

Table 7.1 EPBC offset assessment guide input justification

Aspect	Score	Justification
Time until ecological benefit	20 years	<p>This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the habitat in the offset site to be raised one point. This is on the basis of management actions described in Section 9.5 below. In particular, weed control in these areas and fire management will assist in achieving this aim.</p> <p>Management of weeds will be a key management action to prevent loss and degradation of habitat for MNES species in the proposed offset area. Weed management will focus on preventing introduction and spread of weeds to the subject site and reducing the extent of existing weed infestations.</p>
Risk of loss (%) without offset	8%	<p>This is a risk that Ornamental Snake habitat on the offset site will be lost or experience significant loss of ecological function. The risk may come from a landholder undertaking some clearing under current lawful exemptions such as track maintenance, clearing of Category X vegetation or clearing for fencelines etc. Ornamental Snake occurs in non-remnant areas which are not subject to as rigorous vegetation clearing rules. This risk of loss does not include degradation to the quality of the site.</p> <p>Ornamental Snake habitat within the offset area is likely to include areas of non-remnant vegetation. As such, these areas are not subject to the protection of the <i>Vegetation Management Act 1999</i> in Queensland, and can be cleared. By securing and enhancing the habitat in these areas, close to Ornamental Snake important habitat areas, the offsets will substantially reduce the risk of loss of these areas.</p> <p>The risk of loss without the offset has been set at 8%. This is based on the Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act, which states that the risk of loss over 20 years for the Isaac Council is 8% (University of Queensland 2017).</p> <p>As outlined above, the offset site is potentially at risk of development from other activities. Although remnant vegetation has protection in place through Queensland state vegetation clearing laws, some of the mapped habitat is Category X vegetation and exempt. Additionally, the risk of loss of the offset site as a value for the species acknowledges the risk from:</p> <ul style="list-style-type: none"> • Bushfire – without management, there is the potential for a build-up of a high fuel load across the offset site which could result in a high-intensity bushfire, and the death of individual Ornamental Snake and loss of breeding and foraging habitat across the offset site. • Selective clearing – landowner may be permitted to clear some remnant riparian vegetation under current exemptions if it is required for access track or fenceline maintenance. Understorey can also be removed through grazing, selective clearing, frequent burns. Grazing has also increased the presence of weeds.

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Aspect	Score	Justification
Future quality without offset (1–10)	7	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat without the offset being in place.</p> <p>Threatening processes for the Ornamental Snake, consistent with those described in the species’ SPRAT profile, which are currently likely to be present within the proposed offset area include:</p> <ul style="list-style-type: none"> • degradation of habitat by Feral Pigs • likely fatality from ingestion of poisonous Cane Toads • presence of high fuel load (artificially increased by introduction of Buffel Grass for grazing pasture) which can result in hot fires and loss of coarse woody debris • presence of invasive weeds within known important habitat • habitat degradation by livestock, particularly post rainfall events. <p>Without the offset, the future habitat quality score of known important habitat for Ornamental Snake has been estimated to reduce by one point to 7 from the current score of 8 within 20 years. This is due to the likely continuing impacts from existing threatening processes further impairing habitat quality from grazing, habitat degradation by feral pigs, increase in cane toad populations and loss of gilgai potentially through agricultural development.</p>
Risk of loss (%) with offset	0%	<p>With the offset in place, which includes legal security on title, land management to reduce threats from hot bushfires, weed invasion, habitat loss from grazing or future development, the risk of loss is reduced.</p> <p>The risk of loss with the offset has been set at 0%. Ongoing fuel load management in the offset site is considered to reduce the risk of high-intensity bushfire occurring. Also, prevention of vegetation clearing in the offset area will be outlined in the offset management plan. Offset area will be legally secured on title.</p>
Future quality with offset (1–10)	9	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Ornamental Snake, the habitat quality score of potential habitat is estimated to increase by one point to 9 out of 10 (from 4) within 20 years due to the implementation of management measures outlined in Section 9.4.</p> <p>Management of weeds will be a key management action to prevent loss and degradation of habitat for MNES species in the proposed offset area. Weed management will focus on preventing introduction and spread of weeds to the subject site and reducing the extent of existing weed infestations.</p> <p>There is also a revegetation component of these management actions in the riparian areas, with a slightly longer lag time than weed control. However, management actions will seek to increase vegetation height and canopy cover across the offset site and reduce the risk of high-intensity fires occurring, which will increase the quality of habitat available for Ornamental Snake (with extra cover provided through woody debris).</p>
Area of offset required and % delivered	227 ha 100%	<p>The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 55.67 ha of Ornamental Snake habitat within the impact footprint.</p> <p>Based on the criteria outlined in Section 6.2, there is 219,157 ha of potential Ornamental Snake habitat, as shown on Figure 7.1.</p> <p>Based on the parameters in the offset calculator, to meet the offset liability 100% a total of 227 ha would be needed in the offset site.</p> <p>Preliminary analysis of properties in the study area described in Section 7.5 demonstrates adequate availability of habitat within important areas of habitat for the species.</p>

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Aspect	Score	Justification
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The confidence level that the risk of loss will be averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed in Section 9.5. Management actions proposed are proven as effective and performance outcomes for Ornamental Snake and would be achievable in the timeframe provided for. Also regular monitoring will occur to ensure effectiveness of management actions.</p> <p>Key management actions are likely to include:</p> <ul style="list-style-type: none"> • Increasing native species canopy cover. • Protection of regrowth areas and assistance in natural rehabilitation if required to facilitate connectivity to other areas of habitat. • Reducing non-native weed cover with a focus on pasture and invasive grasses and control of grazing pressure. • Fuel load reduction and bushfire management.

The quantum of offset area required for each MNES has been estimated based on completing a preliminary EPBC offset calculator as outlined in Section 7.3. The offset calculator is provided in Appendix A, and justification for inputs summarised above.

Section 7.5 summarises the areas available in the study area and on selected potential offset properties.

7.5 Summary of potential offset areas

Several preliminary potential offset sites have been identified through initial desktop offset analysis that could meet the QPM Energy’s offset liability.

The properties summarised have been shortlisted due to being likely to contain areas of habitat of the required offset values, and in a number of instances there are records of Ornamental Snake on the property or nearby.

The properties are strategically located (some being located adjacent to protected areas, conservation reserves, bioregional corridors or large intact remnant habitats). The offset analysis and properties shortlisted demonstrate that there are large areas of suitable vegetation and habitats available in the landscape, not far from the impact area, and the offset areas can be placed on strategically located properties to maximise conservation outcomes and connectivity.

Based on the criteria outlined in Section 6.2, there is 91,580 ha of mapped Brigalow REs within the study area, as well as 219,157 ha of potential Ornamental Snake habitat, as shown on Figure 7.1.

The chosen potential offset sites were selected as they support functional vegetation communities (remnant and unmapped regrowth) that can be managed to build resilience, improve connectivity and achieve habitat quality gains. Habitat quality gains may include human induced restoration of non-remnant communities. Ongoing land management would be conducted according to an approved OAMP which will seek to maximise landscape conservation outcomes by increasing resilience of self-sustaining communities and populations while providing improved habitat and connectivity for impacted MNES.

Ground-truthing of each proposed offset property would be required to validate suitability of vegetation communities and Ornamental Snake habitat, to assess starting habitat quality, confirm management actions required and ascertain habitat quality gains that can be achieved.

The offset sites identified under this assessment do not necessarily represent the final offset sites or definitively reflect all offset requirements however demonstrates the feasibility of offset site selection in the region.

A high-level summary of the preliminary potential offset sites, offset values they contain, and areas available, is provided below in Table 7.2. These potential properties are shown on Figure 7.2.

A final EPBC offset calculator has not been completed for the potential additional offset properties, due to the lack of ground-truthed information to inform habitat scoring, risk of loss etc. A calculator based on assumptions around the species habitat based on observations in the Brigalow Belt region and from the impact site, are included in the draft calculator in Appendix A.

However, as demonstrated in Table 7.2, estimated areas of species habitat on each property exceed the offset area required calculated for the impact site (227 ha required).

Table 7.2 Summary of additional potential offset properties identified

Potential Offset	Lot and plan(s)	Estimated mapped Brigalow REs available (ha) – RE 11.4.9 in brackets	Comments
Property 1	██████████ 9,904 ha	490 (182)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.4.9–182 ha, RE 11.9.1–169 ha, RE 11.9.5–139 ha • preclear REs – RE 11.4.9 – 2,964 ha • preclear LZ4 – 3,590 ha. <p>Mapped Brigalow REs present (RE 11.4.9–182 ha, RE 11.9.1–169 ha, RE 11.9.5–139 ha).</p> <p>Nearest Ornamental Snake records on the property.</p> <p>Category A area – an area which is an offset area – may be potential to collocate offsets and likely landowner is open to offsets being on their land.</p> <p>Landscape connectivity: good.</p> <p>Preclear mapping in cleared areas is of suitable RE's.</p> <p>Freehold tenure.</p>
Property 2	██████████ 39,575 ha	1,043 (0)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.3.3–1,156 ha, RE 11.4.6–116 ha, RE 11.4.8–404 ha • preclear REs – RE 11.4.8–5,632 ha • preclear LZ4 – 9,478 ha. <p>Mapped Brigalow REs present (RE 11.3.1–638 ha, RE 11.4.8–405 ha).</p> <p>Ornamental Snake habitat present (RE 11.3.3–1,156 ha, RE 11.4.6–116 ha, RE 11.4.8–404 ha).</p> <p>Nearest Ornamental Snake record approximately 3 km.</p> <p>Mapped as core habitat in the threatened (endangered or vulnerable) wildlife habitat suitability models.</p> <p>Contains a high ecological significance wetland.</p> <p>Landscape connectivity: good, property adjoins Nairana National Park.</p> <p>Preclear mapping in cleared areas is of suitable RE's.</p> <p>Freehold tenure.</p>

Table 7.2 Summary of additional potential offset properties identified

Potential Offset	Lot and plan(s)	Estimated mapped Brigalow REs available (ha) – RE 11.4.9 in brackets	Comments
Property 3	██████████ 6,413 ha	433 (14)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.3.1–252 ha, RE 11.4.8–134 ha, RE 11.4.9–14 ha, RE 11.7.1–32 ha, RE 11.9.1–0.3 ha • preclear REs – RE 11.4.8–257 ha, RE 11.4.9–75 ha • preclear LZ4 – 338 ha. <p>Mapped Brigalow REs present (RE 11.3.1–252 ha, RE 11.4.8–134 ha, RE 11.4.9–14 ha, RE 11.7.1–32 ha, RE 11.9.1–0.3 ha).</p> <p>Nearest Ornamental Snake records within property. Mapped as core habitat in the threatened (endangered or vulnerable) wildlife habitat suitability models.</p> <p>Preclear mapping in cleared areas is of suitable RE's.</p> <p>Lands lease tenure.</p>
Property 4	██████████ 8,064 ha	64 (63)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.3.1–0.5 ha, RE 11.4.9–63 ha • preclear REs – RE 11.4.8–1,622 ha, RE 11.4.9–3,244 ha • preclear LZ4 – 5,504 ha. <p>Mapped Brigalow REs present (RE 11.3.1–0.5 ha, RE 11.4.9–63 ha).</p> <p>Nearest Ornamental Snake records within 12 km of property.</p> <p>Freehold tenure.</p>
Property 5	██████████ 7,623 ha	61 (47)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.3.1–14 ha, RE 11.4.9–47 ha • preclear REs – RE 11.4.8–494 ha, RE 11.4.9–3,784 ha • preclear LZ4 – 5,752 ha. <p>Mapped Brigalow REs present (RE 11.3.1–14 ha, RE 11.4.9–47 ha).</p> <p>Nearest Ornamental Snake records within 12 km of property.</p> <p>Freehold tenure.</p>
Property 6	██████████ 11,573 ha	123 (111)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.4.8–10 ha, RE 11.4.9–111 ha, RE 11.7.1–2 ha • preclear REs – RE 11.4.8 – 795 ha, RE 11.4.9 – 3,349 ha • preclear LZ4 – 4,454 ha. <p>Mapped Brigalow REs present (RE 11.4.8–10 ha, RE 11.4.9–111 ha, RE 11.7.1–2 ha).</p> <p>Nearest Ornamental Snake records within 30 km of property.</p> <p>Contains a high ecological significance wetland.</p> <p>Category A area – an area which is an offset area – may be potential to collocate offsets and likely landowner is open to offsets being on their land.</p> <p>Landscape connectivity: good.</p> <p>Preclear mapping in cleared areas is of suitable RE's.</p> <p>Freehold tenure.</p>

Table 7.2 Summary of additional potential offset properties identified

Potential Offset	Lot and plan(s)	Estimated mapped Brigalow REs available (ha) – RE 11.4.9 in brackets	Comments
Property 7	██████████ 90,731 ha	9,133 (6,121)	<p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.4.8 – 3,012 ha, RE 11.4.9–6,121 ha • Preclear REs – RE 11.4.8–5,759 ha, RE 11.4.9–23,556 ha • Preclear LZ4 – 51,223 ha <p>Mapped Brigalow REs present (RE 11.4.8–3,012 ha, RE 11.4.9–6,121 ha)</p> <p>Nearest Ornamental Snake records within 35 km of property.</p> <p>Category A area an area which is an offset area – may be potential to collocate offsets and likely landowner is open to offsets being on their land.</p> <p>Landscape connectivity: good.</p> <p>Contains a high ecological significance wetland.</p> <p>Preclear mapping in cleared areas is of suitable RE's.</p> <p>Lands lease tenure.</p>
Property 8	██████████ 6,661 ha	0 (0)	<p>Ornamental Snake habitat present</p> <ul style="list-style-type: none"> • Preclear LZ4 – 5,885 ha. <p>Nearest Ornamental Snake records within 30 km of property.</p> <p>Category A area - an area which is an offset area – may be potential to collocate offsets and likely landowner is open to offsets being on their land.</p> <p>Landscape connectivity: good.</p> <p>Preclear mapping in cleared areas is of suitable RE's.</p> <p>Freehold tenure.</p>
Property 9	██████████ 14,395 ha	1,019 (0)	<p>Property is on DES offset register as EOI.</p> <p>Contains a high ecological value wetland.</p> <p>Ornamental Snake habitat present:</p> <ul style="list-style-type: none"> • RE 11.3.1–106.24 ha, RE 11.4.8–101.82 ha, RE 11.5.16–257.83 ha, RE 11.9.5–655.1 ha. • Preclear REs – RE 11.4.8–14.4 ha. • Preclear LZ4 – 1,146 ha. <p>Mapped Brigalow REs present (RE 11.3.1–106.24 ha, RE 11.4.8–101.82 ha, RE 11.5.16–257.83 ha, RE 11.9.5–655.1 ha).</p> <p>Nearest Ornamental Snake record approximately 26 km.</p> <p>Mapped as core habitat in the threatened (endangered or vulnerable) wildlife habitat suitability models.</p> <p>The property is State land tenure but is on the DES offset register as an EOI, so tenure to be further investigated.</p>

Table 7.2 Summary of additional potential offset properties identified

Potential Offset	Lot and plan(s)	Estimated mapped Brigalow REs available (ha) – RE 11.4.9 in brackets	Comments
Property 10	<div style="background-color: black; width: 40px; height: 15px; display: inline-block;"></div> 18,848 ha	4,290 (0)	Ornamental Snake habitat present <ul style="list-style-type: none"> • RE 11.3.1–367.5 ha, RE 11.4.8–3,922 ha. • Preclear REs – RE 11.4.8–7,730 ha. • Preclear LZ4 – 10,417 ha. Mapped Brigalow REs present (RE 11.3.1–367.5 ha, RE 11.4.8–3,922 ha). Nearest Ornamental Snake record approximately 19 km. Mapped as core habitat in the threatened (endangered or vulnerable) wildlife habitat suitability models. Contains a high ecological significance wetland. Landscape connectivity: good, property surrounds Willandspey Conservation Park. Preclear mapping in cleared areas is of suitable RE's. Lands lease tenure.

7.6 Offset area management plan

Offset management actions will be tailored to the species being offset, the current condition and threats to the offset area and performance outcomes to be achieved. Management actions will be designed to improve habitat quality and reduce threatening processes. Management actions will be finalised as part of developing the OAMP which will occur post further field assessments being completed and offset calculators finalised.

Management actions will likely include:

- weed control
- erosion and sediment control
- feral animal control particularly feral pigs which impact on gilgai
- bushfire management including fuel load reduction, maintenance of firebreaks
- grazing management to reduce impacts on gilgai
- prohibiting clearing of regrowth vegetation and selective clearing.

The OAMP to be submitted to DCCEEW for approval prior to Project clearing commencing will include the following information:

- current land use
- MNES values and habitats
- habitat quality assessments (starting score, final score)
- connectivity value
- management actions for each offset value
- performance outcomes for each offset value, timing, triggers for corrective action and corrective actions
- risk assessment
- monitoring
- reporting
- roles and responsibilities.

8 Offset principles and approach

The following sections provide information on the residual impacts to be offset, the proposed approach to offsetting for each species, and how the proposed offset will comply with overarching offset policy principles.

8.1 Ornamental Snake environmental offsets

The Project has the potential to result in a loss of 36.05 ha of preferred habitat and 19.62 ha of connectivity/dispersal habitat.

The quality of Ornamental Snake habitat on site has been captured in offset calculators. A preliminary offset calculator is provided in Appendix A.

The proposed Ornamental Snake offset package will be land-based and focused around the protection and enhancement of habitat in the Project area. Threats to Ornamental Snake will also be mitigated focused around grazing management.

Factors that will degrade Ornamental Snake habitat include:

- grazing pressure and feral pigs that continue degrade gilgai and wetlands, particularly post rainfall events
- reduction in water quality and increased turbidity through disturbance from cattle and feral pigs, reducing prey populations (primarily amphibians) and in turn foraging opportunities and carrying capacity for the species
- grazing pressures and landowners ability to rake the ground of all woody debris to improve pasture will decrease or completely remove microhabitats for the species
- without active management, weed cover will increase and reduce native ground cover and native tree species recruitment
- unmanaged cane toad populations have potential to reduce Ornamental Snake populations.

EPBC Act offset principles and how they are addressed by the proposed offsets package are summarised in Tabel 8.1.

Table 8.1 Compliance with offset principles for Ornamental Snake

Suitable offsets must	Principles
1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environmental law and affected by the proposed action.	<ul style="list-style-type: none"> • Areas of existing and potential Ornamental Snake habitat will be identified for offsets in the study area. Site selection will aim to be based on strategic locations to maintain and improve connectivity for the species. • The proposed offset will be directly associated with Ornamental Snake and result in a conservation outcome for the species. • All proposed land based offset areas will be actively managed to improve habitat quality over the specified timeframe, and habitat quality gains will be clearly set out and progress measured on a regular basis. • The land based offset area will be legally secured in perpetuity and actively managed until completion criteria are met. • The proposed offset package will also increase knowledge on the local Ornamental Snake population and habitat restoration which will assist in the overall species conservation and management going forward.

Table 8.1 Compliance with offset principles for Ornamental Snake

Suitable offsets must	Principles
2. Be built around direct offsets but may include other compensatory measures.	<ul style="list-style-type: none"> The proposed offset package will be built around direct offsets but will also recognise the habitat restoration efforts being proposed to reduce the total residual impact (eg weed management and pest control). In addition to these direct habitat offsets a monitoring program and final report will be prepared that will provide important information outcomes of threat reduction, and an improved understanding of the local population. This information will benefit a number of stakeholders including government agencies, future proponents and landholders about management of the species.
3. Be in proportion to the level of statutory protection that applies to the protected matter.	<ul style="list-style-type: none"> The land-based offsets will be assessed in accordance with the EPBC Environmental Offsets Policy and Offsets Assessment Guide which considers the status of the protected matter. The final offset area will be confirmed post field surveys being completed and offset calculators revised. The proposed offset areas, management actions and prescribed outcomes are in proportion to the status of MNES impacted and will meet the policy requirements.
4. Be of a size and scale proportionate to the residual impacts on the protected matter.	<ul style="list-style-type: none"> The land-based offsets proposed will be assessed in accordance with the EPBC Environmental Offsets Policy and Offsets Assessment Guide. This will include quantification of baseline (ie starting) Habitat Quality and the predicted final Habitat Quality associated with Ornamental Snake. Impact area Habitat Quality scores will also be assessed. A net increase in habitat quality will be achieved. Habitat Quality scoring will be developed applying the Queensland Guide to determining terrestrial habitat quality (2017) using specific attributes for Ornamental Snake. Offset calculators will support a determination of the total offset area required. A preliminary offset calculator to guide the size of offset area needed is included in the Offset Strategy (Appendix A).
5. Effectively account for and manage the risks of the offset not succeeding.	<ul style="list-style-type: none"> Risks to the offset not succeeding will be identified and assessed, and appropriate management measures put in place to reduce those risks. Risks to the proposed offset may include: <ul style="list-style-type: none"> Overgrazing, particularly during the wet season. Weed control is not effective. The management measures will be detailed in an Offset Management Plan and will be implemented by suitably qualified and experienced personnel. By engaging appropriate experts in the species to develop the Offset Management Plan it will ensure that learnings from other projects are taken into consideration and the necessary management and monitoring is undertaken to increase the chances of the offset succeeding. Relevant actions to manage risks will include: <ul style="list-style-type: none"> legally securing the offset area on title to prevent future clearing restricting access to reduce impacts from vehicles or third parties entering the offset area weed monitoring and control regular monitoring of effectiveness of management actions grazing management pest fauna management fuel load management and fire management. <p>Performance outcomes will be set, and monitoring undertaken on a regular basis to confirm if performance outcomes are being achieved in the allocated timeframes. If they are not then corrective actions will be specified and implemented.</p>

Table 8.1 Compliance with offset principles for Ornamental Snake

Suitable offsets must	Principles
<p>6. Be additional to what is already required, determined by law or planning regulations or agreed to under schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6 of offsets policy).</p>	<p>The land-based offsets to be delivered will provide some ‘additionality’ to what is required by law or planning regulation. The long term protection of existing Ornamental Snake habitat from future development will occur, habitat condition and connectivity improved. Additional threat mitigation to what is required under law will also be undertaken to increase viability of Ornamental Snake utilising the Project area. These additional threat mitigation measures will include:</p> <ul style="list-style-type: none"> • Prevent further clearing in offset area including understorey. • Manage grazing to ensure native species recruitment occurs. • Managing fire regimes to prevent hot bushfires occurring. • Managing weeds that degrade habitat quality. • Managing grazing particularly in the wet season. <p>A number of weeds and pest animals are not required to be managed under Queensland legislation, or at levels needed, and therefore would continue to degrade ecological condition of the site. Some clearing is also permitted under VM Act even in remnant vegetation.</p> <p>Based on understanding of the majority of properties in the region, which are dominated by cattle grazing, it is likely the proposed offset property will currently be subject to grazing and clearing of Category X areas of vegetation (scrub) to improve productivity for grazing. Gilgai habitat for Ornamental Snake (as they occur in non-remnant areas) can continue to be degraded by livestock impacts particularly during the wet season.</p> <p>Seasonal control of grazing, actively improving condition of vegetation, promoting regeneration and simulating natural fire regenerative events will lead to restoration of vegetation communities and are ‘additional’ actions to be implemented.</p>
<p>7. Be efficient, effective, timely, transparent, scientifically robust and reasonable.</p>	<p>The proposed offsets and governance framework will be efficient, effective, timely, scientifically robust and transparent in their design.</p> <p><u>Efficient/effective/reasonable.</u> The offset package will be effective as it will include the protection and enhancement of existing Ornamental Snake habitat. It will be effective in supporting existing Ornamental Snake populations and look to improve connectivity for the species through the landscape. The offset will also reduce threats to individuals which may increase population numbers.</p> <p><u>Timely.</u> The offset outcomes will be delivered progressively over 20 years. Monitoring and management will occur until completion criteria are met. Legal security of the offset area/s will occur within 12 months of offset management plan being approved.</p> <p><u>Transparent/scientifically robust.</u> The management actions to be implemented will be scientifically robust and have been proven to be effective on other offset projects.</p> <p>Management of the offset will be undertaken by appropriately qualified persons with experience in land restoration and species conservation to ensure management activities are scientifically robust and appropriate, and can be monitored to track habitat quality improvements. Tracking the health and survival of Ornamental Snake populations will be undertaken as part of the offset area monitoring.</p> <p>There will be annual monitoring and reviews of the offset activities and an annual report prepared. More detailed five yearly performance reviews will be undertaken to assess progress towards performance outcomes which include a requirement to assess the effectiveness of the management actions.</p>

Table 8.1 Compliance with offset principles for Ornamental Snake

Suitable offsets must	Principles
8. Have transparent governance arrangements including being able to be readily measured monitored, audited and enforced.	<p>For the established offset area/s monitoring of habitat quality will be undertaken. Monitoring will occur every year for the first five years to evaluate effectiveness of management actions and achieving interim habitat quality objectives.</p> <p>Monitoring and reporting will then be undertaken on a regular basis to be outlined in the offset management plan. A final report will be prepared at the end of the 20 year period outlining how the performance outcomes have been achieved including final habitat quality scores.</p> <p>All monitoring reports will be made available to DCCEEW upon request</p>

9 Future offset commitments

The following sections outline the necessary steps for future offset commitments.

9.1 Habitat quality scoring

Habitat quality is assessed using a combination of indicators that measure the overall viability of the site and its capacity to support a prescribed environmental matter. The habitat quality scoring system involves scores out of 10, whereby a maximum score of 10 represents a fully intact system, scores of 4, 5 and 6 may indicate good quality regrowth or medium value habitat, and a minimum score of 0 would indicate a totally cleared or uninhabitable area.

Methodology for determining habitat quality is outlined in the *Guide to determining terrestrial habitat quality Methods for assessing habitat quality under the Queensland Environmental Offsets Policy* (DES 2020). The guide sets out how to assess the suitability of an offset site relative to an impact site, determine the appropriate size and scale of an offset relative to an impact, conduct a baseline habitat quality assessment for an advanced offset application, and assess the achievement of, or progress toward achieving, a conservation outcome at an offset site.

Habitat quality scoring will be finalised post field assessments of the impact and offset areas.

9.2 Offset calculator

9.2.1 EPBC Act offsets calculator

Environmental offsets proposed have been assessed using the framework under the EPBC Act Environmental Offsets Policy (DoEE 2012). Offset assessment methodologies have applied the criteria within the *How to use the offsets assessment guide which supports this policy*.

The key components of the guide are the Impact Calculator and Offset Calculator. Once the inputs have been provided for the Impact Calculator and Offset Calculator, the Offset Assessment Guide provides the results as a percentage of impact offset, where >100% indicates that all of the impact is achieved through a direct offset.

Calculator inputs are in accordance with the *EPBC Act Offset Assessment Guide* (DSEWPC 2012b) whereby multiple attributes are assessed for each impacted matter.

9.2.2 Land-based Offsets Multiplier Calculator

The Queensland Government Land-based Offsets Multiplier Calculator will identify the offset area based on the area of impact and the habitat quality of both the impact and offset sites. Final habitat quality scores are input into the Land-based Offset Multiplier Calculator to gain offset requirement multipliers and ultimately the required offset area for each impacted matter (remnant vegetation within a defined distance of a watercourse).

9.3 Offset areas and Offset Area Management Plan

Final offset areas will be determined based on field surveys confirming suitability of the proposed areas nominated in this offset strategy, and upon completion of habitat quality scoring and offset calculators. An OAMP will describe the offset area, the performance outcomes to be achieved for each MNES, management actions to be implemented to achieve the set outcomes, risks to achieving those outcomes and appropriate corrective actions, and outline a monitoring and reporting program.

Landholder engagement and agreements will also be confirmed during preparation of the OAMP.

The OAMP will be submitted to DCCEEW for approval. Approval is required from DCCEEW prior to vegetation clearing commencing.

9.4 Offset selection

Land-based offset site options will be further refined, identified and discussed with regulators. QPM Energy will initiate the landholder engagement process and undertake preliminary assessment of potential offset sites (both the preferred offset site and any selected additional offset properties required) to further understand offset site suitability.

Detailed ecological surveys will commence on the shortlisted offset sites to confirm presence of targeted biodiversity values, assess habitat quality and determine management actions required.

Landholder discussions including seeking in-principle agreement will continue and be ongoing throughout the offset delivery program.

Offset calculator assessments will be prepared (assessing impact site and offset site), using applicable assessment tools, to confirm final offset areas needed (ratios).

The above information will be outlined in an OAMP. The OAMP will be finalised and submitted for Commonwealth Government approval.

All offset sites identified in the approved OAMP will be legally secured under a legally binding mechanism (see Section 9.6).

9.5 Offset management actions

A summary of management measures to be employed across the offset area is provided below. Once the final offset area is confirmed, an OAMP will be developed to provide further detail, in order to address key threats and management measures for each species, consistent with priority actions identified in the various conservation and listing advice for the threatened species.

The properties will deliver an overall conservation outcome for those MNES required to be offset through:

- Improving ecological condition of vegetation communities and species habitats through land management activities such as weed control, pest animal management, seasonal grazing management and fire management.
- Removal and/or reduction of threats such as preventing clearing of regrowth, managing the risk of wildfires, limiting the cropping of native grasslands.
- Monitoring to improve knowledge and understanding of habitat restoration techniques; and species utilisation of habitats or other compensatory measures tailored to the particular MNES.

Management actions are summarised below.

9.5.1 Weed control

Management of weeds will be a key management action to prevent loss and degradation of habitat for Ornamental Snake in the proposed offset area. Weed management will focus on preventing introduction and spread of weeds to the offset site and reducing the extent of existing weed infestations.

Initially a baseline weed survey will need to be completed to establish the distribution and abundance of weeds across the offset site. This will include establishment of permanent photo-monitoring points.

On completion of the baseline survey, more specific management actions and outcomes can be prescribed based upon reduction of weed cover and abundance across the offset site.

Weeds will be managed using chemical and/or mechanical control in accordance with the control measures and timing consistent with Biosecurity Queensland Fact Sheets (DAF 2020), for relevant weed species. On completion of the baseline survey, the OAMP will contain specific management actions, monitoring and corrective actions relevant to the species present and nature of existing infestations.

9.5.2 Erosion and sediment control

Erosion within the offset area will be managed through exclusion of stock from certain parts of the offset area, which may be at certain times of year, and pest fauna management (such as management of Feral Pigs). Locations of grazing exclusion and timing will be confirmed in the OAMP.

On completion of the baseline survey, the OAMP will contain specific management actions, monitoring and corrective actions relevant to erosion and sediment control.

9.5.3 Feral animal control with a focus on wild dogs, feral pigs and feral cats

Feral Pigs result in the degradation of species habitat, while predation from feral cats is a threat to Ornamental Snake.

Initially a baseline feral pest survey will need to be completed to establish the distribution and abundance of pests across the offset site. On completion of the baseline survey, more specific management actions and outcomes can be prescribed based upon reduction of pest numbers across the offset site. Control measures that are species specific, as humane as possible and cause little to no damage to the natural environment will be selected. This is likely to consist of shooting, trapping and baiting, and will be confirmed in the OAMP once baseline surveys of the offset area are complete.

9.5.4 Bushfire management including fuel load reduction, maintenance of firebreaks

Management of bushfire regimes in the offset area would reduce the likelihood of threatened species mortality due to uncontrolled bushfire, with the aim of preventing hot bushfires which are a threat. Fire management will also be used as a method to control biomass and weeds as applicable, including strategic grazing if appropriate.

Bushfire management would include creation and maintenance of fire breaks, as well as monitoring of fuel loads and fuel load reduction as necessary (e.g. hazard reduction burns prior to the dry season).

Bushfire management would be undertaken in consultation with the Queensland Rural Fire Service.

9.5.5 Grazing management

Certain habitat types are considered sensitive to grazing, and will therefore require different management actions. Based upon the species habitat, differing actions may include exclusion of grazing (for example to ensure gilgai areas are not degraded or sensitive vegetation and areas subject to regeneration are protected). Exclusion would take the form of fencing off certain portions of the offset area. Areas of revegetation will also be excluded from grazing. Locations of grazing exclusion and timing will be confirmed in the OAMP.

9.6 Legal security

The land on which an environmental offset will be delivered is required to be legally secured. Both the EPBC Act and QEOP require offset areas are legally secured for at least the duration of the impact and once performance outcomes have been achieved. This predominantly would mean the offset is legally secured in perpetuity.

Offset sites will be selected on the basis of ecological characteristics, opportunity for maintaining and/or improving the viability of the protected matter and those threatening processes which may undermine the future resilience of those matters if not managed and protected under an offset arrangement. Any land use or tenure inconsistent with delivering conservation outcomes will be considered during offset site selection process such as mining or petroleum leases and excluded from consideration where possible.

The Offset Area Management Plan/s will be linked to the agreed offset securing mechanism which will drive monitoring, assessment, compliance and reporting requirements.

Legal security is recognised when one of the following mechanisms are used:

- an environmental offset protection area under Section 30 of the *Environmental Offsets Act 2014*
- an area declared as an area of high nature conservation value under Section 19F of the *Vegetation Management Act 1999*, where it is secured for the purposes of an offset
- declared as a nature refuge under Section 46 of the *Nature Conservation Act 1992*, where it is secured for the purposes of an offset
- declared as a protected area under Section 29(1) of the *Nature Conservation Act 1992*, where it is secured for the purposes of an offset;
- declared as a special wildlife reserve under Section 43D of the *Nature Conservation Act 1992*, where it is secured for the purposes of an offset
- secured as a statutory covenant for environmental purposes under the *Land Act 1994* or *Land Title Act 1994*.

Offset areas must be legally secured within 12 months of the offset management plan being approved. These offset areas will be legally secured in perpetuity, actively managed for 20 years to increase MNES habitat quality and reduce threatening processes. The legal mechanism will protect the vegetation on the title, and require land management is undertaken in accordance with the OAMP. This is legally binding on current and future landowners.

QPM Energy is currently exploring the most appropriate legal mechanism to be used. The legal mechanism to be used will be confirmed post Project approval once further discussions have occurred with landowners.

10 Conclusion and next steps

QPM Energy is committed to providing environmental offsets for significant residual impacts to MNES and MSES. Land-based offsets that comply with the EPBC Act Environmental Offsets Policy will form the focus for delivering the Project's environmental offset requirements. Land-based offsets will be strategically located.

Regular communication and progress updates will be provided to government agencies including seeking feedback on proposed offset sites and conservation outcomes to be achieved. Specifically, this will include the following key steps:

- Continue to consult with DCCEEW on the proposed approach for the assessment and delivery of environmental offsets.
- Determine path to fulfil state based offsets (land based or financial).
- Consult with stakeholders to identify opportunities for collaboration and partnerships.
- Engage with landowners as early as possible to understand options available.
- Undertake seasonal ecological assessments within the preferred offset area to confirm values are present and suitability of the habitat.
- Complete ground-truthing which will include validation of the presence of offset values, confirming suitability of the site, assessing habitat quality (including assessing habitat quality for impact site condition comparison) and determining management actions.
- Prepare required documentation at key milestones to gain regulator feedback and endorsement of the offset package.

11 References

Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2011. Draft referral guidelines for the nationally listed Brigalow Belt reptiles. Commonwealth of Australia.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2012, *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*, Department of Sustainability, Environment, Water, Population and Communities.

Department of the Environment (DoE) 2013. *Matters of National Environmental Significance Significant Impact Guidelines 1.1*. Commonwealth of Australia.

Department of Environment and Science (DES) 2021a, *Queensland Environmental Offsets Policy*, Department of science and Environment.

Department of Environment and Science (DES) 2021b, *General guide for the Queensland Environmental Offsets Framework*, Department of Science and Environment.

EMM Consulting Pty Ltd (EMM) 2022a. MNES Assessment Report. Prepared for QPM Energy Pty Ltd.

EMM Consulting Pty Ltd (EMM) 2022b. MSES Assessment Report. Prepared for QPM Energy Pty Ltd.

University of Queensland 2017. Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act. Report to the National Environmental Science Programme. Department of the Environment and Energy.

Appendix A

Offset calculator

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Ornamental Snake
EPBC Act status	Valuable
Annual probability of extinction Based on IUCN category definitions	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes	koala	Area	55.67	Hectares	
			Quality	8	Scale 0-10	
			Total quantum of impact	44.54	Adjusted hectares	
<i>Threatened species</i>						
<i>Birth rate</i>						
<i>Mortality rate</i>						
<i>Number of individuals</i>						

Offset calculator																			
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source			
<i>Ecological Communities</i>																			
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) with offset											
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0											
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)											
<i>Threatened species habitat</i>																			
Area of habitat	Yes	44.54	Adjusted hectares	200	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	227	Risk of loss (%) without offset	8%	Risk of loss (%) with offset	0%	18.16	80%	14.53	13.96	44.67	100.30%	Yes
					Future area without offset (adjusted hectares)	208.8	Future area with offset (adjusted hectares)	227.0											
					Time until ecological benefit	20	Start quality (scale of 0-10)	8	Future quality without offset (scale of 0-10)	7	Future quality with offset (scale of 0-10)	9	2.00	80%	1.60	1.54			
<i>Threatened species</i>																			
<i>Birth rate</i>																			
<i>Mortality rate</i>																			
<i>Number of individuals</i>																			

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	44.536	44.67	100.30%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

