LAND USE 2021

Land Use 2021:
A Place for Biodiversity Offsets

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LAND USE 2021:
A PLACE FOR BIODIVERSITY OFFSETS

Biodiversity offsetting is the process of intentionally producing environmental gains to counter balance the negative impacts of development on nature, with a goal of no net loss or net gain for biodiversity. Embedded as the final stage in a hierarchy of mitigation approaches, it is increasingly used as a policy tool in an attempt to reconcile development and environmental protection, both in Canada and many other countries around the world.

The last 20 years have seen an explosion of interest in the topic in policy circles, among development planners and in academia. Organizations such as the International Union for the Conservation of Nature, the Business and Biodiversity Offset Programme, the Cross-Sector Biodiversity Initiative and the International Association for Impact Assessment have worked to articulate a set of principles and good practices to properly and effectively apply offsetting. Despite this, the offsetting remains a risky and controversial approach to environmental protection. Many aspects of it are poorly understood or inconsistently applied.

8-PART WEB FORUM SERIES

APRIL 19 - JUNE 14, 2021

To help advance thinking, policy and practice respecting biodiversity offsetting, in April through June 2021 the Alberta Land Institute presented a series of web-based presentations and discussions to improve understanding regarding current thinking and good practices in offsetting. We engaged academic experts, practitioners, policy-makers and stakeholders in insightful discussions that aim to link the theory and practice of offsetting for biodiversity. Our goal in presenting this series was not to promote offsetting for biodiversity nor to discourage it, but to help delineate when offsetting might be appropriate and how it should be pursued in those circumstances. We hope we have contributed to better thinking and use of offsetting as one means of creating a better environmental future.

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The Alberta Land Institute (ALI) is an independent research institute founded at the University of Alberta. We promote research to inform public debate and decision-making in the province.

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SCHEDULE OF TALKS
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RECORDINGS/PRESENTATIONS: ALBERTALANDUSE.CA/LU21

LAND USE 2021:
A PLACE FOR BIODIVERSITY OFFSETS

SESSION ONE: PUTTING BIODIVERSITY OFFSETTING IN ITS PLACE - GIVING MEANING AND TEETH TO THE MITIGATION HIERARCHY AND LIMITS TO OFFSETTING

PRESENTED: APRIL 19, 2021

What is the place of biodiversity offsetting in our development and conservation planning? This session explored the special challenges of offsetting with respect to endangered species, marine environments, and protected areas.

Key points from the session

- Offsetting is proposed as a useful tool to achieve no net loss or net gain to biodiversity in the face of development pressures. It may also be used to pursue specific conservation targets.
- Offsetting is to be used as the final step in a hierarchy of mitigation options: first avoid impacts, second minimize those that are unavoidable, third restore onsite, and offset only those residual impacts that remain.
- In designing offsets it is important to be clear about goals, and the background rate of ecosystem decline against which goals will be measured. This will determine which measures are necessary. Offsetting may recognize gains generated by habitat restoration or enhancement, managing threats to wildlife, or by protecting existing habitat, depending on circumstances.
- There are ecological limits to offsetting, which should be recognized and respected.
- Offset performance has not been consistent. Monitoring for compliance and performance is important.
- Offsetting can impact existing environmental programs, distorting incentives, displacing committed resources, and creating potential for greenwashing. These can be safeguarded against through transparency.
- More specific equivalency standards can narrow trading opportunities, but too much flexibility can blur important scarcity signals. Regular reviews and transparency are important for these issues, and for offset programs generally.
- Offsetting should not be allowed for the purpose of permitting activities that harm species at risk, but should be a tool for species recovery. Offsetting should be done in the context of a species Recovery Strategy and Action Plan.
- Offset concepts developed for terrestrial ecosystems may be applied in a marine environment, but must be modified to reflect the greater data gaps, unclear governance and lack of perception of sub-surface impacts that are common for marine areas. Marine assessments require broad temporal and spatial scales, improved modelling and data collection.
- Offsetting in developing countries is often unregulated, making it difficult to apply strict technical standards. Offsets can still deliver benefits if designed properly. One of the major challenges in developing countries is securing long-term conservation gains, for which more financing opportunities must be sought out.

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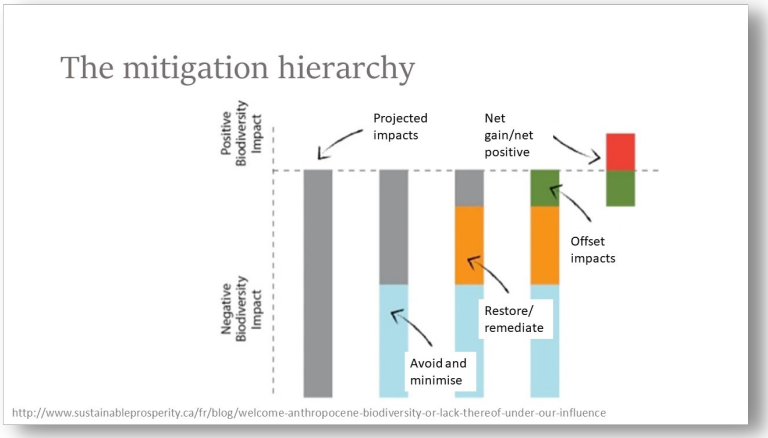
Giving meaning and teeth to the mitigation hierarchy

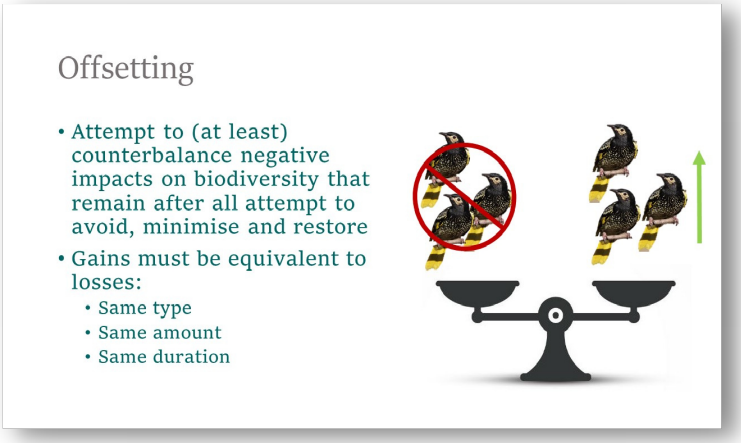
Globally, infrastructure and industrial development projects have negative impacts on biodiversity. Unlike natural threats such as disease or invasive species, habitat loss is often the result of policy decisions. The mitigation hierarchy prescribes that decision-makers avoid habitat loss. If loss is unavoidable, impacts should be minimized, and the area restored or reclaimed. Offsets should only be used for residual impacts that remain after these earlier steps, with a goal of no net loss or net gain for biodiversity relative to change without the regulated development.



Martine Maron
SESSION LEADER

Martine Maron is a Professor of Environmental Management at The University of Queensland, Australia. She helped draft the IUCN Biodiversity Offsets Policy and the UNCCD's Land Degradation Neutrality approach.

To achieve no-net loss, offsetting must be equivalent to the losses and impacts that development has caused. Equivalency means gains must be the same type, same amount, and exist for the same duration. Offsetting gains are generated based on biodiversity targets and can be achieved through habitat restoration or enhancement, managing wildlife threats, or protecting existing habitat.



Offsetting may be required by government legislation and policy, financers with a no net loss lending policy, or corporate policies. Offsetting can be delivered directly by the developer, through a paid third party, by purchasing market biodiversity credits, or through contributions to trusts or funds that develop biodiversity benefits. Offsetting is a disincentive to environmental impacts, as it internalizes the cost of biodiversity loss.

Why aren't offsets living up to their promise?

- Many factors involved

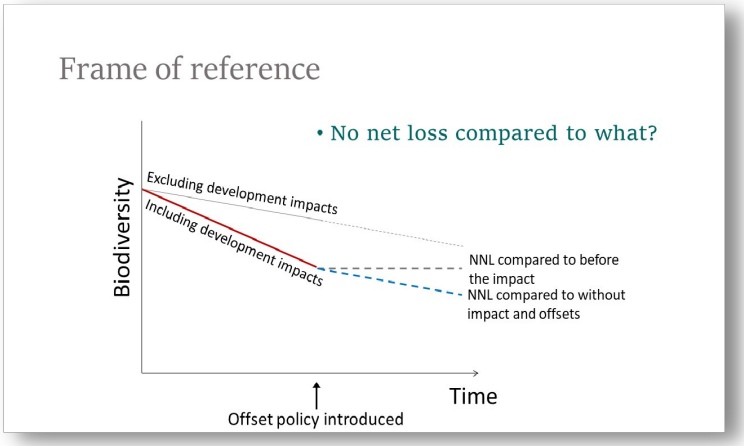
1. Frame of reference not explicit
2. Ecological limits not being recognised or respected
3. Poor technical design of calculation approaches and metrics
4. Implementation failures
5. Unintended system distortion

Offsetting is controversial and many factors are involved in the challenges of offsetting. Successful application of offsetting negates the development impact to restore the background rate of ecosystem change. When designing a compensation policy, net outcome should be determined: maintain background rates of decline or stop all decline. If the goal is to stop all decline, offsetting cannot include protecting existing habitat, and target-based compensation policies should be considered.

Ecological limits exist in offsetting and restoration, as replacing biodiversity can be complex, costly, and lengthy. Restoration offsetting is best implemented in cases with clearly defined target species, when habitat can be rapidly improved, and when counterbalancing loss of poor-quality impact sites.

Offsetting challenges include poor technical design and calculation approaches. Counterfactual controls are often unrealistic and inconsistent, resulting in overestimating the risk of loss in the counterfactual and gain from offsetting. Similarly, uncertainty and time lags are not well accounted for. Accounting should be separated for each element of biodiversity under a no net loss policy.

It is difficult to obtain implementation data for offset projects. Previous research has shown that some offsetting projects have not been implemented, some projects were inadequately implemented, and a majority of projects reported failure to achieve no net loss. Conditions of impact approval should include details of the required offsets and their outcomes. Ongoing monitoring, evaluation, and reporting costs should be considered. Offsetting projects should set up publicly accessible registers prior to development and continue with regular reporting. Transparency will build public confidence.



Within the offsets program there are often unintended impacts on existing environmental and biodiversity management systems. Offsets used to protect existing land provide an incentive to maintain a background risk of loss. With companies offering funds to implement biodiversity benefits there needs to be clarity on the work being done. There is a difference in volunteering for conservation benefits compared to delivering offset benefits that commercial entities are required to carry out. It is important to ensure that offsets are not replacing previously allocated conservation spending. There is a risk of "green laundering" that generates a reliance on offset generated funds that rely on habitat destruction. This is amplified by the positive rhetoric that focuses on gains; the net outcomes are not positive, they are mutual.

Offset credits for specific categories of biodiversity can be difficult to obtain. The low volume of trades and high prices are seen as a market failure. Regulators amend trading rules to incorporate flexibility to increase trading volume. This will undermine the scarcity signal that is required to achieve the market goals of incentivizing avoidance, incorporating the true cost of biodiversity loss, and achieving no net loss. Continued risk assessment, safeguard implementation, and transparency is needed.

Ultimately, the goal with offset policy is to review and renew policy as needed. More robust policy is required to protect biodiversity while allowing development to continue.

Can Offsets Be Used to Achieve Recovery Objectives for Species at Risk?

Offsetting should be developed to achieve recovery of species at risk, and offsetting policies should combine regulatory and non-regulatory regimes.

Offsets can be used to achieve recovery objectives for species at-risk. Successful recovery occurs in strict conditions where benefits are quantifiable and consistent with recovery objectives. Currently, offsets slow but do not prevent declines in habitat or species population, thus not achieving no-net loss. Despite this, Ontario is issuing "overall benefit" offset permits that purport to offset harm, and the Department of Fisheries and Oceans is issuing Species at Risk Act permits that are contingent on offsets.

Offsetting to recover species should not be a means of facilitating permitting for activities that harm species. It should be developed to achieve recovery when coupled with non-regulatory actions to reduce threats to species at-risk. Offsetting should be embedded in and contingent upon the Recovery Strategy and Action Plan, which should define target states and the applicability of offsets to achieve them. Offsetting should also be subject to effective and enforceable monitoring. Offsets are one strategy for addressing issues facing species at risk, but should be used in combination with other strategies.

Because not all impacts can be offset, there cannot be a greenwashing of data. Transparency is needed regarding net loss, as well as clarity in language use and legal tools. If the decision is made to further jeopardize a species at risk, it must be transparent and communicated clearly.

David Browne
PRESENTER

David Browne is Director of Conservation at the Canadian Wildlife Federation (CWF). He leads the overall development and delivery of CWF's conservation programs and has worked in the field of biodiversity conservation at the local, national, and international levels.

Marine Biodiversity Offsets - Pragmatic Approaches Towards Better Conservation Outcomes

Sustainable ocean management is an ongoing issue; biodiversity loss has been reported in 75% of marine areas under national jurisdictions and 66% of all oceanic systems. Marine offsets are increasingly recognized in national mitigation policies, but have had limited application.

Limited application of marine offset strategies is due to lack of research on the efficacy of marine offsets. This is due to real or perceived implementation difficulty, paucity of data to inform management, complexity of monitoring and enforcement, and a limited understanding of impacts. There are also differences between terrestrial and marine environments, data gaps in baseline definitions and counterfactual scenarios, an absence of clear national governance regimes, and the lack of perception of impacts since the impacts occur beneath the surface. Fundamental offset principles, types, and approaches apply equally on land and at sea. Averted loss offsets support effective management of marine protected areas in countries lacking funding. Many high risk marine habitats are not receiving protection but have potential for offsets (like the Port of Rotterdam expansion offset to prevent trawling on a protected seabed).

Céline Jacob
PRESENTER

Céline Jacob is an environmental geographer and consultant on blue economy at Vertigo Lab in Bordeaux, France. Her research interests include environmental governance systems with a particular focus on marine conservation and the sustainability of economic development.

Restoration offsets include ecosystem engineering and structuring species such as kelp, coral, and biogenic reefs which can support restoring ecosystem function. There are limits to restoration, especially for cold water corals due to slow growth and deep-sea system sensitivity. Policy-based offsets, though not often applied, have potential for wide-ranging or migratory species and land-based solutions. Having more policy would be beneficial overall.

To improve marine offset implementation, avoidance must be practiced to reduce the need for offsets and move away from a siloed project-by-project approach. Additionally, marine impact assessments require broad spatial and temporal scales to capture marine ecological characteristics, cumulative impacts, and land-sea interfaces. Improved modeling and technologies can support collection of large volumes of data at reduced costs, and more data is needed. Ongoing transparency with the public and various stakeholders is also required.

Consequences of funding protected area management as biodiversity offsets in Uganda

Offsetting in protected areas in developing countries, such as Uganda, are often voluntary and not regulated by government policies. These offsetting measures face challenges, including additionality, equivalence, permanence, cost-shifting, and social impacts on local communities.

The primary challenges facing protected areas in developing countries are uncertainty around permanence and cost-shifting. This results in unclear duration and longevity of offsets. Additionality can be tentative when uncertain sources of funding slow (but fail to stop) biodiversity loss. Resulting benefits to an area only occur during the period of funding, after which previous challenges return. The location of an offset project can create challenges with similarities and equivalencies. If the protected area being restored is in the vicinity of an impacted area, it will likely have similar biodiversity and beneficiaries, but if it is not in the vicinity there will be challenges. In Uganda, most areas were protected and designated as an offset area. Social impacts are relatively minimal if offsets occur in a protected area due to pre-existing regulations that are expected to continue alongside the offset. However, if a new protected area is being acquired and new regulations are acquired, populations of people could be displaced in order to create the protected area.

Ultimately, offsets in protected areas are beneficial despite the associated risks. Offsets should be used as a stepping stone for implementation due to uncertainty of funding in perpetuity. Further conservation financing opportunities need to be sought out and implemented to ensure offset activities continue after funding stops.

Ritah Kigonya
PRESENTER

Ritah Kigonya is a PhD candidate at the Norwegian University of Science and Technology. Her research explores the realities surrounding biodiversity offset implementation in developing countries, with Uganda as her case study.

PANEL DISCUSSION - QUESTIONS/ANSWERS

Can volunteering, citizen science, and environmental compensation work together? How could they be used to benefit each other?
Transparency is key. Volunteers must be aware if the tree-planting project they join is required as an offset or not so that they can freely choose to either continue with the project or plant different trees elsewhere. Otherwise, companies are appropriating volunteer labour. When a project developer cannot carry out all offset activities to their fullest, collaboration between projects or groups can be beneficial. (Martine Maron, Ritah Kigonya)

The current evidence standard for an offset in Canada is based on a protocol on a reasonable level of assurance. Is David Browne proposing a standard of scientific certainty? What type of weights and measures legislation is required so that this new community has the same trading certainty as a bond? How do we bring scientific certainty into this exchange relationship?
When dealing with species at risk, a higher bar of certainty is required regarding an offset, and scientific certainty is one way to quantify that certainty. Further, species at risk laws are meant to disrupt "business as usual." Mitigation and offset costs are often small in relation to development costs and can eventually generate their own economic benefits. (David Browne)

Discuss target-based offsets more. For example, enforceable limits on buffered disturbance which decline rather than increase or stay flat over time in a range needed to improve avoidance and give mitigation policies teeth.
A target-based approach is susceptible to the many risks around offsets discussed in the session presentations, but it can help address certain risks too. Instead of looking at an impact and offset in isolation, target-based approaches fit in with other efforts and desired outcomes, which can be a positive perspective. (Martine Maron)

Offsets can cause system distortions. Can cultural norms anchored in ecosystems be mobilized to act as non-finance-based incentive mechanisms to achieve offsets?
Cultural norms are important because the activities that drive landscape change and population change at this point are not offsets, but those driven by cultural norms. The extent to which offsets might nudge norms in an undesirable direction is more influential than the way offsets are designed. (Martine Maron)

Has there been discussion of having companies create trust funds so that offsets are financed in perpetuity?
There have been discussions but they have not yet materialized. There are unanswered questions around who would host the fund and further complexities involved with developing countries that prioritize development over conservation. (Ritah Kigonya)

Opinions on the counterintuitive idea that offsets can be used to improve situations in net gain contexts where sustainability thresholds and limits have been crossed in developing world contexts.
This is the type of goal a target-based approach can help achieve. Threatened species have already crossed a threshold, and the target needs to be net gain in absolute terms, which is possible as long as actions can be undertaken to achieve recovery. A net gain scenario using multipliers could be designed to resolve the impact, but there are limits. (Martine Maron, David Browne)

Since we can't make more land, is an offset requirement really just a development tax?
Offsets are not a tax, but a cap in a cap and trade approach. Offsets are a reallocation of costs away from the public toward the developer causing a disturbance. (Martine Maron, David Poulton)

Offsets need to be effective for the duration of a project, essentially in perpetuity. How can we build the long term requirement into the offset?
Designing an offset in perpetuity is a tall order because funding is not always available in the long term. As a result, certain projects can be linked to others to allow for the continuity of management. There is a nuance to what permanency means depending on the species or habitat in question, as some species will require a particular piece of habitat to persist over the very long term, while others may be able to tolerate habitat characteristics shifting around the landscape. (Ritah Kigonya, David Browne)

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SESSION TWO: NO NET LOSS IN A CHANGING LANDSCAPE

PRESENTED: APRIL 26, 2021

Offsetting requires the weighing of environmental gains with environmental losses. But what kind of gains are legitimately counted and against what do we measure losses and gains? These questions touch on the complex issues of additionality and equivalency, which require us to project ecological futures in various scenarios. This becomes more complicated in the context of a changing environment, and these topics are the focus of this session.

Key points from the session

- The goal of biodiversity offsetting is no net loss or net gain of biodiversity. Measurement against these goals, however, depends on assumptions about the baseline state of the ecosystem, additionality, and the interests that are expected by be served by the target state. These variables determine which offset options will best serve the goals in any particular circumstance.
- Additionality requires assumptions to be made about behaviour, about which there is asymmetrical information, with landowners understanding land value and options more than regulators.
- Options to produce ecological gains for offsetting include protection (which secures existing ecosystems) and restoration. Protection only produces a benefit if measured against a baseline that assumes a loss will otherwise occur. Restoration may pursue different target states, such as more pristine wilderness conditions or a landscape dominated by traditional uses, such as traditional agriculture. This is a social decision, based on history and values.
- Political and governance systems are not well-matched with the long term needs of ecosystems. Offset measures may require centuries to exhibit their full potential and benefits but policy cycles are much shorter. Only legal protection can establish management for the long term.
- Restoration is increasingly expected to serve the interests of historicity, poverty alleviation, sustainable livelihoods, scaling up, aesthetics, threatened species and evolving cultural values. Further, it is expected to do this in a changing landscape. As a result restoration is moving toward creating novel ecosystems, different from anything that has come before.
- Depending on social conditions and values ecological gains may be generated in a variety of conditions, including very wild, dominated by traditional human land uses and in urban centres.

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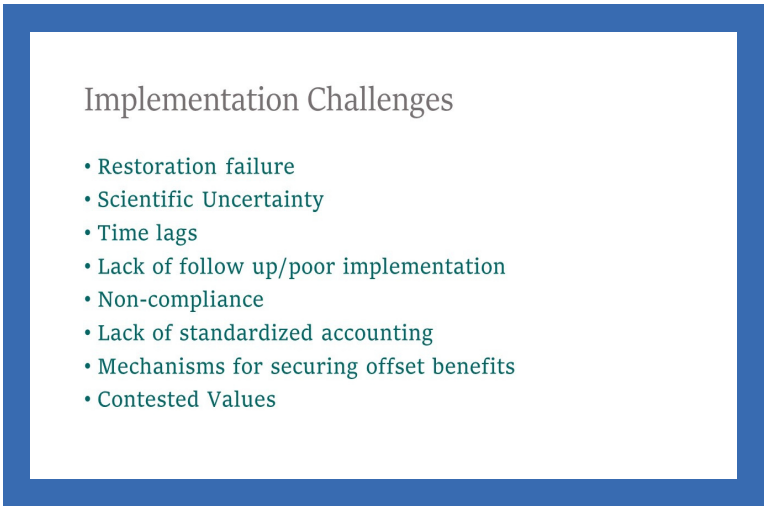
Just a Buzz Word? No Net Loss in a Changing Landscape

How can no net loss work have teeth in real policy? No net loss (NNL) policy currently faces two issues: no net loss of area and function and the conceptualization of a site's function over time. Another challenge is the acceptance of continued loss while providing sustenance or human habitation, and balancing this need with restoration.

Most empirical evidence suggests that offsets are a policy failure due to implementation challenges. This includes restoration failure, scientific uncertainty, time lags, lack of follow up, non-compliance, lack of standardized accounting, costly mechanisms for securing offset benefits, and contested values in society.

Marian Weber
SESSION LEADER

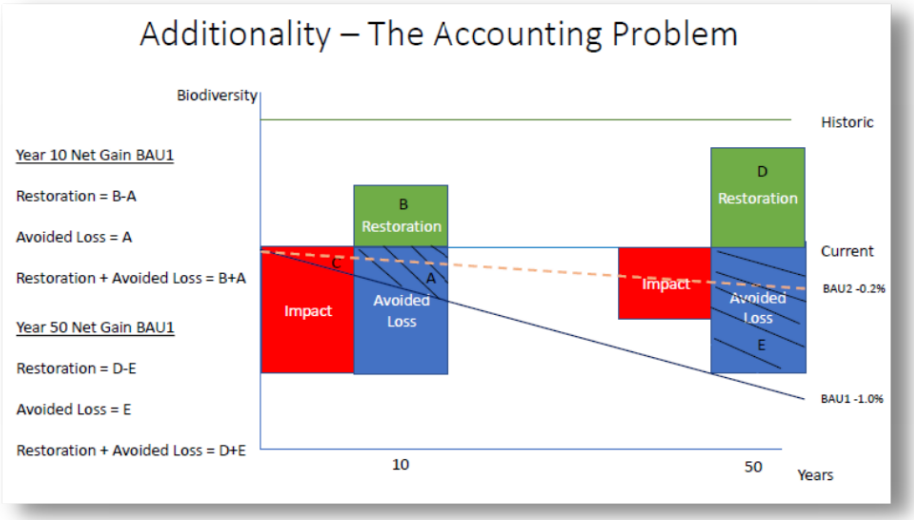
Marian Weber is an Adjunct Professor in the Department of Resource Economics and Environment Sociology at the University of Alberta, and in 2019 became Chief Environmental Economist for BC Ministry of Environment & Climate Change Strategy.



A challenge in offset implementation is additionality. Additionality is the principle that offset benefits should arise from a new program. This involves considering baselines and counterfactual scenarios, timing and maintenance of biodiversity restoration, implications arising from the preference for restoration over avoided loss, viewing the site as a part of the surrounding landscape, and not crowding out voluntary work with policy. All these considerations impact whether an offset is evaluated as a net loss or net gain.

Additionality involves behavioural considerations, such as asymmetric information, credit stacking, and permanence. Asymmetric information poses a problem because land owners understand site benefits better than regulators, resulting in difficulties in setting prices, establishing mitigation ratios, and determining probabilities of site conversion. Similarly, credit

stacking leads to policy issues because implementation does not always lead to net benefit and nonexecution leads to the loss of multifunction sites. (Credit stacking will be further discussed in Session 4.) Permanence is a challenge as landowners are unlikely to participate in programs that require selling land or participating in a permanent easement because keeping option value over land is desirable.



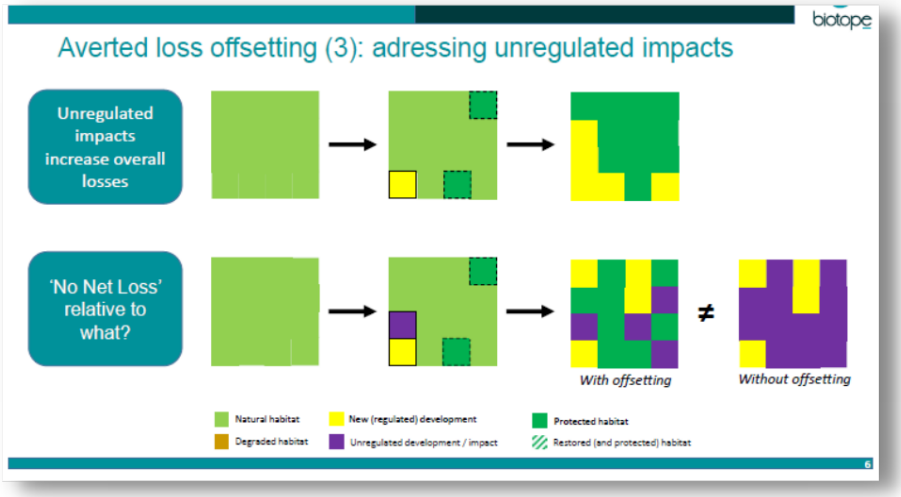
Ultimately, to achieve net gain, a combination of avoided loss and restoration is required. NNL is a historical construct, and when thinking about NNL, we need to consider which historical benchmarks are desirable, whether they are achievable, how they construct baseline settings, and how we relate baselining in the past with anticipating the future in the midst of accelerated anthropogenic changes.

What Does No Net Loss Mean?

Quétier presented real-world case studies of offset designs and implementations to reflect on the issues still present in offsetting as offsets work toward no net loss (NNL) goals. Offsetting in these case studies occurred by protecting habitat, restoring habitat, or changing land management.

Ambatovy, in Madagascar, experienced a loss of 2,000 ha of forest, and protected 20,000 ha of undisturbed forest as an offset. The project claimed a NNL of biodiversity as a result of protecting ten times the destroyed area. Protecting twice the destroyed area led to the loss of 33% of habitat; simply protecting existing habitat led to net loss. If this offset design is supported in policy, it is indicative of the amount of loss with which communities are comfortable.

There are additional unregulated activities that harm the biodiversity of an area, including small scale farming, poaching, and fuel. These additional drivers of biodiversity loss add to the overall impact of an area.



An alternative to protection is restoration. One example is the LNG terminal in northern France where coastal development on sea shores impacted seabirds. The solution was to purchase farm land that had been expanded onto coastal marshes and restore coastal wetland to benefit coastal shorebirds. Biodiversity was successfully created from a biodiversity-poor area.

Fabien Quétier
SESSION LEADER

Fabien Quétier is the technical director on 'No Net Loss' and 'Net Gain' solutions for biodiversity at BIOTOPE, a consulting firm in France, where he advises clients on mitigation hierarchy implementation. He is a member of the IUCN Commission on Ecosystem Management.

Restoration gains can also be obtained passively by decreasing pressures, such as grazing or poaching, or actively by removing invasive species, reintroducing species, or revegetation. In the context of offsetting, restoration could create NNL or net gain scenarios. However, restoration does not always work. In France, biodiversity that triggers offsetting is tied to traditional agricultural landscapes, and as a result, conservation policy focuses on reinstating extensive, low-impact, and small-scale farming systems that enable wildlife to coexist with agricultural production. Changes in land management are options for habitats where restoration is less effective. This method worked well for the little bustard, a large bird species, as vegetation was made more suitable to the species in the midst of railway development.

Ultimately, when offsetting, a piecemeal approach should be avoided in favour of a landscape-scale approach. This could change entire farming systems to increase biodiversity while maintaining land productivity. Additionally, offsetting information should be publicly available.

Governing for "no net loss" of biodiversity over the long term: challenges and pathways forward

When there is a not net loss (NNL) objective for a project, it is assumed that biodiversity gains can be produced, gains can be maintained as long as impacts remain, or gains can be maintained in perpetuity.

When discussing long-term gains that are maintained in perpetuity, different ecological timeframes must be considered. Short term maintenance of gains from an ecological point of view is less than 20 years, medium term maintenance is between 20 and 100 years, and long term maintenance is between 100 and 300 years. Beyond 300 years is considered "in perpetuity," during which time complex ecosystems can be restored. From an institutional point of view, this means gains must continue after the project is over and for longer than offset policies require.

Current offset policies follow policy cycles, not ecological timeframes. In offset policies, 30-50 years is considered long term, and little to no planning occurs beyond this timeframe. In ecological timeframes, this is considered medium term. To ensure gains can be secured in the ecological long term, land ownership can be secured legally, offsets can be added into a network of protected areas through a covenant or easement, and payment and management can be secured so management plans can be expanded to ensure long-term monitoring.

There are limits to propositions regarding improvement of long-term gains. In governance there are issues with additionality, intra-generational justice, inter-generational justice, long-term costs and the dependence on current unstable and changing politico-economic systems. Ecological limitations include management time frames not being adapted to the ecological needs of different biodiversity surrogates, specification, and novel ecosystems. Further, the shocks of the Anthropocene are not being addressed.

Western systems of governance have failed to address the long-term consequences of impacts. To improve limitations, tools can be adopted, including internalizing control, research, and stewardship when estimating offset costs, internalizing the long-term, permanent recruitment and retainment costs for long-term offset gains, and building institutions that prioritize renouncement, avoidance, and making polluters pay the intra-generational and inter-generational costs of damage. Offset policies must incorporate multidecadal and century-plus time frames and plan for long-term social-ecological resilience and stewardship. This planning includes

Florence Damiens
SESSION LEADER

Florence Damiens is a PhD candidate at the Royal Melbourne Institute of Technology (RMIT University). Her research interests lie in bridging political sciences, political ecology and biodiversity conservation to better understand how different political narratives and modes of governance affect biocultural diversity and sustainability. Her PhD is devoted to the politics of biodiversity offsetting, with a focus on Australia and France.

engaging with the dynamic nature of future gains in the Anthropocene and working with local stakeholders and their formal and informal systems of governance to ensure long-term stewardship. In Canada for example, existing Indigenous systems of governance understand long-term effects better than current Western systems of governance. Utilizing this knowledge is necessary to improve policy surrounding maintenance of long-term gains.

No Net Loss in a Changing Landscape? The Challenges of Ecological Restoration

When considering challenges in restoration, offsets, and no net loss (NNL), there are three important lessons to keep in mind:

- **the past and continuity matter,**
- **ecosystems are dynamic and adaptive (but the dial on change has been turned up),**
- **cultural legacies matter.**

The UN decade on ecosystem restoration resulted in a significant change in global ecosystem priorities. Restoration became a top priority and provided opportunities for job creation, food security, and addressing climate change. As a result of these changes in priorities and expectations, approaches to ecological restoration may need to be reconceptualized.

Eric Higgs
SESSION LEADER

Eric Higgs is a Professor of Environmental Studies at the University of Victoria. His research interests include ecological restoration and responsible intervention in hybrid and novel ecosystems. He previously directed the Mountain Legacy Project.

Ecological restoration is the process of assisting the recovery of an ecosystem that is damaged, degraded, or destroyed. There are four key components to restoration success: ecological integrity, long term sustainability, social benefit and engagement, and past and future considerations. Restoration is currently under pressure from increased novelty, historicity, poverty alleviation, sustainable livelihoods, scaling up, aesthetic dimensions, threatened species, and evolving cultural values. There is concern that current restoration methods may not be able to address these issues.

Restoration can address these changes by shifting away historic models to a new restoration model. With an historic model history is a template, there is a single trajectory, and a compositional emphasis. With the new restoration model, history is a guide and there are multiple trajectories, a processual emphasis, and pragmatic goals to reflect livelihood needs.

The continuous push on functional and compositional attributes of ecosystems creates novel ecosystems. Novel ecosystems are defined by differences in ecosystem composition, structure, and function. Novel ecosystems are persistent, self organized, and have thresholds at which restoration efforts will fail.

Successful restoration projects include species reintroductions, rewilding, reclamation, bio-novelty, forest landscape restoration, ecological design, and offsets. Restoration comprises different practices, but how big is the 'restoration tent?'. What does restoration encompass and how does it hold on to the core principles of ecological integrity, long term sustainability, social benefit and engagement, and past and future considerations?

PANEL DISCUSSION - QUESTIONS/ANSWERS

Are regulators the only ones who can ensure that biodiversity offsets happen?
It depends on the context. In France, offsets are enforced by regulators, but regulators can have limited capacity for enforcement. They also rely heavily on local NGOs to alert when offsets are not complied with or when development is authorized without appropriate offsetting. The courts also play a role, as they are where permitting decisions are challenged, and in cases of non-compliance can go far in terms of penalties. (Fabien Quétier)

Does more traditional use of the landscape offer a nature-friendly middle ground between the industrial impact on the landscape and the more pristine environments we may seek to put in place through offsetting or preservation through averted loss.
Traditional agricultural landscapes can be valuable for biodiversity. The question highlights the importance of being clear about objectives. In Europe historical agriculture is socially recognized as a target state for biodiversity, whereas in Australia and Canada a less disturbed wilder landscape is desired. (Eric Higgs, Fabien Quétier and Florence Damiens)

Is setting up appropriate financial mechanisms for offsetting an unreasonable cost to impose on industry? Is this the industry that should bear that cost?
Large projects can be led by private industries but can be funded by public-private partnerships. For example, roads can be public entities, so the polluter would be the state. Ultimately, offsetting is about internalizing the cost of destroying biodiversity. This leads to the central tension between the interest to develop and the consequences that result, and additional tension around what makes a legitimate project. Further, regulatory offsets are a way to generate investment money needed for restoration. A polluter pay principle is valid, and the discussion of a combination of public pay compared to industry needs to be on the table (Florence Damiens).

Does restoration stop at the city-urban boundary and are only non-urban landowners at risk?
Some of the most exciting work in restoration currently is occuring in urban regions. There is an increasing emphasis on the importance of preserving urban biodiversity. (Eric Higgs and David Poulton)

In a developing country, norms can be created to improve management. It is still complicated to include offsets in the list of conservation opportunities. How can we change that? More generally, how can we make offsetting a bigger part of our conservation action mix?
Offsetting does not work well unless you have a broader civil society agreement on what is being achieved beyond offsetting. In many cases, we do not have that. People will trust offsetting when, in addition to strong industrial guidelines and governmental oversight, there is a broader appreciation of the overall goal. (Eric Higgs)

LAND USE 2021: A PLACE FOR BIODIVERSITY OFFSETS

SESSION THREE: BEYOND MULTIPLIERS: MANAGING THE RISKS OF OFFSETTING

PRESENTED: MAY 3, 2021

There are inherent risks associated with biodiversity offsetting. Offset multiplier ratios are frequently used to compensate for risks. The use and effectiveness of multipliers is under debate. This session explored how multiplier ratios should be used and what other tools are available to manage the risks of offsetting.

Key points from the session

- All offset design should be seen in the context of the mitigation hierarchy. The risks of offsetting are one of the reasons the hierarchy prioritizes impact avoidance and minimization.
- Multipliers are applied to reduce risk and uncertainty that an offset will fail to meet its objectives due to data gaps, restoration failures, imperfect currencies and indicators, and time lags. For example, a multiplier of 2:1 will yield an offset project of twice the planned benefit compared to the impact being compensated for in order to adjust for these risks.
- There is no clear answer to how large multipliers should be. In theory they may be as high as 10 or 20, or even into the hundreds, but at the higher levels they become impractical.
- The correct use of multipliers should drive proponent to implement more and better avoidance, minimization and restoration, in order to reduce the residual impact to which the multiplier will be applied. This process should incent an exploration of the most cost-effective conservation measures. We see an example of this with pipeline proponents in caribou ranges in western Canada.
- Many projects in Canada are approved without any offsets, so offsets should not just be compared to no net loss goals or hypothetical project denials but also to approvals with no offsets.
- Multipliers alone are not sufficient to compensate for offset weaknesses, and should not be a substitute for proper regulatory oversight.
- British Columbia has developed a draft Habitat Offset Decision Support Tool that calculates a customized project-based multiplier, based on habitat characteristics of the impact and offset sites, and risks, time lags, duration and permanence of the offset measures. The tool encourages transparency, clarity of assumptions and discussion among stakeholders.
- South Africa uses multipliers as one component of a system based on defined conservation targets for different ecosystems. A biodiversity status assessment of each ecosystem guides the application of the mitigation hierarchy and whether offsetting is required, what forms of offset are allowed and which multipliers apply. Multipliers are used to scale conservation proportionate to ecosystem targets.
- Multipliers should be use selectively, with alternatives such as more avoidance, minimization and restoration, better research and monitoring, and more timely offsetting actively considered at all times.

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An Introduction to Multipliers

From a conservation perspective, avoidance is preferable to offsetting as it carries lower risk and uncertainty. The mitigation hierarchy should always be used when planning offset projects. Mitigation planning should be an iterative approach, continually reassessing the project to determine if further impacts can be avoided. The remaining ecological impacts will require offsetting. Implemented offset projects must meet objectives and compensate for residual effects. To reduce the risk or uncertainty of an offset project being successful and delivering a no net loss (NNL) outcome, a multiplier can be applied. For example, an offset may be designed to have twice the benefit to biodiversity as the development impact, a multiplier of 2:1.

Multipliers can assist with compensation and contribute to meeting broader landscape conservation priorities. Multipliers account for uncertainty and data gaps, restoration failure, and time delays in offset delivery. They provide ecological insurance when using imperfect currencies and indicators. Establishing multipliers in offsets projects is more difficult. There is no clear answer to how large a multiplier should be. In theory, the longer the offsetting delay and duration of the offset project, the higher the multiplier. Multiplier values can get as large as 10 to 20, and in specific theoretical situations could be in the hundreds. While multipliers can be very large, that is not always practical. The session will explore what multipliers are designed for and when they should be used.

Joseph Bull
SESSION LEADER

Joseph Bull is an ecologist and conservation scientist. He is currently a Senior Lecturer at the Durrell Institute of Conservation and Ecology at the University of Kent, visiting Researcher at the University of Oxford, and co-founder of Wild Business Ltd.

Reflections on Practice and Theory

In Canada, provincial governments are land managers and share responsibility for caribou protection with Environment Canada. In Alberta, pipeline disturbance of caribou habitat required an offset as outlined by the Canada Energy Regulator. Offsets were imposed to compensate for residual project impacts on caribou ranges with the aim of achieving no net loss (NNL) of critical habitat in the absence of equivalent government action. Whether offsets should only be required within caribou habitat and ranges and if a reduced value for buffer areas should be considered is debated. Companies determined offsets and multipliers based on a literature review and survey that identified restoration methods and their relative values. A decision framework outlined when and where to use restoration measures and their specifications (such as species and planting density). Multiplier or risk values were assigned to each restoration measure while considering relative temporal values.

Marcus Eyre
PRESENTER

Marcus Eyre is a former senior environmental advisor to the Canada Energy Regulator (CER) and the technical lead in developing offset requirements in caribou ranges in western Canada.

Major categories of multipliers include delivery risks, time delay, and project location. Multiplier values range from one to five depending on the restoration method, and greater risk will increase the multiplier. The relative difference between higher and lower values is important when determining multipliers. The range needs to be sufficient to allow for easy selection of the most ecological and cost-effective options. Multipliers must be used to calculate residual impacts otherwise it will disincentive restoration. Other approaches include simple fixed ratios, which provide an overall final ratio. However, using one metric can result in unintended consequences that require prescriptive regulations. Simple fixed ratios should be used in simple, predictable, and in a repeated context where details can be regulated. Well designed multipliers should reward further avoidance and impact reduction. Multipliers reward the most effective offsetting by incentivizing reduced relative cost. Poorly designed multipliers can lead to a non-compliant proponent, intentional cost cutting, and unintentional neglect.

Offsets primarily focus on ecological actions to compensate for project impacts after prevention and mitigation measures. Other reasons for offsets include stakeholder demands, avoiding legal action, social licence, and as a compromise between regulatory bodies. Offsets should not be used to justify projects that should not be approved. Many projects in Canada are approved regardless of residual effects and with no offset requirements. Residual impacts are accepted as a trade-off for obtaining social and economic wants. The risks of using offsets should be compared not only against hypothetical project denials but also the relative risks of no offset project and continued contributions to cumulative impacts. Offsets are a tool

to influence behaviour and to achieve conservation actions. The cost of offsets drive further impact reduction by incentivizing restoration, minimization, and avoidance. Whether this achieves NNL is uncertain but it works towards NNL longer term.

There is ongoing acceptance of residual impacts and cumulative effects in damaged landscapes requiring restoration. Offsets are an underutilized tool with potential for wider application. Multipliers are a rigorous and comprehensive framework necessary but not sufficient for effective offsets. They are one component of a broader program that should include proper regulatory oversight. In early project stages, use multipliers as a model and plan updates, similar to adaptive management. Models provide standardized measures for which to test assumptions, consequences of actions, and the relative effectiveness of different alternatives. In the absence of specific guidance from the mitigation hierarchy, good multipliers provide incentives to further avoid and minimize residual project impacts.

British Columbia's Draft Habitat Offset Decision Support Tool

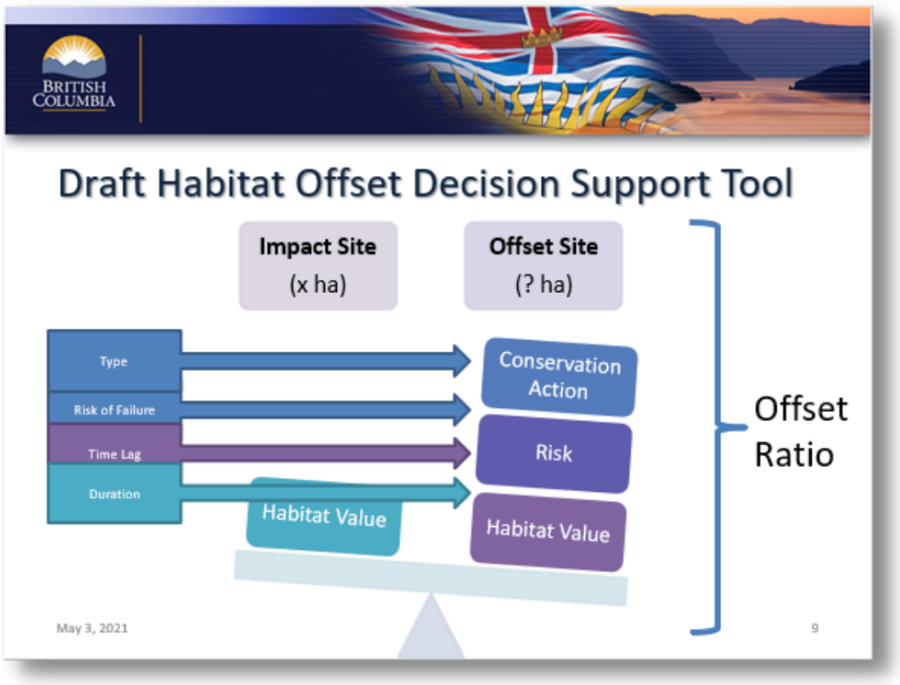
In Canada, mitigation policy and associated frameworks for provinces and territories are still being developed. British Columbia (BC) has some of Canada's richest biodiversity and over two hundred distinct First Nations. The provincial government manages 94% of BC's public land. *The Environmental Mitigation Policy* (EMP) was developed to reduce project impacts and maintain native biodiversity and ecosystems. The policy's foundation is the mitigation hierarchy and it complements existing legislation through the use of permit authorization conditions. Development of the EMP, which was released in 2014, involved multiple agencies, industry representatives, and First Nations. Throughout offset implementation the biggest issue was how decision-makers can determine adequacy of offset proposals.

Karen Stefanyk
PRESENTER

Karen Stefanyk is a Senior Conservation Policy Analyst with the British Columbia Ministry of Environment and Climate Change Strategy. Karen has also worked as a consultant with a focus on wetlands, wildlife and vegetation ecology, and developing mitigation and monitoring plans.

This presentation was prepared and presented in collaboration with Naomi Nichol, British Columbia Ministry of Forests, Lands and Natural Resource Operations and Rural Development

The Habitat Offset Decision Support tool was developed to establish a standardized method to assess offsets based on ecological factors and known risk, with a focus on impacts and direct habitat loss. The tool was developed with input from policy analysts, scientists, operational staff, and environmental economists. It is currently a draft but is used by government staff, decision-makers, First Nations, and qualified professionals. It works through groups of weighted values compared between impact and offset site. The relation of all characteristics and relative ranking generates a unique habitat value multiplier for impact and offset site. The tool considers listed species, ecosystem, and habitat. It also allows users to assess for presence, absence, or adjacency to different land designation, invasive species, and special habitat features. The user can consider different characteristics of the impact and offset site, and input values as an objective answer or relative percentage. Restoration objectives are input and must include track record of the proposed methods and percent area covered. Proposed actions at the offset site, such as protection, averted loss, restoration, enhancement, and creation must be considered. Risks, including restoration failure, time lag and ecological trajectory, duration and permanence must also be considered. The Habitat Offset Decision Support tool will determine the offset ratio. In theory, higher multipliers are needed to incentivize preventative measures. A literature review suggests the default offset ratio is 8:1, with the lowest ratio being 4:1. The offset ratio changes through a combination of site characteristics being impacted and effectiveness of conservation actions. Reducing time lag and increasing overall certainty will reduce the overall offset ratio. Manipulating inputs provides different scenarios and can help determine course of action. The use of the tool and the resulting ratio is not meant to be prescriptive but should be used as decision support. The tool is meant to document assumptions on inputs and provide consistency and structure when discussing losses and gains.



Benefits of the tool include transparency, clarity of assumptions, and facilitating discussion among stakeholders. The focus is ecological equivalency and it encourages discussion on what is being lost and gained from an ecological context. Overall, this tool has been well received by government and First Nations members. Areas for improvement include incorporating traditional ecological knowledge and re-evaluating the relative weighting of inputs. Further work is needed in communicating what it means when the tool gives a high ratio: revisiting the mitigation hierarchy or the offset is not appropriate. Current implementation is on a project-by-project approach with desired outcomes. Offsets are a valuable tool to meet objectives when averted loss is favoured over restoration, or vice versa. Multipliers have a role to play in incentivizing appropriate action. Legislative and management framework is needed to achieve targets with established conservation goals.

Target-based compensation and multipliers in South Africa

South Africa has set quantitative ecosystem-based targets that represent minimum conservation areas needed to retain the majority of characteristic ecosystem species. Objectives ensure representation of biodiversity patterns. Targets are expressed as a proportion of the historical extent of each ecosystem and are the foundation of biodiversity assessment and planning processes in South Africa. Forward planning is done at different scales from national, provincial and local levels. Resulting plans identify and describe biodiversity priority areas (critical areas) and highlight ecological importance. Targets are integrated into two indicators derived from biodiversity assessments. The first indicator is ecosystem protection level and is defined relative to the applicable biodiversity target for a particular ecosystem. A system is considered not protected (less than 5% of its biodiversity target is adequately protected), poorly protected (5% and 49%), moderately protected (50% to 99%), or well protected, where the target has been met or exceeded. The second indicator is ecosystem threat status and is reported using categories such as least concern, vulnerable, endangered, or critically endangered. Ecosystems are assessed based on agreed criteria and quantitative thresholds described in the IUCN Red List of Ecosystems. A key criterion is the extent of ecosystem loss or depletion over a specific time frame, relative to an ecosystem's historical extent. These ecosystem indicators show there are many areas with high threat status but many ecosystems are poorly or not protected.

The biodiversity status assessment informs conservation investment and strategy. It guides land use planning including mitigation hierarchy application and offset design or compensation. Target-based offsetting guidelines exist at the provincial level, while national guidelines are being developed. Guideline outcomes ensure offsets contribute to the protection and management of priority biodiversity areas that are unprotected. The

Amrei von Hase
PRESENTER

Amrei von Hase is an ecologist working on biodiversity conservation, offsets, and ecological compensation. She was the Science Lead for the Business and Biodiversity Offset Programme (BBOP).

Susie Brownlie
PRESENTER

Susie Brownlie is an environmental assessment practitioner. She was a member of BBOP's advisory board and co-chair of IAIA International's Biodiversity and Ecology section.

intention is not to pursue no net loss (NNL) or net gain specifically. Restoration is generally not feasible for terrestrial systems in South Africa. Stronger biodiversity outcomes are achieved through retaining and protecting existing ecosystems.

Ecological targets inform offsets in three ways.

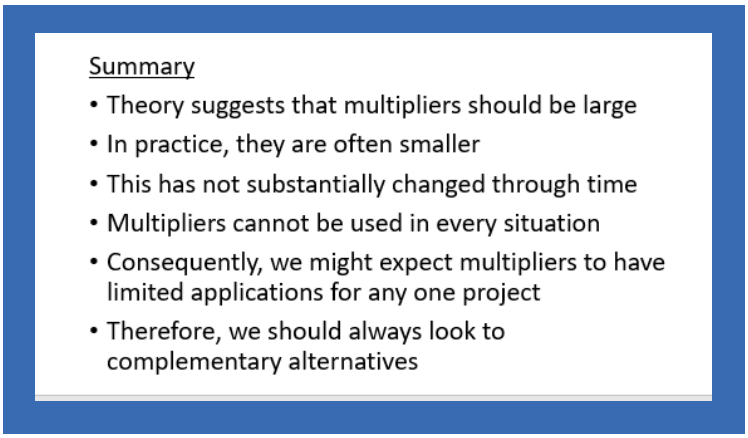
1. First is to assess whether an offset or compensation is required. Offsets are not required in systems of least concern unless other triggers apply, and impacts on critical ecosystems must be avoided.
2. Secondly, is determining the offset location and ecosystem type. The same type of ecosystem is required (like for like) or, alternatively, a more threatened system. There should be focus on priority areas outlined by biodiversity plans.
3. The third consideration is the size of the offset requirement. This is designed for each project in proportion to residual impacts and biodiversity targets for affected ecosystems. Overall compensation is scaled using target-based multipliers. This is a precautionary approach to ensure no ecosystems become more threatened or endangered.

An example would be an ecosystem that is not currently protected and is categorized as vulnerable. If there is a 30% biodiversity target, then at minimum 30% of its historical extent should be protected. A basic ratio of 3:1, when applied at the project level, would lead to a landscape where approximately 37% of the system is formally protected. This would exceed the minimum target. And 63% of its historical extent would be transformed or developed. This assumes every impact is compensated. This approach is a managed net loss because overall loss is accepted for improved ecosystem protection. Multipliers can be set to achieve particular landscape outcomes or target specific biodiversity features. For critically endangered ecosystems and areas considered irreplaceable for achieving biodiversity targets, the ratio is 30:1. Endangered ecosystem ratios are 10:1 to 30:1, vulnerable systems at 1:1 to 4:1. No offset is required for least threatened ecosystems.

Project level compensation can be scaled to achieve overarching biodiversity targets and provide a defensible basis for determining multipliers. This target-based approach is the foundation of South Africa's offset system and aims to protect important biodiversity areas. Target based compensation approach can be applied to other contexts to encompass situations where NNL or net gain of biodiversity are desired and appropriate. This would improve alignment of mitigation and biodiversity policy.

Multipliers: Theory vs. Practice

When examining global biodiversity offset systems, we must consider multipliers specifically: what should they be used for, what are they used for, and how large should they be? The key challenge with practical implementation is multiplier size. Theoretically, multipliers may need to be extremely large, even in the hundreds, to serve various purposes. Implementation of ratios and multipliers is varied as seen in Canadian and South African examples.



Joseph Bull
SESSION LEADER

Joseph Bull is an ecologist and conservation scientist. He is currently a Senior Lecturer at the Durrell Institute of Conservation and Ecology at the University of Kent, visiting Researcher at the University of Oxford, and co-founder of Wild Business Ltd.

Multipliers should incentivize avoidance; therefore, large multipliers may be appropriate. Overall feasibility must be considered as very large multipliers are impractical and fail to serve their purpose. The global use of multipliers in policy and projects typically vary between 1 and 10. Research on multipliers and offsets more generally proposed 10 as the maximum practical limit. Higher values can be used for avoidance or national conservation targets. In long term offset restoration projects, it can take 20 to 30 years for the area to mature into the target habitat. The minimum suggested multiplier is 15. There is debate between how large multipliers can be in practice (10 or below) and how large they might have to be in theory (15 and above). The majority of multipliers currently implemented are lower than theory suggests. Also, the size of multipliers has not significantly increased over time. Multipliers should be used selectively and alternatives implemented when possible.

There is limited research and data available on developmental impacts on biodiversity and restoration success. Multipliers account for ecological risk, alternatives include further research and stronger monitoring. Multipliers are used to consider time lag between the biodiversity offset starting and reaching the target ecosystem. Alternatively, biodiversity offsets can be required prior to the start of a project (biodiversity banking). Multipliers cannot be used in every situation and they should have limited application; complimentary alternatives should be explored.

PANEL DISCUSSION - QUESTIONS/ANSWERS

What is feasible: managed no net loss, no net loss, or net gain in the current world? Which goal is most realistic for us to pursue given all the complications?
Overall offset goals will depend on the geographical location. In countries with undisturbed biodiversity and development pressures a managed net loss is expected. Other areas where biodiversity is impoverished should strive for net gain. Additionally, outcomes and targets should be considered as it aids in the understanding whether a no net loss, net gain, or managed net loss is the appropriate strategy (Joseph Bull, Amrei von Hase, Karen Stefanyk).

What country is doing it better? Canada or South Africa?
Canada and South Africa have different ecological objectives that utilize the same policy mechanism. South Africa's goal is to meet landscape conservation targets whereas Canada uses a traditional mitigation of impact caused by specific development. Both are an appropriate approach (Joseph Bull).

Canadian examples show that we have a long way to go developing offset policies and tools-was this process all led by the government? How has the experience been on the ground?
In Canada we need an offsetting system and support with legislative and regulatory mechanisms. Regulators can initiate offsets; however, a holistic government approach is needed to ensure policies are ecologically, economically and practically minded. There is a federal policy on wetland conservation that aims for no net loss of wetlands on federal land. Almost all provinces have offset policies for wetland conservation. These individual policies did not have a coordinated effort to determine a common approach to offset. There is a push for provinces to set offsetting and conservation targets. Canada can benefit from concrete targets and what they are trying to achieve (Marcus Eyre, Karen Stefanyk, David Poulton).

Long term security and success of offset projects: what if the company fails during the offset period? What arrangement other than multipliers can we put in place to monitor success of projects and undertake corrective action if needed?
Multipliers are important in offset design and inform the sizing of the offset or the compensation. A multiplier cannot be applied to this kind of risk. When designing and implementing policies the practical element is most important (over theory): is there enough expertise, are there enough resources, is there sufficient infrastructure for monitoring, reporting and disclosure? Examples of offsets likely to show longevity are projects where cost, resources, and monitoring framework are designed at the start of the project. This ensures sufficient resources are given to long term security. Implementation may not be a problem but long-term monitoring is a long-term cost and liability. While multipliers cannot deal with this risk, the other mentioned variables can address it. Additionally, we must consider regulations to act as enforcement to ensure an offset is delivered and successful (Joseph Bull, Marcus Eyre, Amrei von Hase).

LAND USE 2021: A PLACE FOR BIODIVERSITY OFFSETS

SESSION FOUR: ALIGNING CARBON AND BIODIVERSITY OFFSETS

PRESENTED: MAY 10, 2021

The world is faced with twin global environmental crises: rising temperatures and declining biodiversity. As we consider measures to address each of these situations it is critical that we avoid a silo approach, risking solutions to one problem that exacerbate the other. Offsetting has been used as a greenhouse gas management and mitigation tool for several years with varying degrees of credibility and success. Biodiversity offset systems are increasingly common and sophisticated. Can and should we combine biodiversity and carbon offsetting?

Key points from the session

- As offsetting is seen as a tool for combating both climate change and biodiversity loss, there is a great deal of policy interest in whether or how these two types of offsets might be combined.
- The two broad approaches are stacking, where each type of credit is recognized and sold separately, and bundling, where a single credit recognizes both types of ecosystem service.
- A third alternative is to top up the price for the provision of one type of credit with a payment (possible a premium or subsidy) in recognition of the contribution to the other ecosystem service. We have seen this in systems like the Climate and Community Biodiversity standards and REDD+.
- Distinguishing between ecosystem services is complicated where they derive from interrelated ecological functions.
- This issue gives rise to concern about whether the provision of the second ecosystem service is additional, and how accounting for each aspect can be rigorous and transparent. These aspects are essential, as there is a risk of double-dipping.
- Policies in different jurisdictions have treated these issues in very different ways, with no clear consensus. The issue is ongoing and complex.
- At a minimum, the provision of one ecosystem service should not be pursued in a manner that compromises the other.
- The private sector could be an important source of finance for ecosystem services. Private investors in voluntary markets may approach this issue with both creativity and rigour. They want to assure a revenue stream while not degrading any ecosystem service.

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Nature-based Solutions: Combining climate and biodiversity offsets for a stronger, greener economy

Biodiversity loss and climate change are major global challenges. There are significant estimates of species loss by 2100 if climate change is not addressed. Global carbon dioxide (CO_2) levels are 50% higher than pre-industrial levels and rising. Approximately 20% of greenhouse gas emissions come from land use related activities, such as forestry, farming, and wetland management. Land use significantly contributes to climate change, which poses a problem for biodiversity. The United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention on Biological Diversity are working together for nature-based climate solutions that address both climate change and biodiversity. Preliminary analysis of protected areas and biodiversity hotspots in Canada suggests there are 55 Mt of additional CO_2 sequestration available from improved land use and conservation efforts.

The use of offset systems can meet climate and biodiversity goals. A variety of tools can be used including:

- Stacking: taking CO_2 and biodiversity offsets from a project and selling them separately
- Bundling: selling CO_2 and biodiversity offsets together as a package deal
- Blending: injecting biodiversity requirements into existing CO_2 offsets
- Top up: combining payments for ecosystem services with offsets; can produce a pure net gain in CO_2 or biodiversity

There are voluntary and regulatory offset markets. When regulation drives offsets, it results in larger and higher priced markets. Regulations requiring offsets provide greater incentive than corporate social responsibility or voluntary pledges. While these actions are important, moving towards regulation as a foundation for offsets will help meet climate change and biodiversity objectives.

Stewart Elgie
SESSION LEADER

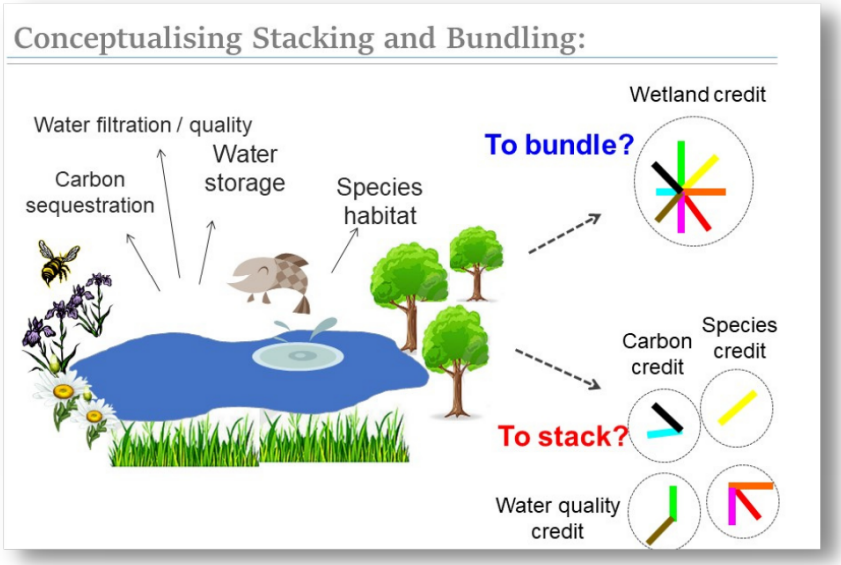
Stewart Elgie is the founder and chair of the Smart Prosperity Institute at the University of Ottawa where he is also a professor of law and economics. The Smart Prosperity Institute is Canada's largest environment-economy research network and think-tank. Elgie is one of Canada's most well known and respected environmental lawyers.

Integrating biodiversity and carbon: Examples of stacking and bundling

Globally there has been an increase in no net loss (NNL) and mitigation policies. Several initiatives have provided guidance on best practices in offsets including the Business and Biodiversity Offsets Programme (BBOP). There are parallel trends between climate mitigation and the role of carbon offsets. Nature based solutions should create synergies and limit risk of trade-offs. Existing controversy around offsets has raised questions around combining biodiversity and carbon offsets. Project developers and offset providers want to know if they can align biodiversity offsets with other projects on the same site. Policy makers and practitioners want to incentivize the provision of multiple ecosystem services and benefits rather than single services like carbon sequestration. To mitigate risks, such as overall loss of services, and ensure good outcomes, stacking and bundling are potential solutions. Stacking and bundling are different ways of packaging multiple ecosystem services produced on a piece of land, for use in environmental compensation programs and conservation projects. The benefits and risks of selected case studies are explored and conclusions and recommendations provided.

Amrei von Hase
PRESENTER

Amrei von Hase is a conservation ecologist working in Cape Town, South Africa. She was the science lead for Business and Biodiversity Offset Program (BBOP), an international multi-stakeholder collaboration that operated from 2004 to 2018.



The voluntary forest carbon markets have developed standards and certification systems. The voluntary carbon system can be combined with certification according to the Climate and Community Biodiversity standards. This ensures eligible land management projects adopt best practices and multiple benefits approaches in design and implementation. To be certified as a carbon offset project, such as a REDD+ project, clear benefits for biodiversity and local communities alongside principal climate mitigation benefits must

be demonstrated. Carbon offset markets trade in credits based on units of carbon, buyers of Voluntary Carbon System and Climate and Community Biodiversity certified offsets are interested in carbon related services bundled with other services. All benefits are delivered at a single site and are not separately valued or sold. Carbon offsets bundled with biodiversity and social services have advantages for market participants. A growing number of buyers of voluntary forest carbon offsets, choose offsets with certified biodiversity and social co-benefits. Voluntary biodiversity offset projects, undertaken by companies with residual impacts on biodiversity cannot be combined with the REDD+ project. Best practice biodiversity and carbon offsets have stringent additionality requirements that prevent offset stacking.

Australian policies have different provisions on offset stacking. The *Carbon Farming Initiative* and the *Carbon Credits Act* enables land managers to obtain carbon credits through land management practices that enhance carbon storage such as reforestation. Projects must demonstrate additionality relative to business-as-usual baseline and offset permanence. The commonwealth *Environmental Protection and Biodiversity Conservation Act* has biodiversity offset policies that apply when proposed development affects biodiversity of national significance. This policy does not allow biodiversity and carbon offset stacking. Conservation gains achieved when participating in another initiative are not eligible biodiversity offsets. In contrast, the *New South Wales Offset Policy for Major Projects* permits biodiversity and carbon offset stacking and unbundling. Policy states biodiversity and carbon credits can be generated through the same management actions. This policy contradicts the *Environmental Protection and Biodiversity Conservation Act* biodiversity offset policy and the *Carbon Farming Initiative*. It has drawn criticism from various stakeholders. Concerns include lack of additionality, risk of double counting, and associated net loss of biodiversity. Symmetrical accounting of carbon and biodiversity losses and gains across all affected sites could mitigate risks.

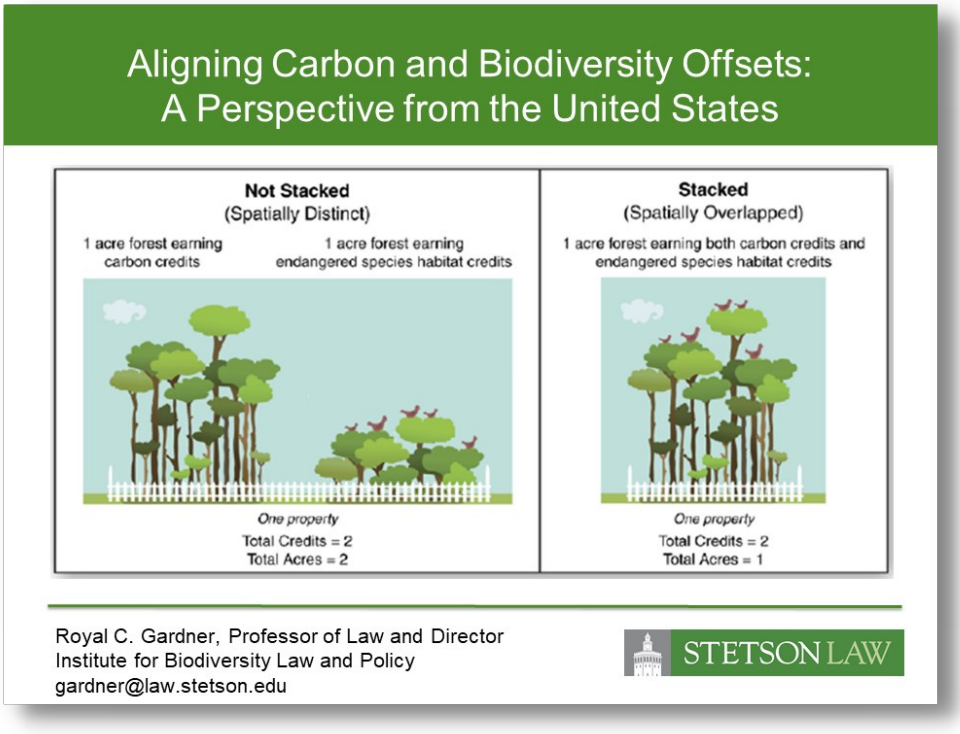
Impact assessment, mitigation measures, and ecological compensation are regulated under federal law in Germany. Compensation can be delivered by conservation banks or compensation pools operated by a range of institutes. In addition to providing compliance driven offsets for residual ecological impacts, these agencies wanted to sell voluntary carbon offsets. To address concerns around stacking and bundling two different strategies have been employed. The first strategy is to target spatially separate lands. Ecological and carbon credits are allowed on different lands under different management actions with no overlap. The second strategy is to develop projects where the two credit types are quantified and explicitly related to each other using detailed methodology. These credits are then stacked but not unbundled. This approach ensures clear additionality of ecological outcomes, limits risk of overall or net loss of services, and safeguards the integrity of the credits and the agency.

The Willamette Partnership Ecosystem Credit Accounting System in the United States works with stakeholders from government, farmers, and conversation groups. They have piloted multiple benefits approaches to develop robust mechanisms for trading a variety of credit types in one marketplace. Participating landowners are supported with whole system restoration targeting different ecological and ecosystem benefits. Land owners provide benefits to land management that are not valued under regulations or in environmental markets. This partnership has developed an accounting and measurement protocol outlining how to generate different credit types at a single restoration project. Similar management activities can contribute to multiple credit types that are stacked, an additional safeguard is credits cannot be unbundled. When one type of credit is sold, other associated credits are retired. Offset credits should not be unbundled as ecological functions are interrelated.

Developing robust systems for multiple offset services is complex and requires early and extensive planning. Projects need clear objectives and outcomes. Potential options need to be investigated and environmental and social implications considered. Available additionality tests need to be reviewed and measurement and accounting methods determined. Policies should outline the cost of benefits and the coordination required between policy, standards, and regulatory regimes. Pilot projects contribute to data collection, understanding, and inform policy and program design. When in doubt, bundle don't stack.

Aligning Carbon and Biodiversity Offsets: A Perspective from the United States

Stacking and unbundling examples involve regulated markets, where laws or regulations drive offsetting. Most examples involve biodiversity not carbon offsets but previous lessons learned can align biodiversity and carbon offsets. An early environmental market was the acid deposition program in the United States (US); a cap-and-trade program for sulfur dioxide (SO_2) and nitrogen oxide (NO_x). Emissions reduced through pollution control equipment produced excess allowances; SO_2 or NO_x credits. These were traded in an early large-scale environmental credit market. One conservation action created two credit types that were unbundled and sold.



Royal Gardner
PRESENTER

Royal Gardner is a Professor of Law and Director of the Institute of Biodiversity Law and Policy at Stetson University in Florida. He is an expert in wetland law and policy and previously Chair of the Scientific and Technical Review Panel of the Ramsar Convention on Wetlands.

Wetland mitigation banking in the US involves offsets produced by third parties. Restoration companies restore wetlands and generate credits, which are sold to offset permitted impacts. Wetland credits represent a variety of ecosystem functions. Measurements are needed to account for site condition and function of the impact and offset area. Functional credits include flood control, habitat, water quality, and carbon sequestration. The credit or offset is limited to a specific type of wetland credit and cannot be unbundled. Unbundling wetland credits is challenging as ecosystem functions are interdependent and integrated.

In North Carolina a private restoration company sold 250 wetland credits for $3.8 million USD to offset a highway project's impacts. Credits were based on restoration and preservation actions. Years later nutrient offset credits and water quality credits from the same area were certified. These offsets were sold for $700,000 USD to offset new highway impacts. A review by the state found this resulted in a net loss of ecological functions. This led to regulations on nutrient offset credits being derived from land that was also used to produce wetland credits. There was no additionality. New Jersey allows credits from spatially overlapping areas to be stacked, unbundled and sold to different entities. A wetland mitigation bank site that produces wetland credits can also have a riparian zone that produces flood control credits. Policy states that functions and values of an area where wetlands and riparian zones overlap, are higher than functions and values of solely a wetland or riparian zone. However, a wetland credit already accounts for flood control function and this could be double-dipping.

Species credits under the US *Endangered Species Act* can be used to offset impacts to species habitat. Credits are developed at a conservation bank. An area is restored or preserved for a species and credits are generated. Conservation actions can benefit more than one species, credits can be stacked but not unbundled. In Florida some conservation banks have two species of lizard credits. If developers require only one species of lizard, it is sold and the other retired. However, if developers need both lizard credits, then credits can be bundled to offset impacts from a single project. Another conservation area effectively generates two species credits that are used to offset impacts from multiple projects. A nature reserve offsetting impacts to two species using different conservation actions to generate credits; a strong example of additionality.

Carbon and biodiversity credits were combined in the Florida Panther Conservation Bank. When established it reserved the right to sell carbon credits with approval of the US Fish and Wildlife Service. To incentivize establishment of further conservation banks it was important the agency reserve approval rights. This ensured areas would not be managed for carbon to the detriment of biodiversity. Florida does not have a regulated carbon market, some income may be generated from voluntary markets. Property owners participate in conservation programs and are incentivized to manage land for biodiversity benefits. Under the Conservation Reserve Program and Wetland Reserve Program, owners are obligated to manage land for conservation purposes. Under federal regulations, owners can be additionally paid for carbon credits from the voluntary market. This is not real additionality.

A new policy addresses stacking and unbundling with environmental banks in coastal Louisiana. Policy application is limited but recommendations suggest interdependent and integrated functions, like carbon sequestration, should not be unbundled. Ecosystem credits with multiple functions should not be unbundled. Managing sites for one credit type should not denigrate ecological values represented by other credit types. Additionality is a continuing challenge and stacking and unbundling is complex. Agencies require resources and expertise to properly assess, monitor, and verify specific functional gains and losses.

Cultivo: Invest in Nature

Core issues when investing in offset projects is a lack of cost transparency, understanding project details and difficulty assessing the level of financial investment required. Cultivo has developed a series of tools to ascertain the variables required to understand investing potential in a specific project. It collects data at environmental and social levels. Once the project starts, these tools are used to monitor the project. Inefficiencies in monitoring, reporting, or implementations will be identified. Further challenges are lack of standardization and poor data disclosure.

Potential projects are delineated using algorithms, spatial analysis, and remote sensors confirmed with ground truth sensors. This allows for the discovery of projects that will meet specific investor criteria. This may be specific geography, type of ecosystem, or a specific type of offset. An agroforestry project in Florida required a $23 million investment. Conservation activities included wild restoration and agroforestry activities. The site used tree species with dense root systems specifically for climate resiliency. The stacking and unbundling of credits at this project ($16 per tonne) would generate $33 million from biodiversity, $4.5 million from water storage, and $66 million from agroforestry. The returns projects are drawing investors.

Investors want a revenue stream, regardless if credits are stacked or bundled. Projects should protect and ideally increase biodiversity, capture carbon and contribute other benefits. A grassland project in northern Mexico has been undergoing desertification for 30 years due to traditional grazing practices. The area is currently under 300,000 hectares, but is increasing. This project can potentially capture 4.2 Mt of CO_2 annually. More importantly, proper watershed restoration could capture 7.7 m^3 of water per year. Required investment is low and this project will have a significant impact on biodiversity. This project's water restoration has significant social impacts as this area experiences significant cultural and social pressures. The break-even point is $7.10/tonne, given forecasted rates of $16/tonne this project already has target returns.

Analysis has identified 150 million hectares for potential offset projects, deeper analysis of 88 million hectares has been completed. Projects in the investment pipeline cover over 5 million hectares. These areas are a mix of ecosystems around the world and can capture 89 Mt of CO_2 and 300 million m^3 of water annually.

Manuel Piñuela
PRESENTER

Manuel Piñuela is a nature advocate and science entrepreneur. He is the co-founder of Cultivo, Drayson Tech, and SENS.L , businesses based on the provision of ecosystem services.

The Canadian perspective

In Canada there are limited regulated offset policies for biodiversity. The federal *Fisheries Act* is the most established policy. The *Species at Risk Act* has potential offset policies but this has not been utilized. The *Clean Water Act* and *Endangered Species Act* in the United States have robust wetland and species offset markets, but in Canada these are limited. There is a limited regulatory market for endangered species in Canada. Carbon offset systems are established in Quebec and Alberta. These offset systems do not include forests. British Columbia has a carbon-neutral government that includes forest-based offsets. The federal government is designing an offset program that includes forest management. This will open the offset market in Canada in a regulated capacity.

To address the no gain problem of offsets, a biodiversity requirement can be injected into a CO_2 offset. This will ensure a forest carbon offset has net biodiversity gain, or at minimum no net loss. Alternatively, the government could offer top up payments for biodiversity offsets in addition to carbon offsets. This will not be an offset but a payment for ecosystem services; additionality is not a concern.

Stewart Elgie
SESSION LEADER

Stewart Elgie is the founder and chair of the Smart Prosperity Institute at the University of Ottawa where he is also a professor of law and economics. The Smart Prosperity Institute is Canada's largest environment-economy research network and think-tank. Elgie is one of Canada's most well known and respected environmental lawyers.

PANEL DISCUSSION - QUESTIONS/ANSWERS

For financial additionality tests shouldn't it be viable to say if project developers can show that markets are not financially additional- stacking should be permitted? Discounts can be used to hedge against the risk of asymmetrical information. What can we do to get past the problem of additionality in stacking?
The financial additionality argument is valid and an additionality test can be applied. If the financial additionality argument does not achieve the desired outcome, then it is unlikely to be a satisfactory additionality test. Proving additionality requires open data availability that can be analyzed and observable to investors and land owners. Ongoing transparency in the accounting of ecosystem services is needed. In Maryland there is a water quality trading program dealing with nutrient offsets. A nutrient trading program is using a tracking tool to calibrate the area for carbon sequestration. It is anticipated that participating farmers should receive water quality and carbon credits from forested buffers. A single conservation action, on spatially overlapped lands, has generated two types of credits. These credits can be sold in two different markets. The key to success in this project is rigorous accounting mechanisms. (Amrei von Hase, Royal Gardner, Manuel Piñuela)

In Canada we are about to develop forest carbon offset protocols- if we add biodiversity requirements on top of that, no net loss, net positive, is it worth it? What about a premium return- do you get a higher value for the offset if there are additional biodiversity requirements?
Anecdotal evidence suggests premium prices are possible. In voluntary markets it is difficult to obtain data which makes determining a premium associated with co-benefits challenging. Project investors want biodiversity included in their offsets. The accounting of the species in an offset project was peer reviewed. It resulted in $4 more per tonne for the offset site because of extensive biodiversity present. This offset project sold at more than $18/tonne. There was no specific ecosystem measure, but the collateral around the offset was transparent and visible. From a market perspective, investors are not interested in projects that do not contain a biodiversity component. Encouraging partnerships outside of a regulatory capacity can encourage biodiversity top-off. (Stewart Elgie, Amrei von Hase, Manuel Piñuela, Royal Gardner)

There are internationally agreed methods to count carbon (such as Redd+) does this exist for biodiversity?
There is no international biodiversity standard equivalent to carbon. Biodiversity is complex and varies between ecosystems, climates, and local expressions. Clear and detailed international methods and standards on counting biodiversity are extremely difficult. However, the International Union for Conservation of Nature (IUCN) has published an agreed hierarchy to classify and map ecosystems and protocols for species identification. Best practice guidelines (ex. BBOP) can help assess biodiversity and biodiversity impacts. There are best practice documents in different countries with restoration methods for specific biodiversity. (Amrei von Hase)

Scenario: biodiversity and carbon offsets generated by local communities. Revenue may not be of interest because of high investment and operational costs- shouldn't it be possible to unbundle for these specific cases when the objective is to get local communities to protect and manage biodiversity in ecosystems?
A small offset project in Mexico was in a community with no specific regulations for biodiversity. To incentivize community members social safeguards are required and full transparency of how much capital will return to the community. Indigenous communities, customers and investors are asking for social safeguards. A transparent profit-sharing formula accessible to all stakeholders will align incentives. Profit sharing and early wetland mitigation baking was uncertain because regulatory agencies had not provided approval. The first successful project was a public and private partnership. A private company assumed risk and restored wetlands on public government lands. The local government controlled the land and had a wetland park with funds provided for long-term stewardship. (Manuel Piñuela, Royal Gardner)
Offsets internalize damage for project components and supply of offsets can't be separated from demand. If offsets are unbundled to incentivize supply and not demand, it can result in poor environmental outcomes. (Amrei von Hase)

LAND USE 2021: A PLACE FOR BIODIVERSITY OFFSETS

SESSION FIVE: OFFSETTING AS IF PEOPLE MATTERED - SOCIAL ASPECTS OF BIODIVERSITY OFFSETTING

PRESENTED: MAY 17, 2021

Offsetting usually focuses on ecological goals and establishing criteria to assess ecosystem health. However, people are impacted when ecosystems are altered. People may lose or gain the benefits of ecosystem services or economic opportunities and their relationship to the landscape, which is a core piece of identity, culture, and spirituality, may be impacted. Manipulating this relationship is a sensitive subject, hence the importance of the discussion in this session.

Key points from the session

- To be successful, offsetting must not only satisfy technical ecological criteria, but achieve some level of social acceptability. It should leave communities no worse off. Social values must be weighed against the technical criteria for biodiversity offsetting.
- Creating partnerships with local communities, including a variety of interests groups, is important for understanding and respecting local social values. There may be no consensus of views between these groups, however.
- Some social values are directly related to specific places, so the idea of offsetting for those is inherently problematic.
- In survey data from southern Sweden, people preferred offsetting on prior industrial lands, larger offsets, close to the disturbance, and representing both natural and recreational values. When these values were weighted against each other, size was indicated to be the prioritiy, with distance being relevant to natural values and siting on industrial land being relevant for recreational values.
- The governance of offset regimes should acknowledge and tap into collective values, making use of established groups.
- Gaining social acceptance is always difficult because offsetting is an admission that a project will have unavoidable negative consequences. Building respectful relationships requires transparency and time.
- Interdisciplinary, collaborative work on offset design can help to understand different values and perspectives and foster creativity.

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Why do we need to consider social issues when designing and implementing biodiversity NNL/NG?

Common challenges facing biodiversity offsetting include technical, governance, and effectiveness issues. Social impacts of offsetting pose an additional challenge. Losses and gains in biodiversity impact people's cultural relationship with the land, and as a result, costs and benefits experienced by local people must be considered.

Considering social aspects of offsetting is important because no-net loss (NNL) policies should be sustainable, equitable, and leave communities no worse off in terms of wellbeing. Wellbeing is related to material assets, relationships, and how a person subjectively feels about their ability to make personal choices. Access to nature influences wellbeing because nature and culture are inextricably linked. Understanding cultural values and beliefs in relation to natural landscapes helps justify and motivate offset strategies. These strategies are meaningful to local people and align with their priorities. Creating partnerships with local people is key to a successful offset.

The Bujugali and Isimba hydropower projects in Uganda, exemplify the need to consider social impacts. The Kalagala offset was created to counter the effects of the Bujugali project, but both developments disrupted sacred features and spirits on the landscape through flooding and rock-blasting. These features and spirits were related to cultural heritage and important to people's wellbeing, and their disruption impacted cultural heritage.

Victoria Griffiths
SESSION LEADER

Victoria Griffiths is a natural resource management and sustainable development specialist with field experience in developing countries, including in sub-Saharan Africa. She is an Associate with The Landscapes and Livelihoods Group and is a registered Professional Natural Scientist with the South African Council for Natural Scientific Professions.

Whether and how cultural heritage is important to wellbeing varies based on geography, education, wealth, and gender. More educated people find cultural heritage less important to wellbeing, while wealthier people and men find cultural heritage more important to wellbeing.

There have been attempts to manage impacts on cultural heritage and incorporate local culture into NNL strategies through engagement with spiritual leaders and the relocation of features associated with spirits. These strategies are not always popular among local communities because spirits are believed to belong at specific geographic features i n situ. As a result, it is best to avoid impacts. When avoidance is not possible, achieving NNL and ensuring people are no worse off is more difficult. Comprehensive engagement with local communities will improve social outcomes of projects and their offsets and create more equitable NNL strategies.

- Understanding cultural heritage can be difficult, complex and time consuming

➢ Cultural values are hard to articulate

➢ People may not be willing to share cultural knowledge easily and openly

➢ Spirits and sacred sites are sensitive topics

BUT

Ignoring cultural values or failing to account for them can undermine people's **wellbeing**

- Taking time is vital
  - ➢ including comprehensive engagement
- Helps with improving social outcomes (and acceptability) of projects and their offsets
- Assisting with the design of **equitable NNL strategies** that **leave local people 'no worse off'**

Offsetting as if people
DON'T matter
=
badly designed offsets that risk failure

Might need an offset AND separate social compensation measures

People matter!

Expert Guidance for Environmental Compensation (offsetting) is Consistent with Public Preferences – Evidence from a Choice Experiment in Sweden

In a perfect compensation scenario, offsets would be in kind, without risk, on site, and executed shortly after damage occurs. This is not always possible in practice, so decisions and trade-offs must be made regarding offset area and design. Literature and guidelines on compensation suggest that the size of an offset site can be seen as a function of distance to the damage site, compensation should be like-for-like, and the proximity of the offset is more important for recreational values than nature values. In this choice experiment, 1,000 respondents in urban areas in southern Sweden answered questions about their preferences for offset design in order to determine whether their preferences align with these guidelines.

Linus Hasselström
PRESENTER

Linus Hasselström is an environmental economist and researcher at KTH Royal Institute of Technology in Stockholm, Sweden. His research focuses on ecosystem services valuation and market-based mechanisms for offsetting.

Scott Cole
PRESENTER

Scott Cole is an environmental economist and consultant at WSP in Gothenburg, Sweden. His work focuses on valuing environmental change to support environmental policy making.

The experiment included four variables:

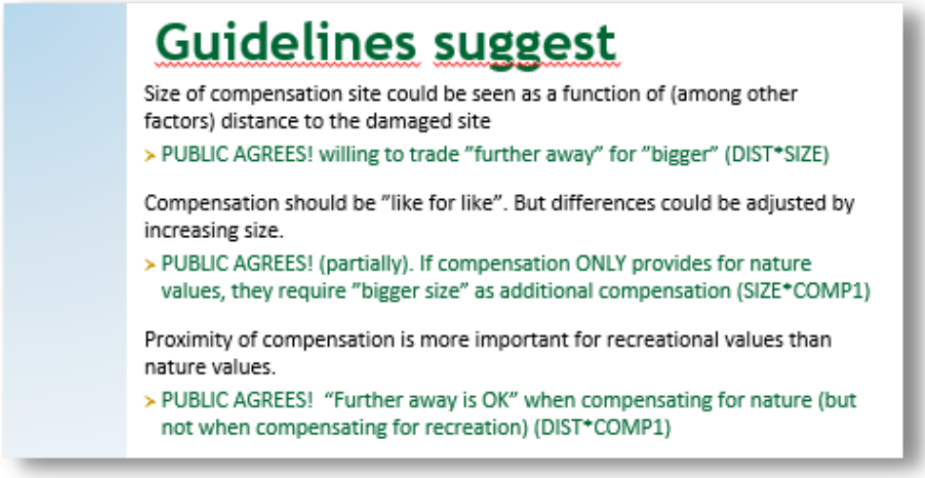
- **location (an already green area or an industrial area)**
- **size (equal to or twice the size of the area damaged)**
- **distance (300m or 900m)**
- **compensation values (recreational or natural)**

The first model found that in terms of location, the industrial site was 5% more likely to be chosen than the pre-existing green site. In terms of size, the bigger site was 25% more likely to be chosen than a site that was equal in size. In terms of distance, the closer site was 10% more likely to be chosen than a further site. Lastly, in terms of compensation focus, 5% of respondents were more likely to choose compensation for natural values, but 21% would prefer compensation for both natural and recreational values. In this model, size and distance were of particular value.

The second model, which added additional explanatory variables, explored whether the changing of one variable depends on the value of another variable and their combined effects on the choice of the compensation site. In practice, there may be competing compensation proposals where several design variables are changing at the same time, and the complex model addressed this.

The results of the second model show:

- **a larger size was preferred by 4.6% when the compensation site is further away,**
- **size was 5.6% more important for nature values than for both values,**
- **the effect of the distance was 7.3% greater for nature values than for recreation values, and**
- **the effect of industrial land use was 6.6% greater for recreation values than for nature values.**



The majority of respondents agree that when development affects greenspace, there should be compensation. However, less respondents agree that compensation is necessary when a bike path is built, even if it affects local habitat. As a result, the extent to which these guidelines should be based on public perspectives compared to expert opinion is up for debate.

The application of No Net Policy in Quebec: can we really engender a "social fit" for more sustainable land use planning?

Wetland loss and stream disappearance in the Saint-Lawrence lowlands prompted a law in Quebec that introduced a new no-net loss principle. The mitigation hierarchy was implemented, and five corresponding implementation mechanisms were utilized. Regional conservation plans and restoration and creation programs, which relate to the "avoidance" and "offset" steps respectively, are two such mechanisms.

Mitigation hierarchy literature reviewed by most institutions focuses on restoration, effectiveness of offsetting, and optimization of institutions instead of the social and political elements that impede progressive change. As a result, the implementation of the mitigation hierarchy has had minimal impact on ecological outcomes. The institutional bricolage framework is used to understand how offsetting schemes are politically and socially constructed in Quebec.

Historical no net loss policies depended on top-down, decentralized water management systems, but there was no enforcement and low impact on other policies with this system. Eventually, regional municipalities were granted implementation management systems for wetland and stream conservation. This was a missed opportunity to empower watershed organizations.

The equivalence principle is still relevant in this new offsetting scheme. In Quebec, equivalence is defined as an ecosystem area and function as well as the broader regional environmental issues. Equivalence is assessed through the amount available in the restoration fund. These amounts are reallocated to the regional municipalities in proportion to the money collected through the issuing of development permits. This approach relies on the loose notion of equivalence that goes toward an ecosystem services equivalence.

In order to enter a new social fit for wetland offsetting, there must be acknowledgement and appreciation of collective needs and interest. This can be mainstreamed by various stakeholders, including watershed organizations, Regional Environmental Councils, or regional

Céline Jacob
PRESENTER

Céline Jacob is an environmental geographer and consultant on blue economy at Vertigo Lab in Bordeaux, France. Her research interests include environmental governance systems with a particular focus on marine conservation and the sustainability of economic development.

municipalities. These organizations can consider a variety of perspectives and encourage stakeholders to adhere to new restoration solutions through the use of utilitarian considerations.

The implementation of no net loss policies in Quebec can move toward improved land use planning goals that acknowledge collective values. To achieve a novel social fit for wetland offsetting, there must be a reconfiguration of governance that does not view offsetting as a bandage on an existing system. Without this reconfiguration, uncertainties remain concerning the potential for system change, given the strong influence of power relations and path dependency.

Building stakeholder support - three key concepts

Resolving social impacts of offsetting is more challenging and time consuming than addressing technical issues because, unlike with technical issues, there is no clear set of solutions. All people and projects are unique, and as a result, each solution needs to be tailored to fit the challenges of each individual situation.

Not every person will accept the need, location, or design of a proposed project. The goal of stakeholder support however, is to achieve a general consensus (or an absence of objection) among land owners, Indigenous nations, environmental regulators and other stakeholders. Gaining social acceptance can be difficult because offsetting is indicative of a failure to design a project that avoids or minimizes ecosystem impact. The failure to do less intensive and invasive activities can pose a problem when speaking with affected communities because they are being asked to accept unavoidable effects.

Specific challenges involved in social impacts of offsetting include equivalency, additionality, location, time, and duration. These challenges are vast, and as a result key principles of engagement must be utilized alongside an admission of failure to manage a less invasive project.

Engagement during negotiations and discussions should:

- **be transparent,**
- **use accurate and relevant information,**
- **ensure inclusiveness (removing barriers to participation),**
- **express a desire to use community input,**
- **be accountable to explain how information will be used.**

Some of these principles are being enshrined in environmental legislation and many of them are addressed in the UN Declaration of the Rights of Indigenous Peoples (UNDRIP).

In addition to purposeful engagement with the community, it is important to:

- **have a polite, professional attitude,**
- **allow time for meaningful relationships to develop, and**
- **bring credibility to a project by collaborating with independent experts, such as local wildlife researchers.**

Charlie Palmer
PRESENTER

Charlie Palmer is a biologist who has been involved in the development and implementation of many conservation offsets to mitigate the effects of major infrastructure projects, particularly for designated species at risk. Palmer works for Hemmera, a Canadian environmental consultancy.

PANEL DISCUSSION - QUESTIONS/ANSWERS

Are there Indigenous-led programs and perspectives on the topic of social impacts and offsetting?
There are Indigenous groups on the west coast of Canada who want habitat offsetting to address the cumulative effects experienced on their territories. These group would like to see this from both the government for reconciliation purposes and from industries who want to promote projects on Indigenous people's territories. Some groups are publicized while others are more commonly heard in community engagement discussions. (Charlie Palmer)

How important is creativity in offset proposals?
In interdisciplinary, collaborative work, such as between environmental economists and biologists, different perspectives on the same project is a positive way to foster creativity.
Various stakeholders, such as those in Quebec, have successfully fostered creativity through engagement with various experienced groups, such as NGOs or watershed organizations. (Scott Cole, Céline Jacob)

How does a "not in my backyard" attitude affect social impact challenges in offsetting?
The root of the problem is that communities are asked to host a project that might negatively impact them while benefits accrue in a different area. As a result, these communities must be given a voice in the development of the project before it is fully designed. (Charlie Palmer)

LAND USE 2021: A PLACE FOR BIODIVERSITY OFFSETS

SESSION SIX: MAKING OFFSET CREDIT BANKING WORK

PRESENTED: MAY 31, 2021

Previous sessions in this series explored environmentally and socially beneficial offset project design. They also considered the pitfalls to avoid when designing offsets project-by-project. This session considers how to create offset delivery systems that are efficient while optimizing the environmental and social benefits and avoiding common pitfalls. One such positive mechanism is offset credit banking. Under banking systems offsets are created and certified in advance of negative impacts, and their transferability creates a market in environmental benefits. This discussion was facilitated by Amy Taylor, an environmental economist based in Canmore, Alberta and Director of Operations for Green Analytics.

Key points from the session

- Offset credit banking is one delivery mechanism for offsetting that allows offsets to be implemented prior to negative impacts. Credits for the offset measures are retained to be used to satisfy mitigation requirements for later projects and impacts.
- In the United States, offset credit banking relies primarily upon private entrepreneurs, who can develop and sell offset credits.
- In Germany, anyone can create offsets and submit them for approval. Historically the system was developed by local authorities and federal regulators, and it was local authorities that developed most of the offset credits.
- The State of New South Wales in Australia has a banking system which depends on a standard "biodiversity assessment method", which provides consistency and transparency to the offset process.
- Key elements to successful banking systems include clear goals, uniform mitigation standards, practical and transparent assessment methodologies, permanency of land protection, transfer of liability and an accessible registry of ownership and liability.
- Challenges may include change management, investment in information and data systems, offset supply and market liquidity, and the capacity of stakeholder groups.

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Making Credit Offsets work

The global market for biodiversity offsets is approximately five billion dollars per year, and the United States is responsible for over three billion dollars of this market. The United States is one of the most robust credit banking markets for offsets with significant room for growth and the opportunity to leverage private capital in a way that surpasses public funding investments.

There must be a driver for mitigation, and initially in the United States, the *Clean Water Act* did not have a requirement for no net loss. In 1989, no net loss of wetlands and streams became the goal, but until 1995 mitigation was ad hoc and lacking a clear standard for how to achieve no net loss. In 1995, guidelines introduced the idea of mitigation banking, which allowed for mitigating in advance of an impact. Ultimately, three forms of mitigation implementation evolved: mitigation banks, payment to in-lieu funds, and permittee-responsible mitigation. In 2008, a federal mitigation standard was adopted, which created a preference for mitigation banks and set forward a 12-step mitigation plan requirement for all mitigation projects.

George Kelly
PRESENTER

George Kelly is the founding member of Bespoke Mitigation Partners, a customized advisory and business and project incubation firm focused on environmental markets and nature-based solutions. He is also the Global Client Strategy Officer for Earth & Water Strategies.

Mitigation Plan Requirements

12 Steps Required under the 2008 Mitigation Rule

- Objectives
- Site Selection
- Site Protection Instrument
- Baseline Information
- Determination of Credits
- Mitigation Work Plan
- Maintenance Plan
- Performance Standards
- Monitoring Requirements
- Long-Term Management Plan
- Adaptive Management Plan
- Financial Assurance

There are key elements necessary for a successful wetland and stream credit market. Clear no net loss policy goals are needed alongside uniform mitigation standards and simplified, understandable mitigation plans. A rigorous certification process of mitigation is also important, as is the permanency of land protection. Lastly, in third party mitigation, such as with mitigation banks and in-lieu funds, the transfer of liability is important.

Stream mitigation banks in the United States are currently centered in the southeast; this is where resources are located and reflective of the mitigation standard rules in these states.

Developing an Effective Mitigation Market - Different Third-Party Delivery Options Can Offer Different Benefits

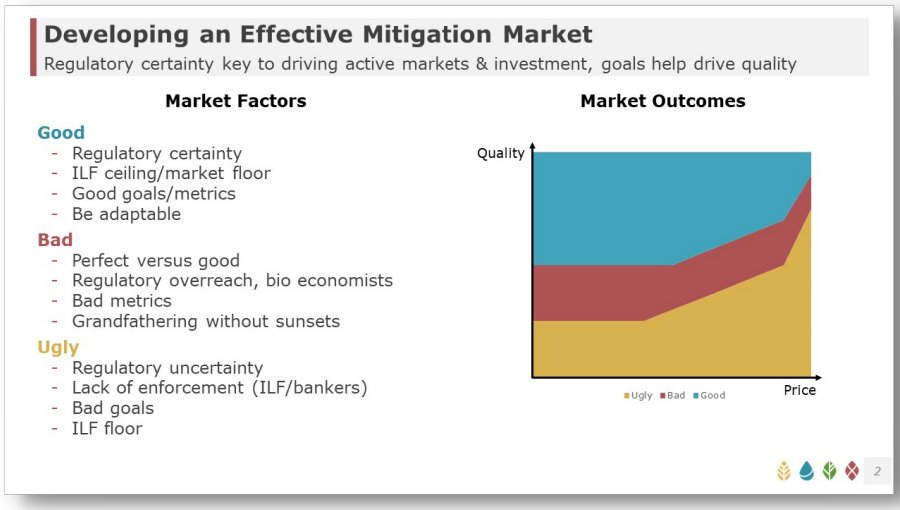
With the 2008 Mitigation Rule, mitigation banks, in-lieu fee payments, and permittee-responsible mitigation were outlined as mitigation delivery mechanisms. When selecting a delivery mechanism for a project, bank credits should be the first choice of mitigation delivery, because the offsetting work has already been done to generate the credits prior to the impact project. In-lieu fees should be the second choice because they can aggregate credits and complete more robust and sustainable projects. Permittee-responsible mitigation should be the last choice because it is generally only successful in large-scale projects.

In mitigation banking, mitigation and offset credits are generated and sold to a buyer in a certain service area. This is beneficial because there is minor temporal loss, the work is done in advance, the banker holds the liability, and there is fast permit review for the impact project. Single client mitigation banks are also an option, which can be efficient, cost-effective, and can reduce risk.

In-lieu fee programs operate by having a large portion of credits released in advance, which are then immediately priced. This can result in individuals with little experience in implementing projects setting credit prices, which can create negative market incentives if not managed properly and require re-pricing if not priced correctly. Further, temporal loss can be significant in these programs, as many projects take several years to complete implementation.

Conor Gillespie
PRESENTER

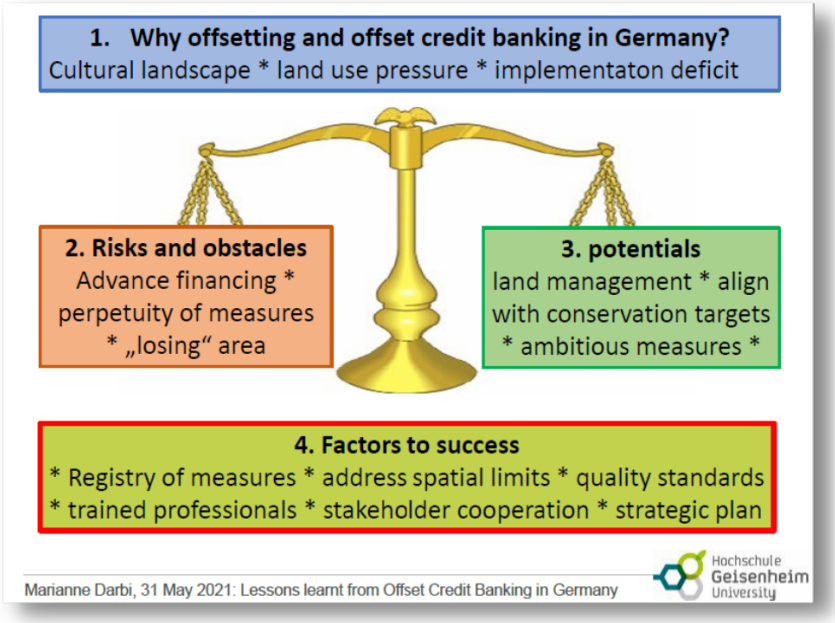
Conor Gillespie is a restoration ecologist specializing in the restoration of aquatic resources. He has worked on permittee-responsible mitigation projects, mitigation banks, ILF projects and programs, and ecological offset projects. He now serves as the founder of Catalyst Companies.



In permittee-responsible mitigation, liability stays with the permittee. In this system, credits are not generated to sell in an open market, but rather to offset the impacts created by the permittee on a certain project. This is a targeted approach that mitigates only as much as needed at a moderate price. For large projects, this option can be successful.

There are additional market factors to consider when establishing a project that will incentivize private investors and expedite the restoration process. Regulatory certainty is important to prevent uncertainty and overreach. In-lieu fee programs must effectively regulate credit pricing in order to avoid negative market incentives and temporal loss. Goals and metrics, which vary from state-to-state, are often unnecessarily complicated and should be simplified. Finally, adaptability of projects is important. If these factors are not considered, challenges including regulatory uncertainty, poor metrics, a lack of enforcement, and difficulty finding investors will cause difficulty in mitigation delivery.

Offset Credit Banking in Germany



Marianne Darbi
PRESENTER

Marianne Darbi is a professor of landscape planning and impact mitigation at Hochschule Geisenheim University. Her research focuses on biodiversity conservation and management, impact mitigation, sustainable land use, green economy, and market-based instruments.

Credit banking in Germany applies to all impacts on all scales. It is not restricted by size or area and has a broad scope, encompassing abiotic features, flora and fauna species, landscape scenery, and recreational function. Much like the United States, it employs the mitigation hierarchy.

Credit banking dates to the 1990s and emerged as a result of spatial constraints and land use challenges in Germany. There was a lack of land to use for conservation, resulting in a deficit in offsetting measures. In the 1990s, local authorities began pooling future potential offsetting land. Measures were then implemented in advance of an impact on a local scale. In the early 2000s, this developed into third party offsetting credits through compensation agencies, which is regulated at the federal level and in the laws of German federal states.

In practice, anyone can create offset credits, but they must be approved by the nature conservation authorities. They must also be registered to ensure they are only used once and comply with regulatory provisions of each specific state.

There are risks and challenges involved in mitigation banking. In order to avoid risks, projects should strive for regulatory certainty, transparency around regulations and methodologies, and expert guidance in economic and ecological decision making. These problems are avoided in Germany through regulated markets with oversight authorities. Further, the longevity

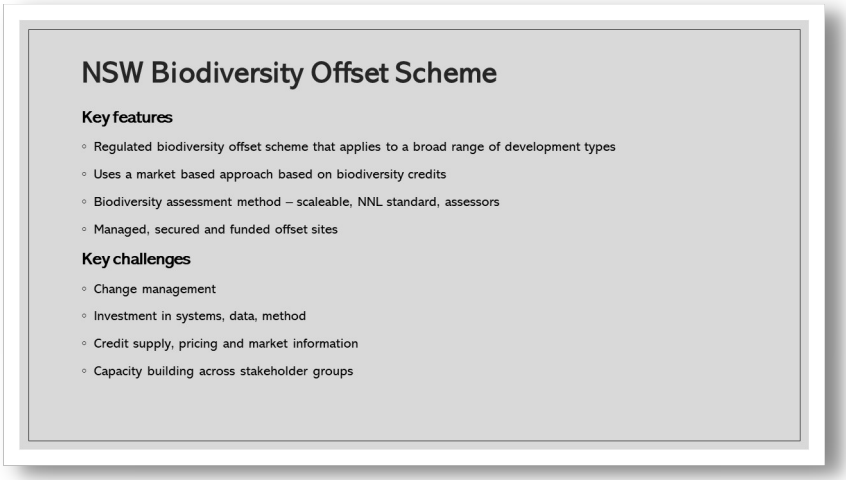
of mitigation is always an issue; offsets are expected to remain in perpetuity, but in practice remain for a maximum of 40 years. A similar issue arises when offset measures are implemented in a smaller space than that impacted, which results in losing area. As a result, there is room for improvement to further reduce risks around mitigation credit banking.

There is potential for credit banking evidenced by the German system. There are specialized offset providers, known as compensation agencies, that apply an active land management system as a result of high land use pressures. Active land management offers the possibility to negotiate land before pressures become too much. Another potential is the possibility of using landscape planning and focusing on conservation targets to embed habitat banks into biotope networks to create a green network that can gain a greater benefit for nature.

Key factors that are crucial to the success of offset banking include regulatory guidance, transparency, clear methodology, and a publicly accessible registry for measures. It is also necessary to keep spatial limits in mind to keep impacts and offsets close in size and proximity. Further, local and regional stakeholders should be consulted so as to build ownership for measures and support the implementation and perpetuity of measures. Lastly, trained professionals, such as biologists and economists, need to collaborate within the local areas.

New South Wales Biodiversity Offset Scheme

A comprehensive and regulated biodiversity offset scheme in New South Wales (NSW), Australia, established under the *Biodiversity Conservation Act*, outlines how impacts on biodiversity by development are assessed. The scheme embeds the mitigation hierarchy, meaning projects must demonstrate they have attempted to avoid and minimize impacts on biodiversity. The scheme is designed for proponents to use market-based mechanisms to meet their offset obligations and source required offset credits, either by establishing an offset site, purchasing credits, or paying into a conservation fund.



John Seidel
PRESENTER

John Seidel is currently the Manager of the Offset Assessment & Systems Unit in the New South Wales Department of Planning, Industry, and Environment. He leads a team that supports the development and implementation of the New South Wales Biodiversity Offsets Scheme.

Under the scheme, offsets are described by classes of biodiversity credits, which can be assigned to an ecological community or single species. A class of credits typically has a range of attributes, the matching of which define the like-for-like offset rules. Attributes can further define the community and type of threat biodiversity is facing (i.e. vulnerable, endangered, or critically endangered) and the geographical region from which offsets can be sourced. Further, the fungibility of communities has changed with the scheme as the current scheme uses the concept of a trading group to create fungible clusters of interchangeable PCTs. Currently, the total value of trades on credits is approaching four hundred and fifty million dollars.

A key part of the scheme is the biodiversity assessment method (BAM), which must be applied by accredited ecologists. BAM has three stages: the first stage involves assessing a development site or offset site and categorizing biodiversity and measurement methods. The second stage involves the development impact assessment, where avoiding, minimizing, and offsetting takes place. This stage also allows for the assessment of

prescribed impacts on threatened species and ecological communities unrelated to vegetation. The third stage applies at offset sites, where the assessment method considers the starting condition, types of threats, and the amount of gain generated by the site, which is used to drive the creation of credits. BAM can also help define the management needs of a site and includes standards for no-net loss.

Offset sites are secured, funded, and managed. Offset sites are secured under biodiversity stewardship agreements in perpetuity by ensuring offset agreements run with the land. Funding comes through the sale of credits, as a portion of the sale is placed in a trust fund so that the holder can receive payment for ongoing management projects. Offset management plans are site specific in an attempt to control threats to biodiversity. There is a suite of management actions that are applied annually.

There are challenges in implementing this biodiversity offset scheme. These challenges include change management, investing in management systems and data, credit supply, pricing, and market information, a lack of depth across the market, and capacity-building across stakeholder groups.

PANEL DISCUSSION - QUESTIONS/ANSWERS

What institutional structures are required to support offset credit banking?
In the United States, an inter-agency review team that creates a process for mitigation banking and in-lieu fee payments is important. Transparency between stakeholders is also important, and can be improved through better use of technology and more accurate data entry. In Germany, local partnerships are key to successful implementation. In New South Wales, a stable political environment has proven important for grounding offset credit banking systems, and structures such as trusts are beneficial for administration of offset sites. (George Kelly, Conor Gillespie, Marianne Darbi and John Seidel)

What are the mechanisms for ensuring funds are available for the long-term sustainability of mitigation sites?
In the United States, endowing for long-term stewardship has been successful. There can be discrepancies between how implementers and regulators determine long-term costs, and attempting to create uniform processes can have negative impacts. Thus, these mechanisms should be revisited and adjusted as needed. In Germany, more experienced offset bankers can calculate long term risks and monitoring into their plans. Further, bankruptcy is avoided by putting measures in a nature conservation fund, which ensures the land and measures are exempt from risk. In New South Wales, there are approaches that establish overall management costs that go into stewardship payment funds. (George Kelly, Conor Gillespie, Marianne Darbi and John Seidel)

What is the ownership of land where the banks are used? Are they private or public?
In the United States, most mitigation is done on private land, but it is possible to do it on public land. There can be issues with market and pricing on public land, but it is eligible. There can additionally be benefits from a system of credit bonus for conserving private land. In Germany, the system started on public land, but is a regulated market that has potential inequalities as a result. In New South Wales, they use both private and public land, excluding national parks, but the majority of offsetting occurs on private land. All speakers agree that additionality must be taken into account so as to not offset on the same land more than once. (George Kelly, Conor Gillespie, Marianne Darbi and John Seidel)

LAND USE 2021: A PLACE FOR BIODIVERSITY OFFSETS

SESSION SEVEN: ECOSYSTEM SERVICE AND MARKET-BASED INSTRUMENTS

PRESENTED: JUNE 7, 2021

In previous sessions, offset design issues were discussed. Questions around offset design indicate a need to identify objectives clearly and allocate costs appropriately. One of the mechanisms by which offsetting can improve environmental performance is imposing the replacement cost of impacted environmental values on developers. This creates an incentive to avoid and minimize impacts. Offsetting is one tool that uses prices to achieve environmental benefits, but a whole suite of alternative market-based instruments (MBIs) have been developed globally. The discussion in this session focuses on MBIs in various environmental and policy contexts.

Key points from the session

- Ecosystem services are not protected by law due to ignorance, market failure or institutional failure. Market failure occurs when property rights are such that there is a lack of price signals to influence decision-makers on resource use.
- Payment for ecosystem services (PES) is one tool to address market failure. It is a payment scheme to land managers to manage for the production of desired ecosystem services.
- PES schemes are globally quite common with respect to carbon and watershed values, but less so for biodiversity and habitat. The factors influencing this disparity are perceived scarcity and value, concentration of buyers and sellers, clear metrics, and low transaction costs.
- France has instituted a biodiversity banking system whereby natural compensation sites are implemented in anticipation of development impacts. This is an opportunity to attract public and private investment and to create a national restoration network.
- There are a variety of mechanisms being used to protect natural values in and around Puget Sound in the State of Washington. These include regulatory mitigation banks and in-lieu fee programs, but also voluntary community forests, forest resilience bonds, transfer of development rights. Other legal developments are enabling land-based carbon credits.
- Interest in similar tools is growing in Canada, particularly under the rubric of Nature-based Climate Solutions. These are barriers to market function and include existing regulatory constraints, problems of implementation at scale, lack of clear rights, scalability and high transaction costs. Several current initiatives are underway to address these limitations and there is opportunity for policy innovation and or private and public investment.

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Key points from the session - continued

- Alberta promoted MBIs as a tool of resource stewardship from 2000 to 2015, but they were not widely implemented. This was in part due to the conflict between the official policy direction and the informal patterns of behaviour that exists within key government departments. Path dependency resulted from staff's comfort with regulation and registration and their distrust of non-regulatory approaches.
- Any MBI system should consider whether it is rewarding management actions or the results they produce. This is a risk allocation decision.
- Some aspects to consider in using MBIs are policy and institutional frameworks, social concern, technical resources, and practical feasibility.

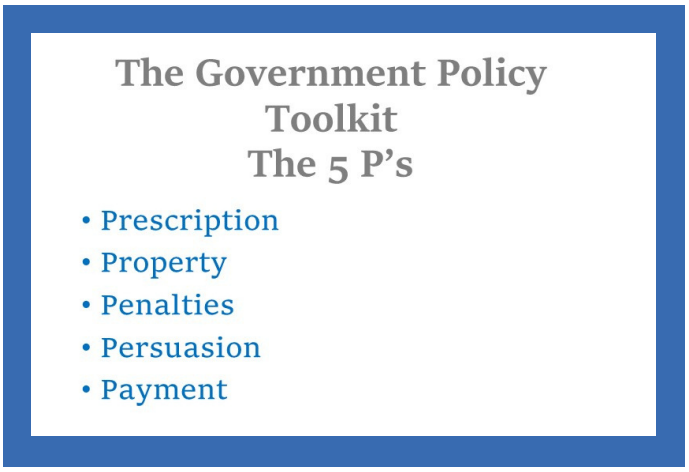
A Global Assessment of Payments for Ecosystem Services

Ecosystem services are the conditions and processes through which ecosystems and species sustain human life. Ecosystem services are critical to human wellbeing, but they are protected poorly by law due to ignorance, market failure, and institutional failure.

Ignorance leads to poor protection of ecosystem services because biophysical provisions are poorly understood. When there is a market for landscape management, such as with agriculture, ignorance is not an issue, but the same is not true for other ecosystems. Market failure is a problem because many ecosystem services are public goods that lack price signals to indicate overconsumption, and their value is landscape-specific. Institutional failure is a problem because many political boundaries where ecosystem services are provided do not match the scale of the service provision, resulting in collective action problems. Laws seldom consider ecosystem services and do not address service provisions.

James Salzman
SESSION LEADER

James Salzman is the Donald Bren Distinguished Professor of Environmental Law with joint appointments at the UCLA School of Law and at the Bren School of the Environment at UC Santa Barbara. His scholarship has addressed drinking water, policy instrument design, trade, and ecosystem services and he has consulted on ecosystem service policies globally.

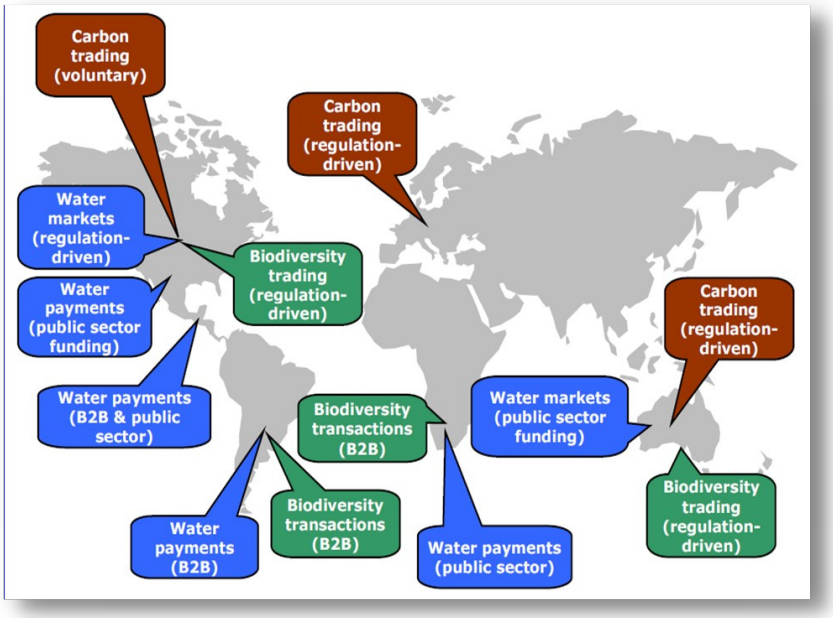


There are five basic tools that constitute most environmental law, including prescription, property, penalties, persuasion, and payment. The goal of payment for ecosystem services (PES) is to expand the reimbursement from land management systems and treat the provision of ecosystem services the same as other marketable goods. For example, paying for managing the land through riparian buffers and "growing the crop of water quality" as is done with cash crops. Thus, PES is the exchange of value for land management practices intended to provide or ensure ecosystem services. Different categories of PES are employed globally.

Despite the rapid growth of PES, there was a lack of empirical research on its evolution, how much it had moved beyond anecdotal data, likely trajectories for the PES sectors, and if PES has worked. Salzman and colleagues examined watershed, habitat, and carbon PES and for each sector explored the mechanisms used, market growth, number of individual programs, and number of countries employing these programs.

Findings suggest that watershed PES programs and transactions are the most common, while biodiversity and habitat PES programs are the least common. Voluntary offsets are an option and credit banks are growing. Forest carbon and carbon credit markets have evolved rapidly but the supply of carbon sequestration exceeds the demand, which, along with market difficulties, is an ongoing challenge. In terms of PES developments, agricultural commodities are becoming increasingly popular.

The effectiveness of PES can be explored by examining whether a service has been provided, if it is provided efficiently and if social welfare is being addressed. At a large scale, it is unknown if PES has positive environmental impacts because of unknown counterfactuals.



There are four factors to focus on for successful PES:

1. Perceived scarcity and a value in the provision of ecosystem services,
2. Concentrated buyers and sellers
3. Clear metrics,
4. Low transaction cost institutions

Currently, watersheds have all of these, but biodiversity none, which explains the disparity between different objects of PES.

Measuring the Impact of Transport Infrastructure of Biodiversity - Towards a Biodiversity Finance in France

This presentation discusses a project examining the creation and benefit of biodiversity banks in France. France's biodiversity laws emerged from an international comparison that examined the factors necessary for successful biodiversity banks. France had a more rigorous framework, a more strict definition of equivalence, and a stronger involvement with stakeholders than other countries, but the deployment of biodiversity banks needed improvement.

Based on this analysis, a potential French biodiversity bank, or a "natural compensation site," was conceptualized. These sites are economic instruments for ecological restoration that are focused on a territory, but they have the potential to become planning tools in other contexts.

The previous planning and biodiversity offsetting method in France, which operated on a "build now, compensate someday" system, lacked a consideration of anticipation and pooling. The implementation of biodiversity banks allowed for the option of anticipating ecological compensation and pooling projects to have ecological benefits at the same time in the planning of an area.

The objective of the research was to promote the deployment of natural compensation sites, by public and private stakeholders, without weakening the mitigation hierarchy and ecological equivalence. An additional objective was to show that offsetting needs for transport infrastructure for the next twenty years require the anticipation of restoration. The final objective was to assess the future costs in offsetting for major infrastructure.

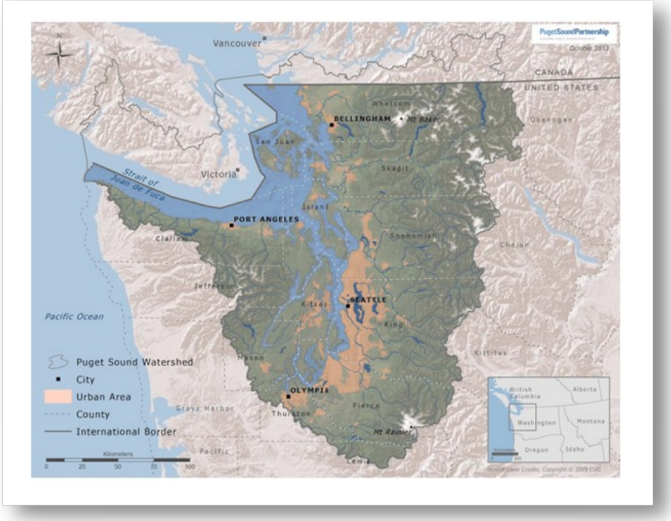
Estimates, indicated by an offsetting ratio, were used to determine potential sites for the market, and evaluations were made based on different offset scenarios. The first was with low avoidance and minimizing strategies and the second with strong avoidance and minimizing strategies, utilizing the mitigation hierarchy. There were also different scenarios of infrastructure development, designed for a national commission that revises every twenty years. Based on future projects, it was estimated that the market could be upwards of 655 million dollars and between 52 and 100 natural sites could be built. Ultimately, biodiversity banks are an opportunity to create a national restoration network based on existing and future offsets.

Carmen Cantuarias-Villessuzanne
PRESENTER

Carmen Cantuarias-Villessuzanne is an Associate Professor in Economics at GROUPE ESPI, French Management School in Real Estate Market, in Paris, France. Her research focuses on natural capital, non-renewable resource valuation, and nature in cities. In 2020, Carmen joined the scientific council of the French research program ITTECOP.

Based on these estimates, the goal is to reduce the risk and to embolden public and private stakeholders to invest in restoration networking in France. Future goals include examining renewable energies, sensitivity analyses, changing infrastructure orientations, and new scenarios between 2030 and 2050.

Mitigation Banking, Market-based Instruments, and Ecosystem Services in Puget Sound, Washington State



Christopher Wally-Wright
PRESENTER

Christopher Wally Wright is a researcher at the Puget Sound Institute at the University of Washington Tacoma. He analyzes existing programs and policies to support implementation of regional recovery plans and strategies.

Development around the Puget Sound is increasing, leading to a growing population and a loss of farmland. Wright's research is focused on exploring why loss is happening and the measures that can be taken, such as ecosystem services or compensatory mitigation, when regulation fails.

This research was conducted by interviewing over 30 agency representatives, landowners, conservation non-profits, and government officials. The findings suggest:

- measuring success for ecosystem services is challenging
- regulations are successful but heavily reliant on agencies' capacity for enforcement and should be supplemented with voluntary measures
- ecosystem service markets are emerging but supply is high and demand is low.

In Puget Sound, there are 19 mitigation banks that cover 5,000 acres (and three more in development for 970 acres). There are also three in-lieu fee programs that allow landowners to make a one-time payment to the program instead of implementing a mitigation project. These projects come with challenges, including identifying suitable private property for sale and working with under-resourced agencies that are essential to the approval process.

Community forests are an example of a success story in Washington State. There are three primary community forests in Washington that serve as a shared residence across cultural and political jurisdictions. They have a mix of non-profit, tribal, and governmental ownership. The forest is managed in a way that offers opportunities for sustainable timber harvesting, recreational use, carbon offset sales, and more.

Market-based mechanisms and conservation finance can be used for ecosystem services. One example is Forest Resilience Bonds, which are financial tools that enable private investment for forest enhancement on public land. There are no market-based bonds in Washington State, but the United States Forest Services' Innovative Finance for National Forests grant program provides funding for feasibility studies, which is an innovative way forward for payment for ecosystem services. Further, the Transfer, Purchase of Development Rights is a voluntary incentive and market-based tool that can help jurisdictions meet their growth and conservation goals while providing economic and environmental benefits.

Carbon credit efforts are reliant on the market and have promise. The Washington State government has passed a bill valuing the carbon and forest riparian easement, which creates the potential for the state to develop methods and markets for valuing carbon. Carbon credit offsets and monitoring is a growing sector in the United States and the potentials and risks are still being explored in relation to the market.

Scaling Investment in Nature in Canada via Market-based Instruments

Financial mechanisms and market-based instruments (MBIs) across land use types (such as protected areas, forestry, agriculture, and ecological restoration) demonstrate overlap, but certain strategies are more applicable in certain landscapes. This presentation explores instruments such as trust funds, payment for ecosystem services (PES), resilience bonds, carbon and biodiversity offsets, and more in relation to their application, key participants, policies, and the growth of the ecosystem services market in Canada.

Existing limitations for MBIs in Canada include:

- existing regulatory constraints
- lack of a cohesive approach and scale with respect to PES and credit markets
- unclear carbon rights on Crown lands
- issues of additionality in carbon rights, carbon-rich landscapes, credit markets at the individual level
- high transaction costs.

All of these factors are barriers to market entry.

However, Canada increasingly recognizes the role of nature-based solutions to provide carbon, biodiversity, and resilience benefits. Canada has made commitments to lower carbon emissions and protect 30% of lands and oceans. Similarly, the federal government has allocated money to conservation and the Nature-Based Climate Solutions Fund and has promoted additional funding mechanisms that prioritize natural infrastructure over grey infrastructure. Additionally, Canada intends to grow the agricultural sector while keeping emissions flat. There is an opportunity for innovation in this space, and the federal government announced investments in agricultural climate action with specific reference to reverse auctions, which is a strategy that can create efficient conditions to engage in PES.

There are currently a range of policy opportunities in Canada. For example, new carbon offset regulations with offset protocols address soil, carbon, and improved forest management are in development. Similarly, there is an issue with ecosystem service rights on Crown land, and carbon is the current focus, but it can pertain to water and biodiversity as well. Further, green bonds will be released, which can be facilitated by nature conservation. Additionally, the new Agricultural Policy Framework that will

Paige Olmsted
PRESENTER

Paige Olmstead is a Senior Research Associate at the Smart Prosperity Institute, based at the University of Ottawa. Her expertise centers around ecosystem services, nature-based solutions for climate change, ecological economics, and environmental and relational values.

begin in 2023 will potentially embed PES and provide an opportunity for PES engagement. All of these policy opportunities, as well as mandating nature-related financial disclosures, promote tracking ecosystem data.

Finally, there are a range of opportunities for public and private investors, but attracting these investors requires regulatory certainty, blended finance, government re-risking, growing intermediary environments to build more complex financial arrangements, and collecting, maintaining, and providing open access to ecosystem service and financial data. This will help move all markets forward.

Practical Governance Challenges For Offsets as Market Based-Instruments in a Regulatory World - A Case Study on MBIs for Environmental Governance in Alberta, Canada

Market-based instruments (MBIs) were promoted by the Ministry of Environment and Parks in Alberta to help meet policy goals and regulatory mandates. However, despite being widely promoted between 2000 and 2015, MBIs were not widely implemented. In 2010, Alberta was poised to be Canada's leader in market-based offsets, but despite a government and collective of stakeholders that were eager to explore MBIs, only 13 of 57 MBI commitments were implemented, and only 7 of these were uniquely new. This is due, at least in part, to informal, internal issues within the Ministry of Environment and Parks. This presentation is a case study on the internal, institutional challenges of MBI implementation in Alberta that resulted in this MBI implementation gap.

Institutional fit refers to the formal institutions and internal, unwritten rules that guide the Ministry of Environment and Parks and affect its acceptance of MBIs as legitimate tools. MBIs must be viewed as acceptable, which depends on the informal institution's shared rules and behavioural norms that determine what is legitimate behaviour. Each jurisdiction across Canada has its own pattern of social conflict that leads its decision-makers to choose certain instruments. What were the norms in Alberta's Department of Environment that played a role in the MBI implementation gap?

The theory of planned behaviour was used to examine specific beliefs and the intention behind the behaviour of the group in question. This was done through 19 interviews with economists, policy advisors, and other experts. The first identified issue was path dependency, as the specialization and disciplinary background of much of the staff was in regulation and legislation. The second issue was a trust in process and a distrust of economics and non-regulatory approaches and tools. The third issue was with legitimacy and the idea of incenting participants to make decisions based on internal information was unfamiliar and uncomfortable for the staff.

Thus, when implementing new tools around MBIs and offsetting programs, it is important to gain the approval not just of the public but also of the institution involved in implementation.

Gillian Kerr
PRESENTER

Gillian Kerr has worked as an environmental consultant in Alberta and with Alberta Environment and Parks for nearly 20 years. She completed a postdoctoral fellowship with MGill on ecosystem services in working landscapes and is currently doing a postdoc at Dalhousie University on perceptions of environmental change in Atlantic Canada.

PANEL DISCUSSION - QUESTIONS/ANSWERS

How can PES be used in the form of periodic payments to secure benefits that may not occur until a later date?
This is a classic challenge with PES, and that PES can be thought of as either payment for management or payment as allocation of risk. If thought of as the former, PES payments are not paying for benefits, but paying for the management of land, which is easier to measure. If thought of as the latter, PES payments are made to landholders as they make changes to land, which is necessary to meet opportunity cost. (James Salzman)

What practical criteria can be used to determine if MBIs are the best policy tool in any particular circumstance?
The starting point is to determine what ecosystem services are available and whether someone is willing to pay for them, because if not, having an MBI is much more difficult. Policy can help create markets, so there is a place for regulation. Social concern must be taken into account in addition to technical aspects of markets. An example of a potential measure is the minimum duration of engagement. Technology can be utilized and improved in certain projects, which can help reduce the burden on landowners and help them clearly see the long-term benefits. Alberta's environmental tools guide, which allows the government to examine the effectiveness, technology, and feasibility of policy tools and to consider what kinds of questions need to be examined in certain circumstances. (Paige Olmstead, Carmen Cantuarias-Villesuzanne, Chris Wally Wright and Gillian Kerr)

LAND USE 2021: A PLACE FOR BIODIVERSITY OFFSETS

SESSION EIGHT: OFFSETTING IN THE CANADIAN CONTEXT - EXPERIENCE AND POTENTIAL

PRESENTED: JUNE 14, 2021

Canada has significant but inconsistent experience with offsetting at the federal, provincial and municipal level with respect to fish habitat, wetlands and species at risk. This session explored the use of biodiversity offsetting in Canada to date and extrapolating from potential projects to future direction, including: A high-level overview as well as examples of provincial offsetting policies and projects in British Columbia, Alberta and Quebec, and the municipal uses of offsetting in Calgary, Alberta..

Key points from the session

- Conservation offsets are one of a suite of market-based instruments (MBIs) that are employed or have been considered in Canada. The goal of MBIs is to create markets that achieve conservation goals, reflect the value of environmental services and incentivize improve environmental outcomes. They require willing buyers and sellers, which imply clarity of services and beneficiaries of those service.
- While some MBIs seek to discourage negative behaviour by applying costs and others try to incent good behaviour by giving rewards, offsetting aims to do both at once, making it a more complex policy tool.
- There are several offset programs at the federal level in Canada: for fisheries, species at risk, and wetlands. There is also a general federal policy that is currently being updated. provinces have at least one offset program of some type. Some resource regulators have required offsetting for particular projects. Canadian programs tend to be project-based, with some employing in-lieu fees. Banking and exchange has often been considered but is not currently used.
- Some challenges with offsetting in Canada include lack of a demand signal from regulation, lack of clarity in ecosystem service definition, the local and place-specific nature of offsets, lack of clarity of uses on public lands, and attempts to pursue multiple policy goals with a single tool. Regional biodiversity targets would be helpful.
- Since 2014 British Columbia has had an Environmental Mitigation Policy (EMP) based on the mitigation hierarchy. It does not change the law and is intended as a voluntary guide for regulators. Regulators have employed offsets as a condition of an environmental assessment certificate, through partnership agreements with the deferral government and First Nations to support caribou recovery and pursuant to the provisions of the *Water Sustainability Act*. Application of the EMP is done on a project-by-project basis and is not consistent.
- Despite interest in MBIs expressed by the Alberta government, there has been an implementation gap. In part this is a reflection of a lack of community acceptance of government direction. This could be addressed by giving greater priority to local initiatives and providing better education and communication.

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Key points from the session - continued...

- Quebec brought in new legislation in 2017 to better protect wetlands through application of the mitigation hierarchy. It makes use of an in-lieu fee program that invests in wetland restoration and creation. The program requires the development of regional plans by regional municipalities. This has created challenges because compensation lags behind disturbances, and it is not clear that the fee is set sufficiently high to meet actual compensation costs.
- The City of Calgary employs the mitigation hierarchy in a number of its conservation programs. The City uses an Ecological Network Analysis to prioritize natural areas and conservation actions. A Habitat Restoration Project Framework is used to guide proponents through the mitigation hierarchy and direct offsetting where needed. An in-lieu fund is used to replace city-owned trees. The City's Natural Infrastructure Program is quantifying and valuing natural assets for use in decision-making.

Offsetting in the Canadian Context: Experience and Potential

Conservation offsets are part of a broad set of market-based instruments (MBI). The goal of MBI is to design markets that achieve conservation goals, reflect the value of environmental services, and incentivize improved environmental outcomes. The value of biodiversity and conservation need to be accurately reflected. Potential MBI for conservation include:

- Subsidy programs, payment for ecosystem services
- Tax programs, develop impact fees or other types of land use taxes
- Market friction programs, certification schemes set up a signal in a market
- Tradeable land use and disturbance permits, to mimic tradeable emission permits
- Performance bonds, in land reclamation performance-based systems are used
- Conservation offsets, signals value of conservation and environmental goods and services

Vic Adamowicz
MODERATOR

Vic Adamowicz is an internationally known resource economist, distinguished professor in the Faculty of Agriculture, Life, and Environmental Sciences at the University of Alberta, and instrumental in founding the Alberta Land Institute.

David Poulton
PRESENTER

Dave Poulton is the Director of the Alberta Land Institute, served as the Executive Director of the Alberta Association for Conservation Offsets and a member of the Advisory Group of the Business and Biodiversity Offset Programme.

In payment for ecosystem services markets there are four key components:

- Willing buyers to demand and pay for ecosystem services or commodities. Environmental components, such as biodiversity, in a market context need to be viewed as something that will be valued, a commodity. Determining benefits and beneficiaries of services is challenging as biodiversity supplies multiple services.
- An approach to change current land use practices and infrastructure in order to generate environmental gains. Changes need to enhance ecological production and function while considering additionality.
- Willing sellers to provide ecosystem services in exchange for funding. An institutional framework to facilitate trading and payment between buyers and sellers trading.
- Consideration of potential co-benefits or co-costs and alternative methods that do not include the ecosystem service approach.

Assessing the public and private net benefits of an impact or offset can inform appropriate policy and actions. A framework will outline when to implement positive incentives, negative incentives, or when no action is required. If an action generates private net benefits, while having negative impacts on the public, negative incentives such as a tax or regulatory mechanisms are required. If an action is costly to the private sector but generates public net benefits, positive incentives like subsidy programs or payments for ecosystem services can be used. Attempting to obtain market equilibrium within an offset scheme is complex and requires positioning offsets in the broader MBI frameworks. Currently the MBI commonly used is a tax, subsidy, or payment system.

Among MBI programs, offsets are one of the few that follow the mitigation hierarchy. Offset demand and scarcity are created by regulation, such as a no-net loss (NNL) goal. Supply is generated through additional framework and needs to assure equivalence and appropriate valuation of the offset. Ideally, offset outcomes are monitored long term and enforced when necessary. Offsets can be project based, utilize banking systems, or rely on in-lieu fees. Project based offsets are most common in Canada, banking systems are not currently used despite interest. In-lieu fees have been popular in some industries and jurisdictions. There is an increasing need to consider public participation, specifically Indigenous involvement in offset planning and implementation.

A majority of Canadian provinces have offset programs in place or under development. These programs were developed in isolation and some require updates. Growing international experience and academic literature contributes to the need for updating and upgrading. There are opportunities to review and bring greater coherence to offsetting applications across Canada.

Provincial Policies

British Columbia
- Environmental Mitigation Policy (2014) – voluntary and regulatory guidance

Alberta
- *Alberta Land Stewardship Act* (no policy or regulations yet)
- Alberta Wetland Policy (2013)

Saskatchewan
- Policy under development
- Agricultural Water Management

Manitoba
- Wetland compensation program for infrastructure
- No net loss of water retention

Ontario
- *Endangered Species Act*
- Wetland policy proposed (2017)

Quebec
- Wetland compensation legislation (2017), policy (2019)

New Brunswick
- Wetland Policy

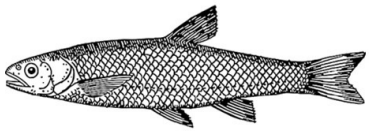
Prince Edward Island
- Wetland Conservation Policy

Nova Scotia
- Wetland Policy

Northwest Territories
- Wildlife Management Guidelines (2019)
- Policy under development

Federal Policy

- Fish habitat (s 35(2) of *Fisheries Act*)
  - Both freshwater and marine
- Federal wetlands policy
  - No net loss policy
- Species at Risk Act
  - Permitting policy (s. 73) under development
- *Operational Framework for Use of Conservation Allowances* (2012)



Federal long-standing policies have attempted innovation. The fish habitat offsetting program under the *Fisheries Act* originated in 1986. It is currently undergoing updating with recent public consultations. A federal *NNL Wetlands Policy* has been in place since the mid 1980's. *The Species at Risk Act* is developing offset policy. Meanwhile, offsets are being applied to species at risk habitat. The *Operational Framework for Use of Conservation Allowances* is an overall federal policy that reviews offset principles and endorses offsetting use by federal authorities. It is currently being reviewed and updated.

Some federal and provincial regulators have attempted offsetting projects or conditions. The Canadian Energy Regulator has attempted to apply offsetting in challenging circumstances. There is concern with the application of offsetting in caribou habitat and range. A joint review considered a pipeline project in the eastern slopes of the Alberta Rockies, particularly through Chinchaga caribou range. Reports exposed tension between the National Energy Board and Climate Change Canada regarding multiplier assessment and application. Prior to approval, the Federal cabinet increased the multiplier requirement due to significant Indigenous interest in caribou and the role it plays in Indigenous culture. In 2018, the Alberta Energy Regulator required offsetting for caribou habitat for the White Spruce Pipeline project. In the Northwest Territories the Mackenzie Valley Review Board required offset conditions for the Ekati diamond mine expansion and an all-season road. Federal and provincial policies have been outlined in more detail and are available for download.

There are relatively few evaluations of biodiversity offset programs in Canada. Global evaluations have examined if biodiversity outcomes have been generated as expected. Results show it is very challenging to set and achieve biodiversity targets and outcomes. While global biodiversity offset projects are increasing, gains and claimed benefits are controversial and lack empirical support. Further research, data sharing, and broader frameworks are needed.

Specific challenges in Canadian biodiversity offset design and implementation include:

- **Lack of a scarcity signal/demand:** a voluntary offset program, even with in-lieu fee system, may not be able to set fees required to provide appropriate scarcity signal or demand. This is associated with existing institutional frameworks and associated fees. Additionally, there may not be demand density in Canada required to generate successful offset programs needed within a continuing framework.
- **Challenges in commodity/value definition:** measuring greenhouse gas emissions and carbon equivalence is difficult, measuring biodiversity is an ongoing worldwide challenge in offsets. Biodiversity needs to be understood as a commodity, clearly defined, measured, and ultimately traded.
- **Local nature of offsets (uniqueness, lack of substitutes, limited scale):** sufficient supply is a challenge given uniqueness of a resource or outcome. This limits the use of market-based and signaling approaches to offset specific conservation outcomes. This is a current challenge in wetland offsets and conservation projects in Alberta.
- **Lack of incentives for supply (funding, continuity, engaging participants):** participation is a major challenge in conservation offsets supply. A supportive and continued engagement process with clear information and long-term funding is needed.
- **Attempting to achieve multiple goals:** bundling conservation objectives with other planning or regional goals. From an economic perspective if there are multiple goals, multiple policies should be used.
- **Institutional challenges:** crossing jurisdictions, different objectives within a government agency, provides friction in offset implementation.
- **Transactions costs:** offset programs can be effective but with high transactions costs implementation may be difficult.
- **Public land:** offset implementation on public land restricts particular land uses and overlaps tenures and jurisdictions.
- **Insufficient monitoring and evaluation:** long-term programs are required to determine offset project success.
- **Lack of consistency:** offset implementation and regulations are inconsistent among provinces and lack cohesion of a federal approach.
- **Choosing the right tool:** offsets should not be used in endangered and critical habitats. Avoiding grassland conversion contributes significantly more to climate solutions relative to an offset riparian grassland restoration project. All components of offset programs need to be considered and multiple tools and policy angles may be required.

Clear definitions of the commodity and low transaction costs will assist in moving offsetting forward. Regional biodiversity targets and target based ecological compensation should be used. Compensation and environmental outcomes need to be considered at a broader scale. This could include the possibility of managed losses for small projects if broader ecological goals are in place. The Alberta wetland programs have shown stronger benefits with a landscape-base approach. Conservation targets should use simple metrics utilizing coarse filters versus fine filters. Offsets could consider performance bonds implemented to ensure the offset outcomes, as used in land reclamation. From an economic perspective, offsets and related MBI generate incentives to conservation outcomes and integrating environmental goods and services into markets.

Biodiversity Offsets in British Columbia

British Columbia (BC) is one of the most biodiverse provinces in Canada as well as having close to 200 Indigenous Nations. The provincial Environmental Mitigation Policy (EMP) enacted in 2014 established the mitigation hierarchy including offsetting as the standard for impact assessments of development activities. The policy outlines procedures, principles, considerations, and processes to guide regulators. It provides a template for mitigation plans. Individual resource sectors in BC, including forestry, oil and gas, and agriculture are governed by their own acts and regulatory body. The EMP complements existing legislation to add rigour, consistency and transparency to decision making. Application of the EMP is up to regulator discretion but can be adopted by proponents to meet corporate goals of no net loss (NNL) or net positive impact. The EMP goal is to sustain environmental value and components important to BC.

Offset regulatory requirements are voluntary in BC but examples include:

- **Offsets as a condition of an environmental assessment certificate:** major projects federally require a joint environmental review panel - conditions exist where there is a requirement to develop an offset plan in conjunction and with the EMP.
- **Offsets through agreements:** partnership agreement between Canada, the Province, and First Nations where mitigation plans, proposed offsets and development of a mitigation offset program, support caribou recovery.
- **Offsets in newer legislation:** the *Water Sustainability Act* mentions enabling statutory decision makers to require mitigation and offsets in legislation.

The EMP is unique to Canada and applies to all environmental levels and values unlike other provincial policies. Province wide training programs increased policy awareness and use, internally and externally. Feedback helped identify issues with determining adequacy of mitigation and offset proposals; specifically ecological equivalency. The province developed the Draft Habitat Decision Support tool to articulate and evaluate ecological equivalency between impact and offset sites. It provides a mitigation ratio as an output and details are reviewed in Session #3. The current EMP phase is review and improvement through policy review, this is a key component of the policy cycle.

Karen Stefanyk
PRESENTER

Karen Stefanyk is a Senior Conservation Policy Analyst with the British Columbia Ministry of Environment and Climate Change Strategy. Karen has also worked as a consultant with a focus on wetlands, wildlife and vegetation ecology, and developing mitigation and monitoring plans.

Offsets present unique challenges and opportunities. Currently, offsetting is applied on a project-by-project basis with in-lieu payments being considered. Current frameworks rely on proponents to propose offset types, location, and rationale on mitigation hierarchy application.

Also outline adequacy and effectiveness of the proposed offset. This is a postage stamp approach. A province-wide overarching framework for biodiversity offsets will contribute to coordinated conservation outcomes. Legislation varies largely by resource sector, and EMP application is discretionary and inconsistent. This results in unequal application of the EMP and offsets requirements across ministries and the province.

There is opportunity to explore how biodiversity offsets are realized and designed to support conservation outcomes. Offsets create opportunities to support local, regional, and provincial conservation objectives in conjunction with First Nations. Current offset initiatives supporting reconciliation include Cumulative Effects Management Framework, modernized land use planning, and intergovernmental partnership agreements. Decision making in biodiversity offset can be supported by providing additional clarity, guidance, and refinement to existing policies and procedures. Limitations of offsets and use of in-lieu fees must be clearly communicated.

Offsets should be considered in a broader landscape or area-based context to achieve greater conservation outcomes. The intent, use and objectives of biodiversity offsets can contribute to sustaining environmental values in BC.

Learning on the Social Acceptance of MBIs in Alberta

The Alberta government created the Environmental Tools Group to determine how to incentivize or disincentivize behaviours that contribute to environmental objectives. Between 2000 and 2015 changes in legislation and policy enabled and promoted use of market-based instruments (MBIs). The provincial government's pro-market approach resulted in updates to legislation including the *Water Act* and the *Environmental Protection and Enhancement Act*, to enable MBIs. The *Cumulative Effects Management Act* and the *Alberta Land Stewardship Act* addressed ecosystem services and non-traditional incentive-based tools. *The Alberta Wetland Policy, Water for Life Strategy, Land-Use Framework,* and the Institute for Agriculture, Forestry, and Environment all promoted educating and working with society to establish MBIs as companion tools to legislation.

Gillian Kerr
PRESENTER

Gillian Kerr is a post-doctoral fellow at Dahlhousie University in Halifax, Nova Scotia with prior offset research and experience with Alberta Environment and Parks.

This resulted in 57 MBIs being enabled, whether generally or specifically in offsets to conservation easements, 13 were implemented between 2000 and 2015. Further, 6 were deposit refunds and not considered novel MBIs. Exploring lack of implementation in Alberta revealed environmental groups acknowledged benefits of biodiversity offsets, and industry (agriculture and forestry) and government were involved at bureaucratic and political levels. Difficulty in MBIs implementation must be assessed more broadly; specifically issues around social acceptance of MBIs in Alberta.

Current economic models and MBIs assume humans make rational or at least bounded rational decisions. Developing tools and policies relies on heuristics and predictable human behaviour. Generalizations and assumptions on human behaviour work 50 to 60% of the time, in 50 to 60% of cases. Evidence suggests people do not react purely economically. Community values and preferences can influence decisions and behaviours, not just economic value. Modern policy design disregards other crucial influences. Empirical studies have shown that policy tools have failed because target population interest is not well understood. Integrating key community perspectives and values may improve policy tools.

In southern Alberta, a study area in the Oldman River Basin examined MBIs in agriculture. Agriculture has a longstanding impact and availability on the landscape, this area is a hub of agriculture in Alberta. The Oldman River Basin has a tightly connected community with interesting groups working on environment and agriculture activities. Activities include intensive

livestock, mixed farming, and government grazing leases. The agriculture community has experience with numerous government policy and regulatory changes.

Research used Q methodology, a systematic study of participants viewpoints that examines and ranks the most important statements and perspectives. Research questions were designed to understand the social acceptance issues with MBIs. Participants represented a variety of sectors including agriculture, local and provincial government, rural community, Indigenous community, non-government organization, academia, and media. Results revealed four major types of thinking around the use of MBIs: incentive orienteers, rural advocates, honest brokers, and progressive producers. No participant groups behaved in a predictable way and groups had a range in gender and age. No groups opposed MBIs, but groups had unique perspectives on rural Alberta and the agricultural industry.

There were three consensus statements all groups considered important:

- Government should consider local initiatives prior to implementing projects from “head office”.
- Education and clear communication around MBIs are needed.
- MBIs need to be used to create positive changes, not just pay people.

Governments want strong policies, but the use of MBIs for environmental management has not been realized. Very few offset projects have been implemented in Alberta. Policy processes including policy tool development are incomplete and do not address issues with social acceptance. The Q method brings relevant stakeholders together and aids in understanding key issues and stressors not typically considered in traditional policy processes.

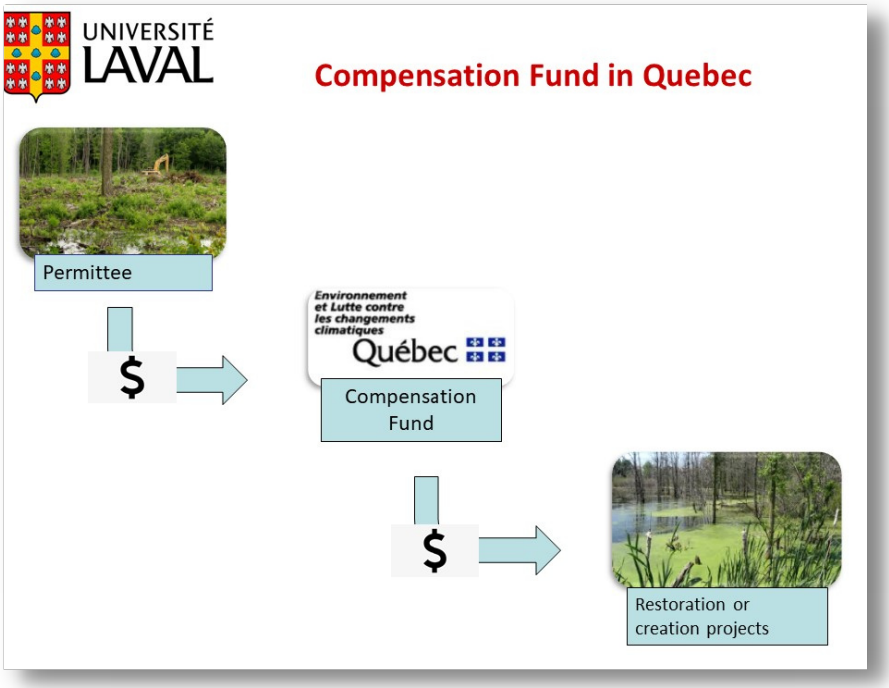
The Act respecting the conservation of wetlands and bodies of water: critical legal analysis of the wetland compensation fund in Quebec

Quebec has experienced alarming wetland declines in the past decade, despite protection through legal tools. Legal framework and losses were addressed in 2017 with new legislation that set a no net loss (NNL) of wetland ecosystems as a major objective. Achieving NNL relies on regional planning and coordination of wetland conservation efforts, mitigation hierarchy implementation within a prior authorization scheme, and creation of a compensation fund.

Activities in wetlands and bodies of water are subject to prior ministerial authorization. Developers must demonstrate wetland impacts have been avoided and minimized. Unless stated otherwise in regulation, residual project impacts are offset through a financial contribution to a government conservation fund. The fund invests money into wetland restoration and creation projects. Quebec has opted for an in-lieu fee program to enhance the effectiveness of compensatory measures.

Valérie Dupont
PRESENTER

Valérie Dupont is a post-doctoral researcher at the Faculty of Law at Laval University in Quebec. Her research focuses on the implementation of the Quebec Act on the Conservation of Wetlands and Bodies of Water.

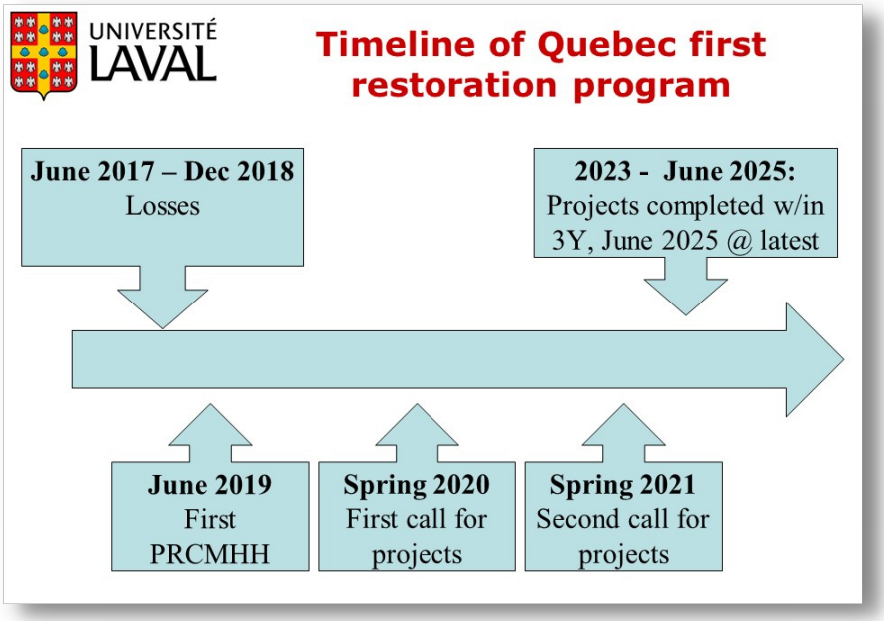


The wetland fund can be invested strategically in accordance with restoration priorities using a landscape approach. The *Water Act* requires regional county municipalities to develop regional wetlands plans to identify

wetlands to be conserved and restored based on socioeconomic and environmental assessments. This obligation is an opportunity to identify and map wetlands that perform key regional functions. Wetlands that will be disturbed, restored, or created as potential compensation sites can be identified early. Regional plans are integrated into land use tools, taken into account when authorizing projects in wetlands, and used for selection of restoration and creation projects financed by the compensation fund.

***The Water Act* requires the development of a restoration and creation program.** This program determines available restoration and creation budgets based on financial contributions of developers received according to the *Environmental Quality Act*. It details necessary elements for selection and implementation of restoration and creation projects including objectives, eligible activities, stakeholders, cost, administrative and legal management, and follow up measures. Regional wetland plans and equivalency between losses and gains are also considered when planning.

In-lieu fees allow target spending of compensation funds, however ex-post implementation raises interim losses. Restoration measures should be implemented once sufficient resources to invest in large scale projects have been collected. This is a current challenge for the Government of Quebec. Projects financed by the first restoration and enhancement programs cover losses occurring between June 2017 and December 2018. The compensation project will not be completed until 2023 to 2025.



Experience in other jurisdictions has shown determining fee pricing is difficult, especially as the fee level is fixed ahead of time. Often fees seem insufficient to restore equivalent ecosystems, leading to a net loss of biodiversity. To reflect full restoration costs fees should include restoration costs but also costs associated with: land acquisition, project planning and design, plant materials, labour, legal fees, monitoring, and long-term protection and management. In Quebec, there is no legal requirement that fees reflect full restoration cost, a detailed formula was adopted in 2018. The formula takes into account acquisition cost of future offset sites based on the average value of vacant land in the regional municipality where the impact site is located. It provides a basic restoration estimate that is multiplied by a factor representing the initial state of the impacted wetland, the scale of the impact, and environmental variations. It is not clear if the basic restoration cost included in the formula covers monitoring and long-term management and protection. Environmental groups criticize generated fees for being too low, while developers think fees are too high.

Aggregation of compensation measures makes it difficult to ensure ecological equivalency between gains and losses with in-lieu fee programs compared to permanent offsets. In Quebec, the *Water Act* requires that select restoration and creation projects maintain the surface area or function of a watershed's wetlands and bodies of water. Projects are assessed using equivalency factors with regard to the wetland being disturbed. The current focus of the first restoration and creation program is surface area with no evaluation of function.

Planning compensation measures while considering regional plans in the restoration and creation program is a key strength in Quebec. Regional plans are due in June 2022, it is unclear how the program will take plans into account, especially if regional priorities do not align with impacted wetlands. Proper methodology is needed to assess functionality and effectiveness of compensation projects.

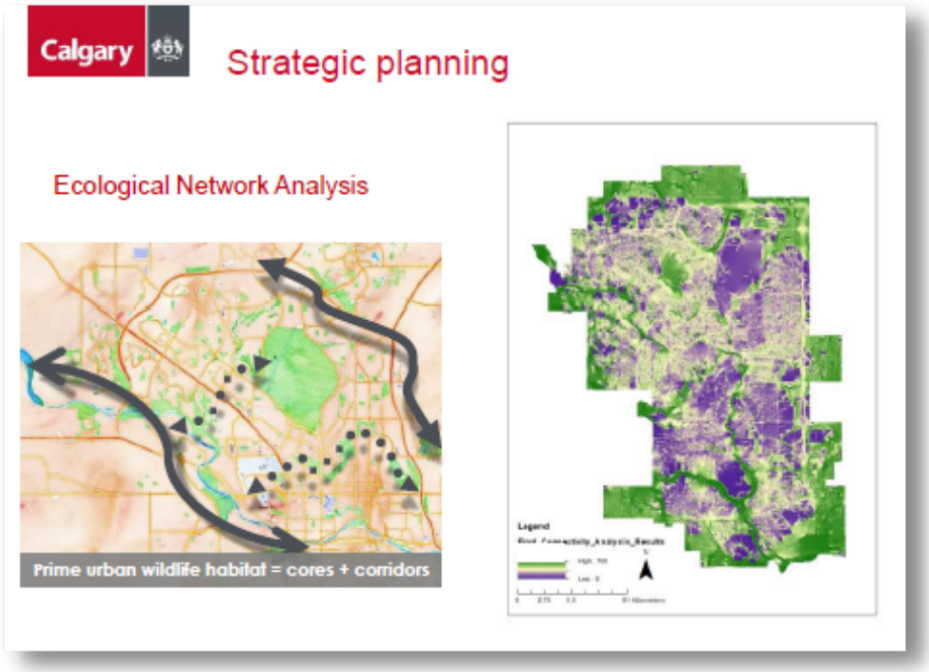
Municipal Offsets: Balancing conservation and responsible development

The City of Calgary uses offset approaches to balance difficult trade-off decisions between development and natural ecosystem conservation. A variety of strategies, frameworks, and processes contribute to environmental protection and directly or indirectly support a mitigation hierarchy approach, including offsets. Next month a city-wide strategy and action plan tying environmental policies together will be approved.

During the planning process there are opportunities to require mitigation hierarchy approaches. Managing private land is challenging. Land use designations and permitting processes manage land activity; currently offsets are not required. Environmental and municipal reserve tools are available but typically only applied to land that cannot be developed, such as steep slopes or riparian areas. The land designation of conservation reserve was added under the *Municipal Government Act*, but a major challenge in implementation is that the municipality has to pay fair market value for land being claimed as a conservation reserve. This is not an offset because it is not the developer paying to compensate for impacts, rather the city. This issue is ongoing.

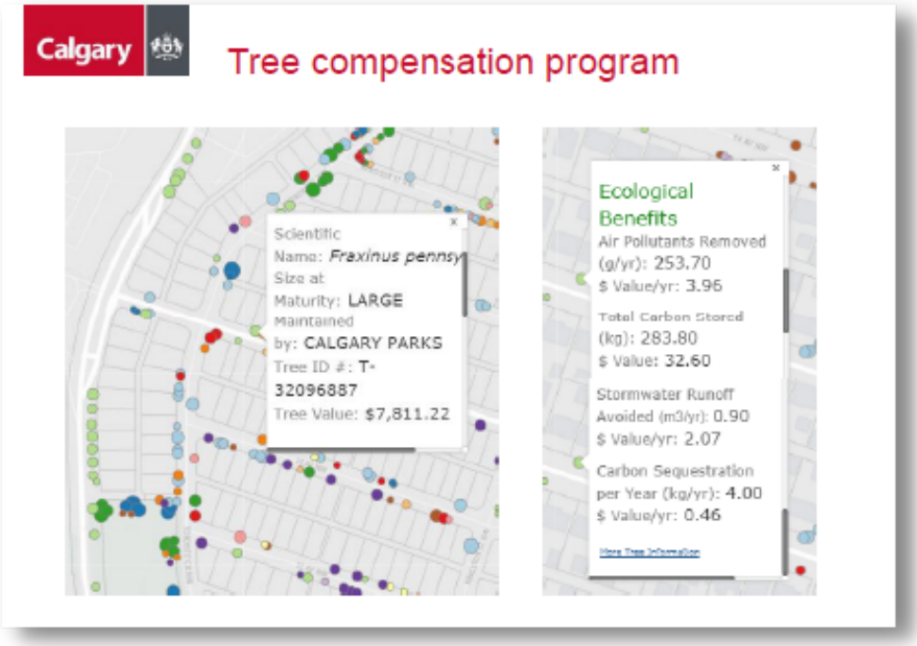
Carol Stefan
PRESENTER

Carol Stefan is a park's ecologist with the City of Calgary. A wildlife and biodiversity specialist, she is a member of the executive committee for the Alberta Association for Conservation Offsets.



Another opportunity is stronger strategic planning across the city with offset opportunities identified and added to land use plans. Urban conservation within Calgary Parks completed an Ecological Network Analysis and identified citywide cores and corridor habitats. This analysis was combined with the habitat condition rating to determine an ecological integrity scoring system. Ecological scores help prioritize natural areas for restoration and protection while using a landscape approach. An area with manicured and mowed turf with a large boulevard was identified for naturalization. The constructed naturalized space is the Calgary Native Bee Project and is a pollinator corridor. Since implementation two species of endangered Cuckoo bumblebees have been recorded. These approaches could be used for offsetting projects.

The Biophysical Impact Assessment Framework is a mechanism by which proponents demonstrate the mitigation hierarchy was used in project design and construction. Similar to federal and provincial wetland policy, specific expectations for compensation or offsets within an impact assessment can be set. The Habitat Restoration Project Framework requires impacts to natural areas be offset through restoration to a reference habitat type approved by a Parks ecologist. The Park Specific Management Plan Framework identifies areas where restoration actions could potentially be used as offsets for internal or external development projects. Enhancement measures move away from planted and manicured areas to naturalized spaces. This is increasing biodiversity outcomes.



The Urban Forestry Plan mapped and valued every city owned tree. Value is based on age, size, and ecological benefits provided by the tree. Associated dollar value reflects payment required for removal. This payment contributes to a fund that plants trees to maintain tree canopy.

After extensive flooding in 2013, the city completed restoration and bank stabilization projects at various locations along the Bow and Elbow Rivers. These projects resulted in loss of fish habitat. A fish compensation plan was developed with support from Alberta Environment and the Department of Fisheries and Oceans. Many bio-engineering projects reduced bank erosion risk and improved riparian and fish habitat. Net gains have been generated and banked against future disturbance.

The Natural Infrastructure Project is examining metrics on quantifying ecosystem services and valuation of natural assets city-wide. Natural assets should be accounted for and tracked similar tangible capital assets. These values would be used in decision making when work is being planned. First stage expected later this year.

The City of Calgary has worked hard to develop processes and tools to manage city lands. Using an overall environmental strategy with offset frameworks is one mechanism for balancing economic and environmental objectives. An offset framework within the mitigation hierarchy approach can improve conservation outcomes while providing transparent, clear, and consistent guidance. This will afford better certainty to city developers and the City.