New South Wales

Biodiversity Offsets Payment Calculator Order 2022

under the

Biodiversity Conservation Act 2016

I, the Hon. James Griffin, Minister for Environment and Heritage, in pursuance of section 6.32 of the *Biodiversity Conservation Act 2016*:

(a) revoke the Biodiversity Offsets Payment Calculator Order dated 29 October 2019 and published on the NSW legislation website; and

(b) replace it with the following order establishing the offsets payment calculator for the purpose of determining the amount that may be paid into the Biodiversity Conservation Fund under Division 6 of Part 6 of the *Biodiversity Conservation Act 2016*.

This Order commences on 17 October 2022.

Dated this 19th day of August 2022.

James Griffin

Hon. James Griffin MP

Minister for Environment and Heritage

(the Minister administering the *Biodiversity Conservation Act 2016*)

Published LW 30 September 2022 (2022 No 576)

Biodiversity Offsets Payment Calculator Order 2022

1 Name of Order

This Order is the *Biodiversity Offsets Payment Calculator Order 2022.*

2 Commencement

This Order commences on 17 October 2022

Note. In accordance with section 6.32 of the Act, this Order will continue to have effect unless and until it is varied or replaced by the Minister administering the Act.

3 Interpretation

the Act means the *Biodiversity Conservation Act 2016*.

Trust means the Biodiversity Conservation Trust established under ***the Act*** and includes any public service employee employed to enable the Trust to exercise its functions.

4 Establishment of the Calculator

(1) This Order establishes the offsets payment calculator that the Trust is to apply for the purpose of determining the amount that may be paid into the Biodiversity Conservation Fund as an alternative to retiring credits in accordance with Division 6 of Part 6 of the Act.

(2) The offsets payment calculator is contained in Appendix 1 to this Order.

Published LW 30 September 2022 (2022 No 576)

NSW GOVERNMENT | Biodiversity Conservation Trust

Appendix 1

Biodiversity Offsets Payment Calculator

August 2022

Published LW 30 September 2022 (2022 No 576)

Table of contents

Definitions

Acquitting an offset obligation	means the Trust's application of the amount paid into the Fund towards securing biodiversity offsets in substitution for the relevant number and class of biodiversity credits otherwise required to be retired under Part 6, Division 6 of the Act
Applicant	means a person (including an individual or entity) who applies to make a payment into the Fund as an alternative to retiring biodiversity credits
Biodiversity Conservation Fund Charge System	means the method by which the calculator determines the amount that a person may pay into the Fund for each biodiversity credit as an alternative to retiring biodiversity credits
Charge	means the amount determined by the calculator that a person may pay into the Fund for each biodiversity credit as an alternative to retiring biodiversity credits
Delivery costs	means the amount calculated in accordance with Part 8 of the calculator
Fund	means the Biodiversity Conservation Fund established under Part 10, Division 2 of the Act
Indexation	means the amount calculated in accordance with Part 9 of the calculator
Like-for-like biodiversity credit rules	means the rules that apply to the determination of like-for-like biodiversity credits set out at clause 6.3 of the *Biodiversity Conservation Regulation 2017*
Market characteristics	means the volume and frequency of trades in different types or classes of biodiversity credits
Predicted credit price	means the price for a credit determined by the Trust through application of one or more of the tools
Risk premium	means the amount calculated in accordance with Part 7 of the calculator
the Act	means the *Biodiversity Conservation Act 2016*
Trust	means the Biodiversity Conservation Trust established under the Act and includes any public service employee employed to enable the Trust to exercise its functions

Published LW 30 September 2022 (2022 No 576)

Abbreviations

ABS	Australian Bureau of Statistics
ARIMA	Auto Regressive Integrated Moving Average
BAM	Biodiversity Assessment Method
BBAM	BioBanking Assessment Methodology
BOS	Biodiversity Offset Scheme
BSA	Biodiversity Stewardship Agreement
BSSAR	Biodiversity Stewardship Site Assessment Report - prepared by an accredited assessor that applies the BAM to determine credit yield, management requirements and TFD. A required step for landholders prior to entering a BSA with the Trust.
DPE	Department of Planning and Environment
EMM	The Ecological Monitoring Module managed by the Trust and required to be implemented on biodiversity stewardship sites established from 2021
IBRA	Interim Biogeographic Regionalisation for Australia
OTG	Offset Trading Group
PCT	Plant Community Type
TBDC	Threatened Biodiversity Data Collection – threatened species data that is curated by DPE
TFD	Total Fund Deposit, which has the same meaning as in section 6.21(7) of the Act

1. Background

This document is the offsets payment calculator established under section 6.32(1) of the Act. The method by which the calculator determines the amount that a person may pay into the Fund for each biodiversity credit as an alternative to retiring biodiversity credits is known as the "Biodiversity Conservation Fund Charge System".

In applying the Biodiversity Conservation Fund Charge System, the Trust's aim is to calculate an amount that reflects a reasonable estimate of the cost to the Trust of Acquitting an offset obligation in a like-for-like manner, including a Risk premium, Delivery costs and Indexation. This amount is referred to throughout this document as a Charge.

The Like-for-like biodiversity credit rules will guide the Trust's application of the Biodiversity Conservation Fund Charge System. The application of these rules will ensure biodiversity impacts are offset with biodiversity that is very similar to the biodiversity that is being impacted. These rules are published on the Department of Planning and Environment (DPE) website.

2. Operation of the Biodiversity Conservation Fund Charge System

This part outlines the Biodiversity Conservation Fund Charge System, which is the calculation assessment methodology that the Trust will follow to determine the amount that may be paid into the Fund as an alternative to retiring biodiversity credits upon an Applicant's request.

2.1 Application of tools

1) The Trust is to first apply one or more the following tools to estimate the cost of Acquitting an offset obligation:
   a) Tool 1 - the cost-structure tool for ecosystem credits: to estimate the likely cost of Acquitting an offset obligation for ecosystem credits based on the estimated costs to generate biodiversity credits at one or more Biodiversity stewardship sites that could supply the relevant biodiversity credits (see Part 3); or
   b) Tool 2 - the cost-structure tool for species credits: to estimate the likely cost of Acquitting an offset obligation for species credits based on categories that consider the cost to survey and manage the species, difficulty to acquire offsets due to species distribution and abundance, and the typical number of credits a species generates at an offset site (see Part 4); and/or
   c) Tool 3 - the econometric model: to estimate the likely cost of Acquitting an offset obligation for ecosystem credits or species credits based on historical market trading data (see Part 5); and/or
   d) Tool 4 - market soundings: to estimate the likely cost of Acquitting an offset obligation based on government information, the market, scheme participants, and/or external experts (see Part 6).
2) The Trust will apply one or more of the tools at its discretion based upon the Market characteristics and the relevant biodiversity credit class at the time to determine the Predicted credit price.
3) Where the Trust applies more than one tool, the Trust will determine a Predicted credit price that falls within the range of the estimates generated by each tool.
4) Where the Trust applies more than one tool, the Trust may:
   a) Give greater weight to any estimate derived from tools 1 or 2 - cost-structure tools in cases where there have been no trades or limited trades in the biodiversity credit.

Published LW 30 September 2022 (2022 No 576)

b) Give greater weight to any estimate derived from tool 3 - econometric model in cases where there are enough trades occurring in the biodiversity credit to make the model's estimates reliable.

c) Give greater weight to any estimate derived from tool 4 – market soundings in cases where the Market characteristics described in Part 6.3 apply to the biodiversity credit.

2.2 Application of Risk premium, Delivery cost and Indexation

5) The Trust will determine a Risk premium that is commensurate with the risk of Acquitting an offset obligation (see Part 7); the Delivery cost to contribute towards the costs likely to be incurred by the Trust for Acquitting an offset obligation (see Part 8); and the relevant Indexation (see Part 9).

2.3 Final Charge formula

6) The Trust will determine a Charge, which equals the sum of the Predicted credit price, the Risk premium, the Delivery cost and Indexation.

7) The determination of a Charge in accordance with 6) is subject to the *Transitional price cap rules for the calculation of Charges for the Biodiversity Conservation Fund Charge System* published by the Trust from time to time.

8) When exercising any discretion in applying the Biodiversity Conservation Fund Charge System, the Trust will:

a) Aim to calculate a Charge that reflects a reasonable estimate of the cost to the Trust of Acquitting an offset obligation in accordance with the Like-for-like biodiversity credit rules.

b) Be guided by its objects in the Act, and in particular its role to seek strategic biodiversity offset outcomes to compensate for the loss of biodiversity due to development and other activities; and its statutory obligation to operate on a not-for-profit basis.

2.4 Transparency

9) The Trust will publish all Charges provided to Applicants between 180 days and 270 days after the Charge is issued.

2.5 Assurance

10) The Minister administering the Act may commission an independent assurance audit of the Trust's implementation of the Biodiversity Conservation Fund Charge System.

3. Tool 1 - Cost-structure tool for ecosystem credits

The first tool in the Biodiversity Conservation Fund Charge System is a cost-structure tool for ecosystem credits.

The Predicted credit price for ecosystem credits using tool 1 is calculated for an offset trading group and relevant IBRA subregions from equation 1.

equation1: Predicted credit price = [(C + MCa + LVy) / CY] x (1+annual index)

Where

C = constant to account for entry cost

MC = estimated management cost per hectare for the offset trading group and IBRA subregion

a = margin on management cost to account for landholder risk and holding costs

LV = estimated land value/hectare for the offset trading group and IBRA subregion

y = proportion of land value/hectare applied in the equation

CY = estimated credit yield per hectare

annual index = average of management cost index (i) and land value index (j) to account for the typical 12-month period from when a payment is made to the Fund and the Trust acquits an obligation

i = management cost index, for typical annual movement in management cost

j = land value index for typical annual change in land value

Table 1 briefly describes how each metric is calculated, the source data and update approach to apply the cost structure method. The balance of Part 3 describes in more detail how each variable is calculated.

Table 1: Cost structure variables for ecosystem credits.

Variable	Calculation method	Source	Update approach
C (Constant)	Informed from regression analysis of total credit value per hectare from ecosystem credits at BSA sites (Part 3.7)	Analysis conducted by the Trust to develop cost-structure tool	A constant that changes each year by the management cost index for the previous 12 months
MC	Average modified* TFD from existing BSA sites (Part 3.3)	Dataset maintained by the Trust on TFDs from approved biodiversity stewardship sites	Updated at least once annually to include new sites and index for movements in management cost index
a	Informed from regression analysis of total credit value per hectare from ecosystem credits at BSA sites (Part 3.7)	Analysis conducted by the Trust to develop cost-structure tool	Fixed constant

Variable	Calculation method	Source	Update approach
i	Index for typical increase in management costs (Part 3.4)	Determined from datasets published by the ABS	Updated at least once annually
LV	Typical land value per hectare for OTG and relevant IBRA subregions (Part 3.5)	Dataset provided by independent valuation expert	Updated for recent sales evidence from time to time
y	Informed from regression analysis of total credit value per hectare from ecosystem credits at BSA sites (Part 3.7)	Analysis conducted by the Trust to develop cost-structure tool	Fixed constant
j	Long-term annual increase in land value for relevant properties (Part 3.6)	Dataset adopted based on advice from independent valuation expert	Updated from time to time
CY	Average credit yield per hectare from existing BSSAR dataset (Part 3.8)	Dataset provided by DPE.	Updated from time to time to include additional stewardship site assessments

* TFDs are modified to account for establishment year, any change in discount rate, and relevant changes to the BAM affecting the TFD, such as introduction of ecological monitoring module (EMM) requirements.

3.1 Process for estimating the Predicted credit price for an ecosystem offset trading group

The steps to estimate these components for the Charge are:

- Step 1. Estimate likely BSA size for the OTG using the *Rules for Estimating Typical BSA size for the Biodiversity Conservation Fund Charge System* (published on the Trust's website as updated from time to time).
- *Step 2.* Estimate typical management costs for the OTG based on likely BSA size and IBRA subregion.
- Step 3. Estimate likely credit yield per hectare for the OTG using the *Rules for Estimating ecosystem credit yield for the Biodiversity Conservation Fund Charge System* (published on the Trust's website as updated from time to time).
- Step 4. Apply equation 1 to estimate the predicted credit price for the OTG.

3.2 Estimating typical BSA size

The Trust will follow the *Rules for Estimating Typical BSA size for the Biodiversity Conservation Fund Charge System* to apply Table 2 when calculating typical management costs.

3.3 Estimating average management costs

The Trust maintains a dataset of TFDs from approved BSA sites. Actual TFDs for each site at the time of establishment are modified to best reflect current values by:

- adjusting from time to time to reflect the current discount rate
- adjusting TFDs established prior to 2021 using the Consumer Price Index to be equivalent to January 2021 values
- including a provision for ecological monitoring for sites established before monitoring requirements were implemented
- indexing forward TFDs from January 2021 values using the management cost index for the previous period (Part 3.4)
- the Trust may exclude outliers when calculating average management costs.

Estimated management costs are calculated by the Trust from the average of the modified TFDs for each category of BSA size (hectares) and geographic region in Table 2.

Table 2: Categories of BSA size and geographic region to calculate management costs

Region	<30 ha	30-50 ha	50-100 ha	100-200 ha	200-500 ha+	500 ha +
Greater Sydney	GS30	GS50	GS100	GS200	GS500	GS500+
Non-Sydney	NS30	NS50	NS100	NS200	NS500	NS500+

The Trust will calculate values for average management costs per hectare in each category with five or more biodiversity stewardship sites.

The dataset will be updated from time to time to incorporate new sites and index for movements in management costs for the previous period.

Geographic regions are described in the *Rules for Estimating Typical BSA size for the Biodiversity Conservation Fund Charge System*

The Trust will publish the average management cost values for Table 2, including annual updates on its website. Individual TFDs contain personal information and therefore will not be published.

3.4 Estimating the management cost index (i)

The index for typical movement in costs relevant to BSA management costs is based on the following material and wage cost indices that relate to the following key components of management costs:

- steel and timber – fencing
- chemicals – weed and pest control
- wages and professional advice – monitoring and reporting, ecological burning, re-vegetation, pest and weed management.

The Australian Bureau of Statistics issues quarterly updates of a range of relevant indices the Trust will use to forecast change in the management costs as outlined in Table 3.

The Trust will publish the calculated management cost index for the previous year and the 10-year average, including updates on its website.

The 10-year average management cost index, calculated as an average annual percentage change when applying Table 3, is applied in equation 1 to determine the Predicted credit price in the cost structure tool for ecosystem credits.

This is also applied when calculating Indexation between the issuing of a Charge and payment into the Fund described in Part 9.

The index is also calculated for the previous year when updating the modified TFD dataset used to update management costs (Table 2).

Table 3: Indexation method for management costs (i)

Component	Weight	ABS Indices (series)
Professional Advice/ Wages	50%	Wage price index - Professional, scientific, and technical services
Chemicals	30%	Manufacturing producer price index – chemicals (A3343980X)
Timber	10%	House Construction producer price index - timber (A2390822X)
Steel	10%	House Construction producer price index - steel (A2390945X)
Total	**100%**	

3.5 Estimating land value of an OTG (LV)

The Trust has adopted a dataset of land value estimates for each OTG and IBRA subregion using recent sales evidence, which will be used to estimate land value when applying equation 1.

This dataset will be updated from time to time to consider new sales evidence.

The Trust will publish the method used to estimate land values on its website. The Trust will publish when the sales dataset has been updated. The Trust will maintain the land value dataset as commercial-in-confidence.

3.6 Estimating land value index (j)

The Trust will adopt, and publish on its website, a dataset of the long-term average annual increase in land value for relevant land, which will be updated from time to time.

3.7 Estimating credit value per hectare constants (C, a and y)

The Trust undertook an analysis that compared ecosystem credit value per hectare from BSA sites against TFD/hectare, land value/hectare, geographic region, BSA size, and establishment year. Credit value per hectare was calculated from the transaction data held by DPE. Where less than 100 per cent of ecosystem credits had been sold, a total value was estimated for all ecosystem credits based on the average price per credit sold at the agreement site. Sixty nine sites were used, selected from sites in active management and

where credit transactions were largely sales in the market rather than directly acquitting a developer's own obligation.

The following formula to estimate credit value per hectare (CV/ha) was established. This simple and practical approach ensures predictions of credit value follow logical relationships between the two main predictable drivers of credit value, management costs and land value.

$$CV/ha = C + MCa + LVy$$

- C = a constant to account for entry costs and the initial hurdle value for landholders to consider entering an in-perpetuity agreement
- a = a margin on management costs
- y = a proportion of estimated land value.

Review and update of constants

- The value of 'C' will be updated annually by the management cost index (i) for the previous year.
- Constants 'a' and 'y' are fixed.

The Trust will adopt the values of C, a and y it determined from this analysis when applying equation 1. The Trust will not publish these values as they are commercial-in-confidence information.

3.8 Estimating ecosystem credit yield (CY)

Credit yield per hectare under the BOS is variable at the site scale and relates to factors such as starting vegetation integrity, high threat weed abundance and if active restoration management actions are applied.

The Trust will follow the *Rules for Estimating ecosystem credit yield for the Biodiversity Conservation Fund Charge System* when calculating typical ecosystem credit yield (CY).

The dataset used in applying the rules will be provided by DPE, updated from time to time, based on the average credit yields from existing and finalised BSA sites that have a finalised Biodiversity Stewardship Site Assessment Report (BSSAR). The Trust will adopt this dataset when applying credit yield in equation 1.

4. Tool 2 - Cost structure tool for species credits

The second tool in the Biodiversity Conservation Fund Charge System is a cost structure tool for species credits. This is different to the cost structure tool used for ecosystem credits and will only apply to species credits.

Each species is assigned a species price category and species credit weighting category following the *Rules for allocating species to categories in the Biodiversity Conservation Fund Charge System*. These rules are approved by the Trust, updated from time to time and published on the Trust's website.

There are three categories of costs and three categories of difficulty to deliver offsets to make a nine-category matrix (Table 4).

The species price categories reflect the cost of conducting surveys and generating credits and difficultly in generating like-for-like credits at a BSA site.

The species credit weighting categories reflect how many credits are likely to be generated at a BSA site. The weightings depend on whether a species is assessed using an area of occupancy or by a count of individuals.

Analysis of BOS market trade data and Trust tender prices shows that most current trading occurs for species that are in the M1D1 category. There are currently few market prices available for species in other categories.

Table 4: Species Credit pricing categories

Difficulty to offset	Survey, management, EMM costs		
	Low (M1)	Moderate (M2)	High (M3)
Low (D1)	M1D1	M2D1	M3D1
Moderate (D2)	M1D2	M2D2	M3D2
High (D3)	M1D3	M2D3	M3D3

4.1 Calculating the predicted species credit price

The Trust will calculate the species credit price value of the M1D1 category from the weighted average credit value of species credits transacted in that category for the previous 24 months, excluding related entity trades and transactions that include credit averaging with ecosystem credits. The dataset on species credit transactions is published on the BOS Public Registers.

When calculating M1D1, the Trust will access data held by DPE to identify related entity transactions and those that include credit averaging and exclude those from the calculation. The Trust will also consider value for money tender price data it holds that are not available on the BOS public register for the same period when calculating weighted average price.

For the remaining categories, the category price value will initially be calculated based on a ratio, determined by the Trust, with reference to a calculated base price for the low cost, low difficulty category (M1D1). For example, if the calculated M1D1 category price value is $100 and the ratio for the M1D2 category is 2, the M2D2 category price value would be calculated at $200.

Once more than 15 independent market transactions, including four or more species, in a category occurs within a two-year period, the Trust will calculate the price for that category using the same weighted average credit value method described for the M1D1 category.

The Predicted credit price for species credits is calculated by Equation 2:

Species credit price category value x species credit weighting x (1 + annual index).

The annual index is calculated as described in Part 3.

The Trust has determined the ratios to apply for each category. These ratios are not published and are retained as commercial-in-confidence.

Table 5: Species credit weighting category

Species Polygon Area category	Typical species polygon size as a % of BSA area	Price weighting
1. Large/widespread polygon size	>33%	1
2. Restricted polygon size	10-33%	1.5
3. Very restricted polygon size	<10 %	2
Flora Count Species Growth Form Category	**Density (plants/ha)**	**Price weighting**
Other	Moderate	0.1
	Low	0.2
	Very Low	0.4
Shrubs	Moderate	0.2
	Low	0.4
	Very Low	0.7
Trees	Moderate	0.4
	Low	1

4.2 Allocation of species and dataset updates

The Trust has allocated around 200 (of 800) species to a category in the matrix following the *Rules for allocating species to categories in the Biodiversity Conservation Fund Charge System.*

Published LW 30 September 2022 (2022 No 576)

This allocation will be retained in a spreadsheet that will be the 'Master List' for issuing quotes. As quotes for new species are received, they will be reviewed against the rules and allocated to categories and this will be added to the master spreadsheet.

Species allocations to categories may be reviewed to incorporate updates to the Threatened Biodiversity Data Collection (TBDC) as published by DPE, data on management costs retained by the Trust or if changes to the rules for allocating species are approved and published by the Trust. Changes to species allocation will be tracked in the spreadsheet.

The weighted average value of M1D1 species credits cost will be recalculated on an annual basis to include new market trades available on the BOS public registers and any relevant credit tender data held by the Trust.

The Trust will publish the category for each species and identify species that have been added or varied in the previous year. The Trust will not publish the weighting assigned as they are commercial-in-confidence information.

The Trust will publish when a species credit price value category changes from being calculated by ratio to weighted average price.

5. Tool 3 - Econometric model for ecosystem credits

The third tool in the Biodiversity Conservation Fund Charge System is an econometric model for ecosystem credits.

The Trust has adopted an econometric model developed by an independent economic modelling expert for the purpose of the calculator. The model development and explanation of the approach is published on the Trust website.

The econometric model is a statistical model that considers trades of biodiversity credits under the previous BBAM and under the BAM to predict a like-for-like Charge for offset trading groups (OTGs) under the BOS that have enough trades to determine a robust price.

The econometric model is a dynamic time series model that uses auto regressive integrated moving average (ARIMA), a common time-series forecasting model.

The general ARIMA model specifications for calculating a predicted credit price for an OTG in the econometric model is:

$$\textbf{Equation 3}: Y_t = \sum_{i=1}^{p} \emptyset_i Y_{t-i} + \beta X_t a_t - \sum_{j=1}^{q} \theta_j a_{t-j}, t = 1, \dots, T$$

Where Y_t is the price paid per credit, *t* is the time series that denotes a year, *i* and *j* are the number of lags. *X* is a set of potential control variables which are described in Table 6.

The model is the simple exponential smoothing ARIMA (0,1,1) model: AR *(p)* and MA *(q)* components are of order 0 and 1 respectively with level of first-order differencing, *d* = 1.

The exponential smoothing ARIMA (0,1,1) model uses an exponentially weighted moving average of the past values to filter out the noise and make better forecasts using the error correction form.

The model choice is based on the following observations:

- First order integrated/differenced models in Y_t , i.e., *d* = 1 fit better than those with no differencing.
- Based on the Bayesian information criterion (BIC) minimisation, ARIMA (0,1,1) model proves to be a better fit than ARIMA (0,1,0) even when the moving-average (MA) coefficient (Equation 3) θ_j is statistically insignificant.
- The ARIMA (0,1,1) model passes the model stability test.
- The ARIMA (0,1,1) model provides reliable forecasts in a wide variety of business and economic time series modelling situations and is easy to update when additional years of data become available.

The Trust will publish which OTGs have sufficient trades to calculate a robust predicted credit price using the model.

The econometric model will incorporate new data on market transactions, updated from time to time, published on the Biobanking and BOS public registers.

The Trust will also access data held by DPE on these transactions to identify government and non-government transactions and credit averaging of different credit types in the same transaction.

Published LW 30 September 2022 (2022 No 576)

Table 6: Econometric model variables

Variable	Type	Reasoning	Interpretation
Different Price	Dependent variable	Variable that is affected by another independent variables.	Average annual change in price paid per credit for the OTG.
Non-Government	Independent Dummy variable	Non-government buyers pay more for the credits than the government buyers on average. This is because government buyers have economies of scale.	It is estimated that non-government buyers pay more than government buyers for every credit purchased.
Averaging	Independent Dummy Variable	Credit prices are averaged across multiple credit types to the difference between averaged and non-averaged trades.	It is estimated that price paid can increase or decrease when trades involved are averaged across credit types.
Tightness	Independent Variable	Subjective assessment from 0-7 of market tightness. Markets with 7 market tightness have higher prices per credit due to low supply whereas markets with 1 market tightness have lower prices per credit due to high supply.	It is estimated that average annual price paid per credit increases with market tightness.
Constant	Intercept	Change in price paid per credit when all independent variables are equal to zero.	The estimate of the annual average change in the price paid per credit for the OTG with government buyer, no averaging and zero tightness for each OTG.
ARMA (MA L1)	Lagged errors	Weight of the lagged error term.	Negative weight (-.99) leads to downward trend in average annual price prediction whereas a positive weight (1.00) leads to upward trend in average annual price prediction. This parameter enters the autocorrelation function of the dependent variable.

6. Tool 4 - Market soundings

The fourth tool within the Biodiversity Conservation Fund Charge System is market soundings. This involves using relevant information from within government, from the market, from scheme participants, and/or from external experts to support the Trust to calculate a Predicted credit price. The application of market soundings will be subject to the *Rules for application of market soundings in the Biodiversity Conservation Fund Charge System*. These rules will be approved by the Trust and be published on its website and updated from time to time.

6.1 Supply and demand forecasting

Market soundings will be used to support supply and demand forecasting, which is important for:

- estimating the market tightness factor in the econometric model (Part 5)
- estimating likely BSA size where OTGs are widespread, and demand is potentially insufficient to encourage establishing a large site to meet credit obligations as per the *Rules for Estimating Typical BSA size for the Biodiversity Conservation Fund Charge System*
- considering the Market characteristics of a given OTG.

6.2 Market sounding input to cost-structure tools

The cost-structure tools for ecosystem and species credits have numerous components that influence the total Charge. The Trust may undertake market soundings regarding individual components such as land value, credit yield or management costs.

The Trust would give priority to undertaking a market sounding where:

- atypical credit yield or management costs are likely
- known concerns about the best available OTG map for a particular OTG or IBRA subregion could affect estimates of credit yield or land value
- new or conflicting information on species distribution or abundance could influence a species allocation
- there are high risk or high value Charge requests.

The Trust will give due weight to the market sounding value for the relevant component of the cost-structure tool where a market sounding was conducted.

6.3 Market sounding to estimate the Predicted credit price

The Trust may also apply information gained from market sounding more broadly in the calculation assessment methodology (Part 2) to calculate the Predicted credit price.

The Trust will give weight to setting the Charge from a market sounding in circumstances where:

- there is strong current evidence of a market price from credit transactions supported by ongoing availability of credit supply from relevant sites
- the Trust has evidence of a market price from multiple suppliers through a reverse auction tender process
- the Trust has entered an agreement or option to purchase relevant credits.

Published LW 30 September 2022 (2022 No 576)

When issuing a Charge that has calculated a Predicted credit price using, or which has given weight to, a market sounding, the Trust will maintain a record of what market soundings were applied.

7. Risk premium

7.1 Calculating the Risk premium

The Risk premium is calculated per credit, as a proportion of the Predicted credit price. The Risk premium proportion is calculated as outlined in Parts 7.2 and 7.3.

7.2 Risk premium for credits priced via the econometric model

For the econometric model, the Risk premium is determined by the econometric model outputs for the relevant offset trading group by the equation

(Upper 95th percentile price / Predicted credit price) - 1

7.3 Risk premium for credits priced via the cost-structure tool and market soundings

The Risk premium for credits under the cost structure tools and market soundings are calculated with reference to the variation in typical management costs for the relevant geographic region. Management cost (TFD) percentiles will be calculated for each geographic region used to estimate typical TFDs (Part 3.3). The TFD percentile distributions will be simulated using a Monte-Carlo approach using 50,000 simulations, an appropriate modelled distribution of values, minimum, maximum, mode and median modified TFD values.

The Trust will determine the management cost percentile level to apply for ecosystem credits in each geographic region and for species credits. The management cost percentile level may vary between geographic regions or categories. The management cost percentile level determined by the Trust, as updated from time to time, will be published on the Trust's website.

A simulated TFD will be determined for the approved management cost percentile level determined by the Trust for the relevant geographic region.

Average and simulated TFDs will be recalculated annually using the Trust's updated dataset of modified TFDs (Part 3.3).

The Risk premium proportion for each geographic region is calculated by the equation:

(Simulated TFD / average TFD) - 1

For ecosystem credits, the Risk premium will be determined for the relevant geographic region for the credit class to which the Charge applies.

For species credits, the Risk premium will be determined from the Non-Sydney geographic region.

8. Delivery Costs

Delivery costs are intended to recover some or all the Trust's costs in accepting and Acquitting an offset obligation on behalf of development proponents. The Delivery cost is calculated as a proportion of the Predicted credit price for each offset trading group or species in a Charge issued for a particular project proposal.

The Delivery cost per credit is determined as the larger of $120 or five per cent of the Predicted credit price.

The delivery cost per credit is determined as five per cent of the Charge value where the *Transitional price cap rules for the calculation of Charges for the Biodiversity Conservation Fund Charge System* published by the Trust from time to time applies.

9. Indexation

Indexation accounts for the time between when a Charge is issued and when a proponent chooses to make a payment into the Fund. Indexation is calculated on a monthly basis.

The monthly Indexation amount that applies to a payment will be provided to the Applicant when the Charge is issued.

Indexation for each month will be calculated based on the following formula:

[Predicted credit price + Risk premium + Delivery costs] X [monthly Indexation rate]

The sum of the predicted credit price, risk premium and delivery costs in the above formula is also subject to the *Transitional price cap rules for the calculation of Charges for the Biodiversity Conservation Fund Charge System* published by the Trust from time to time.

The total amount of indexation payable on a charge is calculated by the Monthly indexation amount multiplied by the number of months between when a charge was issued and when a request to make a payment is made by an applicant.

9.1 Monthly Indexation rate in the econometric model

For Charges where the econometric model is given full weight to determine the Predicted credit price, the monthly percentage rate of increase in the Predicted credit price calculated within the econometric model will be used to determine the monthly Indexation rate as a percentage.

9.2 Monthly Indexation rate in the cost-structure tools and market soundings

For Charges where a cost structure tool or market soundings are used to determine the Predicted credit price, the monthly Indexation rate will be calculated based the annual index divided by 12 to determine the monthly index rate as a percentage. The annual index is described in Part 3 as is the average of management cost index (i) and land value index (j).

9.3 Monthly Indexation rate if multiple tools used to predict credit price

For Charges where the econometric model tool and one or more other tools are used to determine the Predicted credit price, an average of the two monthly Indexation approaches will be used to determine the monthly Indexation rate as a percentage.