Offsetting Measures and Hunting: The risks and opportunities

Introduction: the Mitigation Hierarchy and offsetting measures

The Mitigation Hierarchy is a tool comprised of 4 steps that should be taken in order to tackle threats to the environment from human activities. They attempt to prevent damage to the natural environment by achieving no net loss of biodiversity, and their thorough application could result in a net gain of biodiversity from human activities. Each step is necessary to ensure environmental damage is prevented; skipping one or more steps could result in increased costs and will result in poorer mitigation of damage and a net loss of biodiversity.
It is therefore crucial to follow the steps of the Mitigation Hierarchy in the order presented below.

More information on the Mitigation Hierarchy from a hunting perspective is available here:
http://www.face.eu/sites/default/files/attachments/nnl.pdf

Step 1: **Avoidance**

Avoidance includes active steps to minimise the damage done to the natural environment before human activities can take place, preventing the expected impacts on biodiversity.[1]
Avoidance also makes good business sense by reducing the need for later steps in the mitigation hierarchy.

Step 2: **Minimisation**

Minimisation includes measures taken to reduce impacts that cannot be completely avoided.[2]
For example, development of a residential area in Australia's Wallarah Peninsula (an area of approximately 600ha of near undisturbed bushland) minimised damage from building work to the natural environment by mapping critical vegetation corridors and areas where threatened species were located.[3]

Step 3: **Rehabilitation** and **Restoration**

Step 3 involves measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems, species composition or ecosystem services provision, following exposure to impacts that cannot be avoided or minimised. [ii]

Step 4: **Offsetting**

When damage to the natural environment cannot be avoided, minimised, rehabilitated or restored, but will occur anyway (i.e. residual impacts), offsetting can present a potential solution.
Offsets are "*measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate prevention and mitigation measures have been implemented*" [4].
If undertaken correctly, offsetting can allow both human activities and conservation of nature to occur simultaneously.
However, use of offsets can be risky; they can be very difficult to implement and a reliance on them, while ignoring the other steps in the mitigation hierarchy, can be expensive and lead to a loss of biodiversity.

This document will act as an information source regarding offsetting measures and their place in the Mitigation Hierarchy while highlighting the role of hunters in offsetting measures.

POTENTIAL RISKS BUT POTENTIAL GAINS

In the frame of the No Net Loss discussions conducted at EU level, the use and implementation of offsetting measures are still controversial.
While they can provide solutions for tackling the residual impact from human activities, offsetting measures that are not implemented properly can be a risky approach to biodiversity conservation:

- If not considered as a last resort, the use of offsets can erode the moral responsibility to protect the environment, and replace it with a mindset where negative impacts of human activities on natural land are acceptable as long as the habitat is replaced elsewhere. Offsetting could also legitimize the notion that unsustainable human activities can continue without reform due to the fact that another sector is dealing with the environmental consequences. [v]

- To offset, you have to measure biodiversity in order to determine how much has been lost; a wide variety of different methods exist for this, none of which are perfect, and they often simplify the actual data.[5] However, as what is not measured cannot be compensated, biases and limitations of biodiversity metrics need to be taken into account. Care should be taken so that complex, situationally-appropriate metrics of biodiversity are used in order to not underestimate the impact of human activities or the gain in biodiversity when recreating habitats.

- Offsetting may recreate habitat that is superficially similar to the destroyed environment; however, almost all natural environments are unique due to their socio-ecological complexity, and therefore cannot be perfectly replaced or substituted. This uniqueness arises from at least three attributes:

  I. **Place-specific environment (spatiality):** the geology, geomorphology and hydrodynamics of a location influence the living communities at that site by influencing nutrient availability, elemental conditions, the development of soils, and the availability of water and the distribution of water-borne organisms. The biotic surroundings of a given site also strongly influence the living communities within it by linking into larger trophic webs, determining the community of pests and diseases and the dispersal of individuals.[6]
  II. **Distinctive history (historicity):** the legacy of events at a specific site makes each unique. Histories of fire, droughts or other disturbances and colonisations make natural sites historically-specific. [v] History also influences the communities in an environment as the random order of colonization can result in very different community compositions even in two habitats that are environmentally identical.[7]
  III. **Complex ecological processes and interactions (complexity):** the complexity of an ecosystem adds to its uniqueness by presenting new characteristics and properties that only arise as a result of its complexity. An example of an emergent property that results from complexity is the top-down regulation of communities by apex predators. [v]

  By offsetting damaged land, the recreated habitat may, superficially, be similar to the lost habitat; however it lacks the original habitat's unique spatiality, historicity and complexity which ultimately make it not an identical habitat. It may then be unable to provide the same environment and therefore may not be composed of the same community of species.
  When implementing offsetting, it should be kept in mind that recreating complex environments with basic land management techniques is often difficult; the techniques used cannot always recreate the complexity of the destroyed habitat.[v] This is the reason why it is crucial to use offsetting measures as last resort. In this case, as only remaining and residual impact would be tackled, the outcomes of offsetting could become very positive for biodiversity conservation.

- Ecosystems typically may take decades or hundreds of years to succeed and reach a climax community (one which, through the process of ecological succession, has reached a steady state). Most infrastructure projects have a lifespan of less than 50 years, so it is not guaranteed that biodiversity will have reached pre-development levels before another building project and offset is required. [v]

- Biodiversity may be indirectly lost due to the fact that the area selected for an offsetting measure has lower biodiversity than the land impacted. As a hypothetical example: a forest site is developed into a car park (forest to car park=-100 species); a grassland site is chosen to be offset and converted into forest (grassland to forest=+50 species); there may be a net loss of biodiversity in the offsetting. Selecting the relevant site for offsetting measure while taking into account the loss vs the gain of biodiversity is therefore important in order to truly achieve no net loss of biodiversity.

- It is important to ensure that funding for offsets are adequate and provided on a sufficient period of time (as ecosystems take long periods of time to develop). Adequate funding mechanisms should therefore be defined and established during the design of an offset measure, otherwise the implementation of offsetting measures, even though conducted concretely, may stay superficial with a loss of biodiversity.
  Failure to do so could create a network of 'paper offsets' which exist in theory but in practice do not achieve no net loss of biodiversity.[8] It is very important that this concern is taken into account and that adequate funding mechanisms are defined and established during the design of an offset measure.

To conclude, while on the one hand it is crucial to deal with all the bias, limitations and risks, not conducting offsetting schemes would, on the other hand result in a loss of biodiversity. Indeed, not all losses can be avoided, minimised or restored, some will persist even after these steps have been taken and it is important that residual losses can be compensated for somehow.
Therefore, despite their risks, offsets can be instrumental in ensuring the No Net Loss Initiative is achieved as long as the Mitigation Hierarchy is strictly followed, including offsetting measures being carefully managed that can result in a net gain of biodiversity following impacts of human activities.

OFFSETTING: the case of Germany

It is worth noting that implementation of a scheme extremely similar to the Mitigation Hierarchy called the Impact Mitigation Regulations (IMR, *i.e., Eingriffsregelung*) has been mandatory in Germany since 1993, where unsustainable human activities must first 'mitigate' damage to the environment and then must abide by certain compensation and substitution measures with respect to the damages that cannot be mitigated.

Under this scheme, approval of building development works depends on whether the project's impact on an existing environment is acceptable, as determined by public opinion in particular, under the conservation measures for the site. Due to this legislation, compensation measures became the dominant requirement for project approval.

The Impact Mitigation Regulations were successful for conservation as they presented many obstacles to environment-damaging developments. However they were considered to hinder development projects too much; in 2002 these were modified to make them less obstructive to development while still retaining their ecological rigor.[9] The IMR successfully supported, and continues to successfully protect, the German natural environment while allowing human activities to continue within the landscape.
More information on the implementation for the implementation of IMR can be found here:
http://www.ieep.eu/assets/1666/Eco-Accounts_BW_case_study_final_221114.pdf

Practical steps in offset project design and implementation

If, after completion of the first three steps of the mitigation hierarchy, offsetting is still required to achieve no net loss of biodiversity then it is important that the process is designed and implemented appropriately taking into account the risks described on pages 2 and 3; failure to do this could lead to the loss of biodiversity as a result of negative impacts of human activities.

Offset design

The Business and Biodiversity Offsets Programme (BBOP) Biodiversity Offset Design Handbook[10] identifies 8 steps in offset design, as reproduced below:

Step in offset design		Purpose
1	*"Review project scope and activities"*	To understand the purpose of the project, the main activities that will occur, and to identify when offsetting measures can be incorporated into project planning.
2	*"Review the legal framework and / or policy context for a biodiversity offset"*	To clarify the legal and policy context within which a biodiversity offset would exist. This should include reviewing governmental policy, financial or lending institution's policies and, if working with a private company, its internal policy.
3	*"Initiate a stakeholder participation process"*	To identify relevant stakeholders and involve them at all stages of the offset process.
4	*"Determine the need for an offset based on residual adverse effects"*	To confirm that, despite prior application of the Mitigation Hierarchy, a loss of biodiversity has still occurred from human activities, therefore then confirming the need for an offset scheme.
5	*"Choose methods to calculate loss / gain and quantify residual losses"*	To examine the available methods of measuring biodiversity and, based on which is most appropriate, decide which of these is to be used.
6	*"Review potential offset locations and activities and assess the biodiversity gains which could be achieved at each"*	To compare the various locations at which offset schemes could occur, what activities could be used at each and which of these would grant the greatest gains in biodiversity, in order to create a shortlist for more detailed planning, and then…
7	*"Calculate offset gains and select appropriate offset locations and activities"*	…select a final location and the activities that will be undertaken there from the shortlist of potential offset plans, calculate the net change in biodiversity, and check that adequate compensation is offered to any affected communities so that they benefit from the offset.
8	*"Record the offset design and enter the offset implementation process"*	To finalise and record the decision of the offset location and activities, and demonstrate that stakeholders will be satisfied, that the offset will contribute to national policies and follow national requirements, and that No Net Loss of biodiversity will be achieved.

Table 1: Adapted from the BBOP Biodiversity Offset Design Handbook[x]. For further details on the offset design process, including questions to answer and possible ways of proceeding for each step, please consult the Biodiversity Offset Design Handbook.

OFFSET IMPLEMENTATION

The Business and Biodiversity Offsets Programme (BBOP) Biodiversity Offset Implementation Handbook[xiii] states that there are 5 basic activities to consider in offset implementation:

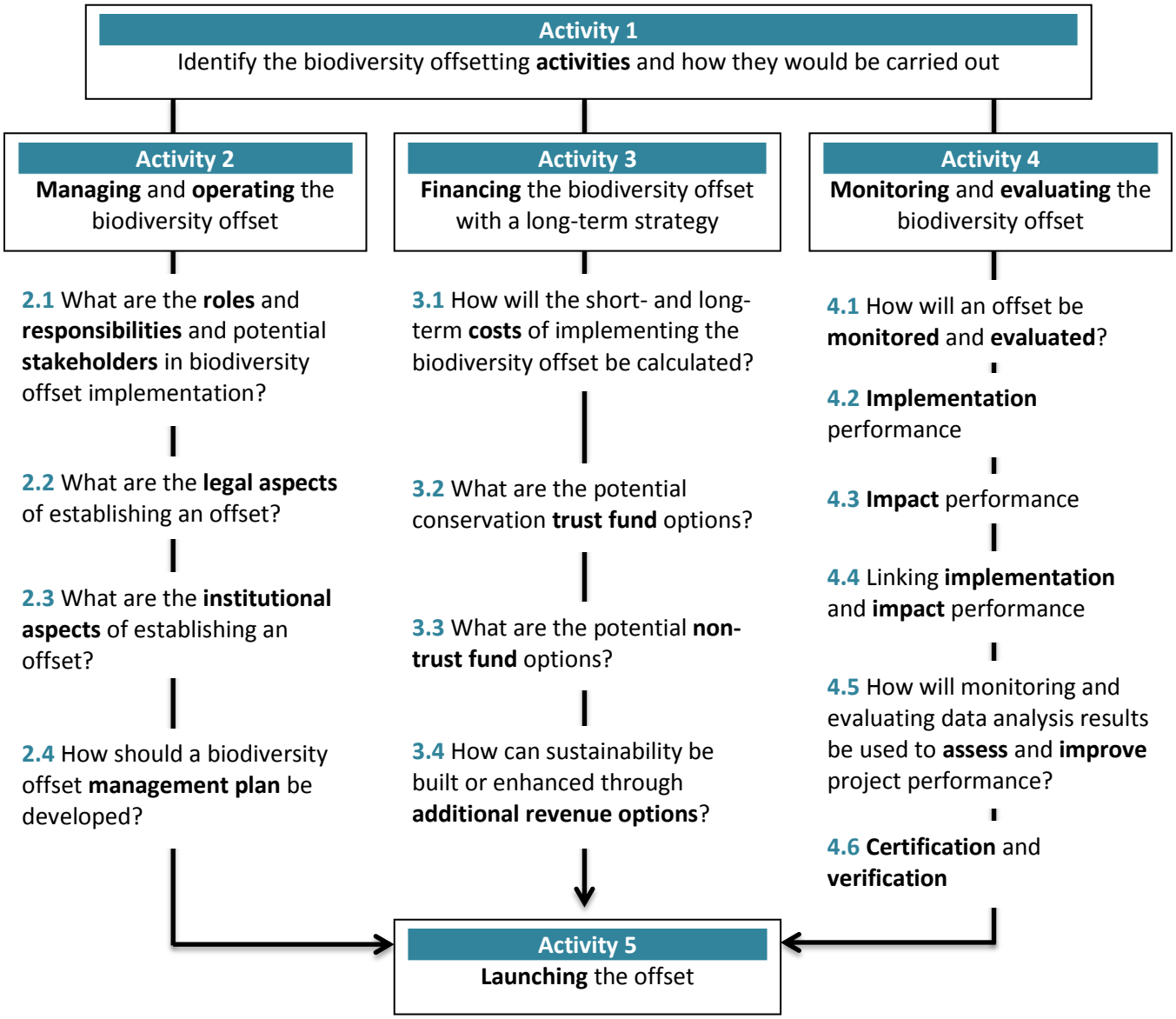

Figure 1: Recreated from the BBOP Biodiversity Offset Implementation Handbook[11]; for further details on the offset implementation process, advice on selecting the correct management tools, or and guidance and additional references for offset implementation please see the Biodiversity Offset Implementation Handbook.

HOW HUNTERS CAN HELP

While sustainable hunting already contributes to the three first steps of the mitigation hierarchy, hunters can also play a relevant role in designing and implementing offsets.

Throughout the entirety of an offset schemes life, it is important that the local community supports the process; failure to achieve this could result in conflict between local stakeholders and the management of the offset.
As highlighted in step 3 and 8 of the offset design, involvement of local stakeholders is therefore imperative to reassure them that their concerns are being addressed and to provide local legitimacy for offsetting principles.

The hunting community is large, diverse and comprised of people from a wide variety of backgrounds, inclusion of hunters in an offset project would provide legitimacy in various socio-demographic groups.
Through their ecological knowledge and skills in land management, including experience regarding species' habitat preferences and requirements, hunters could contribute to various steps of the design and implementation process presented previously:

- Step 6 of the offset design process by both locating potential offset locations and recommending activities to manage the land in a way that recreates the lost habitat
- Activity 2.1 and 2.4 of offset implementation as hunters have experience in habitats restoration and the development of management plans
- Activity 3 of offset implementation as a large amount of the work undertaken by hunters is voluntary and self-funded with possibilities of being implemented and monitored on a long-term basis.
- Activity 3.4 of offset implementation as, in much of Europe, hunters pay land owners for hunting rights to the land. If offset land contains huntable species, hunters are likely to pay landowners for access to the land, providing a longer-term source of funds.
- Activity 4 of offset implementation (offset monitoring and evaluation) as the long hours hunters spend in the natural environment make them ideally placed to conduct biodiversity surveys and monitor the overall health of the offset.

If offsetting schemes are to be undertaken, developers would benefit greatly from the voluntary, local expertise provided by hunters, and their involvement could be a crucial component of these projects.

Relevant information and best practice examples of hunters' activities contributing to nature conservation can be found in the 2015 report of the FACE Biodiversity Manifesto. This report is the result of the implementation of the FACE Biodiversity Manifesto and highlights trends of 181 case studies of conservation work undertaken by hunters. For more information please see http://www.face.eu/nature-conservation.

Conclusion

In conclusion, the Mitigation Hierarchy represents the best attempt to ensure no net loss of biodiversity while finding a balance between human activities and biodiversity conservation. All four steps of the hierarchy are important and it is crucial that these are conducted in order to reduce the need for investment in later, and potentially more expensive steps, while maximising the effectiveness of conservation efforts.

Despite the potential risks associated with badly managed offsetting measures, their inclusion in the Mitigation Hierarchy is important as they offer a final step dealing with residual impacts that may remain after following the Mitigation Hierarchy.
As long as (1) the risks outlined in this document are addressed, (2) offsetting is only utilized after the other three steps of the Mitigation Hierarchy and (3) the offset is well designed and implemented, offsetting schemes can help secure a net gain in biodiversity as a result of negative impacts from human activities.

Finally, if offsetting schemes are put in place, it is important that the local actors (and more specifically hunters) are involved in their design and implementation. Local hunters can provide local, cheap, diverse expertise to offsets due to their experience in both land management and monitoring, both of which are integral to offsetting schemes. Their involvement in offset design and implementation can help offsets to achieve no net loss of biodiversity.

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[1] *World Business Council on Sustainable Development (WBCSD). 2012. Business Ecosystem Training (BT): Glossary of Terms and Acronyms.* WBCSD

[2] *Business and Biodiversity Offsets Programme (BBOP). 2012. Glossar. BBOP, Washington, D.C. 2*nd updated version

[3] *Department of Environment and Conservation NSW, 2006. Avoiding and offsetting biodiversity loss: Case studies*. Department of Environment and Conservation NSW, Australia

[4] *Business and Biodiversity Offsets Programme (BBOP). Principles on Biodiversity Offsets*. Available at http://bbop.forest-trends.org/documents/files/bbop_principles.pdf

[5] *Business and Biodiversity Offsets Programme (BBOP). 2012. Resource Paper: No Net Loss and Loss-Gain Calculations in Biodiversity Offsets*

[6] *Moreno-Mateos D, et al. 2015. The true loss caused by biodiversity offsets. Biological Conservation (in press) Biological Conservation* http://dx.doi.org/10.1016/j.biocon.2015.08.016

[7] *Chase JM. 2003. Community assembly: when should history matter?* ; *Oecologia* 136(4): 489-498

[8] *Quétier F, Regnery B and Levrel H. 2014. No net loss of biodiversity or paper offsets? A critical review of the French no net loss policy.*,*Environmental Science and Policy* 38: 120-131

[9] *Tan R, Wang R and Sedlin T. 2014. Land-development offset policies in the quest for sustainability: what can China learn from Germany. (Offset-Politik im Sinne einer nachhaltigen Landentwicklung: was China von Deutschland lernen kann). Sustainability*6(6): 3400-3430

[10] *Business and Biodiversity Offsets Programme (BBOP). 2012. Biodiversity Offset Design Handbook*-update

[11] *Business and Biodiversity Offsets Programme (BBOP). 2009. Biodiversity Offset Implementation Handbook. BBOP, Washington, D.C.*