Technical submission on the draft Offsets Payment Calculator

prepared by

EDO NSW
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About EDO NSW

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Successful environmental outcomes using the law. With over 25 years' experience in environmental law, EDO NSW has a proven track record in achieving positive environmental outcomes for the community.

Broad environmental expertise. EDO NSW is the acknowledged expert when it comes to the law and how it applies to the environment. We help the community to solve environmental issues by providing legal and scientific advice, community legal education and proposals for better laws.

Independent and accessible services. As a non-government and not-for-profit legal centre, our services are provided without fear or favour. Anyone can contact us to get free initial legal advice about an environmental problem, with many of our services targeted at rural and regional communities.

EDO NSW is part of a national network of centres that help to protect the environment through law in their states.

Submitted to:

Biodiversity Reforms
Office of Environment & Heritage
PO Box A290
Sydney South
NSW 1232

For further information on this submission, please contact:

Rachel Walmsley, Law Reform Director, EDO NSW
T: 02 9262 6989
E: rachel.walmsley[a]edonsw.org.au

EDO NSW
ABN 72 002 880 864
Level 5, 263 Clarence Street
Sydney NSW 2000 AUSTRALIA
E: edonsw@edonsw.org.au
W: www.edonsw.org.au
T: + 61 2 9262 6989
F: + 61 2 9264 2412

Introduction

EDO NSW has been making recommendations for strong biodiversity, native vegetation and land management laws since 1995. This submission supports our June 2016 submissions on the draft Biodiversity Conservation Bill, draft Local Land Services Amendment Bill, and the draft Biodiversity Assessment Method and Mapping Method.[1] We welcome the opportunity to comment on the Draft Offsets Payment Calculator (**Calculator**) and appreciate the invitation to participate in a stakeholder testing workshop, attended by EDO NSW on 7 July 2016 (**Stakeholder Workshop**).

As we stated in our submissions to the NSW Government's land management and conservation package, we are of the view that the proposed laws are a retrograde step for NSW biodiversity and land management. While the proposed investment in private land conservation is welcome, once this money runs out, we will be left with weak laws that offer no real protection for our unique threatened species and ecological communities and will facilitate ongoing decline in biodiversity. Consequently, we do not support the proposed package.

The proposed regime is *highly* dependent on offsetting to achieve biodiversity outcomes. The proposed Biodiversity Assessment Method involves a relaxation of offsetting rules (as compared for example to the Environmental Outcomes Assessment methodology under current native vegetation laws), and will significantly reduce the ecological integrity and effectiveness of offsetting in NSW.

The Draft Offsets Payment Calculator is a support tool for the proposed regime and will give effect to the flawed policy settings in the proposed legislation – as identified in our submissions. Our primary concern in the use of the Calculator is that the focus on creating a market for biodiversity credits undermines the legislative goal of achieving biodiversity outcomes. At the Stakeholder Workshop it was stated that the primary goal of the Calculator is to make the biodiversity credit market work, not to deliver environmental outcomes. This framework is obvious in a number of assumptions within the Calculator that fail to adequately consider the consequences to biodiversity. We therefore do not believe that the offsets regime as proposed should be implemented, however in the event that it is, we provide the following comments regarding:

1. **Environmental Principles Lacking in the Calculator Framework**
    - *Precautionary Principle and Risk*
    - *Risk of Failure*
    - *Ecological Considerations*
    - *Environmental Accounts*
2. **Serious and Irreversible Impacts**
3. **Economic Consideration of Ecological Outcomes**
    - *Economic Cost of Land Clearing*
    - *Externalities*
    - *Incorporating Ecological Costs and Scarcity*
4. **Costs and Trades Models**

[1] These submissions are available at: http://www.edonsw.org.au/biodiversity_legislation_review

5. **Ability to Accurately Predict Usage**
6. **Governance**

This submission was prepared with input from the EDO NSW Expert Register. In particular, we thank Dr Neil Perry, Research Lectureship - Corporate Social Responsibility & Sustainability, Economics, Finance and Property at Western Sydney University for his expert advice and input into this submission. We also thank Dr Sriram Shankar, Senior Lecturer, Australian National University, for advice on the econometric analysis.

We note that the Calculator includes three models for determining the cost of ecosystem or species offset credits, namely:

- A Costs model which incorporates estimated management costs of the offset site and a financial return to the landowner;
- A Group trades model which relies on the trade history for similar groups of credits; and
- An Individual trades model which relies on trade history for the equivalent ecosystem of species only.

1. Environmental Principles Lacking in the Calculator Framework

As mentioned, our primary concern in the use of the Calculator is that the focus on creating a market for biodiversity credits undermines the legislative goal of achieving biodiversity outcomes. Key environmental principles are missing from the Calculator Framework. Examples of this are provided below.

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 99.5% chance of ensuring that sufficient funds are available to meet the actual costs of delivery the necessary biodiversity offsets. Based on modelling undertaken as part of the Calculator development, this requires adding a 50% premium to the price of credits. This is particularly relevant in the early stages of the operation of the Biodiversity Conservation Trust (**Trust**) when risk is high and success is uncertain. This premium should not be discretionary.

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 Trust being unable to source the necessary offsets, the time lag to implementation, and that a number of ecosystems or species are simply not amenable to being offset (for example, there is good evidence the Warkworth Sands Woodland cannot be successfully re-established). 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.[2]

[2] *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth), s. 16.

Ecological Considerations

The Species Credit costs model assumes that if a species has low typical density they are more valuable. While this may be appropriate in some circumstances, this approach fails to recognise that a number of threatened plant species, for example, may be highly clumped, i.e. the species is only found in a small number of locations hosting a large numbers of individuals. Protection of these patches is therefore critical to the survival of the entire population and areas with high numbers of these species should be considered more valuable. This method of considering species density is applied across all threat statuses, without any acknowledgement that critically endangered species are inherently scarcer and therefore even small patches are of high value.

Similarly, the Calculator does not include consideration of the percentage of a Plant Community Type (**PCT**) that has already been cleared. Again this is a failure to understand the ecological implications of scarcity. Combined with the fact that PCT are assigned to only one of seven regions, key biological indicators of the ability to maintain populations of ecosystems and species is ignored in the Calculator.

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, the nature of the offset system encourages protection of moderately degraded sites. 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".[3] 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, biodiversity law reforms need 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. Other jurisdictions such as the United Kingdom have completed a National Ecosystems Assessment to better understand their environmental assets. The

[3] *Biodiversity Conservation Bill 2016* (NSW), 1.3

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).[4]

2. Serious and Irreversible Impacts

The approach used in developing the Calculator highlights the importance of identifying serious and irreversible impacts within the Biodiversity Assessment Method (**BAM**) that 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.

As we noted in our submission on the Draft Biodiversity Bill:

> Serious or irreversible impacts must act as a 'red flag' for unacceptable impacts. This test should consistently trigger mandatory refusal of:
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> - non-major projects (as proposed)
> - major projects (State Significant Development and Infrastructure); and
> - Part 5 projects (for example, utilities and local infrastructure).
>
> The Bill should clearly state what constitutes serious or irreversible impacts – to be given further effect in the Biodiversity Assessment Method (BAM) and Regulation.
>
> The test should be defined as 'serious ***or*** irreversible' impacts, consistent with ESD principles (which call for preventative and precautionary measures).
>
> This should be clarified as an objective test, not a subjective opinion.
>
> In addition to refusal, any subsequent redesign or relocation in a fresh development application should trigger Office of Environment and Heritage (OEH) consultation or concurrence (including to certify revised likely impacts are not serious or irreversible).
>
> The list of serious or irreversible impacts should include, but not be limited to:
>
> - any adverse effect on the following:
>   - Critically endangered species and ecological communities (i.e. those at extreme risk of extinction);
>   - Areas of Outstanding Biodiversity Value; and
>   - Nationally and Internationally Important Wetlands (i.e. Ramsar wetlands and/or those listed in Commonwealth Directory of Important Wetlands).
>   - Any significant effect on the following (as determined by a species impact statement or equivalent BAM process):
>   - Endangered species and ecological communities, including Vulnerable species and ecological communities; and

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[4] 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.

- o Important rivers and biodiversity corridors.
- Consideration must also be given to how areas of culturally significant biodiversity could be protected, in full consultation with Aboriginal peoples of NSW. (At a minimum, the NSW Government should consider interactions with a new standalone culture and heritage framework).

3. Economic Consideration of Ecological Outcomes

We provide the following comments in recognition of the fact that the stated goal of the Calculator is to make the 'biodiversity credit market work'. In that context, we note that addressing the issues raised here will not adequately address the concerns raised elsewhere in this submission or in our previous submissions to the land management and conservation package. However, if the Calculator proceeds as proposed, these changes are necessary to ensure that the economic concepts which the Calculator purports to apply are properly incorporated.

The premise behind the individual and group trade models is that credit price should increase through time as a vegetation type becomes scarcer. We agree that the Calculator should factor in the increasing economic and ecological costs of land clearance as vegetation types are cleared. However, the Calculator does not ensure that this occurs because scarcity is estimated using a small number of past prices that do not reflect 'equilibrium prices'.[5] Where the concept of scarcity is applied, it is based on the Ricardian theory of rent and the related concept of external diseconomies of scale (as explained below), but fails to capture the full cost of ecological scarcity. While it is appropriate to include these factors, we recommend a number of changes to the Calculator to ensure both the impact of economic scarcity and the ecological costs of land clearance are considered.

Increasing land scarcity and the economic cost of land clearance

Based on the Ricardian theory of rent, 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. This also reflects the concept of external diseconomies of scale, which occurs when input prices increase as the demand for a product increases. In the case of biodiversity offsets, the product being demanded is the offset credits and the input is land. As demand for offset credits increases, more suppliers enter the market but the cost of the land input increases. Over the long-run, the price of credits will increase due to the scarcity of land.

The calculator incorporates this aspect of scarcity by fitting an exponential curve to the past trade data, the 'pricing curve'. For a minimum of six trades, a fitted exponential curve will predict and impose an exponentially increasing credit price with the extent of the increase

[5] Equilibrium price is the market price at which the quantity of goods supplied, in this case the number and type of ecosystem or species credits available, is equal to the quantity of goods demanded, being the credits needed as a result of land being cleared. The equilibrium price in a market with many buyers and sellers will reflect the true social value of the last trade and it will be relatively stable unless there are shifts in supply or demand. In a market with limited information, high transaction costs, externalities or insufficient buyers or sellers, the price will not be an equilibrium price. That is, it will not reflect the true social value of the last trade and it will be subject to large fluctuations from trade to trade even when the underlying supply and demand of a good are stable.

determined by the past data. Vegetation type 1395,[6] which was used as an example at the Stakeholder Workshop, demonstrates one set of parameters where the exponential curve is moderately increasing. However, vegetation type 1181[7] demonstrates another set of parameters where the curve is essentially horizontal. Thus, even though the Calculator attempts to incorporate land scarcity, it only does so when the previous trades have increased in price through time. This would be appropriate if the previous trades had been determined in a good, 'thick' market (ie, a market with lots of buyers and sellers involved in a lot of regular transactions). The data would simply reflect equilibrium prices and the flat pricing curve 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. In this context, a perfect market is one where farmers have complete knowledge about the value of native vegetation, where there are no spill-over effects from land clearance, and where landowners 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. For example, for vegetation type 1237[8] trades range from $2,600-$4,000 on either side of two trades at $31,465. Price varied due to the imperfect nature of the market and not because of an increase in scarcity.

Externalities and increasing ecological scarcity

In essence, the Calculator has attempted to incorporate a link between 'threat status' and scarcity in the trades models by fitting the exponential curve to the past trade data. However, as discussed, the 'pricing curve' reflects land scarcity and not the increasing ecological impact of clearing. This rising cost of land clearance, even when offsets are applied, always occurs and is known in economics as a negative externality or spill-over cost. External costs occur when people or landowners who are not part of an offset-credit transaction experience a loss. In this case externalities may include the loss of ecosystem services provided to other farmers and the broader community, or the loss of intrinsic value for those individuals who would like to see native vegetation protected. These externalities must be properly accounted for in the Calculator.

When such externalities are included in the analysis, the pricing curve shifts upwards or pivots upwards depending on the nature of the externality. For example, if the external cost of land clearance is constant as land is cleared and offset, the long-run supply curve would shift up in parallel. If the external cost increases as more land is cleared and offset, which is likely to be the case, the curve would pivot upwards. The trades model in the Calculator must incorporate this ecological externality to ensure that incentives are correct and land clearance is aligned with the socially optimal level. This will ensure that the cost of land clearing better reflects the value the community places on protecting native vegetation.

[6] HN556/Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin Bioregion.
[7] ME029/Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion.
[8] ME001/Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion or HN596/Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.

Incorporating Ecological Costs and Scarcity

The Calculator currently attempts to incorporate the ecological costs in the costs model by using management costs to reflect the land value and threat status, and adding a price premium for critically endangered ecosystems. As discussed below, we recommend more reliance on the costs model.

To ensure ecological costs are incorporated into the trades models, the Calculator should be adjusted in the following ways:

- Remodel credit price increases by changing the nature in which data is ordered. Given the nature of the Biobanking program to date, there is no guarantee that the first land used for offsetting is less productive land (i.e. has a smaller marginal benefit) than the last land used, as implied by the current trades model which has ordered historical data from the oldest to the most recent trades. Reordering the data from lowest price to highest price would artificially create the kind of structure theorised for the pricing curve until the market becomes thick enough to ensure that scarcity is empirically reflected in the data.[9] In our opinion, adapting the underlying model in this way will improve the representation of scarcity.
- Add shift factors, or dummy variables, that reflect the extent to which land has been cleared and offset in any vegetation type. This is difficult to do empirically because past trades have not reflected the extent to which land has been cleared or the threat status of any vegetation type. One way to address this issue is to apply the same approach used in the management costs model for species, where premiums have been calculated for endangered and critically endangered species based on expert opinion. Similarly, a shift factor could be added that reflects the percent cleared of any vegetation type, i.e. 0-30%, 30-70%, >70%.

4. Costs and Trades Models

We are also concerned about the proposed framework for relying on the different models – namely the costs model, group trades model (for ecological communities) and individual trades model. In the first instance it can be expected that most trades will rely on the costs model (i.e. insufficient trades will exist to allow use of the group trades model or individual trades model). The costs model is based on estimates of the cost of achieving the stated environmental outcomes. It is extremely concerning that there has been no independent assessment of the accuracy of these estimates, and where estimates have been based on sales to date, there has been no assessment of whether previous sales prices have been realistic and are capable of ensuring the necessary management outcomes in perpetuity. This uncertainty highlights the need to include a 50% cost premium on all credits.

[9] Our economic expert advisors tested this on vegetation type 1395 by reordering the data and conducting a regression with the natural log of credit price as the dependent variable and the reordered cumulative quantity as the independent variable. The coefficients changed marginally with the vertical intercept falling slightly relative to the historically ordered data and the curvature rising marginally. That is, for any increase in quantity, the percentage increase in price is greater under the scenario provided by reordered data. The adjusted R-squared and the t-statistics remained very similar. In general, such an approach will marginally increase the exponential curvature of the pricing line and any offset liability in the future.

Of more concern is that the proposed framework would allow a credit price which is below the estimated cost of providing the offsets, where sufficient trades have been undertaken. EDO NSW contends that, despite the concerns outlined above, at this stage the costs model provides the best estimate for the actual cost of achieving outcomes and therefore should be relied on to much greater extent. Subject to our recommendations on the need to change the way scarcity is priced, pricing should be based on the costs model unless the group trades or individual trades model produces a higher credit price. This approach would mean that the minimum estimated cost of obtaining and managing environmental offsets is charged and that any additional cost driven by market mechanisms (including proper consideration of significant and irreversible impacts) is incorporated.

At the Stakeholder Workshop, it was indicated that the shift from the costs model to either the group trades model or the individual trades model was based on an attempt to balance recognition of a lack of existing trades with the desire to allow the market to determine the price of credits. The current proposal to move to individual trades is after six trades for ecosystem credits and two trades for species credits. EDO NSW has received expert advice that a minimum of 10-15 trades should be required before the Calculator relies on the trades models. This would also help to address the problem of past trades not being equilibrium prices. If the market broadens through time, the trade models can be used but only from the point that the market can ensure that credit prices are equilibrium prices.

5. Ability to Accurately Predict Usage

According to the Stakeholder Workshop, the aims of the Calculator are to:

- Enable the Trust to fulfil its offsetting obligations using only the money paid by proponents (i.e. full cost recovery);
- Offer proponents a price for credits that is fixed for a pre-determined period and is firm and binding (i.e. not subject to negotiation); and
- Use a payment calculation method that is understood and perceived as being equitable.

The ability to achieve these goals will depend entirely on the Trust's ability to accurately assess the validity of previous credit prices in meeting the required outcomes, and the ability to predict the likely scale and nature of the offsets to be required. It is therefore highly concerning that the Calculator developers stated that they weren't able to do supply and demand modelling, or realistically estimate future development levels and the associated likely take up of the offset fund, or do forward testing of the Calculator to assess likely effectiveness. If the developers of the Calculator are unable to estimate key input parameters into the Calculator, it is unclear how the Trust can be expected to do this and therefore how the system can be expected to function effectively.

6. Governance

It is also concerning that the peer review of the Calculator has not been made publicly available and that the Calculator has not been independently peer reviewed by experts in ecology. 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.