Literature Review: Environmental Offsetting

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List of Abbreviations

BAR	Basic Assessment Report
CDM	Clean Development Mechanism
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
GHG	Greenhouse Gases
REDD	Projects that reduce emissions from deforestation and degradation

1. Key concepts and issues

Environmental offsetting comprises a set of tools emerging in the context of sustainable development discourse. Its definition, as used by the DEA is: *"An environmental offset is an intervention, or interventions, specifically implemented to counterbalance an adverse environmental impact of land-use change, resource use, discharge, emission or other activity at one location that is implemented at another location to deliver a net environmental benefit".* In essence, environmental offsets provide an exchange between being granted the right to develop a particular area, with the ensuing responsibility of neutralising any negative social-ecological impacts through a relevant environmental offset.

From a variety of perspectives, environmental offsets are viewed as a promising means to address the negative social-ecological impacts of development projects, better align the priorities of economic growth, social justice and environmental protection and have been described as the potential "missing link" to achieving true sustainable development. The implementation of environmental offsets is, however, fraught with inherent dangers and practical challenges. The aim of this literature review is to summarise key themes emerging out of international and national literature, frame the debates to enhance meaningful discussion around the different kind of offsets (carbon equivalents, biodiversity, water and air quality) and examine the development of offsets within South Africa's context. This review provides a background to the development of a discussion document that will aim at encouraging discussion and debate around environmental offsets in the context of a coherent proposal for how implement offsets in the South African context.

There can be tremendous potential and value in envisaging a desired social-ecological future for South Africa and carefully identifying the steps and factors needed to realise this. Futures Studies, with strong roots in Scandinavian countries, has emerged to explore possible, probable and preferable futures. Historical factors and present drivers of change are considered in providing forecasts for, and scenarios of, possible futures. How futures unfold are determined not only by what is present but also by what has been absent. This encompasses the absence of systems that adequately account for:

- The value of a stable climate – we are currently facing dramatic and possibly devastating climate change;
- The value of biologically diverse and ecologically functioning habitats – there has been the dramatic loss of species and ecosystem services
- The value of healthy water bodies – many wetlands, rivers and estuaries are critically threatened and the quality and availability of water is diminished
- The value of healthy air quality – many people suffer from ill health resulting from air pollution.

This lens has been flagged, to be taken up further in the discussion document, as it is useful to frame environmental offsets in terms of the kind of future South Africans want and critically examine whether offsets are in fact an effective tool in realising such futures.

1.1. Key characteristics of environmental offsetting

Environmental offsets are currently in use in over 20 countries (mostly developed) that includes the United States, Canada, China, the United Kingdom, Brazil and the Netherlands. The United States was the first country to officially legislate for environmental offsets through its Clean Water Act of 1972 that aimed for a no net loss of wetland habitat. Since then a variety of offsetting approaches have been adopted that include the USAs wetland mitigation and conservation banking schemes; the BushTender, Bush-Broker and BioBanking programmes of Australia and the European Union's Natura 2000 network.

The role of offsets in these programmes is to marry the goal of economic growth with environmental protection. As Clare & Krogman (2013) state: "Governments worldwide are increasingly being called upon to "green" their economies, while at the same time, maintain or increase economic growth and prosperity." It is an attempt to

address the externalisation of the costs of development, which are often carried by the poor and the environment. It is argued that these externalities result from the market failure of not recognising the true value of ecosystem infrastructure and services (e.g. carbon sequestration, water purification etc.). These services are often undervalued and unable to compete with ecologically destructive but economically viable land uses, such as timber extraction. It is argued that through offsets the negative environmental impact of development will be accounted for and neutralised through a project that improves environmental integrity elsewhere. Offset policy implemented in New South Wales, Australia, provides an example of how offsets have internalised the costs of the negative impact of development - since a biodiversity offset for native grasslands was introduced planning permission approvals for projects that clear this habitat have decreased by 80% as the development projects have become prohibitively expensive.

The Department of Environmental Affairs (South Africa) has highlighted the syndrome of "Death by a Thousand Cuts" where the cumulative effect of small, unmitigated effects of development leads to "a steady and significant decline in environmental quality". If unaddressed these many "small cuts" in the environment can result in the collapse of ecological infrastructure, the local extinction of species and the loss of invaluable ecosystem services. DEA envisages environmental offsets as a viable tool to mitigate the cumulative effect of these environmental cuts.

Environmental offsets are part of the mitigation hierarchy adopted in EIA practice, and do not replace the prior steps of:

1. Avoid (negative impacts); and

2. Mitigate (for impacts that are unavoidable).

In the literature it is emphasised that offsets are used only when these two prior steps have been adequately addressed. They are used to neutralise the residual impacts that are not possible to avoid or mitigate.

There are two main categories of offsets identified in the literature namely, direct and indirect offsets:

- *Direct offsets* refer to measurable conservation (or other, e.g. water) gains in relation to the ecological variable/s negatively impacted, where compensation is in the form of habitat, functions, values or other attributes negatively impacted. Examples include: restoring existing habitat; protecting existing habitat; creating new habitat; and reducing threats.
- *Indirect offsets* refer to activities that instead of directly compensating for the specific variable impacted, provide a different but proportionate compensation e.g. financial or educational. For example, this could be in the form of purchasing trading/banking credits, in situ fees, or providing resources for research. An argument that this category is better thought of as compensation, and not strictly as an offset, is prominent.

Financial instruments are a key part of indirect offsets. They are made up of a market and a banking system (e.g. mitigation banking, conservation banking), where buyers and sellers trade offset credits. These instruments provide financial incentives for rural landholders, private conservation organisations and corporations (who become known as third party offset providers) to invest in the protection and restoration of ecosystems. The investment in ecological restoration and protection is known as an advanced offset, which is banked as credits. These can be bought by developers needing to neutralise the negative impacts of their projects. This process is regulated and structured by a mix of actors and institutions including developers, entrepreneurs, NGOs and national or local government departments. An advantage of such financial instruments is that they address the issues of time-lags and uncertainty of offsets. This is because a developer can buy added value credits in the form of mature offsets.

1.1.1. Opposition to Offsetting

There are a number of fundamental red flags raised in the literature that place a question mark on the ability of environmental offsets to achieve a future in which the needs of the poor and nature is considered. These need to be adequately addressed. Otherwise there is a danger that offsets will maintain the status quo in which powerful individuals and corporations can determine outcomes to their economic advantage, with negative consequences for the marginalised and vulnerable (including ecosystem and species).

1. One of the primary concerns for some actors is that environmental offsets quantify and commodify nature by making it fungible and thus turn irreplaceable habitats and species into a tradable and exchangeable item dictated by market principles. As one headline stated: “Markets for the invaluable: the great nature sale is beginning”. George Monbiot, a radical environmentalist, reflects this perspective in his objections to the manner in which environmental offsets frames conservation in the values and language of economics and commodification. These values and language are perceived by a number of authors as root causes of the environmental crises. Monbiot states: “Costing nature tells us that it possesses no inherent value; that it is worthy of protection only when it performs services for us; that it is replaceable. You demoralise and alienate those who love the natural world while reinforcing the values of those who don’t”. In our context, irreplaceable habitats cannot, technically speaking, be offset. The principle of ‘no net loss up to a target’ which is adopted for biodiversity offsets in SA, is a crucial departure point for all offsets.

2. A related issue is that environmental offsets have the power to reshape ethics and values and change the motivations of environmental concern. Through environmental offsets, the values that undergird environmental protection are no longer embodied by individuals, but are rather carried by the market. The consequences of this are highlighted in the following quote: “A shift from one paradigm to the other (from a culture that requires action to one that allows payment) is an ethically significant event, involving a shift in the ethos of culture.” (note 2010: 2081). This ethically significant event results in the thinning of a vocabulary used for deliberating environmental obligations. This is partly because the market is incapable of storing some important environmental values, which consequently get weakened. The market thereby influences the evolution of particular tastes, values and personalities.

3. The danger of green washing has also been raised in terms of the possibility that offset policies could serve to neutralise concern about the negative impacts of development and result in the approval of developments that would previously have been disallowed, while providing little true environmental protection. As Sandra Bell, a nature campaigner of Friends of the Earth stated, "The political agenda in the UK is very clearly about using offsetting as way of speeding up the planning process and allowing more intensive development in certain areas with offsets located in areas where land is cheaper. This is no secret as there are references to 'increasing net developable area' and 'increasing the land available for development' and to 'unblocking' larger housing developments in government documents.”

In response to these concerns, more than 140 environment and development organisations from across the globe have signed a statement condemning biodiversity offsets. This includes the World Rainforest Movement, Friends of the Earth International and Save our Woods (UK).

In counter-balance to these concerns, it should be noted that the context in which environmental offsets are considered is extremely important. The criticisms levelled by George Monbiot, for instance, are in direct response to the development of a regulatory framework for environmental offsets in the United Kingdom, which has a very different natural and socio-economic landscape to that of South Africa and many other developing countries. In particular, the British landscape has already been very extensively impacted by long generations of human activity and the development of the few areas of relatively pristine natural habitat that remain cannot easily be offset by protecting or rehabilitating a large reservoir of unprotected natural habitats. Furthermore, the United Kingdom’s natural resources have already been extensively exploited and there is relatively little

scope for further socio-economic development on the back of natural resource extraction. In comparison to the United Kingdom, South Africa's population is significantly less dense, has higher population growth rate, and South Africa scores much lower on the Human Development Index. South Africa has both a much larger reservoir of relatively untapped natural assets that the United Kingdom, a significant percentage of which is not already under formal protection, and a greater need to develop natural resources to meet socio-economic needs.

1.1.2. Practical challenges to effectively implementing environmental offsets

There are also a mix of practical challenges to the effective implementation of environmental offsets. These include:

1. An important issue is the complexity of social-ecological systems. Characteristics of complex systems, such as non-linearity and unintended, emergent outcomes and consequences, place a question mark on the reliability of an offset approach to deliver what it promises.
2. Offsets are a potentially risky tool as they exchange a certain negative impact for uncertain gains. The difficulty of adequate restoration is highlighted by many examples. For example, a study carried out in Ohio discovered that two-thirds of wetland offsets did not deliver what they had promised (Pearce 2013).
3. There is a danger of environmental leakage where the damaging practice, e.g. deforestation is moved elsewhere.
4. Politics and power dynamics can lead to corruption of planning processes or undermine the effective implementation of offsets.
5. The extensive bureaucracy that will likely be involved in adequately enforcing and monitoring offsets. A question is whether developing countries such as South Africa have the capacity to process such bureaucracy

1.1.3. Principles of environmental offsets

Drawing from the literature on environmental offsetting, the following principles have been identified that inform the implementation of offsets:

- The underlying intention of environmental offsets is to ensure that there is no net loss of natural assets as a result of development, termed "no net loss up to a target" for biodiversity, and "net positive outcomes" are appropriate for air quality, water and carbon currencies.
- Offsets should be designed to ensure additional conservation outcomes, i.e. offsets need to provide a new contribution to conservation, additional to what would have been without the offset.
- Offsets should follow the mitigation hierarchy (avoid, mitigate, restore)
- Spatial areas or species impacts that cannot be subject to offsetting need to be demarcated and defined.
- Offset should be implemented prior to or at the same time as the impact incurred, and should have long term outcomes.
- There should be stakeholder participation, transparency of information and accountability throughout the offsetting process – both scientific and indigenous knowledge should inform the identification of offsets.
- Offset need to be designed so that they can be measured, monitored, audited and enforced.
- Offsets should be located as close to the site of impact as possible in order to prevent the development of degradation hot spots.

In designing offsetting frameworks, careful consideration needs to be given to the 'currency' used to define and measure environmental impacts and offset "credits", particularly with respect to mitigation replacement ratios. For instance, there should be scope for the use of multipliers, where the offset is increased relative to factors such as uncertainty of success, timing of offset, extent of equivalence and distance of offset from impact site.

Equivalence of project impacts with offset gains is an important principle, particularly when vulnerable habitats or species are impacted. However, in some circumstances there may also be scope to compensate with dissimilar elements using a viable credit system in order to support the achievement of regional priorities. There is a risk that placing too heavy restrictions on acceptable offsets may make the development of a viable market of offset projects impossible.

Questions to consider in ensuring the effectiveness of an offset:

- Does the offset adequately compensate for the loss?
- What is the conservation gain to be achieved through the offset?
- How will one manage the offset for the life of the impact?
- How long will it take for the offset to start having effect?
- What is the level of certainty that the offset will have a positive effect?
- How suitable is the offset location in terms of ecosystem/ landscape perspectives?
- How does one determine appropriate mitigation replacement ratios?
- How does one ensure compliance to the mitigation hierarchy?

The following section provides some detail of the four main types of offsets that address greenhouse gases, biodiversity loss, water quality impacts and poor air quality.

I.2. Carbon offsets

Carbon offsets are defined as activities that result in a measurable avoidance, reduction or sequestration of greenhouse gases, where one carbon offset is equivalent to a tonne of carbon dioxide. Carbon offsets provide a tool to potentially reduce the threat of global warming, while also protecting forests and improving local livelihoods. Carbon dioxide is the most widely known and common greenhouse gas. Five other greenhouse gases are methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

- An important characteristic of GHGs is that although they may be produced locally, their effects are global. In addition, one tonne of carbon will have the same effects regardless of where it was produced. This makes carbon offsets much more fungible than e.g. biodiversity or wetland offsets that are much more specific and connected to particular places. Establishing a generalised trading system in carbon credits is therefore much easier.
- Carbon can be regarded either as a commodity or a financial instrument. It has been argued that carbon is best viewed as a commodity; meaning that carbon is fungible and can therefore be easily exchanged and (Promethium 2014);

- Carbon offsets are intangible goods. Their value and integrity therefore depend on definitions and guarantees.

The Kyoto Protocol set the aim of reducing developed nations emissions by 52% below 1990 levels between 2008 and 2012. The Clean Development Mechanism (CDM), that came out of the Kyoto Protocol was an instrument developed to support this aim. It enables industrialised countries to offset their GHG emissions by financing forestry projects in developing countries. About 2500 CDM projects have been registered and by November 2010 certified emission reductions came to the equivalent of 451 million tons of CO2 emissions.

The REDD (projects that reduce deforestation and degradation) instrument came out of the UN conference of parties 15th session in the Copenhagen 2009.

These two mechanisms created a new market opportunity in forest management and new opportunities for poverty alleviation; landowners (CDM) and governments (REDD) can earn incomes by maintaining or enhancing carbon storage potential through e.g. protecting forest cover, reducing deforestation, and reforesting areas. However, CDM for example, has faced a lot of critique and seems to have failed to meet up to its expectations of addressing deforestation.

Carbon trading is an offset scheme broader than only forest management and provides a positive incentive to reduce or sequester carbon emissions. Carbon pricing mechanisms are currently operating in plus 35 countries. Two different policy instruments can be adopted to encourage carbon trading and carbon offsets, namely Carbon Tax and Cap and Trade. The Carbon Tax is a mechanism whereby emitters are taxed when they exceed certain emissions levels. The benefit of this is that it can be implemented relatively quickly and the price is fixed. However, the resultant emissions levels are uncertain. The carbon tax mechanism proved to be a success in Sweden resulting in significant reductions in carbon emissions. Cap and Trade uses an emissions cap of a mandatory limit to emissions that may not be exceeded. It has more certain environmental benefit as the emissions target is set. Any carbon emissions that exceed the cap need to be traded on the carbon market or offset. The price of carbon credits can vary widely from a few cents to 24 dollars a ton. It also requires more legislation than a carbon tax and is open to loop holes present in the carbon trading market.

The most useful practices for carbon sequestration are, in order of benefit:

- Reforestation of thicket and forests
- Restoration and management of grasslands
- Commercial small-grower forestry
- Biomass to energy, provided these are displacing coal, gas and oil
- Anaerobic biogas digesters
- Biochar
- REDD through planning and regulation
- Improved agricultural practices (Kgope)
- Fire management, installing renewable energy systems, avoided deforestation and the use of bio-fuels are additional examples of carbon offsets practices.

Reduced emissions through technological and management interventions usually form much better offsets, provided leakage can be contained

Promethium, a local consulting company, have undertaken a study of the best means to introduce a carbon offset trading scheme into the South African context. Such a scheme is being considered by National Treasury and is suggested by the National Climate Change Response Paper. This will be part of the carbon tax system that is planned to be in effect from 2016. Carbon offsets will be a means for GHG emitters to mitigate their tax liability.

Findings indicate firstly, that there is the necessary infrastructure and potential supply and demand in South Africa to create a carbon offset trading scheme and that this can be established within the same timeframes as the proposed South Africa carbon tax. Secondly, the most time and resource efficient option for a South African carbon offset trading scheme will be to incorporate carbon into the existing trading infrastructure. This differs from most international trading schemes that have been designed as stand-alone trading schemes, separate from other markets.

Carbon offsets pose a number of challenges. These include:

- There can be a tension between biodiversity, water and carbon offset objectives. For example, forests can sequester the most carbon at an age when they do not have the most biodiverse or ecosystem value (old forests capture carbon at slower rates than intermediate forests. In addition, policies such as CDM can encourage the growth of fast growing tree plantations that negatively impact on biodiversity and water retention.
- Linked to the above point, carbon offsets linked to forestry schemes, reduce complex land-use patterns to a simple commodity (carbon) to be traded in the carbon market.
- There is an issue of carbon colonisation, where industrialised countries lock up land and forestry resources for extended periods of time, preventing their local use. For example, the Noel Kempff Mercado Climate Action Project, financed by the Norwegian government, established a protected area to offset their carbon credits. This project displaced local communities and restricted their use of local natural resources.
- As the above example also shows, carbon offsets can exacerbate inequalities and unequal power relations and there is a danger that carbon forestry will result in the loss of indigenous livelihoods and an erosion of the spiritual and natural values of forests.

Challenges relating specifically to the carbon credit market are as follows:

- It is difficult to accurately measure and report carbon emissions.
- The carbon market is weakly developed
- Carbon is an intangible commodity.
- There is a question of how to verify ownership of a carbon credit as it can potentially be sold many times over.
- There is a diversity of widely used standards representing the carbon commodity. It is difficult for consumers to distinguish between high and low quality offsets or evaluate the carbon offset provider. There are presently three main types of standards. The first type certifies the quality of an offset (examples include the Gold Standard, the Voluntary Carbon Standard, Plan Vivo and the Climate, Community and Biodiversity Standard). The second type is a certification of the sellers services (examples include Defra's guidelines and the Climate Neutral Network). The third type is produced by the offset providers themselves.
- There is a lot of variability in the quality of offset retail providers.

1.3. Biodiversity

The Business and Biodiversity Offsets Programme, an international collaboration on biodiversity offsets, has defined biodiversity offsets as "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity".

In a SANBI document (2012) it is stated that in South Africa there is currently little understanding, clarity, or agreement amongst role players on what appropriate biodiversity offsets are, when they should be considered, what the best approaches are to designing and implementing offsets and who is responsible for securing and managing them. It is hoped that this review will help provide some clarity to these questions.

In comparison to carbon offsets, it is impossible to define a consistent, fungible unit of biodiversity. This means that biodiversity cannot be a tradable market commodity. There is consequently the need for e.g. credits/ units to act as proxies. These credits/ units need to be based on robust and diverse metrics that adequately represent different levels and scales of biological organisation and quantify impacts and gains from the offset project/ practice. Biodiversity credits are, however, complicated as the value of biodiversity components (e.g. biodiversity patterns, population, species and vegetation types) and ecological processes are not fixed or intrinsic. This is because the biodiversity service or functional value depends on its relationship to other biodiversity components. It is, therefore, much more difficult to develop a market for biodiversity offset trading as compared to carbon offsets. The role of biodiversity credits, therefore, becomes one of factoring in the cost of negative externalities impacting biodiversity into development projects (Bull *et al*. 2013). A prominent argument is that credits work worst with biodiversity and best with commodities like carbon and water where outcomes can be demonstrably audited and banked.

The BushBroker biodiversity offsetting scheme in the Australian state of Victoria uses the 'habitat hectare' as its unit of exchange. The value of a particular site in habitat hectares is calculated using a standard methodology that takes account of

- The area of the habitat
- The quality of the habitat (using a framework that includes a mix of factors e.g. canopy cover)
- The context of the habitat in terms of its scarcity, relationship to the wider ecosystem and it's importance for wildlife

England's Department for environment, food and rural affairs (Defra) is developing a standard metric to quantify impacts on biodiversity. The aim is for this metric to be both simple as well as sophisticated enough to capture the range of habitats in England. The metric includes the distinctiveness of the habitat (high, medium, low); the quality of habitat (high, medium, low); and the area of habitat in hectares ((high, medium, low). Emerging SA practice is superior to the UK and US systems, but still workable with relatively little information, unlike the Australian Habitat Hectares approach.

Examples of offset projects include:

- Habitat restoration
- Habitat enhancement
- Creating, expanding and strengthening the network of protected areas
- Promoting more responsible natural resource management and alternative sustainable livelihoods for local people.

SANBI (2012) has identified 12 principles of biodiversity offsets, namely:

1. Design offsets so that they result in a No Net Loss of biodiversity and the ecological functioning of ecosystems beyond conservation targets.
2. Biodiversity offsets are similar in kind and adequate (supports NNL of biodiversity).
3. Ensure that biodiversity gains are additional (supports NNL of biodiversity).
4. Make sure that the offset can be managed over time and the biodiversity gain is lasting and protected (supports NNL of biodiversity).
5. Adopt an ecosystem approach.
6. Consider biodiversity offsets as a last resort (follow the mitigation hierarchy).
7. Recognise that there are limits to what can or should be offset.
8. Ensure that offsets make an 'on the ground' contribution to biodiversity.
9. Take a landscape view when locating offsets.
10. Ensure that the offset is defensible.
11. Adopt a risk averse approach.
12. Make sure the offset is fair to all parties concerned.

Additional principles identified by the WWF include:

13. Offsets should be designed and implemented in a transparent, participatory and equitable manner ensuring respect for the rights of indigenous peoples and local communities.
14. The design and implementation of biodiversity offsets should include a mechanism that ensures their long-term implementation as well as independent monitoring and evaluation of performance.
15. Biodiversity offsets are not appropriate in cases where cumulative impacts exceed ecological thresholds and where additional impacts could increase the risk of large scale regime shifts or state changes.

WWF considers the following to be non-offsettable

Areas/ species that are internationally/ nationally recognised as being:

- Unique (not appropriate for the SA context)
- Critical
- Irreplaceable
- Formally protected
- Threatened, endemic or restricted range species (not appropriate for the SA context)
- Globally significant migratory species
- Areas crucial for maintaining key evolutionary and climate change adaptations (hard to identify with certainty)
- Areas crucial to safeguard ecosystem services
- Areas that local people/ indigenous communities are reliant on for their livelihoods

The following challenges to the effective implementation of biodiversity offsets have been identified:

- Statutory capacity to implement, manage and inherit offset areas.
- There is a challenge in ensuring full compliance with the mitigation hierarchy.
- There are numerous examples of offsets not being implemented or being only partially implemented.
- There are examples of insufficient compensation being provided.
- There is uncertainty in the measurement of the biodiversity baseline
- There is uncertainty in the type and magnitude of biodiversity impacts and development can cause greater impacts than expected.
- There is insufficient monitoring of offset outcomes.

- There is a lack of evidence of the effectiveness of biodiversity offsets.

Bull *et al.* (2013) have provided a useful conceptual framework to integrate some of the theoretical and practical problems of offsets (see figure 1).

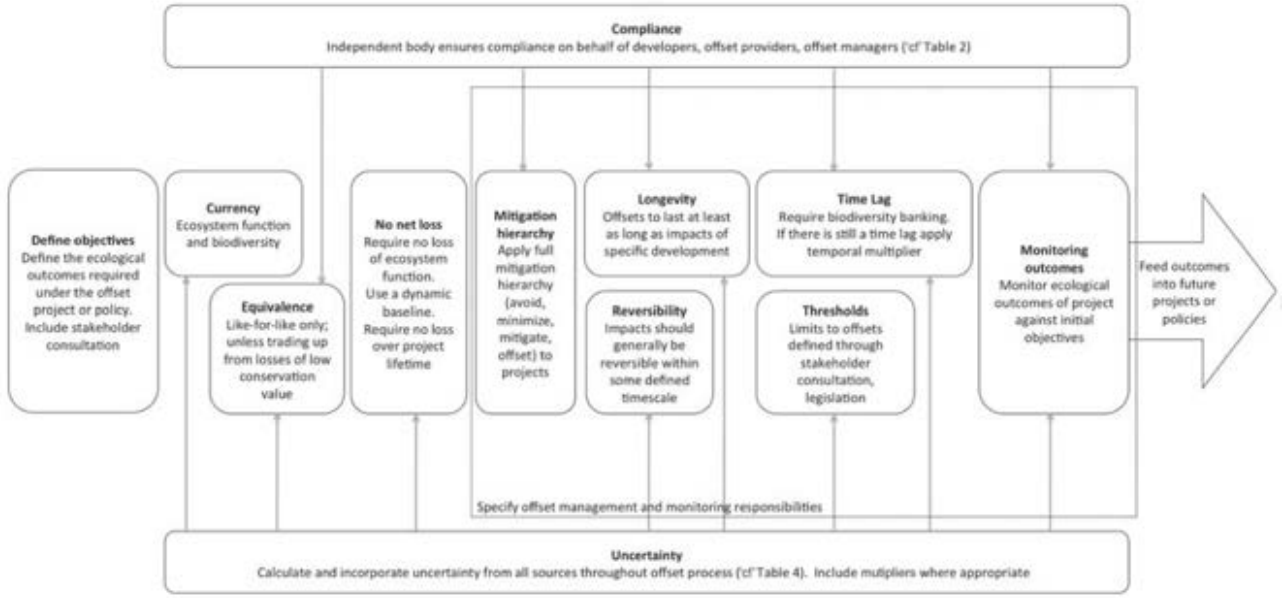

Figure 1: A conceptual framework to address the theoretical and practical problems of biodiversity offsets (Bull *et al*. 2013)

1.4. Water quality

Wetlands, estuaries and rivers all fall under water quality offsets. All three of these ecosystem types have been seriously impacted and require special consideration when exploring conservation options. Wetlands are a top priority as they are the most critically endangered of all South Africa's ecosystems, while being habitats of high biodiversity and providing the invaluable ecological services of water regulation and purification.

The United States Clean Water Act (1972) was the first act to introduce thinking around offsets that aimed for a no-net loss of wetland acreage and function. Out of this act was formed the U.S. Wetland Mitigation Banks scheme, which is the oldest international offset trading program. This scheme encourages companies to restore wetlands, which are then sold as credits to developers who may negatively impact a wetland. Performance standards are a critical element of wetland mitigation banks. There are currently no International or national standards to guide performance. Most cases use subjective performance standards that focus on vegetation.

Challenges in relation to water quality offsets include:

- It is difficult to create wetlands that have the same functional value as those destroyed. Ambrose (2000) looked at 40 sites and found that 0% of created wetlands were functionally successful. In North Carolina there has also been little ecological success in compensating for negative impacts on wetlands. Studies of the North Carolina Ecosystem Enhancement Program (NCEEP) have shown that many restored sites are ecologically similar to those that were disturbed (BenDor & Doyle 2010). Another author states that only 17-21% of offset sites adequately replaced the functions of wetlands impacted (Voget-Kleschin 2013).
- A lack of enforcement and compliance and inadequate assessment and exchange currencies are frequent problems in wetland mitigation, while there is frequent poor performance of monitoring and long-term maintenance of restored sites (Clare & Krogman 2013; Voget-Kleschin 2013).
    - The literature strongly supports the adoption of a watershed approach rather than a case by case approach when offsetting wetland impacts. This approach depends on integrated planning to decide on offset sites based on which will have the greatest benefit and chance of achieving long-term sustainability objectives. Variables to consider include;
        - Habitat diversity;
        - Habitat connectivity;
        - Ecological benefits;
        - Relationship to hydrological sources;
        - Land use trends;
        - Compatibility with adjacent land uses (McKenney & Kiesecker 2010).

1.5. Air quality

Air quality, compared to the other offsets, is most strongly concerned with effects on human health. The poor are often the ones most negatively impacted by poor air quality as they reside in areas where industrial emissions are high and/ or rely on dirty fuels for domestic cooking and heating. Air quality is affected by industries with high emissions (such as coal burning power stations), dust from a variety of sources, smoke from veld fires and domestic usage. As compared to the other offsets, it is most important that air quality offsets occur in the area of negative impact due to the phenomenon of airsheds.

There are a number of air pollution hot spots in South Africa that have resulted from inadequately addressing the cumulative impact of practices negatively impacting air quality. In particular there are three priority areas with elevated pollution levels, namely the Vaal Triangle Airshed Priority Area, the Highveld Priority Area and the Waterberg-Bojanala Priority Area. It is hoped that air quality offsets will provide a means to address this.

Eskom is very interested in pursuing the offsets approach and is taking a leading role. It aims to offset tall stack emissions from its power stations by reducing household emissions such as dirty fuels used for cooking and heating. Evidence shows that many of the tall stack impacts are distributed far beyond South Africa's borders and not just in the airsheds of interest.

South Africa's air quality management offset policy is based on the National Environment Management: Air Quality Act no. 39 of 2004 (AQA) that was brought into full effect in 2010. The objective of this Act is to provide measures for the protection and enhancement of South Africa's air quality and to give effect to Section 24 of the Constitution that requires an environment that is not harmful to the health and well-being of people.

Examples of air-quality offset projects could include:

- The deployment of a community air quality adviser;
- Electrification and/or electricity subsidies;
- Gas subsidy with equipment;
- Improved thermal efficiency retrofits (ceilings, insulation, double glazing, etc.);
- Subsidised low-smoke fuels (anthracite, LPG);
- Paving of roads;
- Tree planting and maintenance;
- Revegetation of mine dumps;
- Improved waste collection services;
- Optimise house size, shell insulation, ventilation, orientation and solar heat absorption;
- Replace coal / wood stove with multi-purpose, high quality, low emission stove. (DEA 2014, air quality offset policy draft)

Questions remain however to what extent these are "outcomes" focused. In particular, is it possible to measure the efficacy of any one of these interventions? Although some measures, such as fuel switching and thermal efficiency, may qualify as offsets, many are dealing in different currencies such as reducing dust in exchange for emitting NOx, SOx, PM10 and Hg.

2. Local policy frameworks and regulatory mechanisms

It has been raised in the literature that the political and institutional context of environmental offsets is very important to the implementation of offsetting (e.g. Voget-Kleschin 2013).

Although South Africa does not have a regulatory framework in place that specifically mandates and regulates environmental offsets, there are a range of policy instruments that could potentially support environmental offsets. Section 24 of the Constitution provides an overarching framework when it states that everyone has a

right "*To an environment that is not harmful to their health or well-being; and b. To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevent pollution and ecological degradation; ii. promote conservation; and iii. secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.* NEMA (National Environmental Management Act No. 107 of 1998), creates the fundamental legal framework that gives effect to environmental rights guaranteed in the Constitution, adopts a precautionary approach to land use change, supports that sustainable development must follow the mitigation hierarchy, and states that the perpetrators of environmental degradation must pay for its remediation.

For biodiversity offsets to work it is essential to adopt a strategic approach that has clear national and provincial conservation objectives and is linked to biodiversity planning. In the South African institutional context, the effective implementation of biodiversity offsets could be supported by

- The National Environmental Biodiversity Act of 2004 which provides a listing of threatened and protected species and Bioregional Plans.
- The National Biodiversity Strategy and Action Plan will provide a Bio-Regional plan that includes green corridors, areas that are non offsetable and areas earmarked for restoration.
- The National Biodiversity Framework calls for a national framework on biodiversity offsets.
- The National Environmental Management Protected Areas Act 57 of 2003 provides for four categories to protect an area (Special Nature Reserves, National Parks, Nature Reserves, Protected Environments), which can be declared on private land at the consent of the landowner.
- The Protected Areas Expansion Strategy.
- The National Framework for Sustainable Development highlights the value of biodiversity and healthy ecosystems to society.

The effective implementation of water quality offsets could be supported by

- The Water Act, which allocates a certain amount of water to the ecological reserve.
- The Water Use Management Framework
- National Water Resource Strategy
- Water Licensing

The effective implementation of GHG emissions offsets could be supported by:

- The National Climate Change Response
- The Carbon Tax to be implemented in 2016, which will help to curb emissions
- Carbon Equivalent Emissions.

The effective implementation of air quality offsets could be supported by:

- The Air Quality Act which provides policy guidance on air quality offsets
- The South African Air Quality Information System

3. Offsets Case Studies

4.1 AfriSAM Limestone Mine, Saldanha

AfriSAM Pty Ltd is the applicant, and are seeking NEMA and MPRDA approval to extend an existing limestone mine for 80 years.

The offset process is being handled in two phases: (1) background context and high level review (concluded), and (2) offset design process (presently underway), which will produce an Offset Report for consideration as

part of the final EA evaluation undertaken by the competent authority. A proposal for an 'adequate and appropriate, implementable offset', is under design.

This process has been facilitated by the:

- Careful forward planning of the applicant and willingness to support an offset contained as a condition of authorisation (should it eventuate);
- Good biodiversity information including detailed site level surveys;
- Availability of the Western Cape Provincial Guidelines on Biodiversity Offsets (PGBO 2006);
- Up to date systematic conservation planning and vegetation maps that cover the landscape in question, updated with fine scale vegetation community assessments undertaken as part of the project;
- Threatened Ecosystem listings, which set targets for the conservation status of the two vegetation types being impacted;
- Management of the design process by two expert EEPs who are skilled in offset design, and
- Options for implementation that include support of NGOs such as WWF South Africa. This support is linked to the development taking place within a key climate change corridor identified by The Table Mountain Fund Trust, an associated Trust of WWF, and the presence of a neighbouring WWF owned conservation property.

Should authorisation be granted, the conditions will determine the process of implementation. Key steps are likely to include:

- Negotiating with land owners (private and public) to secure relevant agreements;
- Resolving management and financing structures for the land transaction and ongoing management;
- Drafting EMP and other documentation for submission for declaration of the Nature Reserve.
- Developing and managing a new reserve network on the West Coast

4.2 ESKOM Air Quality Offsetting Programme (EOP)

A study commissioned by ESKOM to investigate potential air quality offsets, to be implemented in "air sheds" in the Highveld Priority Area where both ESKOM tall stack emissions generated and household sources of particulate and sulphur dioxide emissions (PM10 and SO2) are of health concern. The concept here is that emissions from Eskom Power stations are offset by household emission reductions.

"The objective of the envisioned scheme is to meet ambient air quality standards in the Highveld Priority Area in such a way that the offset scheme leads to reduced human exposure of harmful pollution within the air-sheds of existing Eskom generating power plants. The offset scheme is to be implemented in such a manner as to decrease the exposure of the population to air quality exceeding health limits at a lower cost to the SA economy than through decreasing the exposure by means of stack emission abatement measures."

The household interventions chosen for further study were:

- Retrofit full suite of thermal shell insulation (ceilings and walls), draft proofing and Trombe wall on all existing subsidy houses [Full retrofit]
- Install ceilings in all houses [Ceilings]
- Optimise house size, shell insulation, ventilation, orientation and solar heat absorption for new subsidy houses and social housing [EE RDP]
- Replace coal / wood stove with multi-purpose, high quality, low emission stove [New stove]
- Electricity subsidy
- Gas subsidy with equipment [LPG subsidy & heater]

Since domestic fuel use is such an important contributor to the overall health impact of air pollution, intervention types that reduce or eliminate domestic coal and wood burning will play an important role in improving ambient air quality.

The pre-feasibility study found sufficient grounds to recommend a pilot study to test and improve the prioritised interventions in a designated township within the Highveld Priority Area.

ESKOM has now contracted North West University (August 2014) to lead a project team to conduct the pilot "to test the effectiveness of the most promising household emission offset interventions identified during Eskom's pre-feasibility study including the associated emission reductions, improvement in air quality, and acceptability to households."

4.3 The Medupi Power Station Air Quality Offset

The Air Quality Act AQA recognises that the quality of ambient air in many areas does not support a healthy environment or promote social and economic advancement, and that the poor are worst affected by air pollution's health impacts, while the high social, economic and environmental cost is seldom borne by the polluter. The Act aims to improve ambient air quality so as to secure an environment not harmful to people's health and well-being.

During the environmental impact process for Eskom's proposed Medupi Power Station it was learned that air quality in the nearby Marapong community would possibly be negatively affected, not only by the proposed power station, but also by the existing Matimba power station.

It was also clear that a multi-billion rand investment in pollution abatement technology together with multi-million rand annual operating costs for this technology could not be justified based on the modelled relatively infrequent pollution episodes in Marapong.

The Environmental Authorisation for Medupi contained various provisions aimed at dealing with any "measured" rather than modelled pollution problems, and it contained a simple provision for Eskom to offset its emissions reading "Eskom must initiate a programme of support for initiatives aimed at improving air quality in the Marapong residential area. This programme must be included in the construction EMP and carried through to the operational EMP."

ESKOM has faced significant opposition from civil society over application for exemption or postponement to comply with the standards demanded by the AQA. This could set a worrying precedent in favour of all heavy emitters.

Flue gas desulphurisation (a technique used to remove sulphur dioxide from emissions), which can reduce sulphur dioxide emissions by more than 90 percent, will be installed at the new Kusile power station prior to commissioning, and retrofitted to the new Medupi power station between 2021 and 2024.

ESKOM are on record "Kusile and Medupi will have fabric filter plants which reduce particulate emissions by more than 99.9 percent. As a result, the commissioning of the new power stations will not result in a significant deterioration in ambient air quality, or a significant increase in health risks."

While these technical solutions are in place or planned, the CER (2013) argues that ESKOM has a history of non-compliance, and the notion of exceeding some very significant statutory limit (AQA regulations, derived from international health standards) and not avoiding or mitigating this impact is not good practice when offsetting. It is hard to distinguish this from a "corporate license to pollute" write GroundWork (2014).

4.4. Ingula (Braamhoek)

The Ingula (previously known as Braamhoek) Pumped Storage Scheme consists of an upper and a lower dam, each capable of holding over 20m3 of water. The dams are 4.5km apart and connect through underground waterways which pass through an underground generating facility of four 333 MW hydro-electric generators.

The original ROD in 2002 provided for the purchase of two downstream farms holding a nationally important wetland, and indicated that the application should ensure water flows to the wetland remained unaffected post scheme.

An implementation partnership between Eskom, BirdLife South Africa (BLSA) and the Middlepunt Wetland Trust (MWT) was launched in March 2004. Together with the cooperation of landowners in the district, this property may now form the core of a larger conservation area protecting the moist, high grasslands of the eastern Free State and northern KwaZulu-Natal.

WWF (2014) shows that this area falls within the 8% of South Africa's landscape, which provides 50% of our water, and is therefore classified as a 'Strategic Water Source Area'.

This project was facilitated by significant post ROD investment through the partnership but ran afoul of lack of enabling regulations within DEA enabling declaration of protected area through an offsetting process. Enabling conditions were however the support and presence of NGOs in the form of the partnership, and ESKOM's status as a Schedule 2 Public Entity and their willingness to implement the offset. The site has (?) been proclaimed and BirdLife South Africa are playing an active part in delivering the Environmental Management Plan for the Ingula Nature Reserve.

In comparison the Umoya Windfarm near Hopefield on the West Coast was also approved by DEA and has moved towards implementation relatively quickly owing to support from the (private) developer, and the offset securing key properties holding Critical Biodiversity (CBAs) that are situated within the West Coast National Park expansion zone.

Umoya has handed these sites to SANParks for inclusion into the WCNP, and contracted a payment to SANParks for 20 years. This pattern should be considered an exception though, since most offsets will not fall so favourably within a park expansion zone, and many developers balk at accepting the in-perpetuity responsibility of financially supporting the offset.

4.5 Blue Downs Erf. 1987, City of Cape Town

The development for low cost housing of a remnant of Cape Flats Dune Strandveld and a small wetland, situated in Blue Downs (Cape Town), will be offset by a cash value of about R2M, and also include a land owner levy per household to assist with the long term management of whichever site is secured as an offset.

This site is yet to be determined but it will be one of the remnants identified in the City Strandveld Conservation Implementation Plan (Strandveld CIP, 2012), showing how losses at local level can achieve residual or net gain (the offset) at a wider scale, when a systematic conservation plan is in place.

The R2M financial offset emerged from a conservation calculation (based on Offsets Report developed by an experienced EEP and cited in the ROD as a condition of authorisation), recognises that development of fairly low cost housing does not (apparently) give big enough returns.

The quantum of the offset must be determined only by the cost to offset it, and should not by the financial status of any applicant (or any statutory implementer).

This Offsets Report advises that the conservation contribution be paid to the Environmental Management section of the City of Cape Town, subject to negotiation and approval by the City. The relevant department should "then be able to use the funds for management of Cape Flats Dune Strandveld anywhere within the City, and may use it in conjunction with CapeNature, who manages some of the reserves within the City."

Note that a “financial offset” is a payment by a developer to a third payment to achieve certain pre-determined biodiversity outcomes. However, all offsets should have an ongoing “funding component” to cover the initial and long term management costs.

4.6 Shaw’s Pass, Hemel en Aarde Valley (Hermanus)

The applicant, the Western Cape Provincial Department of Transport and Public Works, sought to upgrade portions of a main road linking Hermanus with Caledon, and realign the dangerous portion through the pass. Unfortunately all potential alignments over the pass had a high negative impact on a highly sensitive and critically endangered vegetation type, Overberg Sandstone Fynbos.

The Record of Decision is well written (with time RODs are improving) and lists a second statutory organisation, CapeNature, who was to assist the competent authority (the Western Cape Department of Environmental Affairs and Development Planning) with identifying, purchasing (initially), proclaiming and managing an appropriate piece of private land in the surrounding landscape.

The offset transaction was designed by a professional EEP workign with the applicant, CapeNature and DEA&DP and has now been fully implemented, using a Stewardship mechanism. A Management Fund has also been established by CapeNature and capitalised by the applicant. This ensures the effective management of the offset site in perpetuity, although the required funding component for management is only calculated out to a 30 year horizon.

The project is notable for the cooperation between three provincial statutory authorities (DTPW, DEA&DP and CapeNature), the use of Stewardship to secure the final offset, and the willingness of CapeNature to exercise their authority to establish and manage the Management Fund.

4. Key Lessons

With particular thanks to W. Olivier, S. Brownlie and M. Botha.

Overall, literature review suggests that in general the offset design and implementation environment (the offset receiving environment) is still undeveloped. This field is technically complex, so focused capacity building that addresses technical capacity for officials, developers, environmental management professionals, and NGOs will address a clear need.

There is particularly limited capacity right now for designing and implementing water, wetlands, ecological infrastructure and carbon offsets, although progress on enabling these has occurred to some degree. Wetlands Offsets are now facilitated through finalisation of the Wetlands Offsets Guidelines, and the case of the *Blue Ridge Mine* (Limpopo), where a voluntary water offset was concluded with provincial DWA(F) authorities, also is instructive. Here the value of the water was sufficient to cover the cost of clearing Invasive Alien Plants in the upstream catchment. The project hence aimed to release sufficient water back into the impacted system to offset the activities of the mine.

Further points to consider include:

- Clarifying nomenclature appropriate for our local context is important. Effective dialogue and progress on these difficult concepts is risked by semantic conversations; the sector should clarify terminology and application, and offer new terms if these are required. We append a glossary of terms from WWF (2012) in Annexure A.
- Offsets are only a component of wider biodiversity conservation efforts. The stronger and more effective our biodiversity and general land use planning is, the easier it will be to direct development away from priority areas and minimise the risks of inappropriate offsets and loss of irreplaceable habitat. In other words, in an ideal world offsets would not be necessary.
- Additionally, as we update land cover, biodiversity information and habitat threat status we can and should amend and improve appropriate basic offset ratios for impacted biodiversity: the use of these offset ratios can also act as a deterrent to transforming priority biodiversity areas in the first place and direct development to locations and environments that could enable the activity. South Africa is fortunate to have a strengthening hierarchy of natural resource plans that together could ensure most development is directed away from areas of conservation value.
- South Africa urgently needs guiding national policy on all currencies of environmental offsets, and financial, that will deal with bundling (combining) and stacking of offsets, and which will act as an enabler for offsets receiving environment. Such policy will clarify nomenclature and use of offsets, and is a pre-requisite for many subsequent improvements in the use of offsets, for instance providing an environment for provinces and local authorities to prepare their own offset policies, the potential development of conservation and habitat banks, and for achieving consistency across provincial and local authority offset guidelines;
- Offsets and compensation are currently not addressed adequately within EIA regulations or other environmental laws. This needs to be remedied.
- Offsets must be addressed as an integral component of 'mitigation' within the EIA process; EIA practice must be improved with respect to addressing biodiversity, particularly regarding alternatives and avoiding 'non offsetables' or 'irreversible' impacts, and/ or 'loss of irreplaceable resources'. Offsets cannot be an 'add on' afterthought included in conditions of permit/ authorisation
- Offsets must systematically planned, transparent, and defensible (repeatable). This is essential to overcome unwilling developers that perceive offsets as incentives to secure development rights;
- There is an urgent need to build capacity within regulating authorities (not just DEA) and environmental assessment practitioners in particular, to ensure rigour when developing offsets, strengthen conditions of

authorisation (so that they are clear, enforceable and auditable), and adequately prepare for offset implementation. This framework should spell out what needs to be in a standard offset requirement for an authorisation.

- Linked to this all relevant government bodies - from departments through to public entities to publicly owned companies – need to be enabled to exercise and implement their offset obligations. Within the current institutional environment is seems unreasonable to expect all nationally generated offsets to be implemented by DEA. This process could be facilitated by setting up Provincial Biodiversity (or Environmental) Offsets Review Committees.
- Experience locally and from overseas shows no offsetting programme can be successful without an effective compliance monitoring & enforcement regime. This is particularly relevant as many offsets are now in design or early stages of implementation;
- Stewardship offers opportunities for securing offsets, where outright purchase cannot be considered or is not feasible;
- A single repository of all local, provincial and national RODs, Specialist Reports, and Offset Implementation Reports, should be created as a single accessible (ideally under the aegis of DEA). It is
- DEA should consider hosting a national Environmental Offsets Forum meeting annually, alternatively request that the National Biodiversity Offsets Working Group hosted by SANBI consider expanding to include all currencies of offsets;
- Institutional mandates and the functions of public entities (derived from general powers and fiscal regulations linked to their classification or listing as a Public Entity) have proven an impediment to implementing offsets. Within this context, mandates and powers need to be reviewed & clarified. Opportunities for improvement can be dealt with through the policy environment, and via intergovernmental liaison.

5. Annexure I

Glossary of Terms (derived from WWF Biodiversity Offsets Policy 2012)

Additionality	A property of a biodiversity offset, where the conservation outcomes it delivers are demonstrably new and additional and would not have resulted without the offset
Aggregated offset	Offsets comprising co-ordinated actions designed to compensate for the combined residual negative impacts on biodiversity from more than one development project in a specific geographical area
Averted loss	
Biodiversity plan	A spatial plan showing areas that are critical for the conservation of biodiversity. The plan may cover ecosystems, biotopes, communities, assemblages of species, habitats of threatened species and/or ecosystem services
Biotope	The combination of abiotic conditions and an associated community of species. The consistent relationship between the biotic and abiotic elements which determines when and where particular species occur together in repeatable and recognisable combinations. In other words, habitat shared by many species is called a biotope
Certification	A process whereby an independent third party (a certification organisation) certifies that an activity, company or organisation satisfies the requirements set by a performance standard
Compensate	To recompense for some loss or service, to make good the lack or variation of something else. Compensation may be 'in kind', involve the provision of substitute services or goods, or may take the form of monetary payment.
Compensatory conservation	A spectrum of efforts to compensate for impacts, but insufficient to achieve a 'no net loss' outcome for biodiversity
Conservation bank	A site, or sites, where natural resources (e.g., wetlands, streams, habitat, species) are restored, enhanced and/or managed for the purpose of providing offsets for impacts. In general, a mitigation bank sells credits to developers whose obligation to provide an offset is then transferred to the mitigation bank
Conservation credit	A unit of measure representing the environmental commodity that is able to be traded (this can be functional or measure of area), based on the activity
Critical biodiversity	Habitat for all life stages of Critically Endangered and/or Endangered species, locally endemic and/or restricted-range species, globally significant concentrations of migratory species, and/or congregatory species; areas with regionally unique and/or threatened biotopes; and areas that are crucial for maintaining key evolutionary and climate change adaptation processes
Critical ecosystem services	Ecosystem services that are valued highly or prioritized at global, national, regional or local scales
Ecosystem services	The benefits people obtain from ecosystems. These include provisioning services (e.g. food, water, timber), regulating services (that affect e.g. climate, floods, disease), cultural services (e.g. spiritual, sense of place, religious value), and supporting services (e.g. nutrient cycling)

Equivalent	The same in effect or value, interchangeable
Environmental Impact Assessment	A formalized process in which all relevant environmental consequences of a project are identified and assessed before authorization is considered
Fragmentation	The spatial and functional break-up of extensive habitats into isolated and small patches or islands, having reduced options for adaptation or genetic exchange
Habitat	The particular abiotic and biotic conditions with which individuals or populations of the same species are typically associated. (This term is often used in a broader sense, however, to refer to what are strictly biotopes)
Irreplaceable	A component of biodiversity is considered irreplaceable if conservation goals for that component could not be achieved without it
Like for Like	Actions targeting the same type of biodiversity as that affected by the project. Also referred to as 'in-kind'
Mitigation	Measures taken to reduce and/ or remedy the anticipated negative impacts of a proposed action
Mitigation hierarchy	Sequence of measures in order of priority to reduce and remedy negative impacts: avoid or prevent, minimize, restore, repair or reinstate and, as a 'last resort', compensate or offset
Multiplier	Factors that increase the size of a biodiversity offset to improve the chances of achieving no net loss. The term 'offset ratio' may be used synonymously
Net benefit	The overall outcome of measures taken to offset residual negative impacts of development to ensure no net loss of biodiversity, and to make a positive contribution to biodiversity conservation so that the net benefits more than fully compensate any losses
Net gain	The impacts on biodiversity caused by the project are outweighed by measures taken to offset the residual impacts, so that the gain to biodiversity conservation more than fully compensates any loss
No net loss	WWF understands no net loss to mean that the persistence and conservation status of affected threatened biodiversity (species to ecosystems) should not deteriorate as a result of a development
Non offsetable impacts	This is a level of severity beyond which impacts on biodiversity by a development project may no longer be capable of being offset. For example, it is not possible to offset the global extinction of a species. Levels of irreplaceability and vulnerability of the biodiversity components to be affected by the project, and the degree of uncertainty with respect to severity of impacts and the probability of success of a biodiversity offset, are all likely to be material factors in determining whether impacts on biodiversity can be offset.
Offset area or offset site	An area of land or water that is the location for offset activities that could achieve no net loss and preferably net benefit for biodiversity on its own or in combination with other areas
Priority Area	Recognized in global, national or regional biodiversity plans or approaches as an area of high conservation value

Residual impact	The impact on biodiversity remaining after steps to avoid or prevent, minimize, restore or repair negative impacts have been taken
Rehabilitation	Measures taken to return a degraded or transformed area to some use, or some way towards its pre-impact state
Restoration	Returning an area to its pre-development/disturbance state.
Stakeholder	A person who is affected by a development or biodiversity offset, or someone who is interested in that development or offset. Stakeholders can comprise landowners or occupiers, local communities, industry, research institutions, government agencies, NGOs, etc.
Systematic Conservation Plan	A plan that aims to achieve representation of the full variety of biodiversity, as well as its persistence, through a systematic and scientifically defensible method of selecting and prioritizing areas to achieve explicit conservation goals. Where there are spatial options to achieve these goals, the plan selects the most efficient alternative

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