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Offsets Payment Calculator

This part of the submission comments on the draft Offsets Payment Calculator (**Calculator**).

Further to our technical submission in August 2016, we remain concerned that the Calculator focuses on creating a market for biodiversity credits in a way which undermines the legislative goal of achieving biodiversity outcomes in NSW. At the *Draft Offsets Payment Calculator Information Briefing* in May 2017 (**information briefing**), it was again stated that the primary goal of the Calculator is to make the biodiversity credit market work, as well as to ensure that the method could be understood, and that it is 'perceived to be equitable'; rather than having a primary goal to deliver environmental outcomes. The result of this premise is that the Calculator fails to adequately consider the consequences to biodiversity and the system fails to create a market disincentive for clearing rare ecosystems.

In fact, the current version of the Calculator is likely to lead to significantly worse biodiversity outcomes than the version that was available for stakeholder consultation during August 2016. This is because the current version of the Calculator fails to incorporate a recognition that scarcity should generate increased credit prices. Instead, the Calculator relies on existing market purchases to drive credit price. For such a system to adequately incorporate the effect of scarcity, there would need to be a direct relationship between the supply and demand of credits for specific Plant Community Types (**PCTs**) or endangered ecological communities (**EECs**) in specific geographical areas. The current exemptions to the offsetting framework, the watering down of the 'like for like' rules, and the nature of the Calculator itself mean that this relationship will not exist, and the market will be flawed. The system can only deliver the outcomes required by the *Biodiversity Conservation Act 2016* (**BC Act**) if scarcity is built into the pricing model.

The Calculator also fails to incorporate key ecological considerations and environmental risks. At the time of writing we have only been able to review a copy of the Calculator as it relates to ecosystem credits. We understand from the information briefing that pricing for species credit species will be based solely on expert opinion. Any expert based system must be extremely transparent and the expert input received and the rationale for pricing decisions must be made publicly available.

We note that the revised Calculator includes three modules:

1. biodiversity credit price module – the predicted market price for biodiversity credits based on the trade history of the ecosystem credit type and the IBRA subregion;
2. biodiversity credit price risk loading module – a margin that accounts for any market credit price variation; and
3. Fund administration costs module – the estimated cost of operating and administering the Biodiversity Conservation Fund (**BC Fund**).

Many of our concerns and recommendations made regarding the August 2016 version of the Calculator have not been addressed in the current version of the Calculator. Where they remain relevant, we re-iterate these concerns here. We provide more detailed comments on the following aspects of the Calculator:

- Environmental Principles Lacking in the Calculator Framework
- Failure to Incorporate Scarcity
- Credit Price Module
- Credit Price Risk Loading Module
- Fund Administration Costs Module
- Governance

We are grateful for the expert analysis and input of Dr Neil Perry for this part of the submission.

Environmental Principles Lacking in the Calculator Framework

Examples of key environmental principles that are missing from the Calculator are provided below.

Ecological Considerations

The Calculator does not include consideration of the percentage of a PCT that has already been cleared. This is a failure to understand the ecological implications of scarcity. While the Biodiversity Assessment Methodology (**BAM**) incorporates a multiplier for biodiversity risk based on the percent of a PCT (or endangered ecological community) cleared, this is merely a conversion factor which recognises that a hectare of cleared land of one PCT does not have the same impact as a hectare of cleared land in another. The BAM cannot be seen in isolation to the Calculator because they work together, along with the legislation, to underpin, or undermine, the future of the State's biodiversity. The BAM multiplier for biodiversity risk is akin to the conversion factor of methane to carbon dioxide emission equivalents in global carbon markets. However, in carbon markets, the carbon price still reflects the scarcity of the underlying resource, in that case the atmosphere. With a well-designed carbon market, the price will increase through time as the atmosphere becomes a scarcer resource (as reflected in a reduced number of credits to purchase). We are concerned that this fundamental mechanism which ties the market to its underlying ecological resource has been lost.

In a well-designed carbon market, methane emissions will always be more costly than carbon emissions. However, the cost of emitting both methane and carbon will increase through time as the ecological resource becomes scarcer. This does not appear to be the case in the Calculator and the associated regulatory tools. It is not appropriate to build this scarcity mechanism into the BAM as suggested at the information briefing because the issue of pricing concerns the operation of the market, which operates outside the BAM. Thus, we **recommend** that a scarcity mechanism must be built into the Calculator, as was the case with the 2016 Draft Offsets Calculator. We address this issue further below.

There is also no consideration within the Calculator of the quality of sites to be purchased as offsets. While quality is reflected within the number of credits that an offset site generates to some extent, the nature of the offset system encourages protection of moderately degraded

sites.[1] As such there is no recognition of the ecological damage that arises from protecting moderately degraded offset sites when high quality sites are subject to clearing.

Environmental Accounts

The Calculator is designed to operate in a legislative environment with the stated purpose of maintaining "a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development". It is not possible to adequately integrate environmental factors in NSW decision-making without clear environmental goals, targets, and good data to guide natural resource management (**NRM**) (often delivered through environmental accounts). To make the environment visible in decision-making and create the right incentives, a regulatory regime for biodiversity needs to establish:

- clear, high-level biodiversity conservation and NRM goals;
- specific targets to be integrated in strategic planning and NRM;
- a set of state and regional environmental accounts to track environmental status and condition; and inform investment, strategic plans and development decisions; and
- a state-wide ecosystems assessment to provide better data to inform decisions.

All of these requirements are relevant to informing the Calculator. The lack of comprehensive and adequate state-wide environmental information means that the Calculator is not informed by sufficient information about the value and scarcity of biodiversity in NSW.[2] Other jurisdictions such as the United Kingdom have completed a National Ecosystems Assessment to better understand their environmental assets. The United States of America Government and Ontario Biodiversity Council also have policies and programs to more adequately value ecosystem services (the benefits provided to humans by nature).[3]

We **recommend** that the Calculator should be informed by ecological considerations and ensure that the pricing model adequately reflects the ecological systems it purports to protect.

Failure to Incorporate Scarcity

The current version of the Calculator fails to incorporate any recognition of scarcity in credit pricing. This is a serious retrograde step from the August 2016 version of the Calculator. The premise behind creating a market for biodiversity is that credit price should increase through time as an ecosystem type becomes scarcer, thereby creating a disincentive for clearing rare ecosystems and an incentive to protect them. The market price is supposed to reflect the 'external cost' of land clearing, such as the ecosystem services that native vegetation provides to other farmers and the broader community, or the loss of intrinsic value for those individuals who would like to see native vegetation protected. The negative externality or spill-over cost of land clearance increases as more of a vegetation type is cleared and as the vegetation type is cleared in a specific geographical area. This suggests that credit prices should increase through time as more of a specific vegetation type is cleared in an area.

[1] See our comments in relation to protecting high quality sites in our submission to the BAM.
[2] To this end, we strongly support the proposal for Biodiversity Outlook Reports (on status and trends) as proposed by the Regulation. See our submission on the Regulation for further comment on this.
[3] See further EDO NSW, Submission 3, Technical Submission on the biodiversity reforms (June 2016), pp 24-27, at http://www.edonsw.org.au/nsw_biodiversity_reform_package_2016.

The Ricardian theory of rent also suggests that credit prices should rise as more of a vegetation type is cleared. Here, the concern is with the opportunity cost of the land protected. As a vegetation type is cleared and offset, the land used for offsetting moves from relatively unproductive and inexpensive agricultural land to more productive and more expensive land. That is, the opportunity cost of the land increases and a landowner will require a higher offset price.

These mechanisms to drive credit price rises are not reflected in the structure of the Calculator. This problem is initially created by the watering down of the principle of like-for-like and the ability to pay into the BC Fund rather than identifying offsets at the time the demand is created. Credits can later be purchased by the BC Fund, but the purchased credits do not need to have any ecological association or like-for-like properties with the land cleared. Within this regulatory structure, the role of the Calculator must be to represent how the market would work in a well-functioning system - to 'make the market work'. Thus, the Calculator itself should act to build in the kind of scarcity that would result in a well-functioning system. The Calculator only exists because the market for biodiversity in NSW has failed to date. It has failed to reflect the true underlying value of biodiversity and the Calculator's role is to fix this. Thus, as with a well-functioning system, it must be designed to incorporate scarcity.

Another problem is the use of past prices to determine future prices. Over the long-run, the price of credits will increase due to the scarcity of land and biodiversity, as discussed. However, the Calculator relies on previous credit prices to incorporate this scarcity. This would be appropriate if the previous trades had been determined in a good, well-functioning market. The data would then simply reflect equilibrium prices and the flat pricing curve implied in the structure of the Calculator would indicate that no scarcity effect has yet been reached. However, the previous trades cannot be relied upon because they have been determined in a very imperfect market – again, this is the very reason for the existence of the Calculator. In this context, a perfect market is one where landholders have complete knowledge about the value of native vegetation, where there are no spill-over effects from land clearing, and where landholders value the long-term condition of the land as much as they value current income. In particular, for past prices to reflect equilibrium prices, the number of buyers and suppliers must be large and this has typically not been the case. Thus the actual traded credit prices are not 'equilibrium prices' and cannot be used as an indicator of scarcity. Given the highly limited market to date, and the failure of the BC Act and supporting material to create a perfect market, previous pricing is not able to adequately incorporate increasing land and biodiversity scarcity.

As discussed earlier, it was argued by the OEH at the information briefing that the appropriate place to incorporate scarcity is in the BAM. If this is the case, however, there is no reason to have a market at all. A fixed price for a credit could be used and biodiversity units of varying quality (as set by the BAM) would be traded. As it is currently structured, the legislation relies on a market mechanism. The role of the BAM is to set the conversion factors just as methane emissions are converted to carbon emission equivalents. However, as noted as with a carbon market, the biodiversity market must reflect scarcities and thus the Calculator must have a built-in scarcity factor as with its predecessor.

The BAM also fails to create true 'red lights' to development. Without genuine red lights, a market response to scarcity simply will not exist. Without scarcity, the price of credits will not increase as areas of certain biodiversity are reduced and there will be no market response to over-clearing and loss of biodiversity. The current lack of red lights and the proposed variation rules will inevitably lead to ongoing and unassessed loss of biodiversity unless scarcity is incorporated into the Calculator.

We **recommend** that the Calculator must incorporate a scarcity multiplier.

We **recommend** that the Calculator must incorporate multipliers that account for the environmental risks to biodiversity that result from the use of the deferred offset system.

Credit Price Module

The Credit Price Module is based on a Dynamic Panel Data Model (**Model**) that only considers recent trades for ecosystem credit species and PCTs. A key assumption is that "for a biodiversity market-based scheme we can expect that the price of credits depends (positively) on the number of credits, given the scarcity effect". The proposed operation of the offset scheme means that this assumption is not met and the associated modelling cannot be relied on to drive increased pricing as biodiversity becomes scarcer.

It has also not been demonstrated, and the data used to date suggests that it is unlikely, that the Calculator meets the statistical assumptions for the use of the Arellano–Bover/Blundell–Bond method, namely situations with:

> 1) few time periods and many individuals; 2) a linear functional relationship; 3) one left-hand-side variable that is dynamic, depending on its own past realisations; 4) independent variables that are not strictly exogenous, meaning they are correlated with past and possibly current realisations of the error; 5) fixed individual effects; and 6) heteroskedasticity and autocorrelation within individuals but not across them.[4]

Using the Model, only 9 PCTs currently have sufficient data to generate a PCT specific market factor and dynamic factor. Factors for all other PCTs are based on data from the region (of which there are only three across the state). At the information briefing it was stated that the lowest market factor has been used to avoid crashing the market – that is avoid making prices too high. Again this is a highly inappropriate premise that fails to reflect the threat status of different PCTs. Given that offsets will be required for all native vegetation "in a vegetation zone with a current vegetation integrity score <20[sic][5] where the PCT is not representative of a TEC or associated with threatened species habitat" there will be significantly more trades in non-threatened PCTs. The previous version of the Calculator incorporated a price premium for critically endangered ecosystems (in the so called costs model). As stated previously an equivalent measure of scarcity should be incorporated here.

The Credit Price Module is designed to use previous prices where they are available. Where they are not available, it is intended to use the average price of credits of the immediately previous quarter, or the last quarter where data is available, of the market region where the trade will take place. This is a high risk strategy given the extremely large regions that the Calculator is based on and the low number of trades undertaken. There is no information to suggest that areas facing high development pressure in the short term are the same areas that have experienced trades to date. Nowhere in the Credit Price Module or the Risk Loading Module is this accounted for.

The proposed Calculator also fails to include any recognition of the true cost of providing the offsets – both in terms of land value and the in-perpetuity management actions required. We **recommend** that the Calculator should include a minimum estimated cost of obtaining and managing environmental offsets with any additional cost driven by market mechanisms (including proper consideration of significant and irreversible impacts.

[4] As described in the Draft Offsets Payment Calculator Dynamic Panel Data Model Technical Report (p. 19).
[5] We assume that the final BAM will refer to offsetting vegetation with an integrity score >20, thus reflecting higher quality vegetation.

We understand from the information briefing that pricing for species credit species will be based on expert opinion. This creates an inherent risk that costs will be underestimated and the lack of timeframe required to implement credits means any such underestimation may exist for a long period of time. We **recommend** that any expert based system must be extremely transparent and the expert input received and the rationale for pricing decisions must be made publicly available.

Credit Price Risk Loading Module

The current approach to risk in the Calculator focusses purely on market risk, i.e. whether the credit prices are likely to be higher or lower than the price predicted by the Calculator. Such an approach significantly under-estimates the *environmental risks* that arise when using the Calculator.

In this regard, the context surrounding the use of the Calculator is important. Under current proposals, funds will only be paid into the BC Fund through the use of the Calculator where development has been approved and offsets for the environmental harm to be caused have not been identified. As such, there is a significant environmental risk that either offsets will not be available for purchase or that there will be a significant lag between the environmental harm being undertaken and the offset being implemented. This likely delay in the sourcing of offsets and the increased environmental harm arising is not accounted for in the BAM and therefore must be recognised in the Calculator to ensure that the goal of achieving no net loss of biodiversity through the use of the BAM is realised. Furthermore, it is likely that development pressure will arise most quickly in areas (such as the Cumberland region) where credits are most expensive. Consequently, if credit prices are consistently under-estimated in this region, even if they are potentially over-estimated overall, the financial risk to the ongoing operation of the BC Fund, particularly in its early stages where limited funds are available, is high.[6]

Precautionary Principle and Risk

The approach taken to risk assessment is contrary to the application of the precautionary principle. Adequately incorporating the precautionary principle into the Calculator requires embedding a 100% chance of ensuring that sufficient funds are available to meet the actual costs of delivery the necessary biodiversity offsets. The Calculator incorporates a formula to allow a varying level of risk to be used to calculate the credit price. Given that in the early stages of the operation of the BC Fund there will be a risk of inefficient operation and uncertain success, we **recommend** that this risk should be fixed in the Calculator and not left to the further discretion of the Minister or the BC Trust (as the Fund manager).

Risk of Failure

The Calculator currently fails to incorporate the risk of catastrophic failure, in this case likely to be driven by factors such as the BC Trust being unable to source the necessary offsets (or consistently sourcing offsets using variation rules), the time lag to implementation, and that a number of ecosystems are simply not amenable to being offset (for example, there is good evidence the Warkworth Sands Woodland cannot be successfully re-established). We are extremely concerned that the broad offsetting variation rules proposed for the BC Trust will significantly undermine the ability to create an effective and efficient market, let alone protect biodiversity. (For more information see our comments on the Regulation).

[6] We provide further comment on the need for the Fund to operate in-perpetuity in our submission on the Regulation.

We **recommend** that the Calculator should incorporate an additional credit requirement to recognise the fact that offset obligations are being discharged by a proponent without any assessment of whether the offset obligation can be met. An example of a similar system is the Carbon Farming Initiative which currently includes a risk premium of 5% additional credits.

Fund Administration Costs Module

We understand that the Fund Administration Costs Module will be populated once the structure of the BC Trust is clearer. There is a significant risk that the structure of the BC Trust will not be fully formed by the proposed implementation date and that estimation of these costs will be a high risk component of the Calculator.

As discussed in our comments on the Regulation, failure to include substantive measures to meet the 'reasonable steps' required before applying variation rules will have significant implications for the effective functioning of the Calculator. Under the current proposals the costs of identifying potential like-for-like offsets, as currently undertaken by the Nature Conservation Trust, are not clearly costed into the model. Given the Fund is also proposed to be given more flexible variation arrangements, failure to adequately cost the identification, negotiation and implementation of like-for-like offsets could lead to significant cumulative impacts on biodiversity as variation rules could be applied to simply to reduce the Funds operating costs.

Accurately estimating the Fund Administration Costs Module will depend entirely on the BC Trust's ability to accurately predict the likely scale and nature of the offsets to be required and the level of effort required to source. It is therefore remains highly concerning there has been no supply and demand modelling, estimation of future development levels and the associated likely take up of the offset fund, or forward testing of the Calculator to assess likely effectiveness.

Governance

It is extremely concerning that no detailed information is provided to justify the significant change from the Deloittes developed Calculator that was made available for public consultation in August 2016 and the current proposed Calculator. The removal of the scarcity factor embedded in the previous version of the Calculator creates a significant risk to both biodiversity and the effective function of a credit market. Peer reviews have not been made publicly available for either version of the Calculator from either economists or ecologists. It is therefore entirely unclear how the revised Calculator has been assessed against the legislative requirement to "maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development".

It was indicated at the information briefing that the Calculator will be informed by all credit trades, regardless of whether they are undertaken by the BC Trust or by private individuals and/or corporations. It is unclear how trades that aren't made at market price (such as where the offset is located on the same parcel of land or where sites that were previously designed as offsets and are being 'upgraded' to biodiversity stewardship agreements and only stewardship payments are required, or where related commercial entities don't require market price for credit transfer) will influence the predicted credit price. There is a significant risk that the BC Trust will undervalue credits if these situations are not treated separately.

However, we note a broader understanding of what credits are being traded will be necessary to understand how biodiversity is being impacted.

It is also concerning that the Calculator will be used to set pricing for the approved biodiversity actions that seek to avoid offsets. While we recognise the intention is to ensure that the cost of biodiversity protection is compatible, there is no guarantee that an action will be achieved with the amount of funding identified by the Calculator. Any use of the Calculator for this purpose must be considered in conjunction with estimates of the actual cost of achieving positive environmental outcomes through the use of biodiversity actions.

At the information briefing it was also stated that the Calculator is likely to be jointly managed by OEH and the BC Trust. For this to be effective, we **recommend** that clear data sharing arrangements must be in place prior to the implementation of the system and information on credit trades must be publicly available to allow independent verification of the data. Ongoing use of the Calculator should be subject to review by an expert advisory panel including:

- an independent ecologist;
- a member or nominee of the TSSC; and
- Two economists from the disciplines of environmental and ecological economics.