

Draft environmental management plan

Fauna management plan



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Santos GLNG Upstream Fauna Management Plan

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Abbreviations

Acronym	Description
ATP	Authority to Prospect
CE	Critically Endangered
DEHP	Department of Environment and Heritage Protection
DOTE	Department of the Environment (Commonwealth)
EHS	Environment, Health and Safety
EHSMS	Environment, Health and Safety Management System
E	Endangered
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EVNT	Endangered Vulnerable and Near Threatened
FMP	Fauna Management Plan
GIS	Geographic Information System
GLNG	Gladstone Liquefied Natural Gas
GPS	Global Positioning System
LP Act	<i>Land Protection (Pest and Stock Route Management) Act 2002</i>
NC Act	<i>Nature Conservation Act 1992</i>
NT	Near Threatened
P&G Act	<i>Petroleum and Gas (Production and Safety) Act 2004</i>
PWMP	Pest and Weed Management Plan
QLD	Queensland
SMP	Species Management Plan
SSMP	Significant Species Management Plan
TEC	Threatened Ecological Community
V	Vulnerable

1.0 Introduction

Santos GLNG activities, conducted throughout the Santos GLNG Upstream Project Area, have the potential to adversely impact upon fauna (wildlife and livestock) in the region. Santos GLNG has developed a Fauna Management Plan (FMP) to minimise the potential impacts on fauna affected by Santos GLNG activities. This FMP provides an overview of the measures developed by Santos GLNG to protect fauna and minimise potential impacts in the Santos GLNG Upstream Project Area.

1.1 Purpose and Scope of the FMP

1.1.1 Purpose

Santos GLNG has both a legal and social responsibility to manage fauna on Santos GLNG assets. This FMP has been prepared to satisfy these obligations and complements the overarching Santos Environment, Health and Safety Management System (EHSMS).

The objectives of the FMP are to:

- Facilitate compliance with relevant legislation, regulations and approvals;
- Support the Santos *Environmental Hazard Standard 01 - Biodiversity and Land Disturbance* (EHS01);
- Provide a framework for Santos GLNG to:
 - o Identify and monitor livestock and wildlife as well as fauna habitat features present at Santos GLNG assets and/or activities;
 - o Avoid and minimise impacts to fauna and fauna habitat features within the vicinity of Santos GLNG assets and/or activities; and
 - o Develop site-specific / activity specific fauna management measures.

1.1.2 Scope

This FMP provides an overview of the strategy implemented by Santos GLNG to manage all fauna, irrespective of conservation status. Specifically, this FMP:

- Identifies species of fauna present within the Santos GLNG Upstream Project Area;
- Prioritises the management of both livestock and wildlife;
- Describes general measures to minimise impacts to fauna caused by Santos GLNG activities.

This FMP focuses on the management of fauna after proposed disturbance locations have been approved in an internal environmental approval (refer *EHSMS06 – Environmental Impact Assessment and Approvals*). Disturbance planning and assessment is managed primarily through the implementation of the Santos GLNG *Environmental Protocol for Constraints Planning and Field Development*, which amongst other things avoids significant fauna habitat areas during the infrastructure planning stage.

The FMP is to be implemented by all Santos GLNG Project personnel responsible for conducting activities that have the potential to adversely impact fauna throughout the exploration, construction, production, decommissioning and rehabilitation phases of the Project.

This FMP applies to activities carried out within the Santos GLNG Upstream Project Area. The Santos GLNG Upstream Project Area consists of Santos GLNG petroleum tenements comprising the Arcadia, Fairview, Roma and Scotia gas fields and as illustrated in Figure 1.

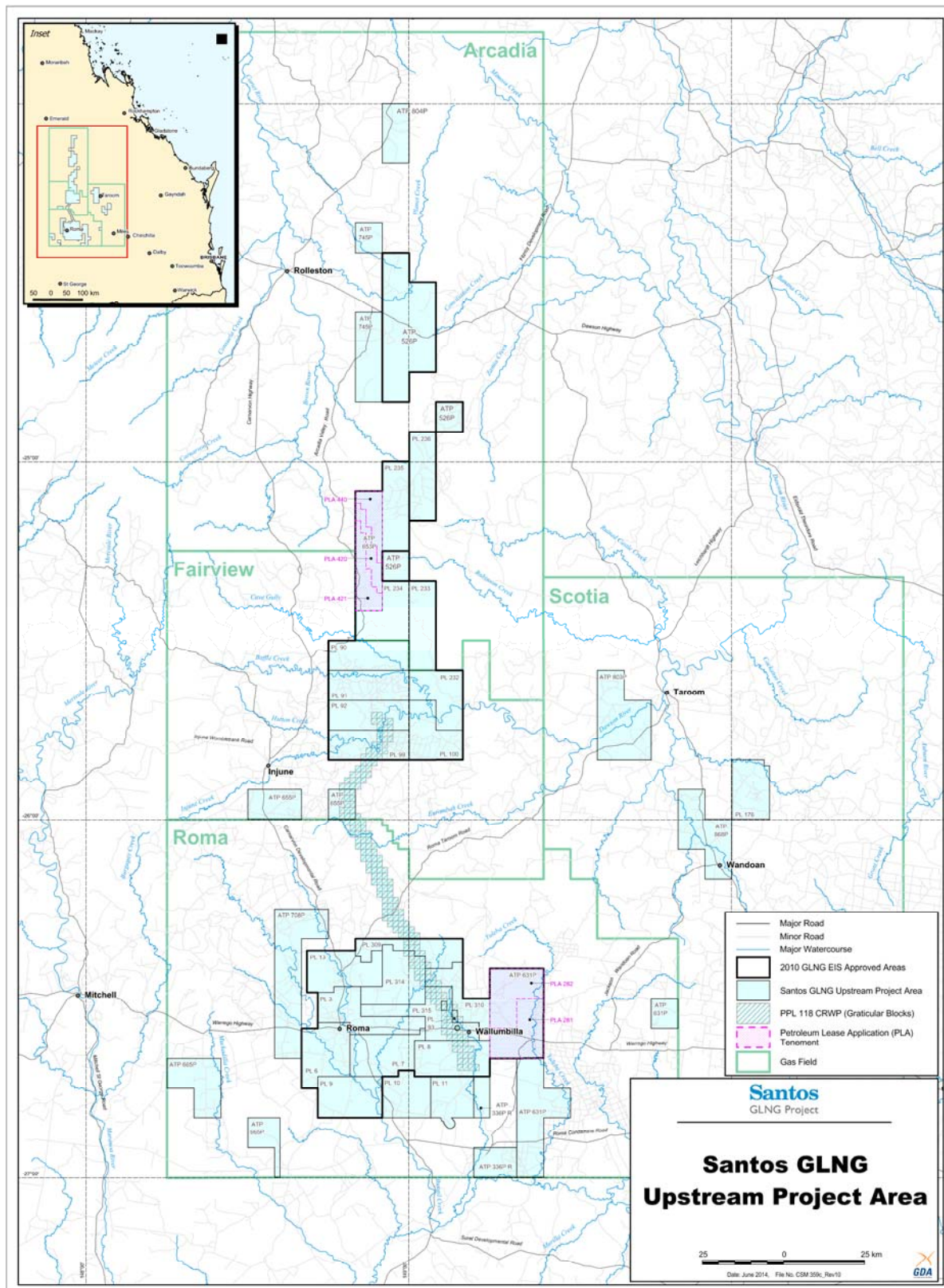


Figure 1: The Santos GLNG Upstream Project Area

2.0 Roles and Responsibilities

Santos GLNG Project personnel are responsible for the environmental performance of their activities, for complying with relevant approval / permit requirements and for ensuring that all environmental objectives associated with the work are achieved. Santos GLNG Project personnel must also be mindful of the General Environmental Duty (GED) as outlined in the *Environmental Protection Act 1994* (Qld) (EP Act). Section 319(1) of the EP Act states that “a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practical measures to prevent or minimise the harm.”

Roles, responsibilities and accountability under the FMP will be assigned in accordance with the Santos EHSMS05 – *Responsibility and Accountability*.

3.0 Legal and Other Requirements

Applicable legislation, regulations, guidance and strategies enacted by the Australian and Queensland governments for the management of fauna in the Santos GLNG Upstream Project Area are described in the following sections.

3.1 Commonwealth Legislation and Strategies

An overview of Australian government legislation and strategies considered in the development of this FMP are presented in Table 1.

Table 1: Summary of Applicable Commonwealth Legislation and Strategies

Act or Strategy	Summary of Act or Strategy
<i>Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important fauna species and ecological communities. The EPBC Act focuses Australian Government interests on the protection of MNES, with the states and territories having responsibility for matters of state and local significance. MNES includes listed threatened species and communities. Condition 7 to 12 of the EPBC Act Approval (No. 2008/4059) requires management plans addressing each listed fauna species and listed ecological community that may be potentially impacted by gas field development within the Santos GLNG Upstream Project Area. Specifically Condition 8(i) provides a list of relevant management practices and methods that should be included to minimise impact and recover from impact. The Santos GLNG project has an approved <i>Significant Species Management Plan</i> (SSMP).
Australia's Biodiversity Conservation Strategy 2010-2030	This Strategy is a guiding framework for conserving our nation's biodiversity over the coming decades. The vision of this Strategy is that Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence.
Australian Pest Animal Strategy	The Australian Pest Animal Strategy provides national guidance to address the undesirable impacts caused by exotic vertebrate animals (mammals, birds, reptiles, amphibians and fish) that have become pests in Australia and to prevent the establishment of new exotic vertebrate pests.

3.2 State Legislation and Strategies

The management of fauna in the Santos GLNG Upstream Project Area largely falls within the legal jurisdiction of the state of Queensland. An overview of Queensland legislation considered in the development of the FMP is presented in Table 2. The EP Act and the NC Act are the two principal pieces of Queensland legislation governing Santos GLNG's wildlife management activities. The *Animal Care and Protection Act 2001* is the principal piece of legislation that provides for the management of livestock.

**Table 2:
Summary**

of Key Applicable Queensland Legislation and Strategies

Act / Regulation / Code	Summary of Act
<i>Animal Care and Protection Act 2001</i> <i>Animal Care and Protection Regulation 2012</i>	The purpose of this Act and regulation is to promote and provide standards for the responsible care and use of animals and the protection of animals from unjustifiable, unnecessary or unreasonable pain. Section 18(1) makes it an offence to be cruel to an animal. Under section 17, a person in charge of an animal during its rescue, care, rehabilitation or release has a statutory duty of care to appropriately provide for the animal's welfare.
<i>Environmental Protection Act 1994 (EP Act)</i>	The EP Act provides for environmental management practices and environmental safeguards. The EP Act also requires Santos GLNG to take all reasonable and practicable measures to prevent or minimise environmental harm.
<i>Land Protection (Pest and Stock Route Management) Act 2002</i> <i>Land Protection (Pest and Stock Route Management) Regulation 2003</i>	This Act and regulation provide the framework for the planning and management of pests in Queensland, in order to prevent their spread in the State through: • Establishing principles and responsibilities of pest management and planning. • Declaring animals and plants to be declared pests. • Preventing the introduction, spread, keeping or sale of declared pests in the State. Landholders are legally obliged to take all reasonable steps to keep their land free of class 1 and class 2 pests.
<i>Nature Conservation Act 1992 (NC Act)</i> <i>Nature Conservation (Administration) Regulation 2006</i> <i>Nature Conservation (Wildlife Management) Regulation 2006</i> <i>Nature Conservation (Wildlife) Regulation 2006</i>	The object of this Act and the relevant regulations is the conservation of nature. The Act provides for the protection of the biological diversity of native wildlife and its habitat and for the ecologically sustainable use of protected wildlife or areas by the preparation and implementation of management and conservation plans consistent with the values and needs of the wildlife or areas concerned.
<i>Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland (NC Act)</i>	Section 174A of the NC Act, the chief executive has approved the <i>Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland</i>. This code will ensure that the activities of all parties involved in the care and rehabilitation of native animals in Queensland result in the best possible conservation and animal welfare outcomes for rehabilitated animals and the wild populations they are returned to.
<i>Petroleum and Gas (Production and Safety) Act 2004 (P&G Act)</i> <i>Petroleum and Gas (Production and Safety) Regulation 2004</i>	A key purpose of the P&G Act and its subordinate regulation is to create an effective regulatory system for activities associated with the exploration, development and production of petroleum and gas resources. Section 9(2) of the Regulation ensures that a relevant person must not bring domestic animals onto a landholder's land without the consent of the landholder. Section 7 of the Regulation outlines obligations to prevent the spread of declared pests.
<i>State Development and Public Works Organisation Act 1971 (SDPWO Act)</i>	Under Section 35 of SDPWO Act, the Coordinator-General must prepare the Coordinator-General's report for an EIS. In evaluating the EIS, the Coordinator-General may state conditions and make recommendations. The Coordinator-General's report requires that Santos GLNG implement fauna management procedures for the carrying out of the petroleum activities to prevent or minimise harm or the potential risk of causing harm to fauna.

3.3 Santos Environment, Health and Safety Management System

The Santos EHSMS, provides a framework for environmental and safety practices across Santos operations worldwide. The framework is consistent with *Australian Standard (AS) 4801:2000 Occupational Health and Safety Management Systems* and *AS/NZS ISO 14001:2004 Environmental Management Systems*.

This FMP complements the requirements of the EHSMS, in particular, the Santos Environmental Hazard Standard *EHS01 Biodiversity and Land Disturbance*. This standard defines the requirements to minimise environmental impacts associated with disturbance to biodiversity and/or land during oil and gas exploration, production, processing and rehabilitation activities. Appendix D of EHS01 contains the Stock Proof Fencing Standard, which prescribes fence construction methods required in order to exclude livestock.

This FMP specifically addresses unique features and requirements relating to the Santos GLNG Project. Santos GLNG specific documentation is based on identified environmental and reputational risks and account for Santos GLNG's legal and other obligations, commitments made by the Santos GLNG Project and Santos GLNG's Social Licence to Operate. In this context, the FMP provides additional guidance for the management of environmental issues and supports the development of asset / activity / department based guidelines and work instructions, in order to secure compliance with legal requirements as well as deliver on company environmental standards.

The Santos approach to environmental management is illustrated in Figure 2.



Figure 2: The Santos Approach to Environmental Management

There are a number of Santos GLNG documents relevant to the management of fauna within the Santos GLNG Upstream Project Area. Individual documents typically reflect the steps in management of ecological constraints during the different phases of the Project, namely Planning, Construction, Operation and Decommissioning and Rehabilitation, as well as the principles for ecological constraints management, namely Avoid, Minimise, Mitigate, Rehabilitate and Offset. Key documents related to the management of fauna are discussed further below.

3.3.1 Environmental Protocol for Constraints Planning and Field Development

The Santos GLNG *Environmental Protocol for Constraints Planning and Field Development* (the Protocol) outlines the approach taken by Santos GLNG to identify, assess, avoid or minimise potential impacts to MNES and State related matters (including fauna), when seeking to locate project infrastructure or undertake Project activities in the Santos GLNG Upstream Project Area. The Protocol aligns closely with the 'Avoid' and 'Minimise' principles for ecological constraints management.

3.3.2 Significant Species Management Plan (SSMP)

The *Significant Species Management Plan* is designed to manage impacts from activities that have been planned (in consideration of ecological constraints) and approved for construction and will have an identified impact on a significant species (EPBC listed) or its habitat or a TEC. The SSMP aligns with the 'Mitigate' principle for ecological constraints management.

3.3.3 Rehabilitation Management Plan (RMP)

Where a direct or indirect impact has occurred to a species of fauna, Santos GLNG will apply rehabilitation measures as appropriate for the impacted species, to minimise cumulative impacts throughout the life of the Project. The Rehabilitation Management Plan aligns most closely with the 'Rehabilitate' principle for ecological constraints management.

3.3.4 Environmental Offsets Strategy

The Santos GFD Project *Environmental Offsets Strategy* is an approach to provide environmental benefits to counterbalance the impacts that remain after avoidance, minimisation, mitigation and remediation and rehabilitation measures. Where required, Santos GLNG will provide suitable offsets for activities that result in an unavoidable significant residual adverse impact to MNES and Matters of State Environmental Significance (MSES). The Santos GFD Project *Environmental Offsets Strategy* aligns most closely with the 'Offset' principle for ecological constraints management.

3.3.5 Pest and Weed Management Plan (PWMP)

The *Pest and Weed Management Plan* provides an overview of the strategy and procedures developed by Santos GLNG to manage pest fauna species in the Santos GLNG Upstream Project Area.

4.0 Fauna Species in the Santos GLNG Upstream Project Area

The Santos GLNG Upstream Project Area is located in an area that is predominantly rural, with many properties containing livestock. Cattle, with sheep and horses locally prominent in some areas, dominate livestock throughout the region.

The Santos GLNG Upstream Project Area covers a large area of land located entirely within the Brigalow Belt Bioregion and includes significant areas of National Park, State Forest and Resource Reserves. The terrestrial and aquatic ecosystems present within the Brigalow Belt provide habitat for a diverse range of fauna species, many of which occur within the Santos GLNG Upstream Project Area. Ecological assessments, field scouting and pre-clearance surveys conducted within the Santos GLNG Upstream Project Area to date have identified in excess of 220 species of fauna.

4.1 Significant Species

4.1.1 Endangered, Vulnerable, Near Threatened Fauna

Due primarily to the scale and intensity of land clearing during the 1900s, many species native to the Brigalow Belt Bioregion are now listed under the EPBC Act and NC Act as Endangered, Vulnerable or Near Threatened (EVNT). Listing criteria for EVNT species generally include:

- Whether the species is subject to a reduction or decline in numbers;
- The geographic distribution for the species is restricted or shrinking;
- Only a limited number of mature individuals exist; and
- The species is subject to an ongoing threatening process and survival of the species is unlikely.

Many EVNT fauna species are known to occur or may occur within the Santos GLNG Upstream Project Area. Table 3 provides a list of the EVNT species observed within the Santos GLNG Upstream Project Area and their status under the relevant legislation.

Species profiles for EVNT fauna species that may occur within the Santos GLNG Upstream Project Area are found online at <http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl> and <http://www.ehp.qld.gov.au/wildlife/animals-az/index.html>.

**Table 3: Known Occurrences of EVNT Fauna Species within the Santos GLNG Upstream Project Area
(Database and Survey Results)**

Common Name	Scientific Name	Status*	
		NC Act	EPBC Act
Cooloola Tree Frog	<i>Litoria cooloolensis</i>	NT	-
Rough frog	<i>Cyclorana verrucosa</i>	NT	-
Pale imperial hairstreak butterfly	<i>Jalmenus eubulus</i>	V	-
Australasian bittern	<i>Botaurus poiciloptilus</i>	C	E
Australian painted snipe	<i>Rostratula australis</i>	V	E
Black-breasted button-quail	<i>Turnix melanogaster</i>	V	V
Black-chinned honeyeater	<i>Melithreptus gularis</i>	NT	-

Common Name	Scientific Name	Status*	
		NC Act	EPBC Act
Black-necked stork	<i>Ephippiorhynchus asiaticus</i>	NT	-
Black-throated finch	<i>Poephila cincta cincta</i>	E	E
Cotton pygmy-goose	<i>Nettapus coromandelianus</i>	NT	-
Freckled duck	<i>Stictonetta naevosa</i>	NT	-
Glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	V	-
Grey Goshawk	<i>Accipiter novaehollandiae</i>	NT	-
Major Mitchell's cockatoo	<i>Lophochroa leadbeateri</i>	V	-
Painted honeyeater	<i>Grantiella picta</i>	V	-
Paradise parrot	<i>Psephotus pulcherrimus</i>	EX	PE
Plains-wanderer	<i>Pedionomus torquatus</i>	V	V
Powerful owl	<i>Ninox strenua</i>	V	-
Red goshawk	<i>Erythrorhynchus radiatus</i>	E	V
Square-tailed kite	<i>Lophoictinia isura</i>	NT	-
Squatter pigeon	<i>Geophaps scripta</i>	V	V
Star finch	<i>Neochmia ruficauda ruficauda</i>	E	E
Superb parrot	<i>Polytelis swainsonii</i>	C	V
Swift parrot	<i>Lathamus discolor</i>	E	E
Turquoise Parrot	<i>Neophema pulchella</i>	NT	-
Murray cod	<i>Maccullochella peelii</i>	C	V
Bridled nail-tail wallaby	<i>Onychogalea fraenata</i>	E	E
Brush-tailed rock-wallaby	<i>Petrogale penicillata</i>	V	V
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	C	V
Koala	<i>Phascolarctos cinereus</i>	V (SEQ)	V
Large pied bat	<i>Chalinolobus dwyeri</i>	V	V
Little pied bat	<i>Chalinolobus picatus</i>	NT	-
Northern quoll	<i>Dasyurus hallucatus</i>	C	E
South-eastern long-eared bat	<i>Nyctophilus corbeni</i>	C	V
Brigalow scaly-foot	<i>Paradelma orientalis</i>	V	-
Collared delma	<i>Delma torquata</i>	V	V
Collett's Snake	<i>Pseudechis colletti</i>	NT	-
Common death adder	<i>Acanthophis antarcticus</i>	NT	-
Darling Downs earless dragon	<i>Tympanocryptis tetraporophora</i>	E	-
Dunmall's snake	<i>Furina dunmali</i>	V	V
Eyrean Earless Dragon	<i>Tympanocryptis tetraporophora</i>	E	-
Fitzroy river turtle	<i>Rheodytes leukops</i>	V	V

Common Name	Scientific Name	Status*	
		NC Act	EPBC Act
Five-clawed worm-skink	<i>Anomalopus mackayi</i>	E	V
Golden-tailed gecko	<i>Strophurus taenicauda</i>	NT	-
Grey snake	<i>Hemiaspis damelii</i>	E	-
Ornamental snake	<i>Denisonia maculata</i>	V	V
Woma	<i>Aspidites ramsayi</i>	NT	-
Yakka skink	<i>Egernia rugosa</i>	V	V

C = Least concern, NT = Near threatened, V = Vulnerable, E = Endangered, PE = Presumed extinct, EX = Extinct

4.1.2 Special Least Concern Animals

Section 34(3) of the *Nature Conservation (Wildlife) Regulation 2006* lists migratory birds under international agreements as well as three native fauna species: the koala (*Phascolarctos cinereus*), the echidna (*Tachyglossus aculeatus*) and the platypus (*Ornithorhynchus anatinus*) as special least concern wildlife. All three mammal species of special least concern wildlife are known to occur within the Santos GLNG Upstream Project Area. Migratory birds are discussed separately below.

4.1.3 Migratory Fauna

Many migratory species listed under the international conventions and agreements Australia is party to are protected under the EPBC Act. The migratory bird species listed in Table 4 are known to migrate within the Santos GLNG Upstream Project Area.

Table 4: EPBC Act Migratory Species observed within the Santos GLNG Upstream Project Area

Common Name	Scientific Name	EPBC Migratory Listing
Fork-tailed Swift	<i>Apus pacificus</i>	Marine
Glossy Ibis	<i>Plegadis falcinellus</i>	Marine
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Terrestrial
White-throated Needletail	<i>Hirundapus caudacutus</i>	Terrestrial
Rainbow Bee-eater	<i>Merops ornatus</i>	Terrestrial
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	Terrestrial
Rufous Fantail	<i>Rhipidura rufifrons</i>	Terrestrial
Great Egret, White Egret	<i>Ardea alba</i>	Wetland
Cattle Egret	<i>Ardea ibis</i>	Wetland
Latham's Snipe, Japanese Snipe	<i>Gallinago hardwickii</i>	Wetland
Painted Snipe	<i>Rostratula benghalensis</i> (sensu lato) (<i>Rostratula australis</i>)	Wetland

4.2 Pest Species

A range of pest fauna species also occur within the Santos GLNG Upstream Project Area. Refer to the Santos GLNG *Pest and Weed Management Plan* for a full list of pest species. The PWMP has been developed to minimise the introduction and spread of pest species and manage pest fauna species through appropriate controls. Pest fauna species within the Santos GLNG Upstream Project Area will be managed in accordance with the PWMP.

4.3 Potential Impacts to Fauna

The activities and infrastructure required to develop and operate the Santos GLNG Upstream Project Area may impact upon fauna. Potential impacts may include:

- **Direct mortality** – resulting from light and heavy vehicular activity, vegetation clearing and ground disturbance activities;
- **Habitat loss and degradation**– caused by vegetation clearing and ground disturbance activities;
- **Introduction of pests and weeds** – increased competition and predation from pest fauna species and a reduction in foraging and breeding resources as a result of weed invasion;
- **Creation of barriers** – restricting movement between habitat areas;
- **Fauna entrapment** – within dams, trenches and other excavations associated with Santos GLNG activities and assets; and
- **Indirect effects** – resulting from increased noise and dust levels associated with the construction and operation of Santos GLNG activities and assets.

5.0 Management Strategy

An overarching fauna management strategy applicable to the Santos GLNG Upstream Project Area has been developed based on the following principles:

1. **Identify** - stock and wildlife as well as fauna habitat features;
2. **Avoid** - impacting fauna and fauna habitat features;
3. **Mitigate and minimise** - potential impacts to fauna by adopting sound work practices and promotion of risk minimisation to reduce potential fauna interactions with humans and/or infrastructure.

Each of these principles is discussed in further detail in the following Sections.

5.1 Identify

The identification of fauna species and habitat will be conducted through two different assessment processes.

Desktop fauna assessment - a preliminary investigation of potential fauna occurring on site may be identified through interrogation of Santos' GIS data and known government and museum databases.

Fauna field assessment - The primary purpose of the fauna field assessment is to identify areas that are undetectable and / or incorrectly mapped in the GIS. The identification at this level is conducted at a finer scale and can be done to identify individual animals, livestock as well as locally significant micro-habitat features that are used for nesting, sheltering and foraging (e.g. nests, hollow bearing trees). Fauna field assessments must be completed by a suitably qualified (and approved for MNES) ecologist.

Information regarding livestock location and numbers may be provided through consultation with the landholder via the landholder relations team.

Fauna assessments are discussed in greater detail in the *Environmental Protocol for Constraints Planning and Field Development*.

5.2 Avoid

Prior to land disturbance, the habitat value of the area will be assessed by a suitably qualified person and infrastructure located to avoid areas of high habitat value wherever possible.

Where wildlife is present within the area proposed for the land disturbance and activities may cause harm to the wildlife, the proposed disturbance should not commence until the fauna have relocated or mitigation and management measures have been investigated and implemented. Fauna microhabitat features such as large hollow bearing trees should be avoided where practicable.

Where infrastructure is to be built in areas containing livestock, the building of the infrastructure should be scheduled, where practicable, to occur when livestock rates are minimal and the landholder is not mustering. This information can be determined from the landholder via the landholder relations team.

5.3 Mitigate and Minimise

The fauna located within Santos GLNG Upstream Project Area are diverse, unpredictable and often highly mobile. Minimising potential impacts on these fauna and their habitats as a result of Santos GLNG activities remains a critical measure in the overall management of fauna throughout the Santos GLNG Upstream Project Area.

5.3.1 Livestock Management

Fences will be installed around well lease infrastructure, dams and where required, other Santos GLNG assets, to exclude livestock. Fences will be constructed in accordance with Santos' policies and standards.

Throughout the Santos GLNG Upstream Project Area, gates will be left as they were found. If closed gates are required to be opened for extended periods (e.g. convoy passage), they will not be left unattended unless otherwise agreed with the landholder.

5.3.2 Wildlife Management

Tampering with animal breeding places for 'least concern' and 'special least concern' species listed under the provisions of the NC Act will only be conducted in accordance with the SMP. Significant species covered by the SSMP must be managed in accordance with the management practices outlined in the SSMP.

In addition to the management requirements provided in the SMP and the SSMP, management for all wildlife will be conducted in accordance with the activity specific management measures to minimise fauna impacts provided in Table 5.

Table 5: Activity Specific Management Measures to Minimise Fauna Impacts

Activity	Management Measure
Clearing woody vegetation	- In authorised clearing areas, minimise disturbances where practicable. - Clearing shall be conducted in a sequential manner and in a way that directs escaping wildlife away from the activity and into adjacent natural areas. - Clearing within known habitats of a particular significant species covered by the SSMP must be conducted in accordance with the Management Practices outlined in the SSMP. - Fauna inspections will be undertaken prior to and during clearing works to advise on clearing techniques that will minimise fauna impacts and to undertake fauna handling, if required. - Prior to clearing, habitat features and habitat for significant species should be identified and flagged, with a view to re-using habitat features once the disturbance has been finalised.
Construction, Excavations and Other Land Disturbances	- Minimise the time the land is disturbed between clearing and rehabilitation. - Records of significant fauna species identified during land disturbance should be maintained in accordance with the SSMP and SMP. For significant species, the location of the species and/or habitat will be recorded in Santos' GIS database, and used for future assessment to allow for adaptive management to be implemented. In addition, the species and/or habitat site will be reported to the Queensland and Australian governments as part of Annual Reporting (see SMP and SSMP). - Cleared vegetation and construction equipment and pipes shall be stockpiled in a manner that does not significantly impede fauna movements. - Measures shall be adopted to prevent fauna entrapment within excavation work areas and infrastructure developments, such as: - Minimising the period of time the trenches and other excavations are open, particularly in known or significant fauna habitat areas. - Where possible, design construction with slopes less than 45° to provide exit ramps for fauna. - Utilising branches, ropes, hessian sacks, ramped gangplanks or similar to create 'ladders' to enable fauna to exit the excavations. - Providing egress points for animals to gain purchase on the lining of any ponds

Activity	Management Measure
	- and dams. - o Installing exclusion fencing around dams / sumps where practicable; - o Ensuring cellar covers are installed. - o Where required, engaging appropriately certified personnel to undertake monitoring of the open trench or construction areas and remove trapped fauna. • A suitably accredited fauna spotter / catcher should survey trenches in areas of high habitat value prior to the commencement of pipe laying or backfill activities and relocate any trapped fauna as required. • Ensure fauna are discouraged from work areas by, where practicable, erecting barriers around land disturbances that are likely to injure fauna. • All Santos GLNG Project personnel shall not feed fauna and food scraps and putrescible wastes are to be stored appropriately to prevent fauna from feeding and to discourage access to work areas. • Monitor disturbances for fauna such as ground dwelling reptiles and burrowing fauna that are attracted to construction areas during the disturbance events. • Measures will be put in place to ensure 'no go zones' are not impacted during construction.
Watercourse Crossings	• Watercourse crossing construction works will be scheduled, where practicable, during low flow periods. • Ensure mitigation measures for creek crossings are consistent with AS2885 'Pipelines', 'Gas, Liquid and Petroleum' and Australian Pipeline Industry Association Code of Environmental Practice' and the conditions of any specific approval (such as waterway barrier works). • Ensure watercourse crossing construction works are conducted in accordance with the requirements of the SMP and SSMP for significant aquatic species. • Fauna passage devices such as pipes that allow the movement of fish and other aquatic fauna should be considered for major watercourse crossings. • Implement measures to reduce soil erosion and stream sedimentation.
Driving	• Ensure all Santos GLNG Project personnel shall adhere to designated speed limits when driving. • Where practicable, limit or avoid travel during dusk, dawn and at night when fauna are most active. • Maintain and operate vehicles to reduce noise, dust and smoke in habitat areas.
Monitoring	• Encourage beneficial revegetation after disturbances. • Monitor regrowth to ensure habitat values are being restored and will return in time (as per the requirements of the RMP).

5.4 Rehabilitation and Offsets

5.4.1 Rehabilitation

Many of Santos GLNG's land disturbance activities are temporary impacts. The RMP outlines the appropriate rehabilitation schedules based on current land uses, threatened species habitat and the associated best management practices.

5.4.2 Offsets

Under the existing EPBC Act approval, Santos GLNG is required to provide an offset area for the approved disturbance limits relating to MNES. The offset must secure an area of private land for a variety of Threatened Ecological Communities (TEC)'s and habitat for threatened fauna. This offsets requirements aims to increase the overall size of TEC's and fauna habitats impacted by the project overtime. Although these offsets are directly linked to TEC's and fauna habitats of EPBC listed

provisions of these offsets will benefit many other fauna species not listed under the EPBC Act.

5.4.3 Training

All Santos GLNG Project personnel working in the Santos GLNG Upstream Project Area undergo a basic site-specific induction which includes an outline of the fauna management requirements (and other environmental issues) on-site. Applicable training suited to the different roles and responsibilities (Section 2.0) is also to be undertaken in accordance with appropriate Santos standards including *EHSMS06 Training and Competency*.

Regular toolbox meetings and awareness sessions are also conducted. Topics addressed by these session will include key fauna management principles to maintain compliance with regulatory requirements and to reinforce solutions or increase awareness of any fauna related issues that arise during the course of exploration, construction, operations, decommissioning and rehabilitation.

6.0 Evaluation and Review

6.1 Evaluation

The implementation and effectiveness of this management plan and its associated procedures will be regularly assessed to ensure:

- Santos GLNG is demonstrating compliance with legal and landholder obligations;
- The overall management strategy remains relevant and up to date; and
- The plan and procedures adequately manage the environmental issue.

Effectiveness will be assessed against management measures as shown in Table 5. A variety of methods can be used to assess procedural effectiveness as shown in Table 6.

Table 6: Methods to Assess Procedural Effectiveness

Assessment Tool	Description
Checklists – Santos GLNG Compliance Management System	• Checklists, developed to reflect legal and procedural requirements / outcomes will be used by individual Santos GLNG Departments to assess and manage compliance. The results of the checklists will be evaluated for trending non-compliances that may be resolved through procedural change or by implementing another measure or process.
Audits	• Conduct internal and third party audits to formally assess the level of compliance with both regulatory requirements and with Santos GLNG procedures. • Audit outcomes are used to develop corrective actions which may include changes to this plan and/or procedures.
Review of Incidents	• A review of internal incidents, near misses or hazards will be undertaken to identify recurrences of similar incident types. This may highlight a requirement for a change in the existing plan and/or procedures, require the development of a new procedure or by implementation of another measure or process to address the recurring issue.
Review of Data	• Analyse all relevant data collected for negative and/or undesirable trends that may be prevented by procedural changes or by implementing another measure or process.

6.2 Review

The FMP is a living document and shall be reviewed at least every three years or sooner if any of the following occur:

- The plan is not adequately managing the issue (refer Section 6.1);
- Legislative requirements change;
- The area of activity changes; or
- A previously unidentified significant fauna species is found within an area of activity.

Reviews and changes to the FMP are to be communicated to relevant Santos GLNG Project personnel.

7.0 Definitions

Term	Definition
Checklist	Checklists assist in assessing the implementation of a Procedure. Checklists contain a list of key items required, things to be done, or points to be considered and are a tool to assess compliance with a Procedure.
EHSMS	Santos Environment, Health and Safety Management System (EHSMS) which forms the overall framework under which all Santos activities are undertaken.
Fauna	For the purposes of this management plan fauna includes all vertebrate fauna species located within the GLNG Upstream Project Area.
Livestock	All animals kept on a farm for domestic and or commercial purposes.
Management Plan	M Management Plans are specific to an environmental issue and/or topic. They primarily serve to provide a high level overview of the legislative and approval requirements and the Santos GLNG management strategy in place for the relevant environmental issue. Management Plans are also suitable for providing environmental regulators an overview of Santos GLNG environmental management, and in many cases, may be a direct requirements of an environmental approval.
Procedure	Procedures are designed to assist in the implementation of the Management Plan, by prescribing a series of processes and actions for a specific topic.
Rehabilitation	Means the process of reshaping and re-vegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in the environmental authority and, where relevant, includes remediation of contaminated land.
Santos GLNG Upstream Project Area	Comprises all Santos GLNG exploration and production tenements of the Arcadia, Fairview, Roma and Scotia gas fields.
Spotter Catcher	Person who holds a Current Rehabilitation Permit issued by the Administering Authority.
Suitably Qualified Person	A person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
Wildlife	For the purposes of this FMP Wildlife is all vertebrate fauna species that occur independently of people in natural conditions within the GLNG Upstream Project Area. Wildlife includes native and introduced species.
Woody vegetation	The vegetation for which the ecologically dominant stratum is composed of trees or shrubs.

8.0 References

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