax Issues of Carbon Credit* Trading, online:< http://www.esicarbon.com/Resources/legal-and-tax-issues-of-carbon-credit-trading.html>, [Minton].

[760] *Ibid.*

[761] Florida Administrative Code, s 62-341.215. For a discussion about the property rights over carbon credits and tax implications in Florida, see Minton, supra note 759. See also Charles H. Egerton, *Mitigating Tax Consequences for the Mitigation Banker,* online: < http://www.deanmead.com/2008/12/mitigating-tax-consequences-for-the-mitigation-banker/>, [*Egerton*].

[762] The U.S. Takings Clause is a provision under the Fifth Amendment of the United States Constitution which states that: "nor shall private property be taken for public use, without just compensation." See

[763] *U.S. CONST. amend. V*

[764] *Markus W. Gehring & Charlotte Streck, "Emissions Trading: Lessons From SOx and NOx Emissions Allowance* and Credit Systems Legal Nature, Title, Transfer, and Taxation of Emission Allowances and Credits" (2005) 35 E.L.R. 10,221–22.

report, transfer or sell carbon credits is part of the bundle of rights associated with property ownership."[765]

In the U.S., the examples described above showed that laws and regulations play an important role in determining whether credits from environmental markets, including biodiversity offsets under biodiversity banks, would be considered subject to property and therefore transferable. What do Alberta's laws say in regards to ownership over biodiversity credits?

2.4.1 Ownership over biodiversity credits in Alberta

Although not specifically concerning biodiversity credits, Alberta's *Public Lands Act* indicates that the Crown in Right of Alberta can actually grant private entities different rights in regards to the land. These rights can either grant an interest in the land, or provide other right, such as entry into the land.

However, the *Forests Act*, which also deals with public forested lands in the province specifies that forest dispositions do not create any interests on Alberta's public lands.

> A timber quota holder, whether or not the quota holder holds a timber licence, and a holder of a timber permit do not acquire any right or interest in the forest land that is the subject of the quota, licence or permit, but may enter on the land for the purpose of doing or complying with those things specified in the licence or permit or in this Act or the regulations. [766]

Despite not granting any interest in the land to the disposition holder, the *Forests Act* expressly grants the disposition holder "ownership" over the harvested timber or the products of the forests. Section 16 (2) states that:

> Except as against the Crown and subject to any agreement to the contrary, ownership of all Crown timber on land subject to a forest management agreement or forest management lease is, during the term of the agreement or lease, vested in the holder of the agreement or lease, who is entitled to reasonable compensation from any person who causes loss of or damage to any of the timber or any improvements created by the holder. [767]

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[765] See also Roseland Plantation LLC v. United States Fish and Wildlife Service et al. (2006 U.S. Dist. LEXIS 29334).
[766] *Forests Act*, *supra* note 46*,* s 28(1)
[767] *Ibid,* s 16 (2).

Similarly, section 28(4) of the *Forests Act* says that timber quota and holders of timber permits are considered the owners of the timber cut or authorized to be cut.

> the holder of a timber licence or timber permit becomes the owner of timber authorized to be cut pursuant to the licence or permit when the timber is actually cut by the holder or on the holder's behalf, but is nonetheless entitled, except as against the Crown, to compensation from any person who deprives the holder of the holder's right to cut and recover any timber.[768]

As noted earlier, the law has an important role in determining whether a biodiversity credit will be considered subject to property and if so, who will be the owner of those rights. If the approach followed by *Alberta's Forests Act* were also applied to biodiversity credits under biodiversity banks, it could be argued that even if forestry disposition holders did not have any right in the land where biodiversity offsets would be implemented, the biodiversity conservation benefits/services produced by the biodiversity offsets would be owned by forest operators implementing and operating biodiversity offsets under biodiversity banks. Consequently, they would be considered owners of the biodiversity credits representing these benefits.

Another option to ensure transferability of biodiversity credits emerging from biodiversity offsets on lands where biodiversity bankers do not have any right in the lands could be the approach adopted by Australia. The country has dealt with the issue by expressly recognizing carbon credits as a separate interest in the affected lands.769

Beyond the Australian approach, biodiversity credits could be considered transferable based on the stewardship unit under *ALSA*. As noted in the Legal Framework chapter, *ALSA* facilitates the implementation and operation of biodiversity banks in Alberta. These biodiversity banks could be implemented and operated through the stewardship units, which could be used to counterbalance the impacts from activities carried out somewhere else.[770]

Although *ALSA* expressly states that: "a stewardship unit is not and may not be created as

[768] *Forests Act* s 28 (4).
[769] See Australia's *Carbon Rights Act* 2003 (WA), s 6 (1) (a)
[770] *ALSA*, *supra* note 118,s 47 (2) (e). For more details on stewardship units see *ALSA*, s 46.

an interest in land,"[771] the *Act* allows the creation of regulations to "use, sale trading, exchange… of stewardship units.[772]" It creates, therefore, the potential for a future biodiversity credit trading scheme in Alberta.

As already mentioned, while *ALSA* opens the door to creating a trading system through regulation, its future regulations would need to clearly define aspects such as i) who is the owner of the conservation or restoration rights undertaken on the public land, ii) who can request biodiversity credits from those activities, iii) who can transfer these credits and iv) how to proceed with the transfer.

Section 47(3)(iii) of *ALSA* states that a program might be established to certify an activity as a stewardship unit. Within this context, "anything" including an "activity" that is suitable as a stewardship unit as pursuant to s. 47 (3) (e) to counterbalance the negative impacts of an activity could be certified. Therefore, the conservation, restoration or reforestation activities of a biodiversity bank could be certified as a counterbalancing activity. Once certified, stewardships units are subject to trade and transfer pursuant to s. 46 (1) (e).

All these property rights and transferability aspects could be specified in the biodiversity banking agreements between the Government of Alberta and the forest operators involved in biodiversity banks implementation and operation. As noted earlier, forest dispositions do not grant forest operators any interest on the land they are working on. However, as suggested by this chapter, if a more comprehensive approach to forest management were adopted, forest dispositions could entitle them to implement and operate biodiversity banks of the scheme.

ALSA's section 47(3)(e) (ii) and (iii) states that the *Act* and its regulations could clearly determine who would be the owner of the rights emerging from the stewardship units, and, shown through certificates, and to what this certification will entitle its holder.

If a credit trading system were created through future regulation under section 46 (1) (e), and the government did not reserve for itself the right over the biodiversity credits produced by a biodiversity bank, *ALSA*'s section 47(3)(e) (ii) and (iii) could allow forest

[771] *Ibid*, s 46 (2).
[772] *Ibid*, s 46 (1) (e).

operators to become the owners of the "services" provided by the biodiversity bank they implement, and consequently, the owners of biodiversity credits. These services would be considered stewardship units, and should be considered subject to transfer.[773] These rights should be explicit in each biodiversity banking agreement between the government and biodiversity bank implementers and operators.

Conclusions

There is a strict link between property rights and the implementation and operation of biodiversity banks and offsets under them, as well as with the transfer of biodiversity credits.

The absence of clear property rights in biodiversity banking systems is a major challenge faced by these types of systems, especially on public lands allocated to multiple private entities. Thus, this lack of clarity of property rights can lead to uncertainties regarding who has the right to implement and operate biodiversity banks, how to implement long lasting offsets and who has the right to transfer and sell the services provided by those banks.

Lessons learned from international biodiversity banking experiences suggest that if biodiversity banks are implemented on public lands, the rights to establish biodiversity banks, will not only depend on the property rights over the land or any interest in the land where offsets are being implemented but on identifying potential preferential rights before implementing the biodiversity bank, and adopting measures to ensure that these preferential rights will not negatively impact the permanence of the biodiversity bank, if used. The same considerations apply to private lands in Alberta. If a landowner were to implement biodiversity offsets under a bank on its property, the permanence of the offset would depend on the lack of existence of mineral rights under that tract of land. However if there were no mineral rights under it, the offset would not be threatened by other users of the land with a preferred right over the surface, because the owner of the land would be the only one entitled to carry on activities on the surface of the land.

In terms of rights to transfer biodiversity credits, the chapter found that it is not a challenge exclusively affecting public lands or private lands. The transferability of

[773][773] *ALSA*, *supra* note 118, s 46 (2).

biodiversity credits depends on whether the government reserves this right for itself or whether it grants it to private parties, and whether biodiversity credits are recognized subject to property by private parties by the laws and regulations supporting a biodiversity banking system and/or by the biodiversity banking agreements between the government and biodiversity bankers.

This chapter analyzed two main questions in the context of Alberta. The first one is whether the forestry sector and/or other private entities would have the rights to implement and maintain long lasting biodiversity offsets under biodiversity banks on public lands.

The second question is whether biodiversity credits would be subject to property, and if so, whether private entities, most precisely Alberta's forestry sector, would be considered owners of biodiversity credits emerging from biodiversity banks.

An affirmative answer to the first question depends on a sustainability approach towards forest management at the time of using the *Forests Act* and its forest (timber) allocation system. The main limitation of current timber dispositions to facilitate the implementation and operation of biodiversity offsets and biodiversity banks by Alberta's forest operators is the purely timber-harvesting approach, which exclusively limits almost all forest activities to timber harvesting. Expanding this limited approach to a sustainability forest management approach would support the idea of using deferred projects as offsets, as included in the *BOPF*'s draft, and enable forest operators to implement and operate biodiversity banks on Alberta's public lands. This could be done for example, by combined dispositions that would not only grant timber harvesting rights, but also conservation rights. Under these new dispositions, disposition holders could not only be timber harvesters, but also biodiversity bankers.[774]

The integration between the ecological, social and economic pillars under the sustainable forest management principle demonstrates that the ecological benefits produced by biodiversity banks do not only benefit the environment by offsetting biodiversity impacts

[774] As noted earlier *ALSA*, and *ALSA* plans prevail over timber disposition and other plans. See *Forests Act*, *supra* note 46, Part 2.1, s 45.1 (1).

caused somewhere else, but they could also create important economic and social benefits to the province, by creating a new market niche through the trade of biodiversity credits. Trade opportunities could provide economic benefits to new actors such as small and medium forest operators. The sustainability approach justifies amending Alberta's *Forests Act* to ensure the Act expressly enables all forest disposition holders to enter into conservation/restoration activities as part of combined conservation/restoration/timber harvesting dispositions. This approach also justifies the use of section 47(3)(a) to modify existing forest dispositions to enable forest operators to implement and operate biodiversity offsets without being considered as in non-compliance with the *Forests Act*.

Furthermore, *ALSA* plans also provide the opportunity to enhance current forest dispositions, because if dispositions went against *ALSA* plans' goals, the latter would prevail.[775] For example, if *ALSA* plans designated areas for biodiversity banks in areas where forest dispositions exist, forest dispositions in place should grant forest operators combined rights for conservation and timber in such a way that they can implement and operate biodiversity banks.

In order to answer the second question — whether private entities would be considered owners of biodiversity credits and would have the necessary rights to transfer the biodiversity credits created within biodiversity banks — it is important to mention that theory shows that implementation of biodiversity banks does not create an interest on public lands, but an interest in the activity that is being performed on public lands. This activity leads to a property right over a "service." The service is, therefore, subject to being transferred and sold by private entities. In countries with regulated biodiversity banking systems, where offsets have been implemented on private lands, these biodiversity services, represented by biodiversity certificates have also been private. They have been, thus, owned and transferred by the owner of the bank.

ALSA considers a conservation offset or a biodiversity bank, as "anything", including an "activity", that is suitable as a stewardship unit,[776] Thus, stewardship units are subject to

[775] See *Forests Act*, *ibid,* Part 2.1, s 45.1 (1).
[776] *ALSA* s 47 (3) (e). See *ALSA*, *supra* note 118.

trade and transfer.[777] *ALSA* allows certification of stewardship units, and their transfer and sale. The *Act* grants no interest in the land, and it is assumed that the Act does not grant the power to sell the land. However, if biodiversity credits from biodiversity banks were considered a separate interest, different from the right over the land, they could be subject to property, and be sold and transferred. Therefore, activities certified as a stewardship unit, services emerging from the conservation or restoration activities performed on the land as part of the biodiversity banks could be transferred. These aspects could lead to certifying activities providing an environmental service and not specifically an environmental product.

Forest disposition holders involved in banking activities on public lands that lead to biodiversity services recognized as stewardship units could therefore transfer these credits as long as the government does not reserve such right for itself. The transfer of credits should be ideally included in the *Act*, or regulations dealing with a biodiversity banking system, and, even if not specifically assigning property rights, providing supporting clauses in the related legislation.

The next chapter, *Additionality of biodiversity banks on public lands,* analyses the principle of additionality within the context of biodiversity banks implemented and operated on public lands. It specifically investigates whether the biodiversity banking system analysed by this dissertation would comply with the principle of additionality.

[777] *Ibid*, s 46 (1) (e).

CHAPTER 3: ADDITIONALITY OF BIODIVERSITY BANKS ON PUBLIC LANDS

3.1 Introduction

Chapter 2: *The role of property rights in the implementation and operation of biodiversity banks on public lands* introduced an analysis of the property rights needed to implement and operate biodiversity banks on public lands, and to transfer and sell biodiversity credits within these biodiversity banks. As noted earlier, in order to be able to implement a biodiversity bank, the implementer needs to have certainty regarding the rights to enter and to develop surface rights. Given that mineral rights prevail over surface rights, mineral rights need to be identified before implementing and operating biodiversity banks on public lands where surface and mineral rights constitute different estates. Otherwise, the implementation of biodiversity banks on public lands with mineral risks could be risky.

The previous chapter showed that the main limitation of current timber dispositions to facilitate the implementation and operation of biodiversity banks in Alberta by that province's forest operators is the timber-harvesting focused-approach which exclusively limits almost all forest activities to timber harvesting. The chapter demonstrated that if a sustainability approach towards forest management were adopted in the province it could provide forest operators the basis needed to implement and operate biodiversity banks on Alberta's public forested lands that are allocated to private entities. Within the context of Alberta's public lands, the role of *ALSA* as a legal planning tool and its conservation plans will be crucial in helping the forestry sector operate biodiversity banks and exclude third parties from their conservation activities. In addition, *ALSA* could facilitate forest operators selling and transferring biodiversity conservation services represented by biodiversity credits or certifications as included under *ALSA*.[778]

This chapter investigates whether the biodiversity banking system analysed by this dissertation would comply with the principle of additionality.

Additionality refers to an effort that is supplemental to the business-as-usual (BAU) scenario. It implies that the benefits emerging from certain activities promoted by a

[778] For example, through regulations that regulated the sale, trading and exchange of stewardship units. See *Alberta Land Stewardship Act,* SA 2009, c A-26.8, s 46 (1) (e).

program or a project would have not otherwise happened in a business-as-usual (BAU) scenario. On the contrary, the lack of additionality means that conservation would have occurred anyway without the need to implement any conservation activities.

As noted in the background section and in the Property Rights chapter, Alberta forest operators have been identified by this dissertation as potential implementers of biodiversity banks on public lands. Thus, in order to sell biodiversity bank credits to oil sands developers, forest operators would have to go beyond both BAU and their own legal conservation requirements.

In theory, there are different ways to include an additionality requirement into the legal framework supporting a biodiversity banking system. For example, one could do it by incorporating a legal provision into *ALSA*, stating that offsets under biodiversity banking systems have to be additional.

Nevertheless, including an additionality requirement in the legal framework supporting the use of biodiversity offsets and biodiversity banks would not be enough to demonstrate a legal surplus or additionality in practice. The general question would be how to attain additionality in practice. In other words, what would be the additionality test biodiversity banks would need to comply with to demonstrate that they are additional in practice?

The environmental, legal and financial additionality have been traditionally considered the main elements to test the existence of additionality of any offset.

While the environmental additionality means that the environmental benefits produced by the offset would have not been produced without the conservation/restoration activities under the offset, the legal additionality means that the biodiversity benefits produced by the biodiversity offset were not produced through activities mandated by law. In other words, the environmental benefits would have been produced without the offset.

On the other hand, financial additionality implies that the conservation benefits produced by the offset would have not occurred without the economic support of the biodiversity bank system, meaning without the investment of the biodiversity banker to implement the offset under the biodiversity bank.

In terms of determining whether the additionality of an offset will be easier to demonstrate on private or public lands, it can be argued that in a perfect scenario, if a landowner carried out conservation activities as part of a biodiversity bank on private lands, and the results exceeded legally required environmental outcomes under a BAU scenario, the biodiversity offsets under a biodiversity bank would probably be considered additional.

However, the additionality of biodiversity offsets and biodiversity banks on public lands is not as straightforward.

Some restoration and/or conservation activities on public lands could be considered BAU, and consequently not additional. For example, establishing and maintaining conservation areas on provincial public lands, such as creating and maintaining provincial parks or reserves could be considered activities that are part of a BAU scenario of public lands, because conservation activities undertaken under such projects are considered one of the government's mandates.

Most of the regulatory biodiversity banking systems around the world have been carried out on private lands in Australia or the U.S., where additionality of biodiversity offsets under biodiversity banks has not been an issue subject to different studies. There are no substantive examples of these types of systems on public lands. Consequently, there arises the challenge of determining how best to demonstrate additionality on public lands.

Although there are different types of additionalities, this chapter argues that achieving additionality, either on public or on private lands, depends on the environmental and legal additionalities.[779]

This chapter elaborates on the environmental and legal additionalities.

Land users with legal mandates, such as reclamation and progressive reforestation, have been suggested by the literature and this dissertation as potential implementers of biodiversity offsets under biodiversity banks. As noted earlier, authors such as Marian Weber suggest the use of reclamation offsets, based on reclamation mandated by part 6,

[779] See discussion provided in the Conceptual Foundations section on environmental additionality. S 2.2.3.

section 137 (1) of the *Environmental Protection and Enhancement Act* (*EPEA*).[780] The use of reclamation offsets has been even incorporated into *ALSA*, which mentions that conservation offsets are activities to counterbalance the effect of an activity. Section 47 (2) (g) of the Act specifies that biodiversity offsets can be performed by reclamation activities as long as they are additional, when it states that:

> "counterbalance" includes encouraging voluntary measures to offset an activity by committing, without limitation, to additional restoration, reclamation or mitigation…[781]

The *BOPF*'s draft has incorporated the additionality requirement. It states that: "an offset should deliver environmental gains over and above what is already taking place."[782] Furthermore, it identifies reclamation of legacy disturbances as one of the eligible actions to implement offsets.[783] However, as this chapter later explains, achieving additionality of reclamation activities could be challenged on the ground that reclamation is already a legal mandate, and that the reclamation deficit in practice is due to a lack of enforcement instead of a lack of financial or institutional capacity, as argued in some developing countries.

On the other hand, progressive reforestation, mandated by section sections 21 (5) (b), section 22 (5) (b) of Alberta's *Forests Act* was suggested by the Property Rights chapter of this dissertation as the basis for biodiversity banks in Alberta.

As noted in the background section,[784] reclamation implies reclaiming and remediating lands impacted by development to a state of "equivalent capacity,"[785] capable of supporting the same kinds of land uses and equivalent vegetation and wildlife as before disturbance.[786]

On the other hand, progressive reforestation is a requirement imposed by Alberta's *Forests*

[780] *EPEA*, *supra* note 81.
[781] *ALSA*, *supra* note 118, at 47(2) (g).
[782] *BOPF, supra* note 149 at 4.
[783] *Ibid*.
[784] See Background section 1.1.3 Reclamation
[785] See *Webfar*, *supra* note 84 at 4.
[786] *Ibid*.
See also *OSASRC*, *supra* note 74 at 1.

Act to forest operators.[787] It means: "progressively reforest any land where the holder has harvested or an equivalent amount of forest land within the management unit."[788]

As noted earlier, *ALSA*, section 47(1)(g), includes reclamation and other activities such as restoration, mitigation and the acquisition of land as the basis to create offsets, and therefore, biodiversity banks. Unlike reclamation, progressive reforestation is not specifically mentioned by *ALSA* as one of the activities that can lead to the creation of offsets.

To determine whether offsets under a biodiversity bank on Alberta's public lands would be considered additional, this chapter explores whether regulatory biodiversity offsets/banks emerging from progressive reforestation would comply with the different additionalities tests, and compares them with reclamation offsets. The chapter also describes the main characteristics of the additionalities identified above. It then compares how offsets under the NSW and the U.S. regulatory biodiversity banking systems comply with these tests. The comparative analysis of the NSW and the U.S. schemes help to illustrate how Alberta's legal framework could support additionality in the biodiversity banks implemented under a regulatory biodiversity banking system in that province.

The chapter concludes that achieving additionality of biodiversity offsets under biodiversity banks, either on public or private lands, does not only depend on the express inclusion of the requirement of additionality into the legal framework, but on the coexistence of the legal and environmental additionalities, and the voluntariness of biodiversity banks.

This chapter argues that private entities with legal mandates could participate in biodiversity offsets as long as the benefits produced by the offsets emerged from additional conservation/restoration activities beyond what the law mandated. In other words, if a forestry operator needed to engage in reforestation activities (e.g. to reforest 20 hectares) to comply with a legal obligation under its disposition, the reforestation activities could not be counted towards the creation of a biodiversity offset. However, if the same operator decided to reforest 30 hectares instead, the additional 10 hectares not

[787][787] See *Forests Act*, *supra* note 46, Part 2.1, s 21 (5) (b).

[788] *Ibid.* The *Forests Act* does not provide any definition of progressive reforestation. However, for the purpose of this dissertation, it refers to reforestation activities that take place in different stages.

implemented to comply with the legal mandate would count towards the offsets. From the total amount of reforested hectares, only 10 hectares would be considered legally additional.

In other words, the only conservation/reforestation activities counted towards the creation of the offset should be the ones that were additional to the reforestation mandated by law. The reason for this restriction is that biodiversity offsets cannot be implemented to replace legal conservation/restoration obligations because that would go against the biodiversity offsets essential principles of respect to the mitigation hierarchy, and, as noted in the conceptual section, biodiversity offsets should be used only as the last resort of the mitigation hierarchy.[789]

If private parties with legal mandates could participate in biodiversity offsets, the questions that arise are whether the activities towards implementing biodiversity offsets would be considered voluntary if they are already mandated by law, and if they would comply with the environmental and legal additionality.

3.2 Voluntariness in Alberta's biodiversity banking system

Within the additionality scope, voluntariness means voluntarily carrying out conservation or restoration activities, such as progressive reforestation activities in furtherance of the establishment of a biodiversity bank. Within this context, voluntariness would probably be the first aspect that needs to be incorporated into the legal provisions supporting a biodiversity banking system. This element aims to ensure that whoever is implementing and operating the biodiversity bank voluntarily decides to participate in the scheme, but is not legally required to do so.

In practice, laws and regulations supporting biodiversity banking schemes should not mandate implementers of a biodiversity bank to implement and/or operate these types of instruments. The legal framework just needs to provide them the opportunity to do so. Because these laws and regulations do not talk about a mandate to become an implementer of the scheme, voluntariness is easily demonstrable in terms of their participation.

[789] See essential principles, mitigation hierarchy.

In a potential biodiversity banking system in Alberta, the voluntariness element of additionality is manifested through the voluntary participation of the forestry sector in both the implementation and operation of biodiversity banks. This voluntariness is linked with the option of the sector to participate in the system as a provider of biodiversity conservation services. To ensure additionality, voluntariness should be included into the legal framework by expressly mentioning that biodiversity banks are an option. As noted in section 3.1.3, participation in their establishment and operation is voluntary, but once the banker enters into a biodiversity banking agreement with the government, this initial voluntariness becomes mandatory. In other words, the banker would be mandated to undertake all committed conservation or restoration activities towards implementing and maintaining a biodiversity bank.

Laws and regulations supporting the implementation of biodiversity banking systems around the world have expressly incorporated the option of using biodiversity credits emerging from biodiversity banks on a voluntary basis. Thus the participation of the biodiversity banker in these schemes is not mandatory. For example, the U.S. Wetland Mitigation Banking specifically mentions that the permit applicant could either build a wetland bank and use the credits to offset its own impacts, or buy credits from a bank owned by another party. [790]

The voluntariness of a biodiversity banking system is, therefore, implemented in practice through the possibility of either implementing or acquiring biodiversity credits as an option and not as a legal mandate, and thus it is a legal surplus to the standard mandated by legislation. In practice, there are however different circumstances where conservation or restoration activities are already being carried out.

In the Australian State of New South Wales (NSW), both the implementation of biodiversity banks and acquiring biodiversity credits from biodiversity banks are included as options or alternatives to traditional biodiversity conservation mandates. Within this context, developers who need to compensate for residual impacts to biodiversity from their activities are able to buy credits from a biodiversity bank to satisfy consent conditions.

[790] See *MitBankGuide, supra* note 240, s I B) (Background).

Otherwise they would need to undergo the usual threatened species assessment process under the *Threatened Species Conservation Act* [791] and do the mitigation measures themselves.[792]

Alberta's legal framework supporting a biodiversity banking system in the province could condition the additionality requirement on the voluntariness of the actions directed to implement a biodiversity bank. This voluntariness could be manifested by including biodiversity as an "option" provided by the law and regulations.

3.2.1 Voluntariness and legal mandates

As noted earlier, the voluntariness of a biodiversity bank could be demonstrated by engaging in activities that are additional to those mandated by law. It is necessary to know the scope of these legally mandated activities, considering that all what goes beyond that scope would be considered a surplus for additionality purposes.

The purpose of reclamation is reclaiming and remediating lands impacted by development to a state of equivalent capacity, capable of supporting the same kinds of land uses and equivalent vegetation and wildlife as they were before disturbance.[793] Its scope is mainly determined by the activities carried out to perform reclamation. According to the *EPEA,* these activities include: "(i) the removal of equipment or buildings or other structures or appurtenances; (ii) the decontamination of buildings or other structures or other appurtenances, or land or water; (iii) the stabilization, contouring, maintenance, conditioning or reconstruction of the surface of land; (iv) any other procedure, operation or requirement specified in the regulations."[794] Decontamination and stabilization, contouring and reconstruction of the surface of the land are related to restoration activities after development or extractive activities have been carried out and have impacted the land on which they were performed.

On the other hand, reforestation is done through "any operation involving seed management, seedling production, site preparation, tree planting, seeding, regeneration or

[791] See *Threatened Species Conservation Act*, *supra* note 351, part 6 (Licensing), s 94 A.
[792] See *NSWBIOBFRWK*, *supra* note552.
[793] *Webfar*, *supra* note 84.
See also *OSASRC*, *supra* note 74 at 1.
[794] *EPEA*, *supra* note 81, s 1 (ddd).

reforestation surveying, stand cleaning, stand tending, stand thinning, tree improvement, fertilization, drainage, pruning or site analysis that is carried out in the course of forest renewal."[795]

In this context, reclamation activities would be considered additional as long as they are voluntarily established and are additional to those legal obligations already in place or required by law in section 47 (1) (g) of *ALSA*.

To ensure this voluntariness, regulations for biodiversity offsets and biodiversity banks could encourage voluntary measures to offset an activity by committing[796] to additional conservation activities beyond those mandated by law, in this case by *EPEA* (reclamation) or by the *Forests Act* (progressive reforestation).[797] This could be done, for example, by stating in *ALSA* that in order to comply with the voluntariness requirement of additionality, biodiversity offsets under biodiversity banks are one of the options to compensate for residual impacts caused by oil sands developments.

3.3 Legal and environmental surplus

The legal surplus or legal additionality, and the environmental surplus imply surpassing legal obligations, but it is important to clarify how such a surplus can be obtained, and more importantly how it can be "additional" if conservation activities under the scheme are legally required. A legal surplus occurs when the results of conservation activities exceed those demanded by legal mandates or obligations. In a similar manner, the environmental surplus refers to the additional ecological or environmental benefits provided by the offsets emerging from a biodiversity bank under a biodiversity banking system. As noted in the first part of this dissertation, determining environmental additionality requires a sound methodology to measure the biodiversity values lost, and compare them to the biodiversity values created by the offset. The methodology could determine ways to identify biodiversity values lost and those that are created through the biodiversity bank to compensate for the losses. The NSW methodology, for example,

[795] *Timber Management Regulation*, *supra* note 692, Part 6, s 122.1 (1) (a.2).
[796] According to *ALSA*, s 47 (1) (g), reclamation, and other activities such as restoration, mitigation, the acquisition of land, the establishment of a conservation easement or the donation of actual or in-kind, financial or other resources could be the basis to create a regulated conservation-offset program.
[797] *Ibid*.

compares those values to a benchmark of native vegetation, which maps and identifies vegetation depending on its quality. The more quality the vegetation has, the more value it has.[798]

However, the non-fungibility of biodiversity makes it difficult to replicate exact biodiversity values. There are different approaches to address this issue. For example, the U.S. uses different methodologies tailored to each specific issue. Other jurisdictions, such as NSW in Australia have developed specific methodology to measure the additional benefits provided by biodiversity offsets. This methodology will be further described in this chapter.

To determine what is being lost and compare it to what is being compensated a biodiversity banking system in Alberta would ideally develop its own methodology, such as in the NSW system. However, such a methodology would require mapping and a sound knowledge of the vegetation of the region, both in terms of quality and quantity. Nevertheless, this type of methodology would need to be further developed by qualified experts in biology and forestry.

To be additional, restoration activities do not only need to be voluntary, they also need to produce additional environmental outcomes or benefits beyond what the legal mandate would have produced. Environmental outcomes would ideally need to be considered in the regulation supporting a biodiversity banking system in the province.

The implementation of biodiversity offsets under biodiversity banks should incorporate additional conservation, reforestation or restoration activities to those activities mandated by law. As noted earlier, the environmental outcomes achieved through these conservation, reforestation or restoration activities would need to be additional to what was mandated by law. Within this context, laws and regulations usually establish a mandate, for example, to re-vegetate, recover, reforest or conserve a tract of land, or parts of a land, which has been subject to exploitation or development, and which needs to recover its environmental functions.

[798] See *BBASSMETH2014, supra* note 244.

In Alberta's biodiversity banks, a legal surplus could occur on lands subject to legal mandates, as long as the conservation activities part of the biodiversity banks are considered additional.[799]

Although there is no proper definition of what additionality means for biodiversity banking systems in general, section 4 (1) of the NSW BioBanking regulation and section 2.7 of its BioBanking Assessment condition the creation of biodiversity credits on: i) management activities that are "additional" to any biodiversity conservation measures or other actions that are being carried out on the land or ii) management activities that are required to be carried out by any statute in the case of publicly owned land.[800] In other words, they condition the BioBank on the additionality of activities already in place or future actions mandated by law or regulations.[801]

By providing the opportunity to voluntarily undertake "additional conservation activities" or activities beyond what the statutes already mandate, this provision ensures that the environmental additionality and the legal surplus (beyond what is mandated by the prescribed conservation activities, such as reclamation or progressive reforestation) are met. The NSW BioBanking methodology links additionality to biodiversity credits creation. The BioBanking Assessment Methodology states that: "additionality refers to the extent to which biodiversity credits can be created for management actions that are already required to be carried out pursuant to existing conservation obligations."[802] Despite requiring additional conservation measures, neither the law nor its regulation specify which are these "additional conservation activities" or which are the concrete technical aspects that would make a biodiversity offset be considered as additional.

The *NSW BioBank regulation* provides the opportunity to use legal conservation or restoration mandates as the basis for its BioBanks as long as they are additional. The *NSW assessment methodology* ensures that additional biodiversity benefits can emerge from

[799] *BioBanking regulation 2008, supra* note 354, Part 2, s 4.
[800] *Ibid*, part 2 – 4 (1-e).
[801] The Habitat Conservation Bank in the U.S. does not establish anything about additionality. This is the reason why this sub-section only describes the NSW system.
[802] NSW Biobanking Assessment Methodology *2008*, s 7,2 at 44. See also *NSWBBASSMETH*, *supra* note244, s 12.10.1.1, at 57.

conservation activities. The environmental surplus requirement is therefore included into the regulation supporting the system.

To ensure the additionality of conservation activities under existing legal mandates section 7.2 of the assessment methodology limits the scope or applicability of the additionality requirement, or at least of the additionality test to actions which go beyond the current legal obligations (e.g. covenants or agreements under specific regulations) existing on the land where the biodiversity bank will be implemented.

The legal additionality requirement under the NSW BioBanking system does not apply to voluntary conservation activities implemented on lands not subject to legal conservation or management obligations. Although the methodology does not explain why a legal surplus is not required for voluntary conservation, the reason for this is probably that since the law does not legally mandate them, implementing conservation activities is already additional. There is, therefore, no need to demonstrate that there is a legal surplus. If they are voluntarily implemented on lands subject to development and they provide environmental outcomes beyond the BAU scenario, these other voluntary activities would be considered additional at a simple glance, without the need of further consideration.[803]

The BioBanking system produces two types of biodiversity credits: biodiversity and species credits. Depending on the environmental goal to be achieved and the credit pursued, the NSW assessment methodology identifies two groups of conservation actions, obligations or mandates to be used as part of biodiversity banks. These activities are: i) conservation measures or actions to obtain biodiversity credits and ii) conservation measures or actions for species credits. Examples of conservation measures to obtain biodiversity credits include: managing grazing for conservation, weed control, managing human disturbance, retaining dead timber, erosion control, replanting or supplementary planting. On the other hand, examples of conservation measures to obtain species credit include: controlling vertebrate pests such as pigs or foxes, controlling feral herbivores or maintaining natural flow regimes. To be able to obtain credits, these activities under a biodiversity bank need to be additional to other conservation or restoration activities mandated by Law.

[803] See additionality elements identified in the introduction to this chapter.

Each of these activities has a value, represented by a percentage under the NSW BioBanking methodology.[804] For credit creation purposes, if one or more of these activities are used as legal obligations or mandates on lands where the BioBanks are implemented, they have to be discounted from the overall conservation activities on that specific land. For example, if at the moment of implementing a BioBank, there are weed control activities, and nutrient control activities in place as part of a legal mandate, 7.5 percent and a 5 per cent will be deducted from the overall conservation percentage.[805] These activities already in place will not be part of the credit. This deduction avoids double dipping, or using the same activities to obtain biodiversity credits from biodiversity offsets while meeting already existing obligations.

The U.S. Mitigation banking system also specifies that if mitigation banks are established on public lands, such as public parks, mitigation credits generated by these banks

> should be based solely on those values in the bank that are supplemental to the public program(s) already planned or in place; that is, baseline values represented by existing or already planned public programs, including preservation value, should not be counted toward bank credits. [806]

This implies that federally funded offset conservation projects undertaken under a program such as the Wetlands Reserve Program[807] could not be considered a bank, and could not generate biodiversity credits, unless additional restoration or conservation activities were undertaken as part of the offset, and only if they produced supplemental environmental benefits.[808] For example, imagine both the water quality and the vegetation of a 25 hectare wetland close to a highway was negatively impacted due to the infiltration of de-icing chemicals. The wetland was restored through an offset federally funded under a Federal program, such as the Wetland Reserve Program. To do such restoration, the offset implementer planted native vegetation and used mechanisms to prevent de-icing salts

[804] See Percentage discount for biodiversity credits under the NSW BioBanking Assessment 2014, *BBASSMETH*, *supra* note 244 at 57-59.
[805] For Percentage discount for biodiversity credits and for species credits under the new NSW BioBanking Assessment, *ibid* at 58.
[806] *MitBankGuide*, *supra* note 240, s II B) 2
[807] United States Department of Agriculture, Natural Resources Conservation Service, *Wetland Reserve Program*, online: < https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/>.
[808] See *MitBankGuide*, *supra* note 240, s II B) 4. See also *MITBANKFACTS*, *supra* note 42.

entering into the wetland.[809] Based on section 2 of the Guidance, the activities under such an offset would not be considered part of a biodiversity bank, and would not generate any credit. However, the same offset implementer could privately fund additional protective measures to protect the wetland. Activities such as planting vegetation around the wetland to prevent de-icing substances from reaching the wetland could be considered additional or supplemental and could be the counted towards generating biodiversity credits.

Unlike the NSW system, Alberta's legal framework does not base the assessment of its biodiversity banks additionality on the existence of a legal obligation, but on the voluntariness of the actions carried out to obtain an additional environmental outcome.

3.4 Additionality of Reclamation Offsets and Progressive Reforestation

This subsection examines whether reclamation and progressive reforestation offsets would be considered additional either in terms of a legal or an environmental surplus.[810]

3.4.1 Reclamation offsets

As already explained, *ALSA* recognizes the use of reclamation offsets as long as they are additional.[811]

If reclamation offsets were implemented through restoration activities as part of the biodiversity bank, these should not be used towards complying with the legal mandate of reclamation. If the oil sands operator, who exploited the resource on site were the one undertaking reclamation activities to comply with a legal mandate, a reclamation offset on the same land would be additional only if these restoration activities went beyond the reclamation mandated by law. Therefore, the activities to comply with the reclamation requirement should be deducted from a total amount of land actually reclaimed. For the present purpose, a positive difference between the amount of land that was legally required to be reclaimed and the actual amount of land reclaimed would be additional

[809] Mary E. Kentula, U.S. Environmental Protection Agency, Restoration, Creation, and Recovery of Wetlands Wetland Restoration and Creation in National Water Summary on Wetland Resources- United States Geological Survey Water Supply Paper 2425, online: <https://water.usgs.gov/nwsum/WSP2425/restoration.html>.

810 As noted earlier the analysis of the environmental surplus or additionality is not the focus of this chapter. It is provided for illustrative purposes only and does not enter into a comprehensive, and/or thorough analysis of technical aspects concerning environmental additionality.

[811] *ALSA*, s (47) (1) (g).

reclamation.

Another alternative analysed by some biodiversity offset designers is that third parties (not involved in the oil sands activities that caused the damage), would be the ones implementing reclamation offsets to offset impacts caused by previous operators.[812] For example, Weber et al. argue that, considering the current reclamation failure, reclamation offsets could be used to compensate for "the legacy footprint" caused by oil sands.[813] There, is however, not much analysis about how these offsets would achieve additionality.

Reclamation offsets would apply if reclamation was mandated for the area, but was not complied with by original operators operating in the area. Pursuant to the reclamation offsets idea, operators that did not operate in the impacted area at the time the impact was produced could either implement biodiversity offsets and use the biodiversity credits produced by the biodiversity bank, or acquire biodiversity credits from other biodiversity bankers within these schemes. Acquiring biodiversity credits from reclamation activities undertaken under a reclamation offset under a biodiversity bank could be, therefore, additional because these operators did not cause the impacts in the reclaimed lands they are acquiring the credits from.[814] The legal and environmental surplus would be provided by the attempts done by a third party to comply with the legal mandate. For example, if operator "A" polluted the land and did not comply with existing legal obligations to reclaim the land, operator "B," who did not cause the impacts on the land, could voluntarily undertake reclamation activities through a reclamation offset.

Even if the third parties did not enter into reclamation offsets to comply with their own reclamation obligations (because they did not operate and/or cause the impacts on the land where they would be establishing and/or operating the biodiversity offset, and they entered into these "additional reclamation activities" voluntarily, reclamation offsets could be challenged. The main reason for this challenge is that reclamation offsets would be used to comply with a legal mandate that was not met by a previous operator of the land, and

[812] See *Poulton primer*, *supra* note 265 at 16.
[813] Weber et al argue that considering the legacy footprint left by some oil sand operators in the province, reclamation offsets could include activities that move reclamation forward to address that past reclamation legacy for there which is no responsible party. However future reclamation offsets (beyond the legacy) would be additional only if they go beyond the reclamation baseline. See *Webfar*, *supra* note 84.
[814] See *Poulton Primer*, *supra* note 265 at 16.

that the authorities in charge of its enforcement did not enforce for some reason. Reclamation offsets could be seen, therefore, as the result of a lack of or limited enforcement issue. Thus, biodiversity offsets should not be seen as a replacement of onsite legal obligations.

As explained when discussing biodiversity loss caused by bitumen extraction in Alberta in the conceptual section, and when explaining the financial and institutional infrastructure needed to support a biodiversity banking system in Alberta, developers have to deposit certain funds, such as cash and bonds into the Environmental Protection Security Fund to ensure that lands will be reclaimed even if the developer does not do it itself.[815] Despite this requirement, reclamation still faces a major deficit in the province, and the funds required under the Fund do not reflect the real and actual cost of reclamation. It is, therefore, important to consider whether in such situations the use of reclamation offsets could be justified.

If the government receives the securities to carry on reclamation on a specific land, and for any reason it does not reclaim the land due to financial issues or to a lack of either time or technical expertise, and the government enters into a reclamation offset agreement to allow a third party reclaim the land, was not the government already paid for reclaiming that land? Even if the operators implementing and operating the offsets/banks are not the ones causing the impacts, and other operators are the ones buying biodiversity credits to offset their own residual impacts, the use of reclamation offsets could be considered a perverse incentive that encourages not to reclaim. Although these questions require some further thinking, they could lead to challenging the use of reclamation offsets in the province.

Furthermore, the argument of "additionality" based on the lack of compliance of legal mandates, such as environmental conservation or reforestation, has been made before by some developing countries. Mexico, for example, used it to demonstrate the additionality

[815] See Background section, 1.1.3 and the Legal Framework chapter, s 1.2.5.5.

of offsets and of its Payment for Ecosystem Services.[816] The reasoning behind arguing additionality in such cases has been the lack of institutional and monetary capacity of the governments, with little law enforcement. Even as part of a legal mandate, voluntary activities towards conservation would be considered additional. An example of these activities in Mexico is using conservation activities in national parks to offset development activities somewhere else. Even though national parks are already protected by law, development trends and stressors, such as illegal colonization and illegal deforestation could negatively impact them. Consequently, conservation activities performed by private entities on these lands could be considered additional.[817]

As with the justification adopted by developing countries, Weber et al. state that reclamation offsets could be additional. According to the authors, reclamation offsets could be considered additional as long as the operator of the land restores the impacts caused by its or a third party's project in advance to when it is legally required. This means, for example, that instead of finishing the project and restoring the site once the life of the project has ended, the restoration activities of the reclamation would need to be implemented before that point, such as when the project is five years old and is still operating, instead of when it is 15 years old and larger impacts have been caused. According to Weber, the difference in the timing of when to implement the reclamation offset would make the reclamation offset additional. She argues that offset implementers would be considered as going beyond the law because they would be restoring the site and obtaining environmental benefits before the time when the law mandated it, with the result that environmental benefits produced by reclamation would be enjoyed for a longer

[816] Beatriz Lucas, Winnie Lau, Eduardo Rolón, *Feasibility study for a Marine Payment for Ecosystem Services in the Mesoamerican reef of Mexico,* online: <http://www.summitfdn.org/wp-content/uploads/downloads/2012/11/Marine-PES-Feasibility>.
See Luis Rico Garcia Amado et al, "Efficiency of Payments for Environmental Services: Equity and additionality in a case study from a Biosphere Reserve in Chiapas, Mexico", (2011) 70:12 *Ecological Economics* 2361, online: <http://www.sciencedirect.com/science/article/pii/S0921800911002916>. This paper assesses the equity, additionality and stakeholders' perceptions of a PES scheme in a Mexican community inside a Biosphere Reserve. The paper concludes that "Additionality of PES schemes is linked with property rights over the land. Additionality is, therefore, "low for landowners and high for the landless people in the community.
See also Penny van Oosterzee, James Blignaut and Corey J. A. Bradshaw "iREDD hedges against avoided deforestation's unholy trinity of leakage, permanence and additionality" (2012) 5:4 *Conservation Letters* 266, online: <onlinelibrary.wiley.com/doi/10.1111/j.1755-263X.2012.00237.x/epdf>. This paper suggests an alternative way to address additionality and promote the implementation of REDDs.
[817] See Greiber, *supra* note654.

time.[818] Thus, offset reclamation could be a useful tool to address the environmental footprint left by previous oil sands operators, who did not meet their reclamation mandate, as well as to plan present and future reclamation needs.

.One issue that has not been discussed in detail by implementers is whether the non-compliance with and/or lack of enforcement of the mandate would justify considering reclamation offsets as additional. This dissertation considers that arguing that there has been a clear non-compliance of reclamation should be insufficient in Canada. Despite the lack of compliance with the legal mandate of reclamation, Alberta is one of the strongest economies in Canada. It has a strong government with institutional and monetary capacity. The laws for protection of the environment exist and there should be enforcement of these laws. As distinct from developing countries, Alberta does not lack legal, institutional or monetary capacity. Thus, reclamation activities should be in place, and to be additional reclamation offsets must be accounted only for those restoration activities that go beyond the reclamation mandated by Law.

3.4.2 Progressive Reforestation

If a private entity who had a legal mandate to reforest decided to implement a biodiversity offset, reforestation activities part of the biodiversity offset would need to be additional to those implemented to comply with the legal mandate. It means that only reforestation activities undertaken in addition to those ones implemented to comply with the legal obligation should be accounted towards the biodiversity offset. As with conservation activities under the NSW scheme, progressive reforestation activities implemented in Alberta would need to be discounted from the global reforestation amount. It implies that only those additional reforestation activities that go beyond the legal mandate would be accounted for in a disposition that would be expressly granted for implementing a biodiversity bank. As in the NSW methodology, a percentage discount for biodiversity credits could be created. Under these discount possibilities, a value would be given to each of the conservation or restoration activities undertaken under the legal mandates of reclamation or progressive reforestation. These values or percentages would be later discounted from the overall conservation/restoration activities on the land. Only those

[818] See *WebFar*, *supra* note 84. See also Weber, *supra* note 257.

activities additional to the legal mandate would be the ones provided by the biodiversity offset, and as a result, would be the ones subject to a credit. The amount remaining after deducting the mandatory actions from the achieved reforestation amount would be the additional reforestation activities, which could be accounted as part of the biodiversity bank. There is, however, a need for clear and precise accounting. To do so, like in the NSW scheme, an assessment methodology would be needed. Although not exclusively designed to measure additionality, this methodology could help identify determine biodiversity values, and with that the values of what is lost and what is being offered in compensation. The development of this type of methodology as one of the products supporting the regulation of a biodiversity banking system is essential for the implementation and operation of biodiversity banks under the system.

In order to implement biodiversity offsets that produce additional biodiversity benefits and credits, the forest operators would need to comply with their obligations first. They then would be able to sell the surplus or "additional reforestation" reflected in biodiversity only after complying with their legal mandate, in terms of the amount and level of reforestation mandated by law.

Environmental outcomes and environmental additionality should be incorporated into the legal surplus. This could be done by expressly stating in the regulation supporting a biodiversity banking system, not only that the bank needs to be additional, but also that they need to comply with all the additionalities. More precisely, it must state that biodiversity offsets under biodiversity banks need to provide additional ecological benefits that surpass the ecological benefits required by the legal mandates. Biodiversity banks need to be therefore, legally and ecologically additional. These aspects need to be part of the additionality requirement requested by *ALSA,* for example.

Conclusions

Although the focus of this chapter was to respond to the question of whether biodiversity offsets under biodiversity banks implemented on public lands would be considered additional, the analysis showed that achieving additionality with respect to biodiversity offsets can be as difficult on either public lands or private lands. It does not only depend on

the express inclusion of additionality as a requirement into the legal framework supporting a biodiversity banking system, but on the co-existence of environmental and legal additionality, and on the voluntariness or optionality of the offsets.

The chapter also showed that private parties with legal mandates, specifically progressive reforestation, could participate in the implementation of biodiversity offsets under biodiversity banks, as long as only additional reforestation would be counted towards the offset.

An express requirement of additionality of biodiversity banks in the legal framework supporting a biodiversity banking system could highlight the importance of additionality, and make biodiversity offsets under biodiversity banks conditional upon providing additional benefits. Alberta has the legal framework to create "additional" biodiversity offsets under biodiversity banks, implemented through conservation or restoration activities that go beyond progressive reforestation requirements. Additionality has been included into the *BOPF*'s draft as one of the offset program components. Such a requirement could also be included in *ALSA* and its regulations. The requirement to obtain the environmental and legal additionalities and the way to obtain additionality would also need to be included in ALSA's regulation and/or the *BOPF* program rules and it must also be supported by a clear methodology.

GENERAL CONCLUSIONS

Before writing the thesis, I assumed that the simple action of implementing and operating biodiversity banks on public lands would pose more legal challenges and complexities than implementing these types of instruments on private lands. The reason was apparently simple: private landowners typically may dispose of their land as they see fit. For example, a farmer can plant corn, create a forest, turn his land into a pasture for grazing or use part of his land as a paved parking lot for a new farmhouse for his daughter. By contrast, in a public lands context where multiple users have access or potential access and development rights over and under a piece of land, such access could threaten the implementation, permanence and operation of biodiversity offsets, as well as the capability of biodiversity offsets to produce tradable biodiversity credits.

In an attempt to reveal these challenges, the background and conceptual foundations sections of this dissertation described the offset essential principles developed by the BBOP and the way they were used by the three biodiversity banking systems presented herein. The analysis in the conceptual section demonstrated that the U.S. biodiversity banking systems had limitations and had not been effective in practice because most of the BBOP essential principles were not met, and had not even been considered at the time of evaluating the systems. The sections showed, however, that despite these challenges, the U.S. systems had taken actions to address their issues and improve. Those lessons learned encouraged the design of improved systems, such as the NSW BioBanking system.

Beyond the BBOP offset essential principles, the analysis within the conceptual section showed that as biodiversity banking systems become more complex and sophisticated, an increasing number of factors need to be included in the discussion of their development. These include legal issues, such as the property or use rights needed to implement and operate biodiversity offsets as well as to transfer biodiversity credits. It is also necessary to design legal frameworks able to support effective biodiversity banking systems, and to ensure that those biodiversity offsets, which need to be additional under biodiversity banks, are also included.

Extrapolating challenges and lessons learned from foreign biodiversity banking systems, I assumed that biodiversity banks on public lands allocated to private entities could face additional challenges to biodiversity banks on private lands, considering that those challenges could somehow be exacerbated by the presence of multiple and potentially conflicting land and resource users. However, what the case study revealed was that although the implementation and operation of biodiversity banks on public lands pose some additional challenges, such as having the rights to implement biodiversity offsets and ensuring their permanence, most of the legal challenges to biodiversity banks apply equally on private or public lands. These common areas refer, for example, to the property rights needed to sell and transfer biodiversity credits, and to demonstrating biodiversity offsets additionality.

Thus, I thought that identifying both additional and common challenges to biodiversity banking on public lands would be necessary to guide the development of new policies, laws and regulations supporting any biodiversity banking system on public lands.

Areas of extra challenges on public lands:

Implementing offset under biodiversity banks on public lands can pose additional challenges on lands that belong to the Crown

The case study showed that not all private entities extracting or harvesting resources from public forested lands would have the necessary rights to implement biodiversity offsets on crown land. Thus, the possibility of implementing biodiversity offsets on public lands depends on the rights provided by laws and dispositions in regards to resource use, extraction and harvesting. For example, statutes and dispositions exclusively granting disposition holders the rights to use, harvest and/or extract natural resources without the possibility of undertaking conservation and/or restoration activities could preclude the implementation of biodiversity offsets on public lands allocated to private parties.

In other words, if laws and dispositions granted both the rights to access, use and exploit or harvest natural resources from the land, and also to perform conservation and restoration activities, they could enable private entities to implement biodiversity offsets on public lands.

The thesis concluded that the rights to enable private parties to implement and operate biodiversity banks on provincial public lands need to be clearly included in the legal framework supporting such systems. The dissertation found that a sustainable approach towards forest management would provide forest operators the basis needed to implement and operate biodiversity offsets under biodiversity banks on Alberta's public forested lands allocated to private entities. The case study also showed that *ALSA*, as a legal planning tool, and its conservation plans have a crucial role in helping the forestry sector to implement biodiversity offsets on public lands and to exclude third parties from their conservation activities.

Ensuring permanence of biodiversity offsets and their restoration or conservation activities on public lands can also pose additional challenges.

The case study showed that the biodiversity offsets' permanence challenge is exacerbated by the presence of multiple land users on public lands. The environmental results provided by biodiversity offsets on public lands could be threatened by third party development activities if developers need to access the total or partial area of land where a biodiversity offset has been implemented.

Despite the additional threats to permanence on public lands used by multiple land users, the analysis in Chapter 2 showed that in jurisdictions where mineral rights are separated from surface rights, such as in Alberta, the existence of mineral rights underneath the lands where biodiversity offsets are implemented can equally threaten the permanence of biodiversity offsets whether on public or on private lands, as long there are mineral rights granted to third parties under the land where the biodiversity offsets lie.

Chapter 2 also revealed that despite the different possibilities to ensure permanence of biodiversity offsets on public lands, the permanence of biodiversity offsets on public lands would depend on the measures taken by the government to ensure long-lasting biodiversity offsets.

Areas of common challenges to biodiversity offsets on public and private lands

In regards to the areas of common challenges to biodiversity offsets on public and private lands, the thesis showed that to avoid uncertainties, clear property rights over biodiversity credits would need to be recognized through law or legal title.

Private entities would ideally need to have clear rights to transfer biodiversity credits. However, experience has shown that the lack of express recognition of property rights over biodiversity credits in the laws supporting biodiversity banking systems legislation has not precluded the transfer of credits by private biodiversity bankers. Experience in the foreign banking systems studied by this dissertation showed that despite the express recognition of ownership over biodiversity credits, biodiversity bankers have been able to transfer biodiversity credits, injecting over 3 USD billion per year into the world economy.[819]

Extrapolating from the carbon market experience, the thesis also concluded that ownership over biodiversity credits could be determined through laws supporting biodiversity banking systems, or through biodiversity banking agreements between the government and biodiversity bankers. Furthermore, this could also be determined through case law. The latter approach could, however, reduce certainty to the system and increase the biodiversity credits transaction costs.

Additionality

The thesis showed that additionality is another area that poses similar challenges to biodiversity offsets on public and private lands.

Demonstrating legal and environmental additionality on both types of lands needs to be incorporated in any legal framework supporting a biodiversity banking system.

The case study also revealed that private entities with legal mandates such as progressive reforestation could implement biodiversity offsets under biodiversity banks on condition that additional environmental benefits are produced to those emerging from the legal

[819] See OECD2016, *supra* note 1 at 17.

mandates, and that only those additional outcomes could be counted toward the biodiversity offset. The reason for that is simple: legal mandates should not be used to replace existing legal mitigation obligations.

In sum, based on the findings identified above, this thesis concluded that implementing and operating biodiversity banking systems and biodiversity offsets under them face several challenges independently, whether they are implemented on private or on public lands. There are only certain issues, such as the rights to implement biodiversity offsets on public lands and the permanence of biodiversity offsets on lands used by multiples users, which face extra challenges on public lands managed by multiple land users. It is, therefore, viable to believe that despite the challenges, a biodiversity banking system can exist and work well in jurisdictions with the vast majority of public lands allocated to multiple private entities as long as there is a legal framework supporting the systems, there are clear property rights to implement and operate biodiversity offsets under biodiversity banks and to transfer biodiversity credits, and the additionality of biodiversity offsets under biodiversity banks is attained.

Furthermore, the analysis in this dissertation showed that the story of biodiversity banks is still under construction. However, it is time to pay serious attention to the issues surroundings the design, implementation and operation of biodiversity banking systems in order to help biodiversity banks become a relevant tool to address impacts such as oil sands' residual impacts, and to better plan the coexistence of extractive activities and biodiversity conservation in provinces such as Alberta.

FUTURE RESEARCH AREAS

Beyond legal frameworks, property rights, permanence and additionality, this dissertation identified other aspects as important within the operation of biodiversity banking systems. These include methodologies to assess biodiversity losses and gains, and insurability of biodiversity offsets as well as the challenges faced by indigenous groups to participate in such systems on lands with unsettled rights. These issues are beyond the scope of analysis of this dissertation, but require further analysis and studies in order to better respond to the needs of a biodiversity banking system on provincial public lands. They could constitute the basis of future researc

GLOSSARY

Additionality: An essential principle of a biodiversity offset, which means that the environmental benefits obtained through the offset have to be "demonstrably new and additional and would not have resulted without the offset."[820]

Avoidance: Measures taken to prevent impacts from occurring in the first place, for instance by changing or adjusting the development project's location and / or the scope, nature and timing of its activities.[821] Avoidance is the first and preferred option within the mitigation hierarchy.

Biodiversity: Biological diversity or biodiversity constitutes a fundamental contributor to human wellbeing. It means "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."[822]

Biodiversity banking: It is a regulated offset that conserves, restores, or enhances biodiversity habitat/species at one location to offset/compensate in advance of development for the biodiversity impacts/ losses caused by a development project(s) at a different location. The conservation/restoration/enhancement activities implemented through the bank produce biodiversity credits, which can be either used by the developer/banker or traded and sold to developers in need to mitigate for their residual impacts.

Biodiversity banker: Whoever enters into a biodiversity banking agreement with the government to implement and operate biodiversity banks, and who might have the right to sell biodiversity credits and obtain profits from the biodiversity banks under his/her/its operation.

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[820] Definition extracted from *BBOPGLOS*, *supra* note 34.
[821] *Ibid*.
[822] *Convention on Biological Diversity*, 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993), art 2.

BioBanking: NSW Biodiversity banking system

BioBank: Biodiversity bank established under the NSW BioBanking system. Biodiversity offsets created under each BioBank produce biodiversity credits that can be sold through the BioBank.

Biodiversity bank sites: Biodiversity bank sites refer to the site where a biodiversity bank will be established, and under which one or several biodiversity offsets will be implemented to create biodiversity credits that will be later traded.
Biodiversity credit: credits produced by a biodiversity bank

Biodiversity loss: Biodiversity loss is usually observed as one or all of: (1) reduced area occupied by populations, species and community types, (2) loss of populations and the genetic diversity they contribute to the whole species and (3) reduced abundance (of populations and species) or condition (of communities and ecosystems).[823]

Third party offset bank (biodiversity bank): Banks, where a qualified person/entity implement a biodiversity bank (biodiversity banker) based on a formal agreement with the government (biodiversity banking agreement) and produce credits to transfer and sell those credits to developers (biodiversity bank user) in need to mitigate for the impacts of their development projects. This transfer of credits is made through what is called a biodiversity bank transaction.

Biodiversity banker: He/she/it is qualified person/entity who undertakes conservation, restoration, or establishment activities (e.g. of a wetland or a habitat) towards the implementation a biodiversity bank. The types of activities undertaken as part of the bank respond to the biodiversity goal pursued by the banking system under which the bank is created. For example, considering the main biodiversity or species conservation goal of a conservation banking, such a system would favour conservation activities (such as establishment of conservation easements, or establish prohibitions to prevent forest fires, or preventing the introduction of invasive species). On the other hand, a mitigation banking systems, such as the US Wetland Mitigation Banking System pursues an anti-

[823] Definition extracted from *BBOPGLOS*, *supra* note 34.

pollution goal, by prohibiting harmful discharges to the US waters, including wetlands. If such pollution has already occurred, wetland banking favours activities that could mitigate pollution through activities such as wetland restoration activities to help damaged wetlands. Restoration activities aim to recreate past conditions of a wetland, bringing back areas degraded through sedimentation, nature removal, water diversion, and others.[824] These activities could include for example, planting native vegetation where it was cleared, removing dams, filling ditches, and others.[825]

Can be also called the biodiversity credit seller, if he/she/it is entitled to sell and transfer biodiversity credits.

Biodiversity bank user: Person or entity that acquires biodiversity credits from a biodiversity bank to compensate for the totality or part of residual impacts caused by his/her/its development project. It is also called the biodiversity credit buyer.

Biodiversity bank transaction: Transaction through which biodiversity credits are transferred from the biodiversity credit seller (biodiversity banker) to the biodiversity credit buyer (biodiversity bank user).

Benchmark: A benchmark can be used to provide a reference point against which losses of biodiversity due to a project and gains through an offset can be quantified and compared consistently and transparently.

It usually comprises a number of representative and characteristic 'attributes' used to represent the type, amount and quality of biodiversity which will be lost / gained.

Comparing the observed level (or 'score') of each benchmark attribute at the impact site (before and as predicted after the impact) against the level at the benchmark can help to quantify the loss of biodiversity to be caused by the project.

Similarly, comparing the observed level (or 'score') of each benchmark attribute at the offset site (before the offset and as predicted after the offset intervention) against the level at the benchmark can help to quantify the gain in biodiversity caused by the offset. A

[824] See Wetland Restoration and Rehabilitation, at 1, online at: <http://www.ontarionature.org/discover/resources/PDFs/misc/wetland_restoration.pdf>.
[825] See *ibid* , at 3.

benchmark can be based on an area of land that provides a representative example, in a good condition, of the type of biodiversity that will be affected by the proposed development project. A synthetic benchmark can also be used if no relatively undisturbed areas still remain.[826]

Biodiversity offset: Measurable conservation outcomes of actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.[827]

This thesis defines biodiversity offsets as a set of actions (e.g. restore, conserve, enhance) that create certain environmental outcomes to compensate for similar residual impacts caused by development somewhere else (off the geographic boundaries of the development project).[828]

Biodiversity Bank: It is the entity that provides the venue and methods to trade biodiversity credits emerging from biodiversity offsets. Under a biodiversity bank, offset projects are created "in exchange for biodiversity credits, which can subsequently be sold to compensate for developments with comparable residual ecological impact."[829]

Biodiversity Banking system: A biodiversity banking system is the system in which credits produced by biodiversity offsets and deposited in biodiversity banks are created and transferred. Biodiversity banking system creates markets where developers in need to compensate for its residual impacts to obtain its development approval can purchase credits from a bank providing biodiversity credits.

The three systems studied by this dissertation: the Wetland Mitigation Banking, the Conservation Banking and the NSW BioBanking systems are biodiversity banking systems.

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[826] Definition extracted from *BBOPGLOS*, *supra* note 34.

[827] *Ibid*.

[828] Biodiversity offsets quantify residual impacts from development, and create equivalent or better biodiversity components outside the geographic boundaries of a development. See Bull et al., *supra note* 36 at 2. See also KBB, supra note 36 at 9.

[829] Bull, *ibid* at 2.

Compensation: Compensation means providing a recompense for some loss through something equivalent to what is lost. It can be done in kind or through money. "In terms of biodiversity, compensation involves measures to recompense, make good or pay damages for loss of biodiversity caused by a project."[830] Compensation is the last option within the mitigation hierarchy, and targets residual impacts.

Conservation offset: Biodiversity offset.

Environmental goal: Environmental goal is an aim or a purpose that pursues achieving a benefit towards the environment. Environmental goals are for example, biodiversity conservation, species at risk protection, or pollution prevention.

Environmental objective: Environmental objectives determine the magnitude in which the environmental goal will be protected and help achieve environmental goals. Environmental objectives are for example, no net loss (NNL) and net gain (NG).

Mitigation hierarchy: The mitigation hierarchy is formed by a set of activities, which need to be implemented and followed in a sequential order. Most of the existing literature suggests that mitigation activities are to: "avoid, minimise and mitigate"[831] impacts/harm.[832] Mitigation hierarchy also "means the order of priority selection of mitigation measures". [833]

i) Avoidance: Measures taken to avoid causing impacts on the environment

ii) Minimise: "Measures taken to reduce the duration, intensity and / or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible" on site.

[830] Extracted from *BBOPGLOS*, *supra* note 34.
[831] See *KBB*, *supra* note 36 at 9.
[832] This set of mitigation activities modified and enhanced by Bishop et al in "Building Biodiversity Business", by the following activities: i) avoid, ii) reduce, iii) rescue and iv) repair. See *JoshBish*, *supra* note 236 at 75.
[833] Government of BC, *EMP*, s 2 definitions.

iii) **Mitigate:** Measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and / or minimised. [834]

iv) **Compensate/Offset:** "Measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and / or rehabilitated or restored on site, in order to achieve no net loss or a net gain of biodiversity.[835]

Residual impacts: Impacts left after all onsite avoidance, and mitigation activities have been carried out by the developer or a third party on its behalf.
Unavoidable impacts: Impacts that cannot be avoided, even when avoidance measures have been taken.

Wetland Mitigation Bank: "a wetland, stream, or other aquatic resource area (s) that have been i) restored, ii) established, iii) enhanced, or (in certain circumstances) iv) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources."[836] See mitigation banking.

[834] Extracted from *BBOPGLOS*, *supra* note 34 at 29. The BBOP glossary uses the terminology: rehabilitation/restoration to refer to what this dissertation means by mitigation.

[835] See *Ibid*. Different from the BBOP definition of compensation, this includes offsets as part of the compensation activities. They are the last resort within the mitigation hierarchy.

[836] *MITCOMPI*, *supra* note 24. See also Alberta's Wetland policy, which takes a similar approach towards wetland compensation. In other words, it states that wetland compensation can be achieved either through i) wetland restoration, ii) construction of wetlands, and through iii) enhancement of existing wetlands. *WETPOL, supra* note 152, s 2c at 17.

ACRONYMS AND IDENTIFIERS

ABPropGuide: A Guide to Property Rights in Alberta

ACA: Alberta Conservation Association

AEP: Alberta Environment and Parks

AER: Alberta Energy Regulator

ALSA: *Alberta Land Stewardship Act*

AOSP: Athabasca Oil Sands Project

AUD: Australian Dollars

BAU: Business as usual

BBASSMETH: NSW BioBanking Assessment Methodology 2008

BBASSMETH2014: NSW BioBanking Assessment Methodology 2014

BAPP: Business and Biodiversity Offsets Programme, Biodiversity Offset Design Handbook Appendices

BASSMETH2008: NSW, BioBanking Methodology 2008

BBhandbook: Business and Biodiversity Offsets Programme, Biodiversity Offset Design Handbook

BIOBILL2016: Biodiversity Conservation Bill 2016, public consultation draft (NSW)

BBOP: Business and Biodiversity Offsets Programme

BBOSSO: NSW Biodiversity Banking and Offsets Scheme- Scheme Overview

BBOPGLOSS: Business and Biodiversity Offsets Programme glossary

BBOP essential principles: BBOP Principles on Biodiversity Offsets

BBOPOFF: Business and Biodiversity Offsets Programme, Biodiversity Offsets

BFC: Boreal Forest Communities

BMF: Biodiversity Management Framework under the *LARP*

BOPF: Framework for Conservation Offset Design in Alberta (Draft)

CANFOR: Columbia v. Canadian Forest Products Ltd [2004] 2 SCR 74, 2004 SCC 38

CBD: Convention on Biological Diversity

ConsBankGuide: Guidance for the Establishment, Use and Operation of Conservation Banks

CDM: Clean Development Mechanism

DECCW: NSW Department of Environment, Climate Change and Water

DEFRA: U.K. Department for Environmental and Rural Affairs

DFOPGO: Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting

EMP: Environmental Mitigation Policy for British Columbia

EMPpro: Environmental Mitigation Procedures EMP Procedures

EMPFAC: Environmental Mitigation Policy – frequently asked questions

EPEA: *Environmental Protection and Enhancement Act*

EPEF: Environmental Protection and Enhancement Fund

EP&ANSW: Environmental Planning and Assessment Act 1979 No 203 (NSW)

ESA: U.S. Species at Risk Act

ESRD: former Alberta Ministry of Environment and Sustainable Resource Development

EVC: Ecological vegetation class

FAC85: Fisheries Act, RSC 1985

FESAPOL: *Final Endangered Species Act Compensatory Mitigation Policy*

FMA: Forest Management Agreement

GHG: Greenhouse gas

GBO3: Global Biodiversity Outlook 3

GBO4: Global Biodiversity Outlook 4

ICMM: International Council on Mining & Metals

IMAP: Inventory of major projects – Upper Athabasca Region

INTESAPOL: Interim Guidance on Implementing the Final Endangered Species Act Compensatory Mitigation Policy Memorandum

IUCN: International Union for Conservation of Nature

LANDMA plan: Landscape Management Plan under the LARP

LARP: Lower Athabasca Regional Plan

LUF: Land Use Framework

MITCOMPI: Mitigation Banking Facstsheet.

MULTISAR: Multiple Species At Risk project

NNL: No Net Loss

NG: Net Gain

NSW: New South Wales

NSWBBF: OEH, BioBanking Review

NSWBIOB: NSW Biobanking: a market-based scheme

NSWGEBS: NSW Biodiversity Banking and Offset Scheme - Guide to establishing a biobank

site

NVA 2003: NSW Native Vegetation Act 2003

OECD: Organization for Economic Cooperation and Development

OEH: NSW Office of Environment and Heritage

OEHPRIN: OEH Principles for the use of biodiversity offsets in NSW

UNEP: United Nations Environment Programme

UNDP: United Nations Development Program

UNFCCC: United Nations Framework Convention on Climate Change

U.S.: United States of America

MITBANKGUIDE: U.S, Environmental Protection Agency, Federal Guidance for the Establishment, Use and Operation of Mitigation Banks

USD: U.S. Dollars

SEACOP South East Conservation Offset Pilot

REBILE: A review of biodiversity legislation in NSW

RMA: Management areas under the LANDMA plan.

RIO: Rio Declaration on Environment and Development, United Nations Conference on Environment and Development

TSCANSW: NSW Threatened Species Conservation Act of 1995

BioBanking regulation 2008: NSW Threatened Species Conservation (Biodiversity Banking) Regulation 2008

WETPOL: *Alberta Wetland Policy*

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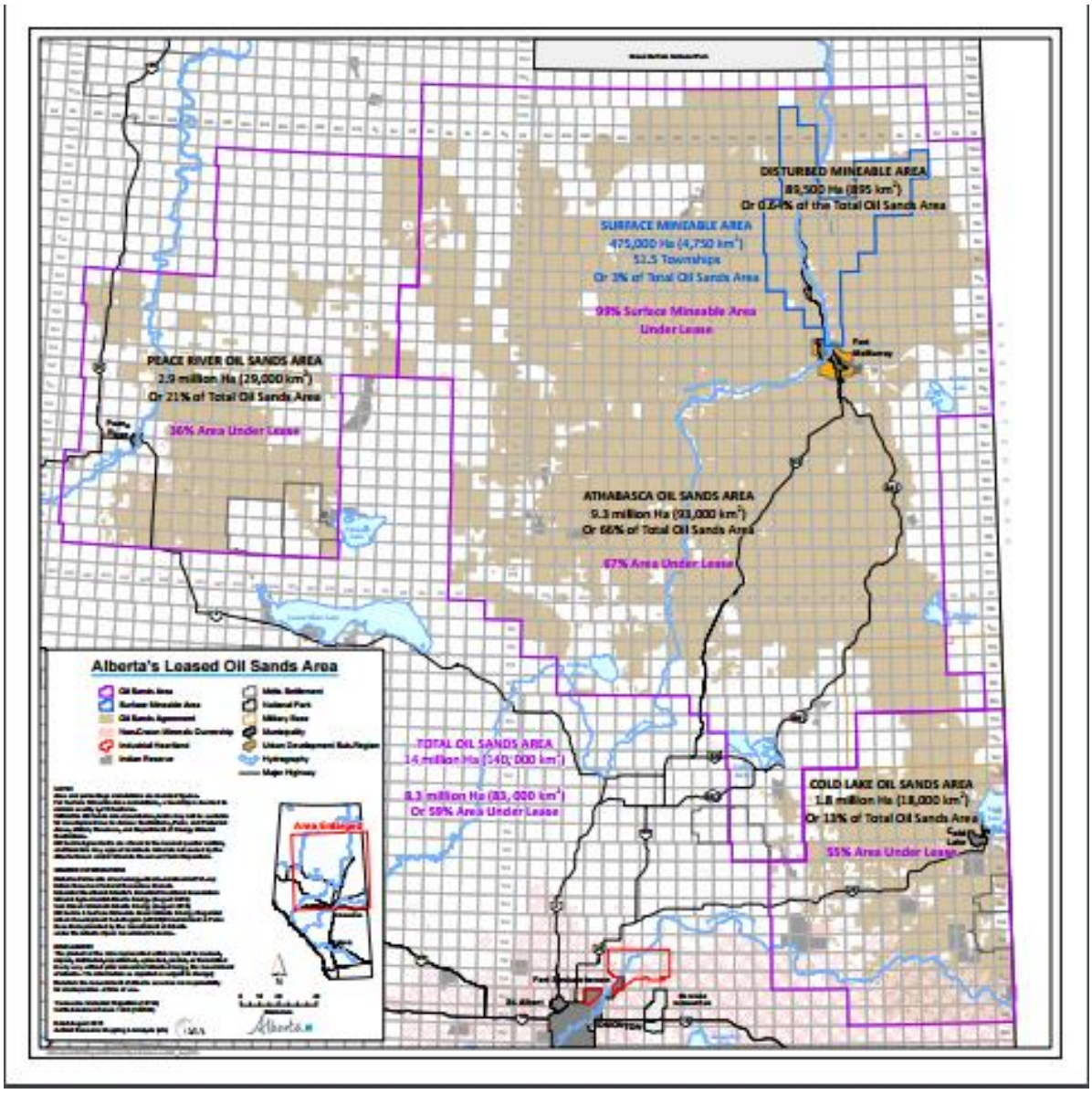
Annexes

Alberta's Leased Oil Sands Area[837]



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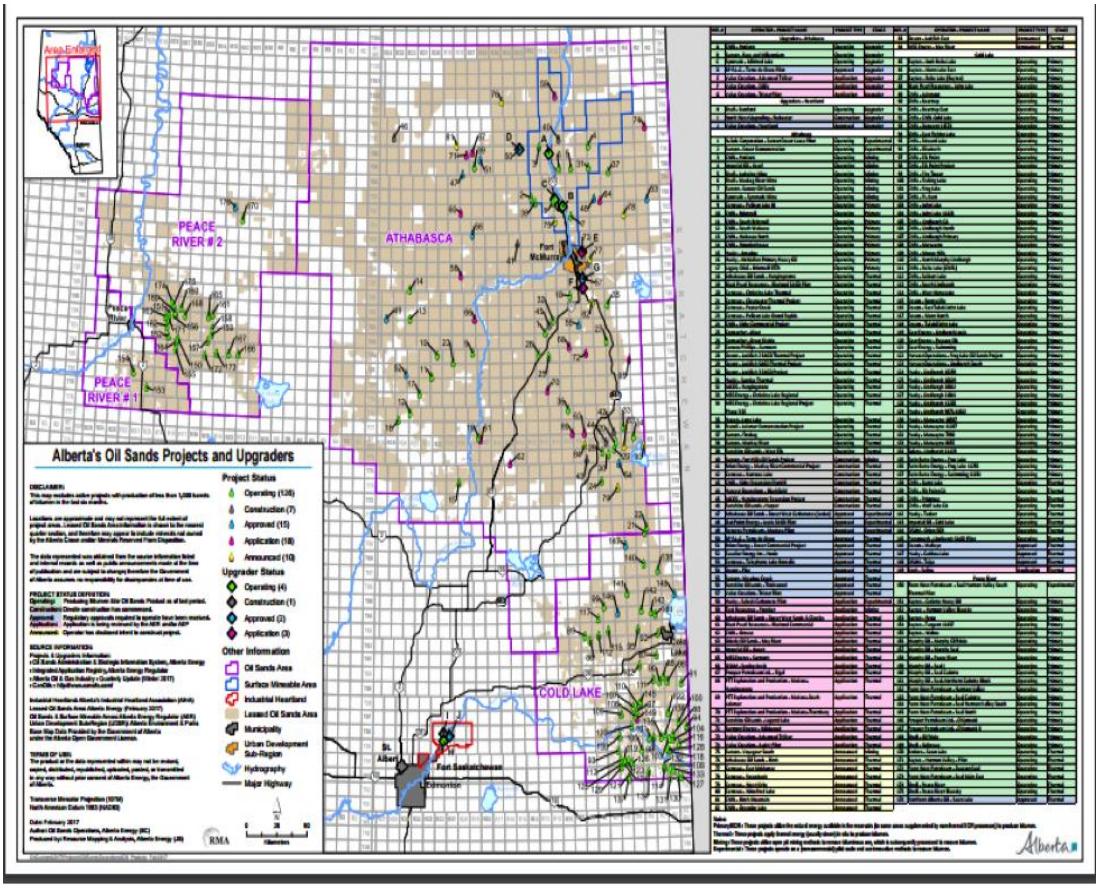
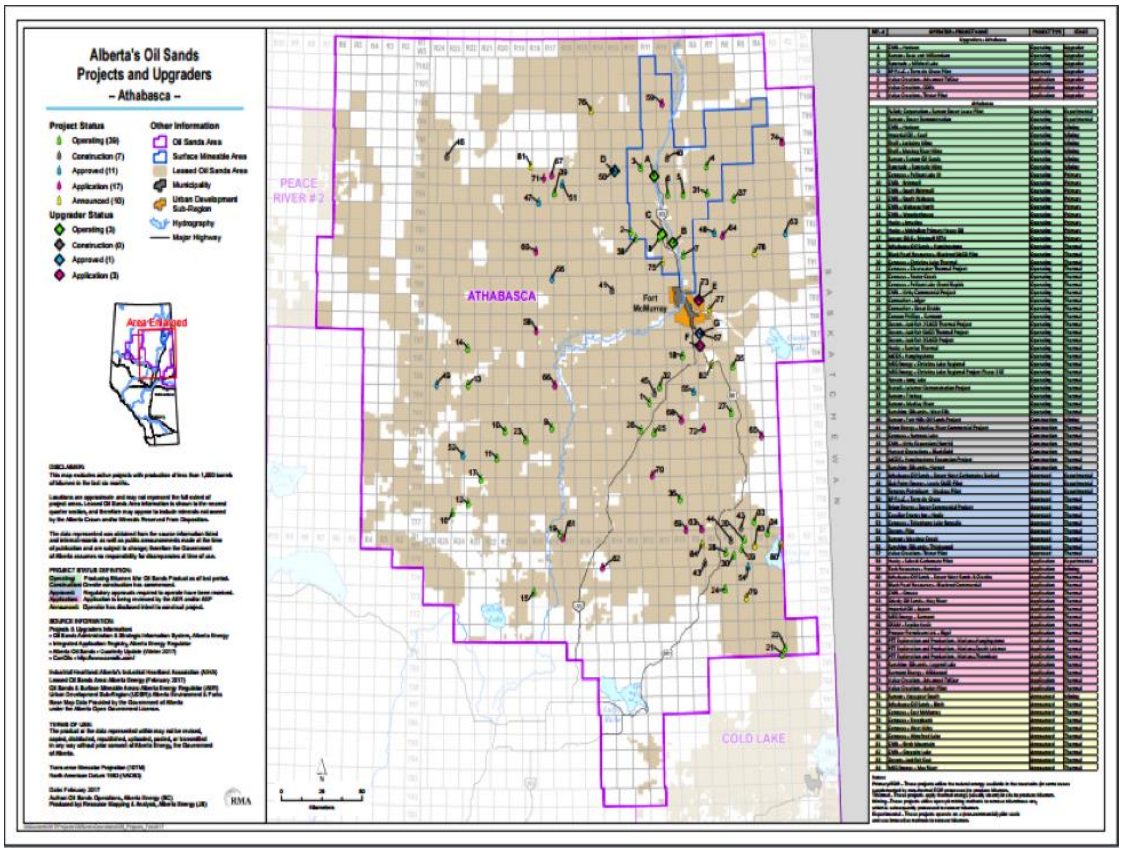
Alberta's Oil Sands Projects and Upgraders[838]



[838] PROJUP 2017, *supra* note 101.

Alberta's Oil Sands Projects and Upgraders - Athabasca[839]



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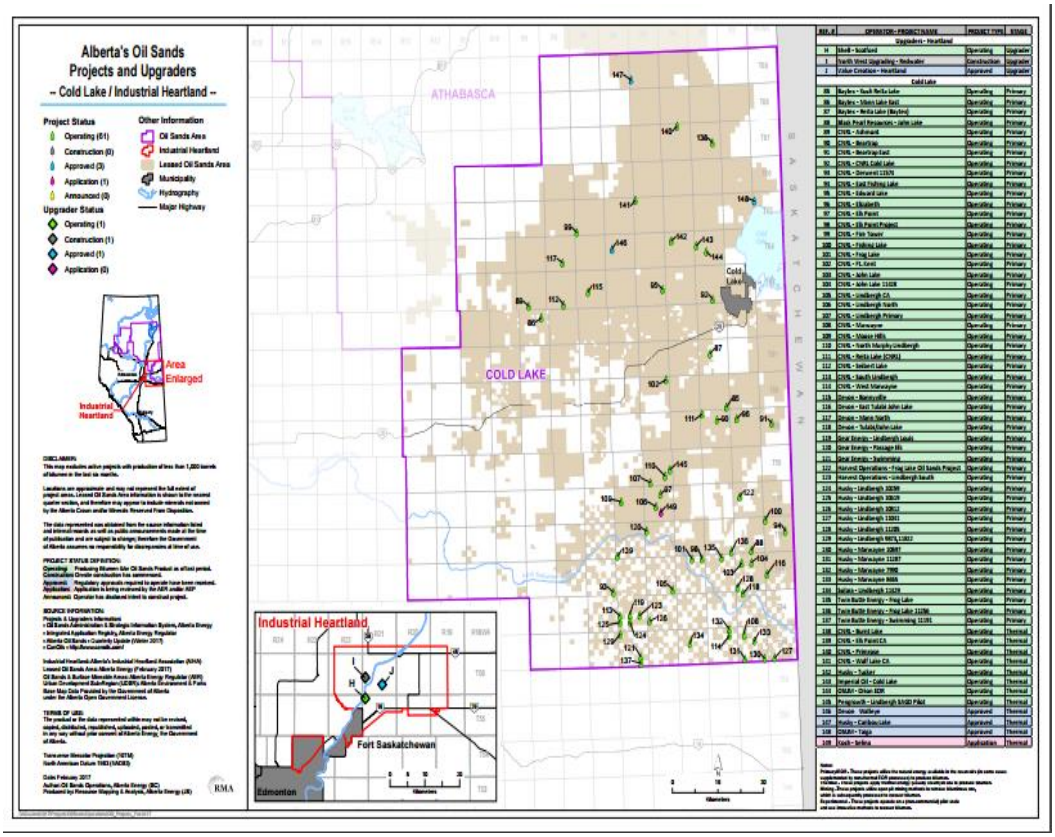
Alberta's Oil Sands Projects and Upgraders – Cold Lake[840]



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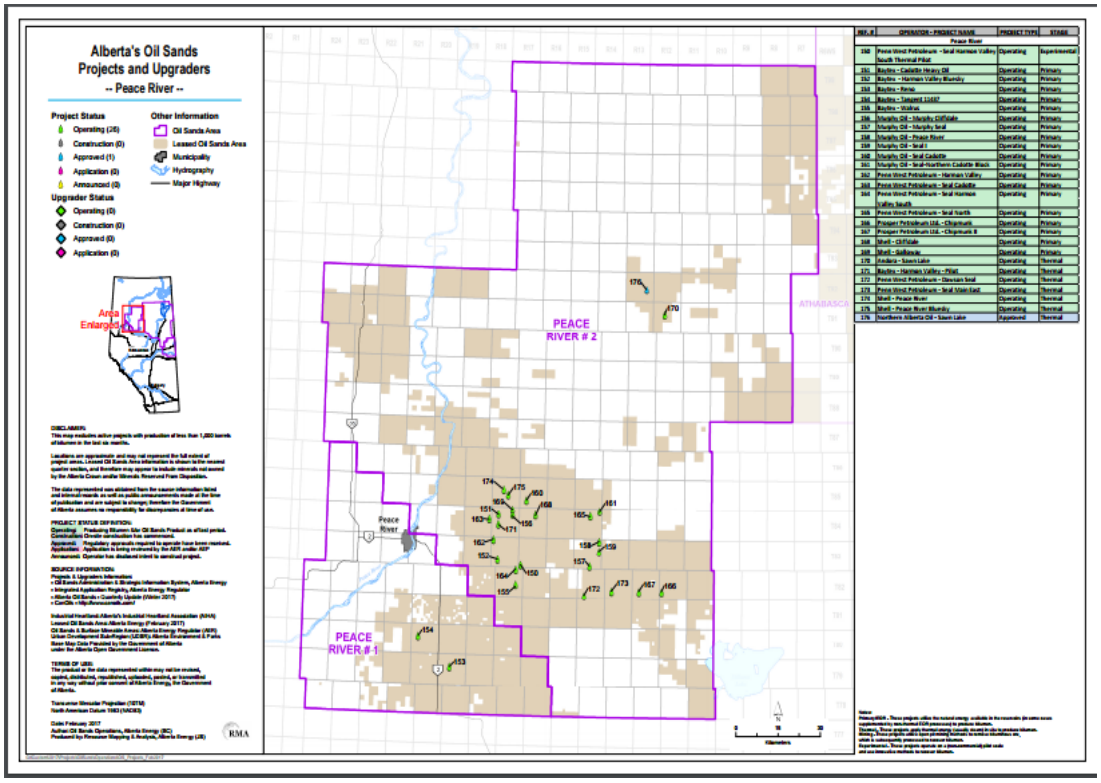
Alberta's Oil Sands Projects and Upgraders – Peace River[841]



[841] Alberta, Ministry of Energy, *Alberta's Oil Sands Projects and Upgraders - Peace River,* (February 2017), online: < http://www.energy.alberta.ca/LandAccess/pdfs/OilSands_Projects.pdf>