

Biodiversity Offsets

A Primer for Canada

Prepared for Sustainable Prosperity
and
the Institute of the Environment

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The Issue

Biodiversity – most simply defined as the diversity of life on Earth – contributes to human wellbeing in numerous ways; it provides us with ecosystem goods and services (like air purification and climate moderation), natural resources for our economic activity, health benefits, and community and spiritual values. However, biodiversity is in rapid decline worldwide.

Due to this rapid decline, there is a growing sense of urgency that humans must take action to protect biodiversity. In Canada, there is currently an opportunity to further the conversation about what Canadians can do to protect other species. New thinking has emerged on the ways in which we can support biodiversity and the policies and programs we could be introducing. Combined with this new thinking, discussions related to biodiversity are taking place at both provincial and federal levels. This creates a unique window to influence biodiversity policy in Canada.

Finding ways to slow, stop or mitigate the loss of biodiversity will require that Canadians consider numerous solutions – many of which are inherently interdisciplinary, drawing on scientific, political, financial, social, legal and economic expertise. Policy-makers are increasingly exploring where policy approaches that use markets can help protect or enhance positive environmental outcomes, or mitigate negative ones. These policies, generally referred to as market-based instruments, use markets to internalize external costs, thus building environmental costs into decision-making.

This report describes one particular market-based instrument – that of biodiversity offsets. Biodiversity offsets are defined as “measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken,” and are generally implemented with a goal of no net loss of biodiversity in the face of new economic activity.¹

The reasons for using biodiversity offsets can vary. They may be undertaken voluntarily by developers, may be required on an individual basis by regulators, or may be required by regulation as a matter of routine. Similarly, the creation of the offset itself can take different forms: conservation measures leading to offsets may be undertaken directly by developers, or may be undertaken by third parties and then made transferable to developers, thus creating a market in banked offset credits. A third alternative, not strictly an offset, is the payment of a fee into a fund dedicated to conservation, such payment in lieu of the creation of a specific offset. Examples of each of these types of offset creation are examined in this report.

There is substantial international experience with the use of biodiversity offsets. Many jurisdictions outside of Canada have offset systems, and two key case studies are included in this background paper – the United States federal wetlands compensatory mitigation regime, and the use of offsets with respect to native vegetation in the Australian state of Victoria – with a view to how Canada can learn from their experiences. In Canada, there is experience with compensatory requirements in fish habitat and in wetlands under federal jurisdictions. Several provinces also have compensation provisions respecting wetland habitats. Recent legislation, policy statements, and regulatory decisions indicate a growing interest in using biodiversity offsets in Canada.

¹ Business and Biodiversity Offset Programme, *To No Net Loss and Beyond: an Overview of the Business and Biodiversity Offsets Programme* (Washington: Forest Trends, 2013) at 4, online: BBOP <http://www.forest-trends.org/biodiversityoffsetprogram/guidelines/Overview_II.pdf>.

However, there are several complex and challenging design issues to address in the development, implement and ongoing operation of any biodiversity offsets policy. These questions are inherently interdisciplinary in nature and must be addressed transparently in the initial policy design. There are issues of equivalency and currency, additionality, timing and direction, uncertainty and risk management, offset availability, and community and stakeholder involvement. This background report defines and discusses each in turn.

A particular question to consider is the role of government. Government may play several roles in enabling, encouraging, or requiring offsets. Among the most important are the defining of principles and standards and the implementation of enabling regulation (where required or desired).

The purpose of this background report is to establish a common understanding of the use of biodiversity offsets, as applicable to Canada, and define the issues that must be considered by policy-makers considering implementing biodiversity offsets. Because this background report serves to establish the knowledge base for biodiversity offsets, it does not draw explicit policy conclusions.

Despite not seeking to make policy recommendations, two general observations are made apparent in this analysis. First, although biodiversity offsets cannot be the sole solution to the challenge of addressing biodiversity loss and offsetting is the approach of last resort in the mitigation hierarchy, they have significant potential in some applications. Second, where there is scope to use biodiversity offsets, there is no single template or approach for a biodiversity offset system that will work best in all circumstances.

Designed properly, and done right, biodiversity offsets have the potential to make a difference.

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I. Introduction



The purpose of this background report is to establish a common understanding of the use of biodiversity offsets, as applicable to Canada, in order to facilitate a conversation about how biodiversity offsets can be used to make a difference to biodiversity in Canada. This report acknowledges the scientific knowledge and economic rationale for offsets, but focuses primarily on the framework and principles that must be considered in the design of any biodiversity offset program.

As a background report, this analysis stops short of prescribing biodiversity offset design recommendations, but instead draws lessons from which Canadian jurisdictions may benefit as they consider moving forward in the important work of preserving nature on Canada's land and waterscapes.

Preserving Biodiversity: The Need for New Approaches

The decline in the diversity of plant and animal species, the genetic diversity within species, and the ecosystems upon which species depend is an ongoing and growing source of concern. From 1970 to 2006, the world population of wild vertebrate animal species fell by an average of 31 percent.² Forty-four percent of water bird populations with known trends are in decline.³ This is not merely an aesthetic or sentimental issue; humanity is dependent on other species for a broad range of important environmental goods and services, without which our lives would be virtually impossible. The loss of the diversity of life is one that touches humans profoundly.

Despite decades of effort by many actors, the principal drivers of biodiversity loss – habitat loss and degradation, overexploitation, pollution, invasive alien species, climate change – are either constant or increasing in intensity.⁴ Many of these drivers have, at least in part, an economic component to them. This has led many thinkers and policy-makers to ask whether it is possible to change economic structures and incentives to better protect species and ecosystems. A variety of policy approaches have been proposed, and some have shown promise as they have been tried in different countries.

This report examines one such approach: the use of biodiversity offsets. **Biodiversity offsets are defined as measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken.** They are generally implemented with a goal of no net loss of biodiversity in the face of new economic activity. Biodiversity offset requirements can go even further, requiring a net positive improvement in biodiversity.

Using biodiversity offsets, in which ecosystem enhancements are matched with the losses caused by development and economic activity, is gaining increasing acceptance in countries around the world. Both the Canadian government and some provincial and territorial governments are showing an increasing interest in it. The aim of this report is to examine biodiversity offsets, their variety, and common design issues. It will briefly look at two of the more well-developed offset systems in jurisdictions beyond Canada – the U.S. wetland compensation system and the offset regime respecting native vegetation in the Australian state of Victoria – with a view to how those jurisdictions have handled some of these issues.

² Secretariat of the Convention on Biological Diversity, *Biological Diversity Outlook 3* (Montreal: Secretariat of the Convention on Biological Diversity, 2010) at 24.

³ *Ibid*

⁴ *Ibid* at 55-67.

Market-Based Instruments

Market-based instruments (MBIs) for environmental protection are a broad class of policy tools that are intended to motivate voluntary environmentally-beneficial behaviour through the use of price signals.⁵ They are frequently described in contrast to prescriptive “command and control” regulation, on the one hand, and moral suasion, on the other. They appeal to individual decision-makers’ self-interest to motivate behaviour in the common interest.

The fundamental concept underlying the theory of MBIs is “externalities.” It has long been recognized in the discipline of economics that a voluntary transaction between two economic actors (companies, individuals, unions, even governments) may produce effects – positive or negative – beyond the parties themselves. These effects are external to the consideration of the parties because they are not held responsible for them. As a result, they have no motivation to minimize negative externalities, nor enhance positive ones. Private actors, therefore, are not motivated to act in the interest of the larger community in significant ways, including protecting the environment and applying thrift to the use of natural resources.

Many MBIs seek to reform this situation by assessing a price for the externalities and attaching it to the activities that give rise to them. Those whose activities benefit the public interest in a healthy environment will receive rewards, and those who pollute or degrade the environment will incur a cost for their actions. Both, then, will be motivated to improve their performance with respect to the environment, not necessarily out of idealism, but because doing so will reap rewards or avoid costs.⁶

Over the last two decades there has been an increasing effort to apply MBIs to the challenges of slowing and/or preventing biodiversity loss. One MBI that has been widely discussed is the use of biodiversity offsets.

5 Robert N Stavins, *Experience with Market-Based Instruments* (Washington DC: Resources for the Future, 2001); Romain Pirard, “Market-Based Instruments for Biodiversity and Ecosystem Services: A Lexicon” (2012) 19-20 *Environmental Science and Policy* 59.

6 MBIs have existed in many forms for several years. Readers new to the concept may reflect upon a system with which most of us are very familiar. The deposit-and-refund system that applies to beverage containers in many jurisdictions is a form of MBI. The prospect of receiving a return on a deposit motivates people to voluntarily make the effort to return bottles, rather than pay a small price (the forsaken deposit) to litter or dispose of the container in the landfill. The cost of the non-return of the bottle is internalized into people’s individual cost-benefit calculations in such a way that responsible behaviour is encouraged. While this policy tool is quite far removed from the subject of this paper, it does illustrate the operation of prices as a means to induce socially and environmentally desirable behaviour.

Biodiversity Offsets Defined

Biodiversity offsets are known by other names. Canadians often use the term *conservation offsets*; with essentially the same meaning, Americans use the term *compensatory mitigation*. Environment Canada has recently added the term *conservation allowance*, which is virtually synonymous.⁷ The most often cited definition of the concept comes from the Business and Biodiversity Offset Programme (BBOP)⁸:

[M]easurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken.⁹

The concept envisions that the environmental degradation from the development of one site (the “development site” or “impact site”) will be compensated for by an equivalent or greater environmental enhancement on another (usually more or less proximate) site or suite of sites (the “offset site(s)”). The BBOP definition also sets out one common goal of offsets:

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.¹⁰

If the development proponent accepts or is held responsible for the implementation of the offset, this amounts to a remedy for the externality of biodiversity loss. The developer is taking on the cost of avoiding the loss to nature, incorporating it into the cost of the development project. Note that while this is a new cost to the developer, it is not a wholly new cost. It is a real cost that has previously been borne by nature. In a sense the transfer of this cost to the developer can be seen as the removal of a public subsidy on development. Because the developer will bear the actual cost of their development, including its environmental impact, they will be motivated to avoid and minimize the impact of their development project on nature. In this it can be seen to be a form of “true cost accounting,” a concept that sustainability advocates often promote.

By aligning the interest in conservation with the interest in development, a well-functioning system of offsets can help overcome the conventional conflict between economic growth and environmental protection. However, it is important to recognize the place of compensatory approaches such as offsets in the mitigation hierarchy.

7 Environment Canada, *Operational Framework for Use of Conservation Allowances* (Ottawa: Environment Canada, 2012) online: Environment Canada <<http://www.ec.gc.ca/ee-ea/default.asp?lang=En&n=DAB7DD13-1&printfullpage=true>>.

8 The Business and Biodiversity Offset Programme (“BBOP”) is an international collaboration of more than eighty companies, financial institutions, government agencies, researchers, and civil society organizations working to establish and promote best practices in the use of the mitigation hierarchy (see below) to achieve no net loss, or a net gain, to biodiversity. For more information and an abundance of valuable materials see BBOP’s website: <<http://bbop.forest-trends.org>>.

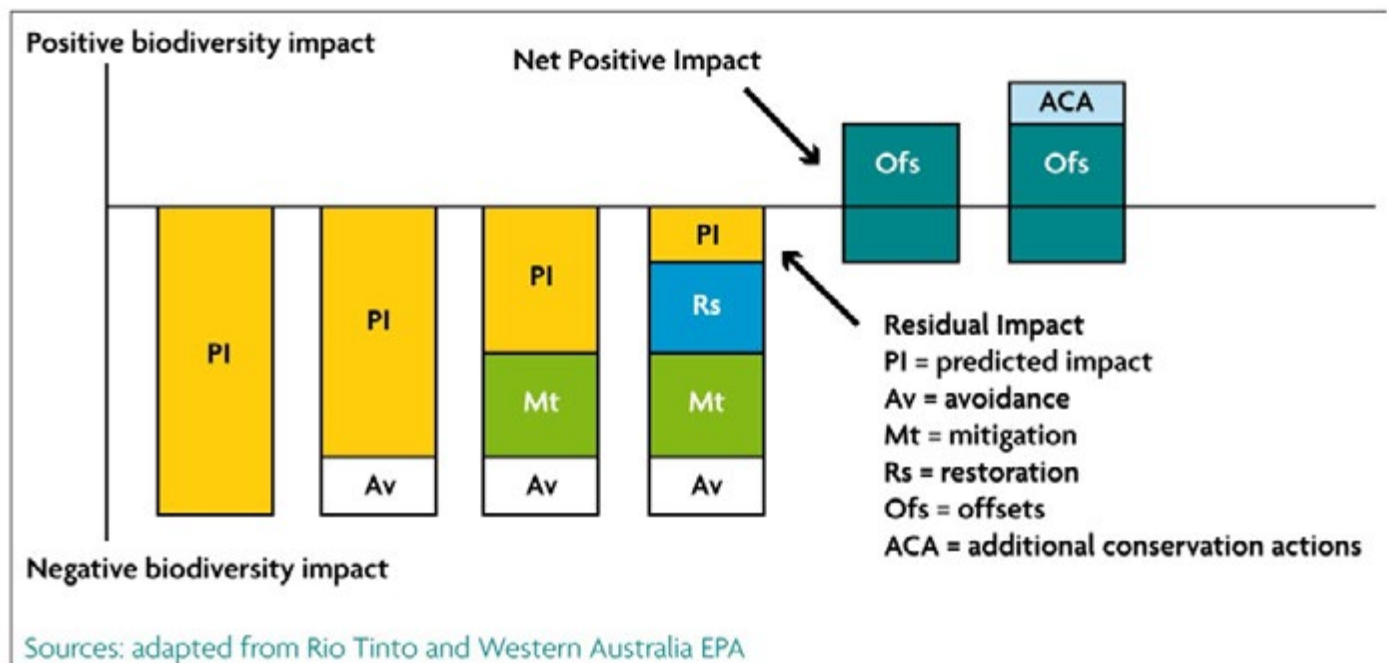
9 Business and Biodiversity Offset Programme, *To No Net Loss and Beyond: an Overview of the Business and Biodiversity Offsets Programme* (Washington: Forest Trends, 2013) at 4, online: BBOP <http://www.forest-trends.org/biodiversityoffsetprogram/guidelines/Overview_II.pdf>. The Business and Biodiversity Offset Programme (“BBOP”) is an international collaboration of more than eighty companies, financial institutions, government agencies, researchers, and civil society organizations working to establish and promote best practices in the use of the mitigation hierarchy (see below) to achieve no net loss, or a net gain, to biodiversity. For more information and an abundance of valuable materials see BBOP’s website: <<http://bbop.forest-trends.org>>.

10 *Ibid* at 4 [emphasis added].

A Last Resort in the Mitigation Hierarchy

It is important to see biodiversity offsets as merely one component in a suite of environmental protection measures respecting project development. Because our understanding of nature, and our ability to recreate the complex dynamics of natural ecosystems, is limited, it is usually far better to leave natural ecosystems in place than to seek to reconstruct or secure them in another location. For that reason offsets should only be turned to as a last resort. Before relying on offsets to neutralize negative impacts, those impacts should first be avoided altogether, or minimized by all reasonable measures, including on-site rehabilitation and restoration. This is why the definition of offsets refers to compensation for *residual* adverse impacts. This sequence of “avoid – minimize – offset” is often known as “the mitigation hierarchy”, and is a key part of biodiversity offset programs worldwide.¹¹

Figure 3: Mitigation hierarchy and offsets



¹¹ *Ibid* at 7; Becca Madsen, Nathaniel Carroll & Kelly Brands, *State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide* (Washington, DC: Ecosystem Marketplace, 2010) at 2-3; Economics for the Environment Consultancy & the Institute for European Environmental Policy, *The Use of Market-Based Instruments for Biodiversity Protection – The Case of Habitat Banking: Summary Report for the European DG Environment* (London: eftec, 2010) at 48; 73 Fed Reg 19594 (with respect to U.S. wetlands compensation). Unfortunately, compliance with the mitigation hierarchy is often difficult to monitor and assess, leading some to identify this as an important challenge for offset systems: Bruce A McKenney & Joseph M Kiesecker, “Policy Development for Biodiversity Offsets: A Review of Offset Frameworks” (2010) 45 *Environmental Management* 165, 173; Palmer Hough & Morgan Robertson, “Mitigation Under Section 404 of the Clean Water Act: Where it Comes From, What It Means” (2009) 17 *Wetlands Ecology and Management* 15 at 30,33 (the latter regarding U.S. wetlands compensation). For a discussion of some of the conceptual, structural and cultural difficulties in enforcing the requirement of avoidance, with a particular emphasis on North American wetlands policies, see Shari Clare et al “Where is the Avoidance in the Implementation of Wetland Law and Policy?” (2011) 19 *Wetlands Ecology and Management* 165.

Despite the importance and the logical and moral appeal of the mitigation hierarchy, it is not easy to define the thresholds at which one might reasonably move from one level of the hierarchy to the next. That is, how much must one reasonably do to avoid impacts before moving on to minimize them? Likewise, how much minimization must be undertaken before it is deemed sufficient, and offsets for the remainder are sought? Answering these questions requires consideration of many factors.

The resolution of these questions should rely on information from many disciplines and parties, and should not be based on costs alone; however, cost may be a significant guide to an optimal outcome. Consider a situation where a credible and reliable opportunity exists for an important biodiversity gain through an offset – and is possible at a cost lower than the marginal benefit from marginal avoidance. In these circumstances the mitigation hierarchy might best be seen as a starting guide, rather than a doctrine requiring strict adherence. Any departure from the hierarchy, however, should be fully and transparently justified, and done in full cognizance of the potential challenges of using offsets to compensate for biodiversity loss.

The important point here is that the availability of offsets are not meant to provide an excuse to a developer for failing to exercise due diligence to avoid and minimize its impact. More than one author has pointed out that if the mitigation hierarchy is not adhered to, then an offset scheme maybe seen, perhaps rightly, as a “license to trash.”¹²

¹² Kerry ten Kate, Josh Bishop & Ricardo Bayon, *Biodiversity Offsets: Views, Experience, and the Business Case* (Gland, Switzerland: IUCN and Insight Investment, 2004) at 19, online: IUCN <http://www.iucn.org/about/work/programmes/economics/econ_resources/?471/Biodiversity-Offsets-Views-experience-and-the-business-case> ; McKenny & Kiesecker, *supra* note 8 at 173

Caveats: What Offsets Are Not

Though offsets hold significant potential for use in protection of biodiversity, it is important to understand their limits as well. The following outlines some ways in which the limits of biodiversity offsets are commonly understood.

Conventional Mitigation – Development mitigation usually aims to minimize the impact of development at the development site. This is important, and should be fully realized before offsets are considered. Offsets go further, however, to compensate for the impact which remains after full mitigation, so as to result in no net loss, or positive gain, to biodiversity.¹³

Justification for a Bad Development Project – The prospect of offsetting ought not to be used to short circuit the scrutiny of a development project by either the proponent or regulators. To do so would both contrary to the mitigation hierarchy (because unwise impacts would not be avoided and minimized) and would undermine the integrity of the regulatory process, which should include consideration of the appropriateness of the development on its own merits, including its “fit” in the landscape.

Applicable in All Circumstances – Biodiversity offsets depend on the replicability of environmental values lost to the primary development. If a development puts at risk ecosystem components that are very rare or difficult to replicate elsewhere, the offsets are unlikely to succeed in their goal of producing no net loss.¹⁴

Comprehensive Environmental Protection – Conservation offsets are one set of tools for the protection of biodiversity and environmental values. They link development capital with the capital needed to compensate for losses to development. They are not a substitute for fundamental elements of conservation such as proper land-use and resource planning, protected areas networks, legal protection of species at risk, and so on. They can and should, however, be designed to complement and contribute to the goals of such public policy programs.¹⁵

A Panacea – As will be made clear throughout this report, the use of offsets may deliver many environmental benefits, but many of those benefits are uncertain in their nature and extent. The goal of no net loss is being pursued in a number of commendable manners but few would claim that it has been achieved either programmatically or in the case of a single project. The implementation of a biodiversity offset program should be seen, therefore, to be a step toward no net loss, not its fulfillment.

Recognizing these limits helps ensure biodiversity offsets -- and their potential use in a particular context -- are well understood and are considered for use in appropriate situations. It also underscores the need to consider biodiversity offsets as part of a larger suite of initiatives addressing biodiversity preservation.

13 The term “mitigation” in relation to offsets can be confusing because some jurisdictions and writers have included offsetting as a variety of mitigation. The U.S. wetlands system, for example, - one of the world’s most advanced offset systems – refers to itself as “compensatory mitigation.” Likewise, the *Canadian Environmental Assessment Act 2012* includes “replacement, restoration, compensation or any other means” within definition of mitigation measures that may be required by a decision maker: SC 2012, c 19 s 52 s 2. To avoid contributing to this semantic confusion, this report is referring to “conventional mitigation” and “minimization” as the second step in the mitigation hierarchy, the reduction of impact at the development site.

14 Business and Biodiversity Offset Programme, *Resource Paper: Limits to What Can Be Offset* (Washington, DC: Forest Trends, 2012) online: Forest Trends <http://www.forest-trends.org/documents/files/doc_3128.pdf>; A recent effort to articulate a principled threshold for the application of offsets may be found in John D Pilgrim et al, “A Process for Assessing the Offsetability of Biodiversity Impacts” 2012 00 Conservation Letters 1. See also Philip Gibbons & David B Lindemayer, “Offsets for Land Clearing: No Net Loss or the Tail Wagging the Dog?” (2007) 8:1 Ecological Management & Restoration 26, which suggests that offsets ought only be relied upon only in the most simple and low-risk circumstances.

15 Fabien Quélier & Sandra Lavorel, “Assessing Ecological Equivalence in Biodiversity Offset Schemes: Key Issues and solutions” (2012) 144:12 Biological Conservation 2991 at 2995.

II. Reasons to Use Biodiversity Offsets



Before exploring the design questions and policy challenges in biodiversity offsets design, it is important to understand the reasons a developer might use biodiversity offsets. The mechanisms by which developers or others may be motivated to dedicate the resources and effort necessary to produce the “measurable conservation outcome” can be voluntary or regulatory. Voluntary offsets are generally applied to a specific project. Regulatory requirements can apply to a specific project or to a broader category of activity. In this section, these reasons why a developer could use offsets are explored.

Voluntary Offsets

A development proponent may undertake biodiversity offsets voluntarily. In a landmark 2004 report, ten Kate and co-authors surveyed developers, environmental stakeholders, and regulators, and found that companies that willingly took on offsets did so to improve stakeholder relations, reduce regulatory risk, improve access to capital, improve employee morale and retention, and improve their social license to operate, among other reasons.¹⁶

In Canada we have seen several examples of companies voluntarily undertaking biodiversity offsets. The following section provides some recent and well-known examples of development projects in Canada that have incorporated biodiversity offsets into their planning – these examples show that not only are voluntary offsets already in use in Canada, the size of the projects is not insignificant.

Canadian Examples of Voluntary Offset Projects

Shell Canada – True North Forest

In 2012 Shell Canada Ltd. announced the purchase of 740 hectares of boreal forest habitat to establish a conservation area under the joint management of Shell and the Alberta Conservation Association. This was added to earlier purchases for a total of 1214 hectares placed under this private protection. The site is 70 kilometres north of Grande Prairie, Alberta, spanning the Ksituan River. The stated goal of the project is to protect and enhance the site, and make it available for low-impact recreation. According to the company website (see below) the intention was to partially offset the habitat disturbance from existing oil sands mining operations.

For more information see: <http://www.shell.ca/en/environment-society/environment-tpkg/true-north.html>.

Oil Sands Leadership Initiative – Algar Caribou Habitat

The Oil Sands Leadership Initiative is a collaboration among six oil sands operators with the stated goal of “driving leadership initiatives and improvements in the environmental, economic and social performance of our companies and industry.”¹⁷ In 2012 the OSLI companies undertook a five-year plan to reclaim an area of 570 square kilometres of boreal forest caribou habitat (of which 20 square kilometres had been previously disturbed). The first phase of the work involved (a) mounding of soil to change the line-of-sight on linear disturbances along with (b) winter planting of 45,000 trees in an effort to restore habitat. This was not a typical reclamation project because none of the companies involved actually had operations in the area, nor did they contribute to the prior disturbance. Rather, the project was an exploration of how habitat reclamation and enhancement might be used to offset disturbance from oil sands development elsewhere in the region.

For more information see: <http://www.osli.ca/projects/land/algar-caribou-habitat-restoration>.

¹⁶ ten Kate et al, *supra* note 9 at 38-45.

¹⁷ “OSLI: Member Companies” online: OSLI <<http://www.osli.ca/about-osli/member-companies>>.

Kinder Morgan Canada – Trans Mountain Legacy Fund

In 2004, when Terasen Pipelines proposed to expand the Trans Mountain pipeline through Jasper National Park and Mount Robson Provincial Park in British Columbia, there was potential for a major confrontation with environmental champions of the parks. The company entered into negotiations with a group of local and national environmental organizations, arriving at an understanding that the two interests would work together to produce a net benefit to the ecological health of the two parks, more than offsetting the impact of the pipeline expansion. When Kinder Morgan Canada acquired the pipeline, it confirmed this commitment. The company allotted \$3 million to the effort, of which \$2.3 million was paid into a fund for ecological restoration work beyond the mitigation of the pipeline project. This fund has since been named the Trans Mountain Legacy Fund, and is focusing its current efforts on aquatic rehabilitation in and around the two parks. (Like-for-like compensation for the pipeline's impacts proved to be impractical, and not a priority, for a variety of reasons.) The pipeline expansion received approval from the National Energy Board without substantial environmental opposition.¹⁸

For more information see: <http://www.transmountainlegacyfund.com>.

Hydro One – Bruce to Milton Biodiversity Initiative¹⁹

Hydro One initiated a project in 2008 to construct a new double-circuit 500 kV transmission line running 180 kilometres from the Bruce Nuclear Generating Station to the Milton Switching Station in southern Ontario. The company estimated that the project would affect approximately 280 hectares of woodland habitat via clearing or conversion to low-growing habitat considered compatible with overhead transmission lines. Whereas the traditional compensation approach of the industry required a hectare-for-hectare replacement of this habitat through tree-planting, the company committed to a more ambitious goal of no net loss of habitat and net gain where practicable. To accomplish this the company worked in consultation with local communities, provincial agencies, environmental interest groups and First Nations and Métis communities to develop a methodology for quantitatively valuing and ranking the habitat lost due to the project, as well as habitat creation and enhancement opportunities. The valuation methodology was applied independently to each watershed that was traversed by the Bruce to Milton Project in order to ensure that the habitat created in each watershed was proportionate to the habitat lost. Strictly ecological values were applied to the comparison of habitat lost and habitat created or enhanced in order to ensure no net loss. However social factors (such as educational opportunities, recreational benefits and involvement of First Nations and/or Métis communities) were also considered when ranking the habitat creation opportunities. Hydro One reports that the goal of no net loss has been achieved, and that a net gain of habitat has been achieved with approximately 380 hectares of habitat created or enhanced.

For more information see: <http://www.hydroone.com/projects/brucetomilton/biodiversity/Pages/Default.aspx>.

¹⁸ By way of disclosure, the author was personally involved in this project, and sits on the steering committee for the Fund.

¹⁹ This description of the project is based upon a draft version of B.J. McCormick, et al., "The Bruce to Milton Biodiversity Initiative: A Novel Approach to Mitigating Habitat Lost Due to the Expansion of a Transmission Line Corridor", presented to 10th International Symposium on Environmental Concerns in Rights-of-Way Management, September 30 – October 3, 2012, Phoenix, Arizona (publication of proceedings pending).

Individual Offsets Required by Regulators

Increasingly Canadian regulators have been imposing biodiversity offsets as a condition of development approvals. Where economic activity leads to development that decreases biodiversity on land or in water, many regulators have powers to make development conditional on the mitigation of negative impacts through conservation actions. The context and regulator in question vary, as shown by these Canadian examples:

- The National Energy Board has three times since 2010 made approval of pipeline development in caribou habitat contingent upon the design and provision of habitat compensation.²⁰ Each condition has been successively more elaborate.
- The federal-provincial Joint Review Panel (JRP) that considered Total E&P's application for the Joslyn oil sands mine closely examined and critiqued the proponent's own offset plans, as did interveners. The JRP imposed a condition that habitat for species-at-risk be created (preferred) or protected "in locations relatively near the project" so as to offset residual impacts on species at risk. While the condition itself focused on species at risk, the JRP made clear that the offsets should include sufficient lands to allay concerns with other valued wildlife, vegetation, wetlands, and cumulative effects overall.²¹
- In 2013, the federal Joint Review Panel charged with examining the impact of Enbridge's controversial Northern Gateway pipeline project recommended approval of the project subject to 209 conditions including nineteen conditions requiring five different kinds of biodiversity offsets (caribou habitat, wetlands, rare plants and ecological communities, fish and fish habitat, marine habitat).²²
- The federal-provincial Joint Review Panel considering Shell Canada's application to expand the Jackpine oilsands mine released its report in July 2013.²³ The Panel noted that oil sands mining and preservation of natural values on the site were fundamentally difficult to reconcile, but stated its belief that "biodiversity offsets (or allowances) provide a potentially viable mechanism for mitigating these effects without sterilizing bitumen resources . . ." ²⁴ The Panel concluded this discussion with the recommendation:

. . . that before other provincial and federal approvals are issued, the Governments of Canada and Alberta cooperatively consider the need for biodiversity offsets to address the significant adverse project effects to wetlands, wetland-reliant species at risk, migratory birds that are wetland-reliant or species at risk, and biodiversity and the significant adverse cumulative effects to wetlands, traditional plant potential areas, old-growth forests, wetland-reliant species at risk and migratory birds, old-growth forest-reliant species at risk and migratory birds, biodiversity and Aboriginal traditional use . . .

and that such considerations guide the issuing of permits.²⁵

20 National Energy Board, *Reasons for Decision: NOVA Gas Transmission Ltd. GH-2-2010* online: NEB <https://www.neb-one.gc.ca/ll-eng/Livelihood.exe/fetch/2000/90464/90550/554112/590465/601085/665334/665172/A1X3T2_-_Reasons_for_Decision_GH-2-2010.pdf?nodeid=665173&vernum=0>; National Energy Board, *Reasons for Decision: NOVA Gas Transmission Ltd. GH-2-2011* online: NEB <https://www.neb-one.gc.ca/ll-eng/livelihood.exe/fetch/2000/90464/90550/554112/666941/685859/793577/793570/A2Q515_-_Reasons_for_Decision_-_GH-2-2011.pdf?nodeid=793571&vernum=0>; National Energy Board, *Reasons for Decision: NOVA Gas Transmission Ltd. GH-004-2011* online: NEB <https://www.neb-one.gc.ca/ll-eng/livelihood.exe/fetch/2000/90464/90550/554112/666941/704296/833910/833909/A2V3A0_-_Reasons_for_Decision_-_GH-004-2011.pdf?nodeid=834064&vernum=0>.

21 ERCB Decision 2011-005/CEAA Reference No. 08-05-37519 online: ERCB <http://www.total.com/MEDIAS/MEDIAS_INFOS/4458/FR/full-report-of-joint-review-panel-january27-2011.pdf>.

22 Canada, National Energy Board, *Report of the Joint Review Panel for the Enbridge Gateway Project, Volume 2: Considerations* (Calgary: National Energy Board, 2013) online: NEB <<http://gatewaypanel.review-examen.gc.ca/cf-nsi/dcmnt/rcmndtnsprt/rcmndtnsprt-eng.html>>.

23 2013 ABAER 011, online: ABAER <<http://www.aer.ca/documents/decisions/2013-ABAER-011.pdf>>.

24 *Ibid* at para 1824.

25 *Ibid* at para 1828.

In December 2013, the federal government released its Decision Report conditionally approving the Jackpine mine expansion.²⁶ The conditions it imposed referred, with respect to offsetting, only to fish habitat compensation. In doing so, however, it required an analysis to be carried out on the use of compensation sites by migratory birds, terrestrial species, species at risk, and Aboriginal peoples.²⁷ The federal Response to Panel Recommendations, released concurrently with the federal Decision Statement, committed Canada to “contribute input as requested on biodiversity offsets in the context of Alberta’s land use planning policies.”²⁸

The conditions imposed in these decisions seek to address specific environmental impacts in a particular circumstance, rather than as a part of a co-ordinated conservation strategy. Because of its inherently local nature, this project-by-project use of biodiversity offsets can be a very appropriate and useful way to mitigate the impacts of development in a particular project.

However, this means of encouraging offsets can be seen to have several limitations. It does not provide businesses with the regulatory certainty that a clear policy framework would provide. Because environmental values are only considered in the context of particular development proposals, the result may be piecemeal environmental direction, rather than the consistent application of relevant environmental principles. Further, the project-by-project nature of these decisions does not foster the development of expertise, standards, and economies of scale that might reasonably be expected if we had an offset regime of broader application.

Broader Offset Regulation

Whether voluntarily or by regulatory order, project-specific efforts are unlikely to protect habitat and biodiversity on the order of magnitude that is required to properly protect nature. That is not to say there is only a limited role for project-specific offsets or that project-based offsets cannot be used in tandem with broader systems. However, in order to achieve the level of positive impact needed, a regulatory regime that provides for offsets to be used as a matter of routine may be needed as part of a co-ordinated landscape plan and strategy.

For the business community, the routinization and standardization of the practice of offsetting for biodiversity allows developers to anticipate costs and alter their behaviour and reduces transaction costs. It also fosters the development of a core of expertise in effective offset development and implementation. For land managers, it assures that offset measures will be complementary to other land management activities, all in pursuit of co-ordinated objectives.

A regulatory regime should both enable the use of offsets by giving credit for conservation and should provide guidance regarding what activities create a permissible offset. It should also drive demand for offsets either by strict requirement, or by strong incentives. Typically a no net loss goal will prescribe that no significant disturbance will be permitted without an acceptable equivalent offset being arranged.²⁹

Note that broader regulation of requirements to offset environmental impacts does not trump the mitigation hierarchy – offsetting should still remain the approach of last resort. There will likely be a role in Canada for both voluntary and regulatory use of biodiversity offsets, used both in specific projects and in broader regimes. The use of one may set the stage for the other, and specific contexts may require different approaches to biodiversity offsets.

26 The Honourable Leona Aglukkaq, *Decision Statement Issued Under Section 54 of the Canadian Environmental Assessment Act, 2012*, online: Canadian Environmental Assessment Agency <<http://www.cea-acee.gc.ca/050/document-eng.cfm?document=96773>>.

27 *Ibid* at 7.

28 Canada, “Jackpine Mine Expansion Project: Government of Canada Response to Panel Recommendations” online: Canadian Environmental Assessment Agency <<http://www.acee-ceaa.gc.ca/050/document-eng.cfm?document=96784>>.

29 Appendix II outlines in case study form two offset systems in operation, one in Australia, the other in the United States. Both operate on this no net loss basis, as do the federal fish habitat and wetlands regimes.

III. Context



International support for the use of biodiversity offsets is based on a growing body of experience with their use. The international context is briefly described in this section. For a more detailed exploration of the issues in the context of specific international experience, refer to Appendix II, in which two international case studies are explored. This section also describes the current Canadian context for biodiversity offsets, focusing on federal initiatives. While the previous section included examples of biodiversity offsets in Canada, at the project level, this section includes discussion of where they are used more systematically.

Global Policy Influencers

While a number of jurisdictions are currently undertaking new offset policy initiatives, the idea of offsets is certainly not new.³⁰ Offsets have been part of conservation planning for several years, both in Canada and around the world. According to a 2011 review, a total of 45 offset programs are active in various jurisdictions around the world, with another 27 under development.³¹ Two well-established programs are examined in Appendix II.

International institutions have recognized the validity of offsets as a conservation tool:

- The parties to the United Nations Convention on Biological Diversity, of which Canada is one, have on several occasions taken decisions to support the research into biodiversity offsets and the development of appropriate standards.³²
- The International Financial Corporation (IFC) has endorsed the mitigation hierarchy, including the appropriate use of offsets and compensation.³³ In 2012 it updated and strengthened its Performance Standard 6 (PS6), requiring that development projects (financed with the IFC's assistance) in natural habitat be designed to achieve no net loss, and those within critical habitat (as per IFC's definition) be designed to achieve net gain.³⁴
- The Equator Principles³⁵ for financial institutions dictate that adopting institutions require clients seeking financing for large projects to propose measures to minimize, mitigate and offset adverse environmental impacts of the subject development.³⁶

Canadian Programs -- Federal

Several provinces have regulatory and policy regimes incorporating the mitigation hierarchy and the concept of habitat offsets or compensation, and more are under development. They mostly apply to specific types of ecosystems, most commonly wetlands.

30 While different from biodiversity offsets in many respects, greenhouse gas emissions offsets have been a part of the conversation on climate change mitigation tools for several years, which has helped familiarize Canadians with the idea of offsets.

31 Becca Madsen et al, *2011 Update: State of Biodiversity Markets* (Washington, DC: Ecosystem Marketplace, 2011) at 2-3, online: Ecosystem Marketplace <http://www.forest-trends.org/documents/files/doc_2848.pdf>.

32 UN Convention of Biological Diversity COP8, Decision VIII/17; COP9 Decision IX/11; Decision IX/18, Decision IX/26, COP10, Decision X/21.

33 International Financial Corporation, International Financial Corporation's Policy on Environmental and Social Sustainability (January 2012) Online: <http://www.ifc.org/wps/wcm/connect/9959ce0049800a91ab32fb336b93d75f/Updated_IFC_SustainabilityFrameworkCompounded_August1-2011.pdf?MOD=AJPERES>. The International Financial Corporation is an affiliate of the World Bank which provides services and advice to private sector financial institution to encourage them to invest in development projects in developing countries. It counts among its membership 184 countries and dozens of companies, foundations, development agencies and civil society groups: www.ifc.org.

34 *Ibid.*

35 The Equator Principles is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects.

36 "The Equator Principles, June 2013" at 5, online: <http://equator-principles.com/resources/equator_principles_III.pdf> "The Equator Principles is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible decision-making": <<http://equator-principles.com/index.php/about>>. The Principles have been adopted by 78 financial institutions worldwide, including Canada's "big four" banks and several other Canadian companies.

Fish and Fish Habitat

Canada's most extensive experience with habitat offsets has been under the federal *Fisheries Act*.³⁷ That Act has recently been amended in a manner that may be significant for the application of the offset concept.

From 1985 to 2013 the *Fisheries Act* contained a provision prohibiting any "harmful alteration, disruption or destruction of fish habitat" unless permitted and pursuant to conditions imposed by the Department of Fisheries and Oceans (DFO).³⁸ Based on that legislative foundation, in 1986 DFO released a policy that committed to a goal of no net loss of fish habitat, and to "strive to balance habitat losses with habitat replacement on a project-by-project basis."³⁹ Since the release of that policy developers affecting fish habitat have frequently faced conditions requiring them to create or rehabilitate fish habitat as compensation as part of the ordinary environmental assessment and permitting process that is applied to each project individually.

DFO's administration of the fish habitat compensation program has been criticized for insufficient documentation and monitoring to determine whether the no net loss goal was actually being met.⁴⁰ In 2011 officials responsible for the program reportedly testified to a public inquiry that the no net loss goal was only a guiding principle and not a literal measure of program performance.⁴¹

In 2012, the Canadian government significantly amended the fish habitat protection provisions of the Act as part of omnibus Bill C-38.⁴² The amendments came into force on November 25, 2013, and could potentially magnify the use of offsets in this arena.

The definitions of the new terms brought into the Act deserve consideration. Section 35 is amended to refer to "serious harm to fish", rather than to fish habitat.⁴³ This is defined to mean "the death of fish or any permanent alteration, or destruction of, fish habitat."⁴⁴ The amendments also limit the application of the section to those fish "that are part of a commercial, recreational or Aboriginal fishery, or . . . fish that support such a fishery."⁴⁵ The words "commercial", "Aboriginal", and especially "recreational" are defined in very broad terms.⁴⁶ Therefore, what at first blush may appear to be a narrowing of the application of Section 35 may not in fact be so, at least not by virtue of these terms.

Perhaps most significantly, the amendments require DFO to consider "whether there are measures and standards to avoid, mitigate or offset serious harm to fish."⁴⁷ This explicit reference to offsetting elevates the concept from policy preference to legislated mandate.

37 *Fisheries Act, 1985*, RSC 1985, c F-14. In subsequent references, this report distinguishes between the "1985 Act" and the "2013 Act", the former not including the 2013 amendments. The proper name of the Act has remained the *Fisheries Act, 1985* notwithstanding the amendments.

38 1985 Act, *ibid*, s 35.

39 Department of Fisheries and Oceans, "Policy for the Management of Fish Habitat" (Ottawa: Communication Directorate, DFO, 1986) at 7, online: DFO <<http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14155/fhm-policy/pdf/policy-eng.pdf>>.

40 DJ Harper and JT Quigley, "No Net Loss of Fish Habitat: A Review and Analysis of Habitat Compensation in Canada" (2005) 36:3 Environmental Management 343; Auditor General of Canada, *Report of the Commissioner of the Environment and Sustainable Development*, ch 1 (Ottawa: Office of the Auditor General, 2009).

41 Mark Hume, "Bureaucrats Questioned on Principle of Fisheries Act at Cohen Commission", *The Globe and Mail* (22 September 2011).

42 SC 2012, c-19.

43 2013 Act, *supra* note 33, s 35(1).

44 *Ibid*, s 2(2). In policy guidance released in advance of the 2013 amendments coming into effect, DFO has interpreted the last two elements of this definition disjunctively, so that the requirement of permanence only applies to alteration, not destruction, of fish habitat: Fisheries and Oceans Canada, *Fisheries Protection Policy Statement, October 2013* (Ottawa: Ecosystem Programs Policy, Fisheries and Oceans Canada, 2013) at 8, online: Department of Fisheries and Oceans <<http://www.dfo-mpo.gc.ca/pnw-pppe/pol/PolicyStatement-EnoncePolitique-eng.pdf>>.

45 2013 Act, *supra* note 33, s 35(1)

46 *Ibid*, s 2(1).

47 *Ibid*, s 6.

Because they are so new, the full significance of these amendments is not clear at this time. With the introduction of the new provisions, DFO has issued a “Proponent’s Guide to Offsetting,”⁴⁸ which emphasizes the importance of the mitigation hierarchy, and that impacts are to be avoided and minimized (“mitigated”) before offsets measures are considered.⁴⁹ It also gives direction on some of the issues that will be discussed later in this report, including the significance of time lags,⁵⁰ proximity,⁵¹ like-for-like,⁵² and additionality.⁵³

The Proponent’s Guide restates and reinforces the option of “proponent-led habitat banking,” whereby a development proponent may undertake offsets in advance of a development proposal, to use those credits when a development is subsequently proposed.⁵⁴ It is interesting to note the absence of any notion of banking of credits provided by third parties. This concept is discussed later in this report, and has been actively considered by DFO recently.⁵⁵

The mitigation hierarchy is also stressed in an “operational approach” document that was released just prior to the amendments coming into force.⁵⁶ It indicates that the priority of DFO in applying the provisions will be in major threats to fish, not minor projects or water bodies, and that further guidance on these terms will be forthcoming from the Department.

Wetlands

Since 1996 the Canadian government has had a policy on wetlands which commits to a goal of no net loss of wetland functions on all federal lands “where the continuing loss or degradation of wetlands has reached critical levels, and where federal activities affect wetlands designated as ecologically or socio-economically important to a region”⁵⁷ and also on “all federal lands secured for conservation purposes” (i.e., national parks, national wildlife areas, migratory bird sanctuaries, etc.).⁵⁸

The federal wetlands policy explicitly commits to the mitigation hierarchy of “avoid-minimize-offset/compensate.”⁵⁹ Compensation is described as being possible through rehabilitation of degraded wetlands, enhancement of wetland functions, non-wetland replacement of wetland functions, or creation of new wetlands.⁶⁰ Like the fish habitat program, the federal wetland program is administered through the environmental assessment and permitting process. While all departments responsible for assessments and permitting are to use the policy, the Canadian Wildlife Service is responsible for its co-ordination.

48 Fisheries and Oceans Canada, *Fisheries Productivity Investment Policy: A Proponent’s Guide to Offsetting, November 2013* (Ottawa: Ecosystems Policy Program, Fisheries and Oceans Canada, 2013), online: Department of Fisheries and Oceans <http://www.dfo-mpo.gc.ca/pnw-ppe/offsetting-guide-compensation/offsetting-guide-compensation-eng.pdf>.

49 *Ibid* at 6-9.

50 *Ibid*.

51 *Ibid* at 7.

52 *Ibid* at 10.

53 *Ibid* at 11.

54 *Ibid* at 13-14.

55 K Hunt, P Patrick & M Connell, *Fish Habitat Banking in Canada: Opportunities and Challenges*, Economic and Commercial Analysis Report 180 (NP: Her Majesty the Queen in Right of Canada, 2011).

56 Department of Fisheries and Oceans, *The Fisheries Protection Program Operational Approach*. This document does not appear to be available in full online as of the date of writing.

57 Environment Canada, Wildlife Conservation Branch, Canadian Wildlife Service, *The Federal Policy on Wetland Conservation – Implementation Guide for Federal Wetland Managers* (Ottawa: Environment Canada, 1996) at 3.

58 *Ibid* at 4.

59 *Ibid* at 17.

60 *Ibid* at 5.

Species at Risk

Section 73 of the *Species at Risk Act*⁶¹ authorizes the Minister of Environment under certain circumstances to enter into an agreement, or issue a permit, to allow a person to engage in an activity that will affect a listed wildlife species. The agreement or permit is to contain terms and conditions as the Minister considers necessary “for protecting the species, minimizing the impact of the authorized activity on the species or providing for its recovery.”⁶² This provision likely authorizes Environment Canada to make the provision of biodiversity offsets a condition of any such agreement or permit.

Environment Canada’s 2012 Operational Framework

In 2012 Environment Canada released its *Operational Framework for Use of Conservation Allowances*⁶³ (the newly introduced term “conservation allowance” is used in place of biodiversity offset). The *Framework* briefly reviews the federal experience with offsets in fish habitat, wetlands, and a few other circumstances. It lays out a set of guidelines and principles for their further use, including many of the subjects covered in this report. The release of the *Framework*, corresponding with the amendments to the *Fisheries Act*, may be seen as an indication of a rising willingness to use and institutionalize this conservation tool.

61 SC 2002, c 29.

62 *Ibid.*, s 73(6)

63 Environment Canada, *supra* note 5.

Canadian Programs -- Provincial

The provincial programs will not be reviewed here, but a list of existing programs and those under development is presented. This list of programs and initiative using biodiversity offsets or offset concepts is offered as partial guidance.

Alberta

Alberta Land Stewardship Act - Sections 45 – 47 enable the development of conservation offset regulations.

Lower Athabasca Regional Plan

Pilot project on southwestern grassland reclamation

Alberta Wetland Policy

Cumulative Environmental Management Association, Terrestrial Ecosystem Management Framework

British Columbia

Draft Environmental Mitigation Policy

Manitoba

Compensation for road projects impacting Northern Waterfowl Management Plan areas.

New Brunswick

Wetlands Conservation Policy

Nova Scotia

Operational Bulletin Respecting Alteration of Wetlands

Prince Edward Island

Wetland Conservation Policy

IV. Offset Supply Mechanisms



Previous sections of this report indicated that the reasons developers seek biodiversity offsets can be either voluntary or regulated. There are also different ways in which the offsets themselves can be created. This section describes the ways in which biodiversity offsets can be supplied to the market.

Project-Specific, Developer-Led

The simplest model of offsets in this report contemplates the offset project (whether voluntary or mandated) being established in conjunction with, and concurrent with or following, a specific development project. Generally the offset work is initiated and led by the developer and its contractors, though usually under the supervision of regulators. This has the advantage of a close identification of the two projects, which can be important in fostering local goodwill. However, such project-specific offsets may have considerable transaction costs because the developer must deal with each project more-or-less anew. As they are inherently local, project-specific offsets are unlikely to produce a concerted or consistent pattern of environmental improvement beyond the local scale.

Offset Banking

A common prescription to make offsets more routine and easier to implement is the development of conservation or biodiversity offset banking. The key to such an approach is the uncoupling of the offset project from a particular development. A competent entity may undertake the development of an offset project, have the offset assessed and accredited by the relevant authority, and then make the resulting credits available, usually for a price, to developers who require them to meet the regulatory requirements of their proposed developments. The United States led the way in this regard, developing a system for banking wetland credits over twenty years ago (see Appendix II for detail).

Proponents of banking systems claim that they bring both environmental and economic benefits. Ecologically, a banking system enables offsets to be established in advance of development projects, avoiding or minimizing the temporary loss of biodiversity that occurs if the offset is not planned until development is underway.⁶⁴ As well, landscape or conservation planners may guide bank site selection and conservation actions to advance the goals and strategies of an overall land-use plan, biodiversity strategy, or species recovery plan.⁶⁵

Often conservation banks will be located on a few larger sites, and this may produce more ecological benefits than a scattering of smaller sites produced *ad hoc* on a project-specific basis.⁶⁶

In some cases, the developer itself may undertake a bank in order to build up credits in anticipation of applying them to its later developments. Typically this has been done by developers with ongoing activities, such as transportation agencies. This is commonly known as “self-banking,” and it gives the developer the possible advantages of economies of scale and certainty. Self-banking of fish habitat, while not commonly practiced, has been allowed by Canadian policy for several years.⁶⁷

64 ten Kate et al, *supra* note 9 at 14, n 8; Deborah L. Mead, “History and Theory: The Origin and Evolution of Conservation Banking” in Nathaniel Carroll, Jessica Fox & Ricardo Bayon, eds, *Conservation & Biodiversity Banking: A Guide to Setting Up and Running Biodiversity Credit Trading Systems* (London: Earthscan, 2008) 9 at 17.

65 *Ibid* at 17; Simon Dyer et al, *Catching Up: Conservation and Biodiversity Offsets in Alberta’s Boreal Forest* (Ottawa: Canadian Boreal Initiative, 2008) at 10.

66 It is important to note, however, that there is nothing inherent in a banking system which necessarily produces better ecological outcomes: Julie Sibbing, “Mitigation Banking: Will the Myth Ever Die?” (Nov-Dec 2005) 27 National Wetlands Newsletter 5; Society of Wetland Scientists, “Wetland Mitigation Banking: Clarifying Intent” (Sept – Oct 2005) 27 National Wetlands Newsletter 5. Each offset project, whether project-specific or banked, must be judged on its own merits.

67 Hunt et al, *supra* note 52 at 6-7, 16-25.

Much greater economic benefits are claimed, however, when third parties are allowed to undertake banking. Here the banker may transfer credits, usually by commercial sale, to any developer active on similar landscape. This means that the offset has a monetary value, which is a price incentive for conservation for both landowners and for those who would restore and steward the natural landscape. In contrast to the conventional situation where development is an economic opportunity and the conservation of nature an external cost, an offset market creates economic value in undeveloped ecologically-valuable land, and in the restoration of ecosystem functions and values.⁶⁸

Further, this economic incentive encourages the development of specialized skills and economies of scale as organizations (either non-profit or profit-motivated) undertake the offset work on a regular and planned basis. The existence of this community of specialized skill and knowledge, and the creation of an inventory of offset credits, likely substantially lowers the information and transaction costs for developers seeking offsets. It may also lead to selection of better offset sites, or better offset implementation methods, because of the expertise developed. As well, the creation of routine offset measures through banking protocols may bring economies of scale to regulators and monitoring systems.⁶⁹

While there may be some small voluntary demand for offset credits, the viability of a banking system relies heavily on government policy. The legal requirement of offsetting will be a driver of demand for offset credits, making conservation banks economically viable. Likewise, the official oversight of performance standards and accreditation of offsets will assure the ecological *bona fides* of the system, help foster confidence in the commercial exchange, and influence the supply of credits.

The use of offsets banks has the considerable advantage that offset credits are produced prior to the development to which they will be applied. This temporary loss of biodiversity values that occurs if development and offsetting commence simultaneously, might be avoided by the inducement to bank credits ahead of time.

The design and implementation of an offset bank may require a substantial investment – in land, research, restoration activities, etc. – and there may be a delay, while the project proves its viability, before even part of that investment is recoverable through credit sales. This means that a conservation bank is often a long-term investment, and that requires stability of the policy environment. Given the critical role of government policy in both the supply and demand of offset credits, any indication that the policy influencing those factors is flexible or likely to change as result of election results or political fashions may well undermine the foundations of a banking system.

A banking system also requires a well-developed legal infrastructure in the form of clear and enforceable private law instruments such as property and contract.⁷⁰ As in any other legal market relationship, these underpin the ability of parties to deal with one another with confidence. These matters cannot be taken for granted in new environmental markets, such as offset banking.⁷¹ Any banking system will depend on the resolution of these issues with some significant certainty.

68 ten Kate et al, *supra* note 9 at 20.

69 *eftec*, *supra* note 8 at 95-96.

70 Hunt et al, *supra* note 52 at 44.

71 For instance, there are many aspects of the environment that we have not conventionally thought of as property or objects of commerce, which require careful consideration from a legal perspective.

In-Lieu Fees

As an alternative to a strict offset program, developers may be required to pay fees into a fund that is to be used for future environmental protection and enhancement. Because the fees are in lieu of specific offset obligations, such programs are usually called in-lieu fees. In-lieu fees are not usually considered to be a form of offset because they do not match particular environmental losses and gains. They do, however, operate on a similar general principle, that of compensation.

An in-lieu fee program may have some of the advantages of a banking system in that it can produce a well-planned concerted effort at environmental improvement under the oversight of a central authority. Often in-lieu fees programs are seen as having lower transaction and administration costs than strict offsets, whether project-specific or banked. These lower costs, however, are often based upon a lowering of standards of assessment of development impacts, and a lack of rigour in matching losses and gains in quality and extent. The higher the standards that are applied to these matters, the more closely the system will resemble true offsets, and the less likely the cost savings of the in-lieu fee program.

While each program must be judged on its own merits, one of the criticisms applied in the past to the U.S. in-lieu fee program for wetlands was that the resulting funds lacked the governance to assure that they were used for the purpose intended at the time the fees were charged. Because such fees create a pot of available money, it is necessary to be clear as to when and how it will be expended.

V. Key Offset Design Issues



While the concept of offsetting environmental losses from development with conservation gains is superficially quite simple, it opens the door to a number of complex and subtle issues. It is important that any offset regime address these issues squarely and work toward their resolution. While general principles may, and should, be advanced,⁷² these issues are not generally amenable to “one size fits all” answers, so will have to be considered in the light of different circumstances.

Equivalency

At the heart of the offset concept lies the matching and exchange of ecological features between the development site and the offset site. It implies that the features of the two sites are equivalent and interchangeable. This assumption, however, runs up against the hard reality that no two sites are identical. Equivalence must be deemed, rather than presumed.⁷³ In approaching this issue one must be cognizant that it has significant implications for both the ecological rigour and the economic viability of an offset scheme. Unfortunately, those two aspects are almost inevitably in direct tension in this regard.

This is one of the key aspects of biodiversity offsets that distinguishes them from, for example, carbon offsets. All molecules of a particular type containing carbon (carbon dioxide, methane, etc.) are the same as all others of that type, and cause the same climate impacts, regardless of how or where they are produced and sequestered. That renders them all interchangeable, which makes for a homogeneous market in carbon offset credits. Biodiversity is not likely that. It has often been referred to as “the anti-commodity”, where each item is unique and not exchangeable with any other.

There are two physical manifestations of the difference between ecosystem sites. One is ecological and biophysical. No two pieces of land have identical hydrology, soil composition, species mix and interaction, etc. While we have various classification schemes that render sites comparable for particular purposes, all of those accept some degree of variation within each category, the limits of which are set by the purpose to be served.

The other manifestation is that two sites cannot exist in the same location. For nature, some functions such as the connectivity required for wildlife movement and migration, or the particular mix of factors that make for good wintering grounds, depend on particular pieces of land. Those functions cannot necessarily be shifted elsewhere.

Location also has a social importance. Local human communities enjoy the benefits of particular local ecosystems. For example, a wetland may provide ecosystem functions and services to local duck hunters, birdwatchers, and (possibly unknown to them) to the beneficiaries of flood control and water filtration. If that wetland is destroyed through development, and another offsetting wetland established near another community, then there will be human winners and losers from the transaction. This can create social and political tension that may undermine support for the offset.⁷⁴

This lack of perfect equivalency between impact and offset sites may render offsetting in the purest sense impossible. It does not, however, render it undesirable if the alternative is development without offsetting. Care must be taken to constantly improve methods to achieve the best result possible from a practical perspective.

Because we cannot replicate all of the ecosystem factors of the impact site, it is critically important that we identify which features, functions and services that we value so that the offset project may focus upon them. This is partly a job for technical experts, but it is also a job for communities and stakeholders. Their involvement at the early stages of planning impacts and offsets can give us an understanding of both how the local ecosystem works, and how people enjoy and value its benefits.

⁷² A well-regarded set of principles, those of BBOP, are set out in Appendix II.

⁷³ For a good review of the issues in this area and credible means of approaching them see Quétier & Lavorel, *supra* note 12.

⁷⁴ James Salzman & JB Ruhl, “Currencies and the Commodification of Environmental Law” (2000) 53:3 Stan L Rev 607 at 626.

The degree of granularity employed in identifying valued characteristics has an important implication for the implementation of offsets. If the focus is on characteristics that are particular to the development site, and difficult to find elsewhere, then offset opportunities will be limited accordingly. The greater the degree of leniency in the notion of equivalency (i.e., the greater the tolerance for some degree of variation from the characteristics of the development site), the greater may be the breadth of the pool of offset options.

Currency

Having identified the relevant values at stake, it is important to derive a means of measurement by which those values can be assessed and compared at both the impact and the offset sites. This measure is effectively the medium of exchange in the offset transaction, and so is often referred to as the “currency.” For example, hectares of a particular type of wetland, numbers of trees of a particular species and age, litres of water filtered, or hectares of habitat for a particular rare or sensitive species may all be currencies depending on the circumstance, as might a very long list of others. The key to a currency is that it captures one or more components of value and does so in a manner that is quantifiable. In a project-specific offset, the currency may be custom designed to suit the particular needs of the situation. Under a banking scheme, however, the currency will likely have to be somewhat more generic to suit the variety of sites and circumstances encompassed by the scheme.

Broad social and ecological values often do not translate easily into measurable currencies. Often proxies will be used, aspects of the ecosystem that are easy to measure and assumed to represent larger aspects of the ecosystem. The conversion of valued aspects to proxies, and then currencies, however, is unlikely to be perfect, and may well result in a distortion, such that the matters that we ultimately end up measuring and trading only approximate what we seek to protect.⁷⁵ This is another area where there is a need for constant caution and improvement.

There is an inherent tension in offset currency design between detail and practicality. A very detailed currency will best protect the range of ecosystem characteristics that may be put at risk by development. It will require extensive data on the characteristics of development site, and an equal or greater level of rigour in identifying opportunities for enhancing those characteristics at one or more candidate offset sites. This attention to detail will add to the time of the process and to the transactions costs. It may well discourage the offset from being undertaken on a voluntary basis, or may bog down a regulated process, perhaps fuelling political opposition to the process.

On the other hand, a very simple currency, such as area alone, may make for easy and quick measurement, but has the substantial risk that it will not take into account an adequate range of the valued ecosystem features that the offset is intended to serve. For this reason, area alone is often considered a very inadequate currency.⁷⁶

This tension between easy low-cost transactions and rigour on behalf of the environment is virtually universal in offset schemes, and must be resolved according to the particular circumstances in question.⁷⁷ Many resolve it by using an easily measured factor, such as area, and integrating it with some rating of quality. (An example of this is the “habitat hectare” used in the State of Victoria, Australia. In this example, “habitat hectares” is a derived measure that combines measures of area and condition. Area is a straightforward measure of hectares or parts thereof. Condition is measured by reference to a benchmark site. For more detail, see Appendix II.)

⁷⁵ *Ibid* at 622-624.

⁷⁶ Joseph W Bull et al, “Biodiversity Offsets in Theory and Practice”, (2013) Fauna and Flora International, Oryx 1 at 3; Business and Biodiversity Offset Programme, *Resource Paper: No Net Loss and Loss-Gain Calculations in Biodiversity Offsets* (Washington DC: BBOP, 2012) at 11, Salzman & Ruhl, *supra* note 70 at 657.

⁷⁷ Some have suggested that this tension is fundamentally irreconcilable, and for that reason regulatory offset regimes are bound to fail in their no net loss goals: Susan Walker, et al “Why Bartering Biodiversity Fails”, (2009) 2 Conservation Letters 149.

Like-for-Like?

This discussion of equivalency invites the question of whether offsets must necessarily seek to replicate ecological conditions of the impact site on a like-for-like basis. Certainly the standard notion of offset suggests that the offset outcomes should perpetuate the ecosystem values compromised at the impact site. This is the essence of no net loss. If this is adopted as a policy and management objective, it ought to be so after conscious deliberation and articulation of a rationale. This pursuit of like-for-like has the considerable advantage that it allows for the direct comparison of impact and offset site losses and gains, based upon discrete empirical evidence.

Most proponents of offsets recognize, however, that there may be some circumstances where offsets can be used to advance ecosystem values beyond those found at the impact site. This may be found, for example, in the goal of *net gain* articulated by BBOP in the passage quoted in this report's "Introduction". This is also often summarized as "like-for-like or better". If one is to pursue this path it is important to recognize that a notion of net gain or positive net impact inherently suggests a goal preferred to the status quo. This calls for the articulation of that goal and the values it embodies. It also calls for clear policy guidance on what standards and measures are to be employed in pursuit of the target state.⁷⁸

This is best done through the clear tools of public policy, such as land-use planning or species recovery plans.⁷⁹ The *Alberta Land Stewardship Act*, for example, provides for the drawing up of regional plans which are to contain a vision and objectives for a planning region.⁸⁰ Market-based instruments, including biodiversity offsets, are to be developed to enhance and implement the objectives of the plan.⁸¹ Hypothetically, one might imagine that such a regional plan might contain an objective of restoring some ecosystem feature or function that, having existed historically, has over time diminished on the landscape. Offsets then might be used to enhance that feature, notwithstanding that it may not have been a current feature of the impact site.

Thomas J. Habib and co-authors have recently published an analysis of the costs (including opportunity costs) of offsetting on a like-for-like basis versus in pursuit of strategic conservation objectives, in the context of Alberta's oil sands. They found the pursuit of strategic objectives to be significantly more cost-effective than like-for-like.⁸²

In the absence of such a clear articulation of strategic policy objectives, however, it is not advisable that private parties or regulators depart from the like-for-like model in pursuit of their own goals. To do so risks an *ad hoc* pursuit of disparate goals, achieving neither the perpetuation of existing values nor the systematic, consistent and effective pursuit of other objectives, however legitimate.⁸³

78 McKenny & Kiesecker, *supra* note 8 at 173-174.

79 It should be noted that the public policy process by which such plans are developed may well bring in considerations other than environmental ones.

80 *Supra* note 22, s 8(1).

81 *Ibid*, s 23.

82 Thomas J Habib et al, "Economic and Ecological Outcomes of Flexible Biodiversity Offset Systems" (2013) 27:6 Conservation Biology 1313.

83 In a different take on this issue of departing from like-for-like, in some cases offsets have been undertaken in a manner to protect the same valued ecosystem features found at the development site, but by managing different factors than are disturbed. For example, petroleum and natural gas development in Uzbekistan is intruding on the habitat of the rare and sensitive saiga antelope. Loss of habitat is a significant threat to the species, but its migratory nature (including transboundary migrations) and the lack of practical opportunities to secure other habitat have led the developer to consider supporting anti-poaching enforcement as an offset mechanism (poaching being another major threat). Joseph W Bull et al, "Conservation When Nothing Stands Still: Moving Targets and Biodiversity Offsets" *Frontiers in Ecology and the Environment* 2013. In this case the currency can be seen to be population numbers of the antelope, rather than area of habitat.

Additionality

In order to qualify as an offset, the outcomes produced at the offset site must be in addition to those that would have resulted had no offset action been taken. This additionality is generally produced in one of two ways,⁸⁴ both of which have their strengths and weaknesses.

The first is positive management actions. These are direct physical actions to alter the offset site with the intention of improving its ecological condition or function, again, over and above what would have been undertaken otherwise. Typical examples are the restoration of a wetland, the planting of trees in a denuded landscape, the reintroduction of an extirpated species, or the removal of artificial barriers to connectivity. The gains brought about by these actions can be compared to the losses incurred at the development site.

The challenge with positive management actions lies in the gap between objective and execution. Such actions combine human action – presumably expert and well intentioned – with natural factors that are inherently complex, dynamic and only partially understood. There can be significant uncertainty as to whether the actions will in fact achieve their objective.⁸⁵ This uncertainty grows, of course, with the complexity of the objective, with the limits of our understanding of natural systems, and the duration of time needed to achieve the objective condition. This places an onus on those who promote offsets to squarely face inadequacies in this area and to appropriately discount projections. Of course, actual outcomes ought to be closely monitored with a view to continuous improvement.⁸⁶

The second category of activities that might produce additionality is “averted losses.” This refers to the alleviation of an existing ecological threat or the provision of greater security to an existing ecosystem. This is usually done by the acquisition of an interest in land (either freehold or by a conservation easement⁸⁷ or similar instrument) to secure its ecological values.

The major advantage of averted losses as a means of offsetting development is their relative certainty. That certainty takes both physical and financial forms. Physically, because one is dealing with an existing site in an existing state, it is much more feasible to carry out the necessary studies and, within the limits of the applied methodologies, arrive at an understanding of current ecosystem values. Further, the ecosystem is currently functioning, in contrast to the time lag that occurs before positive management actions may be ecologically productive. Financially, the acquisition of an interest in land, whether freehold or more limited, takes place within the larger open real estate market, making costs relatively predictable. This is an important consideration for commercial actors, whether industrial developers or habitat bankers.

These considerations do not mean that averted losses are free from uncertainty. Stochastic events, ignorance, incompetence, and lack of resources can all intervene to undermine the proper management of a site, before or after acquisition, so as to diminish its ecological value below that anticipated.

The major challenge with using averted losses to contribute to no net loss or other goal is that, while they enhance the security of existing habitat, they do not in themselves add anything to the ecological value of the offset site. This, of course, is in contrast to the development site where ecological losses are real and current.

84 BBOP, *supra* note 72 at 4-5.

85 For a brief review of the conceptual inadequacies of restoration science see Robert H Hildebrand, Adam C Watts & April M Randle, “The Myths of Restoration Ecology” (2005) 10:1 Ecology and Society 19; For a consideration of the range of uncertainties in restoration and their implications for offset policies see Martine Maron, et al, “Faustian Bargains? Restoration Realities in the Context of Biodiversity Offset Policies” (2012) 155 Biological Diversity 141.

86 A regulatory offset system should include a data bank of the actual outcomes of offset activities. This would allow both opportunities to learn from experience, and foster continuous improvement, and an objective measure of the progress of the offset system as a whole in serving its no net loss or other goal.

87 A conservation easement is an interest in land, created by statute in most jurisdictions in North America, by which a landowner covenants to restrict the uses to which a piece of land may be put, or undertakes to carry out certain activities, in order to protect or enhance certain ecological values. It is a voluntary arrangement entered into between the landowner and another party, often a charitable land trust or conservancy. Once finalized and filed on title it runs with the land, so as to bind all subsequent owners of the land.

To assess the value of an averted loss, it must be compared against a baseline of what would have happened if the offset action had not been taken (as is implicitly the case with positive management actions, as well). In some cases the averted threat may be imminent and obvious, but often that is not so. In most instances, the extent of threat must be arrived at with some degree of speculation and uncertainty. It is perilous to rely solely upon the stated intentions or expectations of the individual landowner, for in this commercial arrangement, they have an incentive to exaggerate the threat. It is preferable to rely upon broader trends with respect to the region and type and landscape to define the baseline, though that may imperfectly reflect the situation of the particular piece of land.

Finally with respect to additionality, it is important to note that a third class of activities are generally not considered valid sources of additional ecological value. This refers to that range of activities encompassing education programs, capacity building, research unconnected to a specific restoration or protection goal, or research where the chances of successful implementation of results are merely speculative. While commendable in themselves, these activities do not directly produce the measurable ecological outcomes that are the essence of an offset. To consider them as additional would not only stretch the offset concept unreasonably, but would court cynicism. A 2004 study noted, after carrying out many interviews with companies, officials, and stakeholders respecting offsets: "Several [interviewees] referred to the 'cynicism' stakeholders and observers would feel if companies presented training and scientific research in lieu of damaged ecosystems."⁸⁸

Timing and Duration

The development of natural ecosystems does not occur on the same time scale as human developments. An ecosystem which took centuries to develop may be destroyed in a matter of hours. The restoration of another site as an offset may be initiated on a human time scale, but will develop to fruition on nature's time scale. There is almost always a significant time lag between the negative impacts of development and the positive impacts of offsetting, posing a challenge, at least temporarily, to the no net loss goal.

This time lag has several implications. The longer the intended outcomes of the offsets take to be realized, the more opportunities for events to intervene to frustrate them. Time magnifies uncertainty.

A special concern in this regard is the permanent loss of ecosystem components due to a loss of temporal continuity. A species that is dependent on a mature habitat, for example, may vacate an area upon the development of its natural habitat, and may not be available to return by the time its new restored habitat is sufficiently mature to support the species. If that species plays a critical role in that mature ecosystem, its loss may even permanently impair the full restoration effort. The time lag in such a case would result in a permanent loss to both the species and the functioning of the habitat.

It should be noted that one of the distinct advantages of a banking system is that it can address this time lag. A banking system may require that offset measures reach a certain stage of maturity before credits can be released for sale. This means that the offset work (though probably not the targeted outcome at maturity) actually precedes the development to which it will be applied. (Note, however, that this virtue is in tension with the need to release some of the credits early in order to finance the bank and attract investment to it.)

⁸⁸ ten Kate et al, *supra* note 9. The policy guidance for the U.S. in-lieu-fee program for compensation to damage to wetlands specifies that expenditures on educational programs are not a valid use of compensation funds, presumably on this same basis: 73 Fed Reg 19657.

A related issue is the longevity required of the offset project. The no net loss goal dictates that the offset should be designed and protected to last at least as long as the disturbance from the development project.⁸⁹ Given that many developments are effectively permanent, or have no defined timeline for reclamation, there is a general preference for offset gains to be secured in perpetuity.⁹⁰ In the U.S. wetlands banking system, a prospective bank must demonstrate that protection in perpetuity is in place before being allowed to release any credits for sale.⁹¹

This raises important questions of how to provide for long-term governance, financing, and land tenure, all of which should be actively addressed at the time the offset is planned. Often this is best accomplished by involving a permanent land trust in the long-term ownership and management of the offset, if it is located on private land.

Uncertainty and Risk Management

It should be apparent from the above discussion that there are many sources of risk and uncertainty in the design and implementation of biodiversity offsets. This has been recognized by the Business and Biodiversity Offsets Programme (BBOP):

Due to the complexity of biodiversity, along with relatively limited scientific understanding, and relatively low priority for investment when set against other societal values, the practice of biodiversity conservation is associated with significant levels of uncertainty and risk. Biodiversity offsetting is no exception. In practical terms it is impossible to 'prove' that a no net loss (or net gain) of biodiversity has been achieved through offset activities and many existing projects are likely to fall significantly short of achieving this goal. Many offsets involve certain biodiversity losses in exchange for uncertain, spatially and temporally disjunct gains. Moreover, and irrespective of the quality of baseline information that is available, losses and gains will always, at some level, be biologically dissimilar.⁹²

The management of risk should therefore be a major component of any offset scheme. Several suggestions have been made in that regard, none of which are mutually exclusive.

The first such measure is to be circumspect in the application of the offset approach. As mentioned above, it is not appropriate in all circumstances, particularly where the primary development would result in the destruction of non-replaceable aspects of the ecosystem. This is also an important reason why offsets should not be seen as an adequate substitute for other important conservation programs such as protected areas networks and management measures to improve the survival of species at risk.

Secondly, the risk can be spread through the use of a mixture of different techniques in the design of the offset. This recommendation suggests that a variety of restoration approaches and technologies should be used, and positive management actions and averted losses approaches mixed, in order to cover the weaknesses inherent in each. The effect of a failure in one technique may be cushioned by the success of another.⁹³

89 See Principle 8 of the BBOP Principles in Appendix II.

90 *Ibid.*

91 33 CFR s 332.3(h)(1)(v), 332.8(a)(2).

92 BBOP, *supra* note 72 at 17, references omitted.

93 Atte Moilanen et al, "How Much Compensation is Enough? A Framework for Incorporating Uncertainty and Time Discounting When Calculating Offset Ratios for Impacted Habitat" (2009) 17:4 Restoration Ecology 470.

Use of a Multiplier

The most commonly used means of managing uncertainty is the application of a multiplier, whereby the size of the offset, measured by whatever currency has been decided upon, is increased by some multiple in order to compensate for the risk of failure or inadequacy. The strengths and weaknesses of the use of multipliers to mitigate risk are summarized by BBOP:

The advantage of multipliers is that they tend to be easy to understand, implement, and audit. Yet in practice, they are difficult to calculate accurately and thus do not meet with broad agreement. Where uncertainty is high, multipliers may need to be very large (e. g., an order of magnitude increase in basic offset size) if they are to provide adequate protection against failure to deliver no-net loss. Moreover, **multipliers are not a silver-bullet solution and are inappropriate for dealing with many types of risk.** Thus, area-based multipliers cannot account for the risk that an offset activity may fail (as opposed to falling short of achieving complete success). If a restoration project uses untested techniques and fails to secure any measurable biodiversity benefits, increasing the size of the offset will contribute little towards improving the chance of success. Despite these concerns multipliers have been inappropriately used in this context by some existing offset programs (e.g., in methods used as part of the United States wetlands mitigation banking).⁹⁴

While some discounts are calculated with specific reference to specific risks, in most cases they tend to be a generic means of compensating for the many possible inadequacies of planned offsets.⁹⁵ The fact that there is usually a healthy element of subjective judgment infused into picking a multiplier, and that this can have a significant impact on the cost of the project, means that this is often one of the more contentious issues in offset design or regulation.

It has also been suggested that the performance of offsets be the subject of a new form of insurance, though this raises many questions (for instance, the question of what would be expected of an insurer in the case of an offset failure.⁹⁶)

When risk and uncertainty are low, use of a multiplier may still be considered in the context of ensuring the offset achieves a net positive impact.

94 BBOP, *supra* note 72 at 20 [emphasis in original].

95 *Ibid* at 19-20.

96 Maron et al, *supra* note 81 at 146.

Offset Availability

The issues and challenges discussed above are all conceptual, but are very important in the design and implementation of an offset scheme, whether at the level of individual projects or at the program level. Often, however, the application of those concepts can run into a real practical challenge with the availability of sites on which appropriate offsets can be implemented.

The range of appropriate sites will be limited to those landscapes permissible by the application of rules derived from the concepts of equivalency and currency. This is largely a restriction founded on the natural characteristics of the landscape itself, though viewed through an offset lens. Equally serious are restrictions founded on social, economic and political considerations.

Implementing an offset on private land requires a willing and co-operative landowner. The offset proponent must compete for the use of the land with other uses desired by others, presumably with each willing to pay a price to advance their objective. While this competition for land increases the price of the offset, the option of the offset may increase the value of the land by adding a new source of demand. Importantly, it increases the value of managing the land for its natural values, in contrast to more conventional notions of value based upon development and exploitation of resources.⁹⁷

In some jurisdictions or landscape types, however, candidate sites may not be available for acquisition. In Alberta, for example, about sixty percent of the land is public land, and that portion is mainly concentrated in regions of high resource development interest and active environmental controversy.⁹⁸ There is no legal mechanism on public land, however, by which a private party can implement the secure conservation measures necessary for a biodiversity offset. In the absence of such a mechanism these lands cannot be considered for offsets, unless the public land management agency can be induced into providing co-operation and security, which may not be part of its mandate or priorities.⁹⁹

97 The offer of an appropriate competitive price should make private land available for offsets, with a higher price for those sites in landscape types in short supply or subject to development pressures.

98 In Alberta private land tends to be found primarily in the grassland and parkland regions, with the boreal forest (including the oilsands region) and Rocky Mountain eastern slopes more predominantly public.

99 The option of an offset proponent buying up development rights (mineral leases, timber quotas, etc.) on public land, and then leaving them undeveloped as a protective measure is precluded by the fact that in Canada almost all such instruments are subject to a "use it or lose it" provision, requiring forfeiture if the resource is not exploited.

Community and Stakeholder Involvement

Biodiversity offsets rely upon technical expertise to inventory ecosystem components, to design effective positive environmental management efforts, and to calculate net losses and gains. They may benefit greatly, however, from involving local communities, First Nations, and environmental and recreational stakeholders. From these people can be gathered important local and traditional ecological knowledge, and insights into which aspects of the ecosystem are valued by those who interact with it most often (and may be seen to be a part of it). Close involvement with these groups will also contribute to the offset project's rigour, depth and transparency. This may be critical to the offset's perceived legitimacy, or to the legitimacy of offsetting overall.

Such collaboration may not be without its challenges for the communities, nations, and groups involved. They may be asked to precisely articulate values and goals that were previously vague. They may have to face hard limits, perhaps driven by cost considerations, to what can be practically done, and may be asked to contribute to decisions where some goals are compromised that others may be advanced. These real world trade-offs may be uncomfortable for some groups.

If one of the purposes of undertaking an offset is to build social license, either for a development project or a regulatory regime, then that license will be won or lost from those communities, nations, and stakeholders most affected by the development and the offset. Their involvement affords them a prime opportunity to obtain the facts, consider the views, and build the relationships necessary to formulate their positions with the best inputs possible.

One study, authored by Salzman and Ruhl, has advocated that a regulatory offset regime should be overseen by a group of citizens, perhaps representative of stakeholder groups, who have no direct interest in the developments, but who can assess the rigour and effectiveness of the offset system in meeting no net loss or other policy goals.¹⁰⁰ The authors suggest that this oversight would be a counterweight to the shared interest of developers and system administrators in having the system work cheaply and smoothly, perhaps at the peril of ecological rigour and caution.¹⁰¹

100 Salzman & Ruhl, *supra* note 70 at 687-693.

101 *Ibid* at 673-680.

VI. The Role of Government



Given the critical role of government policy in both the supply and demand of offset credits, the role of government is discussed in more depth in this section. Both project-based and banking approaches to offsets can involve a role for government. Regulatory requirements for offsetting are an obvious role for government, but there is scope for government to be involved in or lead offset framework development, implementation and/or oversight. Government can also play an important role by providing clear policy and consistent direction. Indication that the policy influencing offsets is unstable or likely to change as result of political changes may well undermine the foundations of the offset regime – particularly in the case of a banking system.

The Scope for Government Involvement and/or Oversight

Specific government policy support is not strictly necessary for developers to offset the impacts of proposed projects on biodiversity. As examples of voluntary offsets set out earlier, developers may choose to take the initiative. Even in those cases, however, both the primary development and the activity to produce the offset are almost always required to undergo some sort of official approval process, often as part of the environmental impact assessment. The strictness of that process may encourage or frustrate either the development or the offset. One factor in this regard will be whether that process considers the two activities in conjunction (thereby recognizing their offsetting character) or, alternatively, in isolation from one another, an approach which is implicitly blind to the value of offsetting.

If biodiversity offsets are to become a more routine part of the development process, and a consistent and effective tool of conservation, then much more active government legal and policy development is required. There is no single template for such laws and policies, but some lessons may be drawn from experience of several jurisdictions, and from the nature of the offset notion itself.¹⁰²

Public policy may support biodiversity offsets, even if it does not require them. It may articulate general support for the concept of offsetting, and facilitate the collection and distribution of the information necessary to make sound offset decisions.¹⁰³ This might include both the technical information on biophysical characteristics of the landscape of the jurisdiction, but might also extend to educating the public as to the nature of offsetting and how it is being performed.

If offsets are to be made a regular part of the development process, government has an important role to play in articulating principles and standards. As a template for such principles, reference might be made to the Principles of the Business and Biodiversity Offset Programme, which are reproduced in Appendix I, and to which several (non-Canadian) government agencies and private developers have contributed and expressed support.

More specifically, government might usefully define standards for habitat classification, for the measure of gains and losses, and standards of performance for the positive management actions or protective measures that are considered legitimately additional.¹⁰⁴ Even in the absence of strict regulation, compliance with these standards can be encouraged through the provision of incentives ranging from smoother regulatory reviews to tax incentives to technical supports.¹⁰⁵ This can be an important tool for encouraging compliance in the implementation of land-use plans, another important tool for offsets that government can supply.

102 Michael Crowe & Kerry ten Kate, "Biodiversity Offsets: Policy Options for Government" (2010) online: Forest Trends <http://www.forest-trends.org/publication_details.php?publicationID=3079>.

103 *Ibid* at 18

104 *Ibid* at 19.

105 *Ibid*.

Such principles and standards should be complementary to expectations of the environmental assessment process and regulatory decision-making. Indeed, those processes may drive the development of offset expectations, as we have seen in the series of offset requirements pronounced by regulators in section III above. Regardless of the driver, offset expectations and the environmental review and decision-making process respecting development should be mutually reinforcing if they are not to run afoul of each other.

Public policy may require offsets as a matter of routine. If it does so, then it is preferable if it facilitates the supply of available offsets. While it is certainly an option that offsets may simply be required of developers, who are then left to their own devices to find and design offset options, this has tremendous transaction costs for the developer and places the credibility of the offset program in the hands of those who may have no expertise or interest in environmental security or enhancement.¹⁰⁶

Likely the best way to overcome that weakness is to authorize the development of offsets by third parties, or government itself. This can be done in a variety of ways ranging from the establishment of an in-lieu fee system, a banking system, or by the government itself undertaking to provide offsets. This can include such measures as validating and registering offset credits, brokering of transactions between offset buyers and sellers, and the creation of an actual locus for the market.¹⁰⁷ Monitoring and enforcement will likely best be handled by the government in any such system.

Finally, there may be other aspects of law and policy that might productively be reviewed to see if they help or hinder the goals of a biodiversity policy using offsets. For example, tools might be developed which would allow a private party to secure offsets on public land, assuming it was of the appropriate landscape type.¹⁰⁸ Likewise, if a jurisdiction does not provide an instrument such as a conservation easement for securing the environment on private land, it may wish to consider that.

¹⁰⁶ *Ibid* at 24.

¹⁰⁷ *Ibid* at 25-29.

¹⁰⁸

VII. Case Study Findings



Case study examination of two of the most well-known and longest-running biodiversity offset programs allows practical consideration of how the design issues and role of government can work in the real world.

Appendix II provides two case studies-- that of wetland compensation in the United States and native vegetation in Australia. The appendix provides full details of these two case studies.

Lessons learned from these two approaches are outlined here. In the case of offsetting for native vegetation in Victoria, Australia, a key finding is the importance of having consistency and transparency in the traded currency. The use of the habitat hectare metric has allowed for clear quantification and assessment of offsets needs and opportunities. This is one factor that has allowed a large number of actors, both developers and landowners, to participate in the native vegetation credit market without the heavy up-front qualification that operates in the U.S. wetland compensation system.

The U.S. wetland system, however, points to the thriving commercial market in ecological goods and services that can develop when clear and consistent policy supports commercial third-party offset providers. The experience prior to the 2008 wetland guidelines shows the problems that can be encountered if different sources of offset credits compete without a level playing field, or without sufficient supervisions and follow-up. With no net loss as a goal, it is important that all sources of biodiversity losses and gains be considered within a common framework and measured on comparable terms.

In both experiences, there has been an evolution of offset mechanisms and requirements. In part, this has resulted from the inevitable tension in the notion of offsetting for biodiversity between the interest in effective conservation (requiring extensive data and tight equivalency rules) and the interest in the practical facilitation of exchange (requiring low information and transaction costs). Any system can be expected to wrestle with this dilemma, and to make adjustments in its approach over time.



VIII: Concluding Comments



Given the size and complexity of the challenge of preserving biodiversity and protecting habitat, policy-makers will need to draw on input from many disciplines and will need to consider all tools and mechanisms available. Though not all policies will be applicable in all circumstances, it is very likely that a suite of complementary conservation policies will be needed in most jurisdictions.

Regardless of the policy approaches chosen, the mitigation hierarchy should be respected. Only when avoidance and minimization of impact have been undertaken to their full extent should compensatory approaches be considered. Although compensatory approaches are the last resort in the mitigation hierarchy, there are likely to be cases in which they are necessary. When that is the case, biodiversity offsets offer significant potential to address negative impacts on biodiversity.

Even where biodiversity offsets are the most appropriate approach, there is no single template for an offset system that will work best in all circumstances. A wide variety of approaches to biodiversity offsets have been tried in different circumstances, and all have shown strengths and weaknesses. By looking at past and current experience, however, there has developed recognition of a set of issues that almost always arise when offsets are contemplated. Principles have been derived, drawing on both ideals and practical realities, and those principles are being tested daily as developers, regulators, governments, stakeholder and communities worldwide continue their own experiments with offsets. Following principles like no net loss – and even a net positive impact – can help strengthen the outcome from biodiversity offset use.

Canadian governments, regulators and developers should consider the experience of others in deciding whether or how to use biodiversity offsets in our ecological, economic, social and legal environment. Looking at the examples in Appendix II, the Australian experience, for example, demonstrates the value in consistent and transparent currency. The use of the habitat hectare metric has allowed for clear quantification and assessment of offsets needs and opportunities. This has helped allow a large number of actors, both developers and landowners, to participate in offset market. The U.S. wetland system, however, points to the thriving commercial market in ecological goods and services that can develop when clear and consistent policy supports commercial third-party offset providers.

Just as there are lessons to be learned from the experience of others, there are opportunities for continual learning and improvement. Biodiversity offsets are scalable for pilot projects in particular landscapes or for particular suites of development projects. Such projects could be pursued, experimenting with a variety of approaches. Results should be carefully monitored and shared. Voluntary offset projects can help set the stage for regulated use of offsets. Similarly, project-based offsets will offer insight for broader regimes.

As Canadian jurisdictions move toward developing and implementing their own particular offset systems, it would be advantageous to all parties if they did so in a co-ordinated fashion, based on a common set of principles. Local adaptation of principles will no doubt be necessary, but a maze of unrelated or conflicting offset prescriptions would not likely serve economic or environmental interests.

It is hoped that this report will make a contribution to the conversation necessary for Canada's many constituents to progress in their thinking, and to move toward improved action to protect biodiversity.

In that, however, lies a substantial challenge. If Canada succeeds in getting it right, there is the possibility to make a difference for biodiversity.

Appendices



Appendix I: Principles on Biodiversity Offsets of the Business and Biodiversity Offset Program¹⁰⁹

Biodiversity offsets are measurable conservation outcomes resulting from 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.

These principles establish a framework for designing and implementing biodiversity offsets and verifying their success. Biodiversity offsets should be designed to comply with all relevant national and international law, and planned and implemented in accordance with the Convention on Biological Diversity and its ecosystem approach, as articulated in National Biodiversity Strategies and Action Plans.

- 1. Adherence to the mitigation hierarchy:** A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimization and on-site rehabilitation measures have been taken according to the mitigation hierarchy.
- 2. Limits to what can be offset:** There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.
- 3. Landscape context:** A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.
- 4. No net loss:** A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.
- 5. Additional conservation outcomes:** A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.
- 6. Stakeholder participation:** In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, and implementation and monitoring.
- 7. Equity:** A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognized rights of indigenous peoples and local communities.
- 8. Long-term outcomes:** The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity.
- 9. Transparency:** The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.
- 10. Science and traditional knowledge:** The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

* While biodiversity offsets are defined here in terms of specific development projects (such as a road or a mine), they could also be used to compensate for the broader effects of programs and plans.

¹⁰⁹ Reprinted with permission from Business and Biodiversity Offset Programme, *supra* note 6.

Appendix II: International Case Studies

Case Study 1 – Offsetting for Native Vegetation in Victoria, Australia

Australia has for several years been a vocal champion for the development of market-based instruments for conservation.¹¹⁰ Both the federal government (the Commonwealth, in Australian terms) and several state governments have pioneered a variety of tools, including several different types of offset systems.

Background

A particular concern of Australia with respect to biodiversity is the conservation of the country's remaining native vegetation. According to a national policy document on the subject, only about twenty-five percent of the country's original native vegetation remains intact, with the majority of the loss being in the heavily populated states in the southeast and southwest corners of the continent.¹¹¹

The State of Victoria, located in the southwestern corner of Australia and anchored by the metropolis of Melbourne, has estimated that sixty-six percent of its native vegetation has been cleared.¹¹² Of the five most impacted bioregions in Australia, four are in Victoria.¹¹³ Victoria has been a leader in exploring biodiversity offsets for native vegetation since 2002. Its offset system has undergone an evolution during that period, and is currently in the midst of being revamped in a substantial way. The changes in the Victoria system are an interesting illustration of the interaction of rules of equivalence and currency, the need for sufficient data, and the necessary viability of a system from a practical perspective of cost for all parties.

In 2002 the Victoria government announced a goal of reversing this trend and achieving a “net gain” in “the extent and quality of native vegetation.”¹¹⁴ It pursued this goal through a variety of offset mechanisms and other market-based approaches. The 2002 Native Vegetation Management Framework¹¹⁵ (NMF) recognized that the net gain goal would not be achieved through a single mechanism or without the co-operation of many actors. In addition to regulation, it sought to put in place incentives to stimulate private action.¹¹⁶ This corresponded to the policy's focus on private land management.

110 See, for example, Stuart Whitten, Marc Carter & Gary Stoneham, *Market-Based Tools for Environmental Management: Proceedings of the 6th Annual AARES National Symposium 2003* (Barton, ACT: Rural Industries Research and Development Corporation, 2004) online: Natural Resource Management Australia <<http://nrmonline.nrm.gov.au/catalog/mql:212>>; B Coffey & S Pearson, *Facts about Stewardship, Ecosystem Services and Market-Based Instruments* (Canberra: Land & Water Australia, 2007) online: Land & Water Australia <<http://lwa.gov.au/files/products/innovation/ef071336/ef071336.pdf>>.

111 COAG Standing Council on Environment and Water, *Australia's Native Vegetation Framework* (Canberra, ACT: Australian Government, Department of Sustainability, Environment, Water, Population and Communities, 2012) at 4-5.

112 State of Victoria, Department of Natural Resources and Environment, *Victoria's Native Vegetation Management: A Framework for Action* (n.p.: State of Victoria, Department of Natural Resources and Environment, 2002) at 7.

113 *Ibid.*

114 *Ibid.* at 14.

115 *Ibid.*

116 *Ibid.* at 36.

The Approach

The NVF articulated several important policy principles, including:

- reiterating the mitigation hierarchy of “avoid-minimize-offset,” emphasizing that offsets are to be used only after the two prior measures have been fully considered.¹¹⁷
- introducing an accounting system for losses and gains based upon the currency of “habitat hectares,” which combines area and quality assessment (discussed further below).¹¹⁸
- recognizing that not all native vegetation is of equal value to and protection and biodiversity goals, and set out criteria for determining significance.¹¹⁹ This determination was then used to prioritize conservation actions.¹²⁰
- setting out a system for assessing the contribution of offsets to the net gain goal.¹²¹

The NVF, then, carefully articulated the principles and standards by which offsets were to be used.

The legal architecture of Victoria’s native vegetation offset system is based on the *State’s Planning and Environment Act 1987*¹²² (“PEA”). According to its purpose statement, the PEA is a high-level “framework for planning the use, development and protection of land in Victoria in the present and long-term interests of Victorians.”¹²³ The PEA empowers the responsible Minister to promulgate “Victoria Planning Provisions” (VPPs) to which all local planning authorities “must have regard.”¹²⁴ The VPPs have a section specifically devoted to the protection of native vegetation in the development planning process.¹²⁵ It is this, VPP Clause 52-17, which, from 2002 to 2013, directed planning authorities to consider the NVF,¹²⁶ giving it quasi-legal weight.

One of the key aspects of the Victoria system under the NVF is the treatment of the issues of equivalence and currency. Equivalence was to be determined by reference to “Ecological Vegetation Classes (EVCs). In Victoria 27 bioregions and about 300 “ecological variation classes” (EVCs) have been identified.¹²⁷ In each EVC a benchmark site has been identified, intended to “represent” the average characteristics of a mature and apparently long-undisturbed stand of the same type of vegetation.”¹²⁸ The EVC classification set a limit on the trading area of offsets, and the benchmark set a standard against which quality of native vegetation could be measured. The details in how this is calculated shed some light on the process:¹²⁹

117 *Ibid* at 23.

118 *Ibid* at 17-18.

119 *Ibid* at 22, 49-53.

120 *Ibid* at 23, 54-55.

121 *Ibid* at 23, 54-55.

122 (Vic)

123 *Ibid*, s 1

124 *Ibid*, s 4A.

125 *Victoria Planning Provisions* (Vic) cl 52-17.

126 *Ibid*. See also VPP cl 12.01-2.

127 A list and map of the bioregions may be found online: (Victoria Department of Primary Industries) <http://vro.dpi.vic.gov.au/dpi/vro/map_documents.nsf/pages/bioregional_strategic_overviews>.

128 NVF, *supra* note 144 at 17; see also David Parkes, Graeme Newell and David Cheal, “Assessing the Quality of Native Vegetation: The ‘Habitat Hectares’ Approach” (2003) 4 (Supp) *Ecological Management & Restoration* S29 at S30-S31.

129 *Ibid* at S31-S36; NVF, *supra* note 144 at 17.

The Notion of Currency, as Applied in Victoria

Potential offsets are compared in the currency of “habitat hectares” which combines measures of area and condition. Area is a straight-forward measure of hectares or parts thereof. Condition is measured by reference to the benchmark for the EVC. A development site is compared against the benchmark site according to seven criteria for site condition (retention of old trees, retention of tree canopy cover, retention of cover, and diversity of, understorey life forms, presence of recruitment, absence of weeds, litter, and logs) and two criteria for landscape context (size of remnant patch and links to, and amount of, neighbouring patches). Based on a weighted calculation of these factors, the benchmark is given a “habitat score” of 1 (essentially full intact) and the development site a habitat score reflective of the degree of its similarity or difference from the benchmark site with respect to these criteria. Multiplying the habitat score by the area gives a development site a metric in units of habitat hectares. For example, a site of 10 hectares with a habitat score of 0.4 would measure 4 habitat hectares. Note that this measure accepts that area and condition are interchangeable, such that a 4 hectare site with a habitat score of 1 (equivalent to the benchmark) is deemed to be interchangeable with the 10 hectare site with the habitat score of 0.4.

Under the NVF, the measure of loss in habitat hectares at the development site was the starting point for the calculation of the measures needed to offset the impact of the development. The offset was required to be a conservation outcome that was a prescribed multiple of the loss at the development site, the gain of which was also to be measured in habitat hectares. The applicable multiplier was determined by the conservation significance of the development site.¹³⁰

As suggested by this, the Victoria system of the NVF recognized that not all vegetation sites within an EVC make the same contribution to ecological and landscape functions, even if they carry the same habitat hectare score. Each site was rated on a low-medium-high-very high scale for both “land protection hazard” and “conservation significance.” “Land protection hazard” referred to the contribution of the vegetation patch to controlling erosion, salinity and soil structure, among other things.¹³¹ “Conservation significance” referred to the presence of threatened species or the presence of important habitat types, such as wetlands.¹³² Clearing in areas of high conservation significance was, under the NVF, not permitted except under exceptional circumstances (reflecting the principle of non-offsetability).¹³³

These measures were important because, in addition to determining the applicable multipliers, they dictated when an offset may depart from the like-for-like standard. If an offset was exchanging vegetation patches of equivalent conservation significance, then the exchange may be carried out on the basis of a habitat hectare measurement alone. If, however, an exchange was proposed whereby the offset site was of a different conservation significance than the development site, then the former must be higher.¹³⁴ The relationship of the conservation significance of the two sites also determined the multiplier ratio to be applied.¹³⁵

The Victorian NVF system recognized four types of additionality, being permissible forms of gain to apply to the offset calculation. These are prior management gain (grandfathered credit for positive management actions taken prior to the current regime), security gain (averted losses by on-title management agreement or transfer of a site to a public conservation reserve), maintenance gain (the legal surrender of certain rights of use in order to maintain existing vegetation, another form of averted loss), and improvement gain (improvement of management actions secured by an on-title management agreement).¹³⁶

130 *Ibid* at 54.

131 *Ibid* at 49.

132 *Ibid* at 53.

133 *Ibid*.

134 *Ibid* at 54.

135 *Ibid*.

136 State of Victoria, Department of Sustainability and Environment, *Native Vegetation: Vegetation Gain Approach* (East Melbourne: State of Victoria, Department of Sustainability and Environment, 2006) at 7.

Challenges Along the Way

During the period since 2002 when the NVF was in force the mechanism for supplying offsets evolved. For the first five years developers were largely left to find their own offset opportunities, and were frustrated in this pursuit.¹³⁷ In response, a credit trading system was established in 2007 under the name of BushBroker, whereby any landowner or manager could undertake to produce a native vegetation gain, have it rated for conservation significance and quantified in habitat hectares, and then sell the resulting credits to a developer seeking offsets within the same EVC. The price of credits was left to market forces.¹³⁸ In this process the state government played the role of listing buyers and sellers, and credits supplied to and demanded by the market. Over time, private brokers have grown up as well.¹³⁹

As of mid-September 2013 BushBroker had completed 307 trades, plus 208 “over-the-counter” trades.¹⁴⁰ Over one hundred land securement agreements were in force and Aus\$29 million was held in trust for payment to landowners as agreed management obligations were fulfilled.¹⁴¹ In 2011 a program official presented information that trades to that point had involved 3,420 hectares of land.¹⁴²

In 2012 the Victoria government briefly experimented with a more sophisticated credit trading system, the Victoria Native Vegetation Exchange,¹⁴³ before deciding to review and revamp its system in a much more profound way. After public consultations, a series of reforms were announced in May, 2013.¹⁴⁴ Several policy and guidance documents have since been released.¹⁴⁵ Many aspects of the new system are just coming into force, and the remainder are expected to do so throughout 2014.

137 Michael Crowe, “BBOP Webinar: Biodiversity Offsets and the Credit Market, Victoria, Australia” (PowerPoint webinar) at slide 33, online: Vimeo <<http://vimeo.com/55961648>>.

138 *Ibid.*

139 *Ibid.*

140 State of Victoria, Department of Environment and Primary Industries, e-mail to author, September 12, 2013. “Over-the-counter” trades or fees are a bulk trading arrangement in Native Vegetation Credits between a landowner and the State. These credits are then available at a set price to proponents of certain select (mainly minor or low-risk) development project: *Ibid.*

141 *Ibid.*

142 Anne Buchan, “Native Vegetation Offsetting in Victoria” (PowerPoint presentation) at time 8:00, online YouTube <http://www.youtube.com/watch?v=gLC2qLNs4RI&list=FLiIX-PjGrNZ2Tt6YqZFoF_w>.

143 The “NVX” was an electronic platform designed to enable trades between multiple parties. It was particularly concerned with overcoming the “lumpy asset problem,” which had been identified, whereby sellers have an interest in selling a large block of credits (reflecting the economy of scale of managing a large block of land in a consistent manner), which often will not correspond to a buyer’s interest in procuring a needed specific package of offset credits (reflective of variations in EVC classification and conservation significance): Veronica Nemes, Charles R Plott, & Gary Stoneham, “Electronic BushBroker Exchange: Designing a Combinatorial Double Auction for Native Vegetation Offsets” (2008), online: Social Science Research Network <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1212202>.,

144 State of Victoria, Department of Environment and Primary Industries, *Reforms to Victoria’s Native Vegetation Permitted Clearing Regulations: Overview* (Melbourne: Victoria, DEPI, 2013), online: DEPI <http://www.depi.vic.gov.au/_data/assets/pdf_file/0007/180637/Overview_NVR.pdf>.

145 For a growing library of such documents see online: DEPI <<http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/native-vegetation/native-vegetation-permitted-clearing-regulations/reforms-to-victorias-native-vegetation-permitted-clearing-regulations>>.

Renewal and Moving Forward

The reforms are based on an apparent view that not all native vegetation is inherently valuable to the preservation of biodiversity, and that the focus of protection ought to be sites deemed to be valuable. The new risk-based hierarchy of protection is reflected in the proposed amendment to VPP Clause 12.01, dealing with biodiversity. Whereas the prior provision had a “protection and conservation” objective targeting “native vegetation retention and the provision of habitat for native plants and animals”, the new amendment targets “important habitat for Victoria’s flora and fauna and other *strategically valuable* biodiversity sites.”¹⁴⁶ Similarly, the strategies listed for the pursuit of that goal make several references to the protection and management of sites of “high value biodiversity.”¹⁴⁷

The amendments to VPP Clause 52.17 remove all references to the NVF of 2002, replacing them references to the new *Permitted clearing of native vegetation – Biodiversity assessment guidelines*¹⁴⁸ (“*Biodiversity Assessment Guidelines 2013*”). The *Biodiversity Assessment Guidelines 2013* are intended to wholly replace the NVF.¹⁴⁹

The new guidelines give structure to the ranking process for native vegetation sites, defining three “risk-based pathways:” low, medium and high. Determination for a site is carried out by consideration of two factors: “extent risk” (area and total number of scattered trees) and “location risk.”¹⁵⁰ Location risk is predetermined by the State according to its own data and modelling, and is available as part of an online “Biodiversity Interactive Map.”¹⁵¹ A review of this map indicates that the vast majority of the landscape is deemed to be low risk.

The risk-based pathway applied to a development project will determine the application of the mitigation hierarchy, the calculation of offset obligations, and the scope and nature of permissible offsets.¹⁵² In each case the requirements for projects on low-risk sites are significantly reduced, while more stringent measures, largely focused on identified rare or threatened species, are imposed on higher risk sites. For low-risk projects (again, the vast majority) the requirement to demonstrate avoidance and minimization will be done away with, and offsets may be located anywhere in the same catchment area or municipal district, rather than in the more narrowly-defined EVC. At the other end of the risk scale, projects affecting the habitat of rare or threatened species are required to provide substitute habitat (subject to a multiplier) for every such species identified.

The new system relies heavily on the State’s own data and modelling to determine, without individual project-based inspections and assessments, the nature, condition and significance of vegetation throughout the State on a regional and site-by-site basis. Further, in contrast to the existing system’s reliance on EVC’s to delimit the pool of available offsets, the new system prescribes that offsets must only be located in the same Catchment Management Area or municipal district as the vegetation removed by the development.¹⁵³

In summary, the general direction of the new reforms is to ease restrictions and reduce information and transactions costs for the majority of offset transactions which are deemed to be low risk. More rigorous and specific offset obligations, mainly focussed on particular species, are being introduced for higher risk projects.

146 State of Victoria, Department of Environment and Primary Industries, *Reforms to Victoria’s Native Vegetation Permitted Clearing Regulations: Amendments to the Victoria Planning Provisions* (Melbourne: Victoria, DEPI, 2013) at 6, online: DEPI <http://www.depi.vic.gov.au/_data/assets/pdf_file/0006/199122/Reforms-to-Victorias-Native-Vegetation-Permitted-Clearing-Regulations.pdf> [emphasis added].

147 *Ibid* at 6 [emphasis added].

148 State of Victoria, Department of Environment and Primary Industries, *Permitted Clearing of Native Vegetation – Biodiversity Assessment Guidelines September 2013* (Melbourne: Victoria, DEPI, 2013), online: DEPI <http://www.depi.vic.gov.au/_data/assets/pdf_file/0011/198758/Permitted-clearing-of-native-vegation-Biodiversity-assessment-guidelines.pdf>.

149 *Ibid* at 2; *Overview*, *supra* note 176 at 4.

150 *Biodiversity Assessment Guidelines 2013*, *supra* note 180 at 12-13.

151 Online: State of Victoria, Department of Sustainability and Environment <<http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim>>.

152 *Biodiversity Assessment Guidelines 2013*, *supra* note 180 at 16-22.

153 *Ibid* at 22.

What can Be Learned?

The first area is the provision of offset credits. For the first five years the Victorian system largely expected developers to find their own offsets for their development impacts. This proved to be cumbersome, creating the need to consider banking an exchange system. BushBroker was a very rudimentary listing system to make potential buyers and sellers aware of each other, without playing the active role of market or broker. Dissatisfaction with it led both to the short-lived Native Vegetation Exchange, and more recently to the series of reforms now coming into place.

The second topic is information collection. The system from 2002 to 2013 looked to landowners and developers to carry out the data collection and analysis that was required to determine EVC classification, conservation significance, and habitat-hectare assessment. This was seen by 2012 to be unduly onerous, particularly for small or insignificant pieces of vegetation. As a result, the new system shifts much of that responsibility to the state-run NaturePrint system. This can be seen as a substantial form of state support, allowing private parties to participate in the offset system at lower cost and fewer delays. It may, however, not produce the same level of detailed analysis of actual on-site native vegetation conditions.

The third area is the strictness of equivalency rules. The NVF system relied upon the EVC classification system, with its large multiplicity of classes. This made for a great many types of offsets, each inherently having its own market. This created the perception that many markets were very thin, so much so that they did not effectively operate to create required offsets. The new system uses the much broader class of catchment management area or municipal district (which may have no relationship to vegetation type), seeming to assume that rough proximity provides sufficient equivalence.

With respect to currency, Victoria's development of the "habitat-hectare" metric has been noted world-wide.¹⁵⁴ The use of a habitat quality rating as a qualifier of area is a convenient, if imperfect, means of deriving a metric capable of serving to compare impacts and offsets. While Victoria considers a particular list of factors to assess condition that are reflective of its natural features, the system is capable of being tailored to other ecosystems by selecting other relevant features.

154 See, for example, Quétier & Lavorel, *supra* note 12 at 2994; Bull et al, *supra* note 72; *eftec*, *supra* note 8 at 22.

Case Study 2: Wetlands Compensation in the United States

The federal government in the United States has two of the oldest and most well established biodiversity offset systems in the world. The two systems serve no net loss goals for wetlands and for endangered species habitat, and both make use of the concept to habitat banking as means of delivering offset credits. For the purposes of this case study, the focus is on wetlands.

Background

The foundation in law of the wetlands compensation regime is Section 404 of the *Clean Water Act*¹⁵⁵ of 1972, which, when read together with Section 301, prohibits any “discharge of dredged or fill materials into . . . navigable waters” without a permit from the United States Army Corps of Engineers (USACE). Through a complex web of statutory definitions and judicial interpretations (an ongoing process), this edict has come to apply to any redeposit of material dredged from a waterway or likely to change the bottom elevation of a waterway or convert it to upland, and applies to all waters under federal jurisdictions, including upstream wetlands having a “significant nexus” to downstream navigable waters.¹⁵⁶

An important aspect of the Section 404 regime is that the national policy and guidelines, and overall monitoring of the effectiveness of the regime, is shared responsibility of USACE and the EPA. This split responsibility for the program – administered by the USACE in accordance with some policy guidance and oversight of the EPA – has from time to time created tension between the two agencies, but has also allowed for a healthy mixture of considerations of immediate local conditions and longer-term more general policy goals and considerations.¹⁵⁷

The Approach

The wetland permitting system came to be committed to the goal of no net loss of “wetland function and values” in 1990, when a campaign commitment by (the first) President Bush became formalized in a Memorandum of Agreement between USACE and the Environmental Protection Agency (EPA).¹⁵⁸ The 1990 MOA also dictated that the mitigation hierarchy of “avoidance-minimization-compensatory mitigation” should be followed in pursuit of the goal. The document’s brief discussion of compensatory mitigation (i.e., offsetting) touches on many of the common issues of offsets:

155 33 USC 1251

156 For an accessible guide through the maze of definitions and interpretations see Royal C Gardner, *Lawyers, Swamps and Money: U.S. Wetland Law, Policy and Politics* (Washington, DC: Island Press, 2011).

157 Interview with David B Olson, Regulatory Programs Manager, USACE, in Washington, DC (April 25, 2013); Interview with Palmer F Hough, Environmental Scientist, Office of Wetlands, Oceans, and Wetlands, Wetlands Division, US EPA, in Washington DC (April 26, 2013). The history of the working relationship in the program is discussed in Gardner, *supra* note 105 at 73-92.

158 55 Fed Reg 9210 (1990) text of the MOA available online: EPA <<http://water.epa.gov/lawsregs/guidance/wetlands/mitigate.cfm>>. The background and significance of MOA is reviewed in Hough & Robertson, *supra* note 8 at 29; Committee on Wetland Losses Under the Clean Water Act, Board on Environmental Studies and Toxicology, Water Science and Technology Board, Division on Earth and Life Studies, National Research Council, *Compensating for Wetland Losses under the Clean Water Act* (Washington, DC: National Academy of Sciences, 2001) at 2 online: National Academies Press <<http://www.nap.edu/catalog/10134>>.

Compensatory Mitigation. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been required. Compensatory actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands) should be undertaken, when practicable, in areas adjacent or contiguous to the discharge site (on-site compensatory mitigation). If on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area if practicable (i.e., in close physical proximity and, to the extent possible, the same watershed). In determining compensatory mitigation, the functional values lost by the resource to be impacted must be considered. Generally, in-kind compensatory mitigation is preferable to out-of-kind. There is continued uncertainty regarding the success of wetland creation or other habitat development. Therefore, in determining the nature and extent of habitat development of this type, careful consideration should be given to its likelihood of success. Because the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, restoration should be the first option considered.¹⁵⁹

In addition to committing to no net loss and the mitigation hierarchy, the 1990 MOA opened the door to mitigation banking by third parties, and promised further guidance.¹⁶⁰ The additional guidance came in November 1995 in the form of a document entitled “Federal Guidance for the Establishment, Use and Operation of Mitigation Banks” (1995 Banking Guidance).¹⁶¹ While habitat banking has been practiced by various arms of the U.S. and state government since the 1980s¹⁶² the 1995 Banking Guidance provided sufficient recognition and clarity that prospective banks could attract investment and expertise, becoming a major part of the wetland compensation process.

A recent review has estimated that a total of 798 banks were active under the Section 404 program in 2010, with another 170 inactive or pending.¹⁶³ A US national organization of mitigation banks exists, and holds annual conferences and educational sessions.¹⁶⁴

The 1995 Banking Guidance also presented the possibility that in-lieu fee arrangements “wherein funds are paid to a natural resource management entity for implementation of either specific or general wetlands or other aquatic resource development projects”¹⁶⁵ may be an acceptable means of delivering compensatory mitigation under certain circumstances. This was elaborated upon in subsequent guidance specific to in-lieu fees.¹⁶⁶

As a result of this incremental policy development, by 2000 three forms of compensatory mitigation were potentially available to a developer seeking a permit to deposit dredge or fill material in a wetland. It could undertake compensation work on its own (“permittee-responsible mitigation”); it could purchase credits from an approved mitigation bank, or it could pay fees in-lieu to an “in-lieu fee sponsor.” All of these options were administered through regional offices of the USACE, which adapted national guidelines and principles to regional social and ecological conditions. (One of those regional variations was and is that banks and in-lieu fee programs are not necessarily available in any particular region, which may limit options from place to place.)

159 *Supra* note 107 at 9212.

160 *Ibid.*

161 60 Fed Reg 58605 (1995). An interim guidance was issued earlier, in 1993, in the form of a Memorandum to the Field: 60 Fed Reg 13710 (1995).

162 Hough & Robertson, *supra* note 8 at 24.

163 Madsen et al, *supra* note 28 at 5.

164 National Mitigation Bankers Association, online: <<http://www.mitigationbanking.org/index.html>>.

165 *Supra* note 110 at 58613.

166 *Federal Guidance on the Use of In-Lieu-Fee Arrangement for Compensatory Mitigation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act*, available online: EPA <<http://water.epa.gov/lawsregs/guidance/wetlands/upload/inlieufee.pdf>>.

Challenges Along the Way

While the three aspects of the compensatory mitigation system were all up and running by the turn of the 21st century, the program was also coming under criticism from a number of sources focussing on several aspects. Here are a few examples from the extensive body of critical academic articles:

- In 1997, King and Herbert demonstrated that difference in real estate values expressed through the wetland mitigation system was redistributing wetlands on the landscape, driving wetland toward less settled areas where real estate costs are lower.¹⁶⁷
- In 2000,, Salzman and Ruhl suggested that the interests of administrators in making the banking and credit exchange system function smoothly was leading them to not apply the rigour to equivalency and currency issues that ecological concern would require.¹⁶⁸
- In 2001 Turner and co-authors reported that the system was not living up to its no net loss goal.¹⁶⁹

By far the most comprehensive and politically influential of critiques at this time, though, was a study, released in 2001, from a committee of the National Research Council (NRC), and carried out at the request of the EPA.¹⁷⁰ The NRC report examined both the ecological outcomes of wetland restoration and creation (on both a local and watershed level) and the administration of the Section 404 compensation regime.

One of the focuses of the NRC committee was wetland function, which was one of the objects of the no net loss goal. The committee critiqued the compensation system for taking inadequate account of the several complex functions that wetlands may serve, and the importance of landscape context to those functions.¹⁷¹ It suggested that administrators move away from a strict on-site replacement of the impacted wetland, and work with a broader range of natural resource agencies (i.e., beyond USACE and the EPA) to plan for the health of wetland functions on the landscape overall.¹⁷²

The NRC committee was also highly critical of the USACE's administration of the program. After reviewing a large number of regional and local case studies in wetland mitigation, the Committee found that in some cases even the most basic functions of a compensation scheme were not being carried out.¹⁷³ In some cases no mitigation was required at all, while in others no mitigation plan was required or the performance standards were too vague or unrelated to the values at stake to be useful.¹⁷⁴ Where a clear mitigation prescription was made, in some regions those measures were never taken in as much as 34 to 50 percent of cases reviewed.¹⁷⁵ This situation was allowed because inspections for compliance were rarely carried out.¹⁷⁶ Given these problems, the Committee expressed scepticism as to whether the goal of "no net loss" was being met:

[T]he literature on compensatory mitigation suggests that required mitigation projects often are not undertaken or fail to meet permit conditions. Therefore, the committee is not convinced that the goal of no net loss for permitted wetlands is being met for wetland functions. The magnitude of the shortfall is not precisely know and cannot be determined from current data.¹⁷⁷

167 Dennis M King & Luke W Herbert, "The Fungibility of Wetlands", (1997) 19 National Wetlands Newsletter 10.

168 Salzman & Ruhl, *supra* note 70 at 658-661.

169 R Eugene Turner, Ann M Redmond & Joy B Zedler, "Count It by Acre or Function – Mitigation Adds Up to Net Loss of Wetlands" (2001) National Wetlands Newsletter 5.

170 *Supra* note 107.

171 *Ibid* at 42-59.

172 *Ibid* at 141-145.

173 *Ibid* at 95-101.

174 *Ibid* at 95.

175 *Ibid* at 101.

176 *Ibid* at 101, 110-112.

177 *Ibid* at 3.

This picture of inadequate standards, rigour and follow-up was also found when the Government Accountability Office (GAO) reviewed the program in a 2005 report.¹⁷⁸ An earlier 2001 review by the GAO had found significant deficiencies in the in-lieu fee program, noting that it was impossible to assess the progress to the no net loss goal because many of the regional USACE offices failed to secure firm arrangements with in-lieu sponsors, and failed to collect reports on the ecological success of mitigation measures.¹⁷⁹

In total the NRC and two GAO reports made 32 recommendations, some substantive and some procedural, as to how to improve the effectiveness of the wetlands compensation program.

At approximately the same time these reviews were taking place, the new business community of wetland bankers was expressing concern with the treatment of their sector. They saw themselves as being subject to much more stringent standards than applied to either in-lieu fee sponsors or permittees undertaking their own compensatory mitigation, and lobbied congress to "level the playing field."¹⁸⁰ This gave rise to a provision in the *Defence Authorization Act* of 2004 (otherwise dedicated to the provisioning of the war in Iraq) directing the development of equivalent standards and criteria for all forms of compensatory mitigation.¹⁸¹

Renewal and Moving Forward

The outcome of the combination of the detailed expert critiques, the effective lobbying of the mitigation bankers and the direction of Congress was a major revamping of many aspects of the wetlands compensatory mitigation program, which became effective in 2008.¹⁸² The most significant aspect of the 2008 Guideline amendments were:

- The establishment of equivalent standards and criteria for the mitigation activities of mitigation banks, in-lieu fee sponsors, and permittees undertaking their own compensatory mitigation;¹⁸³
- The clear articulation of a preference, dependent on circumstance and practicability, for compensatory mitigation by means of banking credits over in-lieu-fee payment; and in-lieu-fees over permittee-responsible compensatory mitigation;¹⁸⁴
- The promotion of a "watershed approach", which called for the use of existing watershed plans as well as other appropriate landscape level plans and datasets to help make more informed and ecologically strategic decisions about the type and location of compensation sites.¹⁸⁵
- The requirement of an Interagency Review Team (IRT), comprised of representatives of all federal resource conservation agencies, and, optionally, local, state, or tribal agencies of similar mandate, to oversee the establishment and operation of banking and in-lieu fee program.¹⁸⁶
- A clear requirement for mitigation plans for all mitigation projects, with specified outcomes, monitoring, reporting, and enforcement mechanisms;¹⁸⁷
- The extension of the compensatory mitigation regime to streams, as well as wetlands;¹⁸⁸

178 United States Government Accountability Office, "Wetlands Protection: Corps of Engineers Does Not Have Effective Oversight Approach to Ensure That Compensatory Mitigation is Occurring" GAO-05-898 online GAO: <<http://www.gao.gov/cgi-bin/gettrpt?GAO-05-898>>.

179 United States General Accounting Office, "Wetlands Protection: Assessments Needed to Determine Effectiveness of In-Lieu-Fee Mitigation" GAO-01-325 online: GAO <<http://www.gao.gov/assets/240/231490.pdf>>.

180 Gardner, *supra* note 105 at 129; Hough, *supra* note 106. Reference to this concern is found in the commentary to the 2008 version of the Section 404(b)(1) Guidelines: 73 Fed Reg 19594 (2008) at 19600, 19612.

181 Pub L No 108-136, Sec 314, 117 Stat 1392

182 *Supra* note 129.

183 *Supra* note 87, s 332.1(a), 230.92-230-93.

184 *Ibid* s 332.1(b)

185 *Ibid*, s 332(1), 332.39(c)(2)(i).

186 *Ibid*, s 332.8(b).

187 *Ibid*, s 332.4-332.6.

188 *Ibid*, s 332.3(c)(3).

- An increased emphasis on wetland functions and services, rather than simply area, as a key metric;¹⁸⁹
- The creation of an on-line integrate database of mitigation projects;¹⁹⁰

There has been little if any quantitative assessment of the performance of the compensatory mitigation program since the 2008 amendments. Interviewees at both USACE and the EPA agreed with this observation, noting that many earlier projects were grandfathered in order to be completed under the earlier regulations or guidance.¹⁹¹ They noted that better records are now kept at regional offices of all compensatory mitigation projects, and that this will allow for thorough study in the future, suggesting that it may be ten to fifteen years before substantive conclusions may be drawn.

What Can Be Learned?

The US wetlands habitat compensation system places heavy emphasis on qualifying potential bankers or in-lieu fee agents at the front end of the process. It looks to those entities to do the requisite data collection and analysis, and to design offset plans that will meet program standards and goals. USACE, and now members of other agencies forming part of the Interagency Review Teams, play a review and supervisory role. It thus downloads a lot of the conservation planning, to private actors, but does so under an extensive regulatory regime.

The system has, over more than two decades, been an ongoing experiment in bringing third parties and commercial exchanges into the business of providing offsets. This has proven to be sufficiently effective that banking and exchange has become the preferred means of providing offset credits. Mitigation banks are seen as providing a framework for planning and research, but must also provide evidence of the actual attainment of performance measures prior to being able to release credits for sale, a requirement that helps address the issues of time-lag and uncertainty of outcomes.¹⁹² Notwithstanding this strict requirement, the proliferation of mitigation banks indicates that there is sufficient scope for the profitable operation of this form of private enterprise in service of the public policy goal of no net loss.

Through its approach to wetlands compensation, the U.S. has a great deal of experience in many forms and issues of biodiversity offsets. It has tried several different policy approaches, varying both over time and between regions. Any policy-makers considering the development or effective operation of a biodiversity offset system would do well to carefully review the U.S. experience in this area to see what lessons might be learned.

¹⁸⁹ *Ibid.*, s 332.3(b)(1).

¹⁹⁰ *Supra*, note 129 at 19601. The development of the Regional Internet Bank Information Tracking System (later known as the Regulatory In-lieu Fee and Bank Information tracking system, both bearing the acronym RIBITS) was not actually a feature of the regulatory change, but was announced in the preamble published therewith. The RIBITS webpage may be found at <http://geo.usace.army.mil/ribits/index.html>.

¹⁹¹ Olson, *supra* note 106; Hough, *supra* note 106.

¹⁹² *Supra* note 87, s 332.3(b)(2).

