

# WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

## Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

## Purpose:

Use the WA Environmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

## Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

## Process for using the WA Environmental Offsets Calculator

Step	Worksheet	Component
Step 1: Determining conservation significance	Step1_ConservationSignificance	Conservation significance determination
		Combined <i>area</i> / <i>feature</i>
Step 2: Calculating significant residual impact	Step2_SignificantResidualImpact	Part A: Significant impact calculation
		Separate <i>area</i> or <i>feature</i> calculations
		Part B: Rehabilitation credit calculation
		Separate <i>area</i> or <i>feature</i> calculations
Step 3: Calculating offsets	Step3_Offsets	Part C: Significant residual impact calculation
		Separate <i>area</i> or <i>feature</i> calculations
Rationale for scores used in the Offsets Calculator	Rationale	Offsets calculation
		Separate <i>area</i> or <i>feature</i> calculations
		All

## Step 1: Determining conservation significance

Key:

- Data to be entered
- Drop-down selection
- Automatically-generated scores  
(Or, if appropriate, manual data entry permitted)

Area / feature (Impact site)

Conservation significance determination for the environmental value impacted									
<b>Conservation significance</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; text-align: center;">Description</td> <td>Moderate to high value Carnaby's Black-Cockatoo foraging habitat</td> </tr> <tr> <td style="text-align: center;">Type of environmental value</td> <td style="text-align: center;">Species (flora/fauna)</td> </tr> <tr> <td style="text-align: center;">Conservation significance of environmental value</td> <td style="text-align: center;">Rare/threatened species - endangered</td> </tr> <tr> <td style="text-align: center;">Conservation significance score</td> <td style="text-align: center;">1.2%</td> </tr> </table>	Description	Moderate to high value Carnaby's Black-Cockatoo foraging habitat	Type of environmental value	Species (flora/fauna)	Conservation significance of environmental value	Rare/threatened species - endangered	Conservation significance score	1.2%
Description	Moderate to high value Carnaby's Black-Cockatoo foraging habitat								
Type of environmental value	Species (flora/fauna)								
Conservation significance of environmental value	Rare/threatened species - endangered								
Conservation significance score	1.2%								

Please select <i>area</i> or <i>feature</i> for the calculations	<b>Area</b>
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## Step 2: Calculating significant residual impact

Key:  
 Data to be entered  
 Drop-down selection  
 Automatically-generated scores

Environmental value (step 1)	Moderate to high value Carnaby's Black-Cockatoo foraging habitat
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### Area (impact site)

Part A: Significant impact calculation Area				
Significant impact	Description	Quantum of impact		
	Permanent clearing of 14.5 ha	Significant impact (hectares)	14.50	
		Quality (scale)	7.00	
		Total quantum of impact	10.15	

Part B: Rehabilitation credit calculation Area (onsite)					
Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)	14.50	Time until ecological benefit (years)	40.00
	Rehabilitation via respreading of topsoil and infill planting as required	Current quality of rehabilitation site (scale)	7.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	1.00	Rehabilitation credit	2.88
		Future quality WITH rehabilitation (scale)	5.00		

Part C: Significant residual impact calculation Area		
Significant residual impact	Total quantum of impact	10.15
	Rehabilitation credit	2.88
	Significant residual impact	7.27

### Step 3: Calculating offsets

Key:

	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Moderate to high value Carnaby's Black-Cockatoo foraging habitat	Significant impact (step 2, part A)	14.50
		Rehabilitation credit (step 2, part B)	2.88
		Significant residual impact (step 2, part C)	7.27

**Area (offset site)**

Offset calculation Area							
Offsets calculation	Description	Proposed offset (area in hectares)	24.42	Duration of offset implementation (maximum 20 years)	20.00	Offset value	7.27
	Calculation to determine minimum required offset	Current quality of offset site (scale)	7.00	Time until offset site secured (years)	0.00		100.0%
		Future quality WITHOUT offset (scale)	6.00	Risk of future loss WITHOUT offset (%)	80.0%		
		Future quality WITH offset (scale)	7.00	Risk of future loss WITH offset (%)	40.0%		
		Time until ecological benefit (years)	1.00				
	Confidence in offset result (%)	90.0%				<b>OFFSET ADEQUATE?</b>	<b>YES</b>

## Rationale for scores used in the offsets calculator

Environmental value to be offset		
Calculation	Score (Area)	Rationale
<b>Conservation significance</b>		
Description	Moderate to high value Carnaby's Black-Cockatoo foraging habitat	The Proposal will require clearing of native vegetation that represents Moderate to high value Carnaby's Black-Cockatoo habitat as described by BCE (2022).
Type of environmental value	Species (flora/fauna)	Drop-down list
Conservation significance of environmental value	Rare/threatened species - endangered	Drop-down list
Landscape-level value impacted	yes/no	N/A
<b>Significant impact</b>		
Description	Permanent cearing of 14.5 ha	The Proposal will result in clearing of 14.5 ha for the life of the Proposal which will be rehabilitated at mine closure.
Significant impact (hectares) / Type of feature	14.50	As above
Quality (scale) / Number	7.00	As described by BCE (2022).
<b>Rehabilitation credit</b>		
Description	Rehabilitation via respreading of topsoil and infill planting as required	All cleared vegetation will undergo rehabilitation at the end of the mine life and is expected to be considered rehabilitated 10 years thereafter (i.e., 40 years after commencement of clearing). Rehabilitation will be via respreading topsoil and infill planting as required.
Proposed rehabilitation (area in hectares)	14.50	All cleared vegetation will be rehabilitated as part of mine closure.
Current quality of rehabilitation site / Start number (of type of feature)	7.00	As described by BCE (2022).
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	1.00	Assuming little natural regrowth without rehabilitation.
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	5.00	As described by BCE (2020). VRX acknowledges that rehabilitation of Carnaby's Black - Cockatoo foraging habitat is difficult however VRX proposes to undertake rehabilitation by VDT and infill planting. VDT has been identified as being the best rehabilitation method for the Proposal. The Proposal has a 30 year mine life, progressive implementation of rehabilitation will provide VRX with opportunities to refine the VDT and infill planting methodology. For these reasons it is expected that rehabilitation of the Proposal will be successful, nevertheless VRX has chosen to take a conservative approach and predicts a value lower than the maximum provided in BCE (2020).
Time until ecological benefit (years)	40.00	Vegetation is expected to represent Carnaby's Black-Cockatoo foraging habitat 10 years after rehabilitation works are completed. This calculation is for 14.5 ha of vegetation that will remain cleared over the life of the Proposal, therefore rehabilitation credits should only be considered from year 30 onwards.
Confidence in rehabilitation result (%)	0.8	VRX has given this a high confidence as the target quality is relatively low (i.e., 80% confidence of achieving only 5/10). VDT trials have been conducted and an assessment of the VDT methodology in the context of the Proposal has been provided (Mattiske, 2019a, 2020a). A rehabilitation management plan has been prepared by VRX and will be updated as new site specific information on rehabilitation and VDT learned.
<b>Offset</b>		
Description	Calculation to determine minimum required offset	VRX proposes to offset the significant residual impact of the Proposal by protecting native vegetaion representative of moderate to high value foraging habitat from development (mining or otherwise) for a period of 30 years. This calculation is used to determine the minimum offset required. VRX plans to offset the significant residual impact with an area of vegetation that far exceeds the minimum requirement (discussed further in the ERD).
Proposed offset (area in hectares)	24.42	24.42 ha is deemed sufficient to offset the significant residual impact of the Proposal.
Current quality of offset site / Start number (of type of feature)	7.00	As described by BCE (2022).
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00	VRX has assumed that no development will occur within the area and the reduction in value presented here is the result of incidental anthropogenic activities. If development was to occur, the future quality would be significantly less.
Future quality WITH offset (scale) / Future number WITH offset	7.00	Active, on ground protection of the proposed offset site will maintain the value of native vegetation.
Time until ecological benefit (years)	1.00	VRX is the sole lease holder of the proposed offset site and is able to protect the area from development immediately. 1 year is the lowest value available, but VRX intends to protect and maintain the offset from the commencement date of the Proposal.
Confidence in offset result (%)	0.9	Predicted changes in quality are conservative therefore confidence is relatively high.

Duration of offset implementation (maximum 20 years)	20.00		VRX will protect the proposed offset for 30 years however only 20 years is recognised by the calculator.
Time until offset site secured (years)	0.00		VRX is the sole lease holder of the proposed offset site and is able to protect the area from development from immediately.
Risk of future loss WITHOUT offset (%)	80.0%		The offset site overlies a significant mineral resource therefore there is a high likelihood that it would be developed if protection for an offset is not implemented.
Risk of future loss WITH offset (%)	40.0%		The offset site will be protected from development, therefore the risk of future loss is avoided. VRX acknowledges that after the committed offset period there is still value in developing the site for mining or other activities however it is expected that at this time approval to develop will be more difficult to obtain and the risk at that time will be less than it is now.
Offset ratio (Conservation area only)	N/A		N/A

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## Step 1: Determining conservation significance

Key:

- Data to be entered
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(Or, if appropriate, manual data entry permitted)

Area / feature (Impact site)

Conservation significance determination for the environmental value impacted									
<b>Conservation significance</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; text-align: center;">Description</td> <td>Moderate to high value Carnaby's Black-Cockatoo foraging habitat</td> </tr> <tr> <td style="text-align: center;">Type of environmental value</td> <td style="text-align: center;">Species (flora/fauna)</td> </tr> <tr> <td style="text-align: center;">Conservation significance of environmental value</td> <td style="text-align: center;">Rare/threatened species - endangered</td> </tr> <tr> <td style="text-align: center;">Conservation significance score</td> <td style="text-align: center;">1.2%</td> </tr> </table>	Description	Moderate to high value Carnaby's Black-Cockatoo foraging habitat	Type of environmental value	Species (flora/fauna)	Conservation significance of environmental value	Rare/threatened species - endangered	Conservation significance score	1.2%
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Conservation significance score	1.2%								

Please select <i>area</i> or <i>feature</i> for the calculations	<b>Area</b>
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## Step 2: Calculating significant residual impact

**Key:**

	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Moderate to high value Carnaby's Black-Cockatoo foraging habitat
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**Area (impact site)**

Part A: Significant impact calculation Area				
Significant impact	Description	Quantum of impact		
	Progressive Clearing and Rehabilitation of 339.5 ha of Moderate to High Value Carnaby's Black-Cockatoo Foraging Habitat	Significant impact (hectares)	339.30	
		Quality (scale)	7.00	
		Total quantum of impact	237.51	

Part B: Rehabilitation credit calculation Area (onsite)					
Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)	339.30	Time until ecological benefit (years)	10.00
	Progressive rehabilitation by VDT and Infill planting	Current quality of rehabilitation site (scale)	7.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	1.00	Rehabilitation credit	96.37
		Future quality WITH rehabilitation (scale)	5.00		

Part C: Significant residual impact calculation Area			
Significant residual impact	Total quantum of impact	237.51	
	Rehabilitation credit	96.37	
	Significant residual impact	141.14	

### Step 3: Calculating offsets

Key:

	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Moderate to high value Carnaby's Black-Cockatoo foraging habitat	Significant impact (step 2, part A)	339.30
		Rehabilitation credit (step 2, part B)	96.37
		Significant residual impact (step 2, part C)	141.14

**Area (offset site)**

Offset calculation Area							
Offsets calculation	Description	Proposed offset (area in hectares)	473.98	Duration of offset implementation (maximum 20 years)	20.00	Offset value	141.14
	Calculation to determine minimum required offset	Current quality of offset site (scale)	7.00	Time until offset site secured (years)	0.00		100.0%
		Future quality WITHOUT offset (scale)	6.00	Risk of future loss WITHOUT offset (%)	80.0%		
		Future quality WITH offset (scale)	7.00	Risk of future loss WITH offset (%)	40.0%		
		Time until ecological benefit (years)	1.00				
	Confidence in offset result (%)	90.0%				OFFSET ADEQUATE?	YES

## Rationale for scores used in the offsets calculator

Environmental value to be offset		
Calculation	Score (Area)	Rationale
<b>Conservation significance</b>		
Description	Moderate to high value Carnaby's Black-Cockatoo foraging habitat	The Proposal will require clearing of native vegetation that represents Moderate to high value Carnaby's Black-Cockatoo habitat as described by BCE (2022).
Type of environmental value	Species (flora/fauna)	Drop-down list
Conservation significance of environmental value	Rare/threatened species - endangered	Drop-down list
Landscape-level value impacted	yes/no	N/A
<b>Significant impact</b>		
Description	Progressive Clearing and Rehabilitation of 339.5 ha of Moderate to High Value Carnaby's Black-Cockatoo Foraging Habitat	The Proposal will require clearing and progressive rehabilitation (via VDT and infill planting) of 339.5 ha of native vegetation that represents Moderate to high value Carnaby's Black-Cockatoo habitat as described by BCE (2022).
Significant impact (hectares) / Type of feature	339.30	As above
Quality (scale) / Number	7.00	As described by BCE (2022).
<b>Rehabilitation credit</b>		
Description	Progressive rehabilitation by VDT and Infill planting	Mining will occur in blocks and will be progressively rehabilitated using VDT and infill planting. All cleared vegetation will undergo rehabilitation and is expected to be considered rehabilitated after 10 years.
Proposed rehabilitation (area in hectares)	339.30	All cleared vegetation will be rehabilitated as part of mine closure.
Current quality of rehabilitation site / Start number (of type of feature)	7.00	As described by BCE (2022).
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	1.00	Assuming little natural regrowth without rehabilitation.
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Time until ecological benefit (years)	10.00	Vegetation is expected to represent foraging habitat 10 years after rehabilitation works are completed.
Confidence in rehabilitation result (%)	0.8	VDT trials have been conducted and an assessment of the VDT methodology in the context of the Proposal has been provided (Mattiske, 2019a, 2020a) A rehabilitation management plan has been prepared by VRX and will be updated as new site specific information on rehabilitation and VDT learned.
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Proposed offset (area in hectares)	473.98	473.98 ha is deemed sufficient to offset the significant residual impact of the Proposal.
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Offset ratio (Conservation area only)	N/A		N/A