

# MEMORANDUM

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Project:	Dam Siting Study and Prelim CCA	Date:	24 April 2024
To:	Senex Energy Pty Ltd	From:	Miles Tremlett-Johnstone (RPEQ No. 30225)
ATT:	Phil Wilkinson	CC:	Andrew Vitale, Jacob Cumpstay
Subject:	Louisiana Project Area Dams – Preliminary Consequence Category Assessment		

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## INTRODUCTION

Senex Energy Pty Ltd (Senex) has engaged Engeny Australia Pty Ltd (Engeny) to undertake the following works for its planned development activities in its Louisiana project area (PL 209 and PL 445):

- A conceptual location study to identify suitable areas where Senex could locate regulated or low consequence structures;
- A preliminary Consequence Category Assessment (CCA) applicable to all identified potential storage locations; and
- A preliminary basis of design for the structures.

The Louisiana Project covers an area of approximately 154 km<sup>2</sup> and is located adjacent to Senex’s existing Atlas Project Area approximately 10 km southwest of Wandoan in Southern Queensland.

Senex requires the preliminary consequence category classifications for the proposed dams to establish dam design requirements and feed into a preliminary dam basis of design.

This memorandum forms the preliminary consequence category assessment for the identified conceptual dam locations and was undertaken in accordance with the latest version (Version 5.03) of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures ESR/2016/1933 (DESI, 2024).

Note that as this memorandum is a preliminary consequence category assessment, certification of the assessment by a suitably qualified and experienced person has not been provided. A certified consequence category assessment will be completed as part of the detailed design of the structures.

## STORAGE DETAILS

### General

High level details of the proposed produced water and brine storage dams are provided in Table 1. It is understood that up to 1,000 ML of total water storage comprising approximately 700 ML of produced water storage and 300 ML of brine storage. Senex has identified the central and northern regions of PL209 and the entirety of PL445 as potential dam locations – this area matches the development area for the Senex Atlas Stage 3 EPBC referral.

Senex is applying for an EA amendment to authorise up to 3 regulated and 5 low consequence structures. To support the development of the preliminary CCA Engeny has identified 25 conceptual locations where a structure could be sited across the project area. This CCA applies to all identified conceptual locations and is based on potential impacts to sensitive receptors within and downstream of the project area.

As a minimum, the proposed dams within the project area will be located clear of:

- Ground truthed environmentally sensitive areas and their associated protection zones / buffers.
- Atlas Stage 3 constraints protocol no-go areas.
- 1:100 Annual Exceedance Probability (AEP) flood extents for watercourses of Stream Order 2 or higher.
- Areas of excessively steep topography that are not suitable for cost-effective dam construction.

The proposed produced water and brine storage dams are expected to be designed and constructed as turkey’s nest dams with earth fill perimeter embankments. With this type of dam construction, the entire contents of the dams would be released in the event of a failure of a perimeter embankment.

**TABLE 1: DETAILS OF PROPOSED STRUCTURES**

Structure	Maximum Storage Capacity	Purpose of Structure	Overflow / Dam Break Destination
Produced Water Dam	700 ML	Storage of untreated CSG water.	Lower order tributaries, Woleebee Creek, Jundah Creek, Dawson River.
Brine Storage Dam	300 ML	Storage of reverse osmosis concentrate / brine.	Lower order tributaries, Woleebee Creek, Jundah Creek, Dawson River.

## Expected Dam Water Quality

The water quality of the new produced water and brine storage dams is expected to be similar to the existing produced water dams and brine storage tanks currently in operation at Senex’s Atlas Project Area (PL 1037) located approximately 3km west of the project area.

A summary of water quality monitoring data for the existing produced water dams and brine tanks at the Atlas Project Area from 2023 is shown in Table 2. The water quality monitoring data has been compared against the following:

- Groundwater quality data from shallow monitoring bores within the Atlas Project Area.
- Stock watering limits from the ANZECC Water Quality Guidelines (ANZECC, 2000).
- Guideline water quality values for aquatic ecosystem protection (moderately disturbed ecosystems) derived from Queensland Water Quality Guidelines 2009 (2013) for lowland waters and Environmental Protection (Water and Wetland Biodiversity) Policy (2019) (WQ1308 – Upper Dawson River– Taroom Area).

The water quality data can be summarised as follows:

- Produced water is expected to be of similar salinity to background groundwater quality levels.
- Brine is expected to be significantly higher salinity than background groundwater quality levels.
- Produced water and brine is expected to exceed stock watering and aquatic ecosystem protection water quality limits as outlined in Table 2.

**TABLE 2: EXPECTED WATER QUALITY DATA**

Analyte	Produced Water Dam	Brine Dam	Groundwater Quality Data	Stock Watering Limits	Aquatic Ecosystem Protection Guideline Value
pH	8.9	9.04	7.5	6.5 – 8.5	6.5 – 8.0
Electrical Conductivity (EC) (µS/cm)	10,750	72,950	14,340	5,970	370
Sulfate (mg/L)	1.0	8.75	478	1,000	5
Total Dissolved Solids (mg/L)	6,527	49,875	9,323	2,400	-

# DESCRIPTION OF RECEIVING ENVIRONMENT

## Receiving Waterways

### Surface Waters

The project area lies entirely within the upper and middle reaches of the Woleebee Creek catchment. Any dam break or spillway flows from the structures would flow into Woleebee Creek via Conloi Creek or other various unnamed tributaries within the project area. Downstream of the Project Area, Woleebee Creek flows in a northerly direction for approximately 15 km before discharging into Juandah Creek. Juandah Creek flows generally in a north-westerly direction for approximately 45 km before its confluence with the Dawson River.

The watercourses within the project area are ephemeral and typically only flow during significant rainfall events as they are generally located in the upper reaches of the catchment. Watercourses within the project area are classified as Stream Orders 1 to 5, with the majority being Stream Order 1 (minor streams). Woleebee Creek is classified as a Stream Order 5 watercourse.

The nearest water supply impoundment is Glebe Weir located about 90km downstream of the Project Area along the Dawson River. Glebe Weir is part of the Dawson Valley Water Supply Scheme (DVWSS) which provides water for irrigation, town water supply, industrial use, and stock and domestic supply.

Figure 1 shows the project area relative to the surrounding and downstream drainage features. Watercourses further downstream of the map extents in Figure 1 are included in Appendix A.

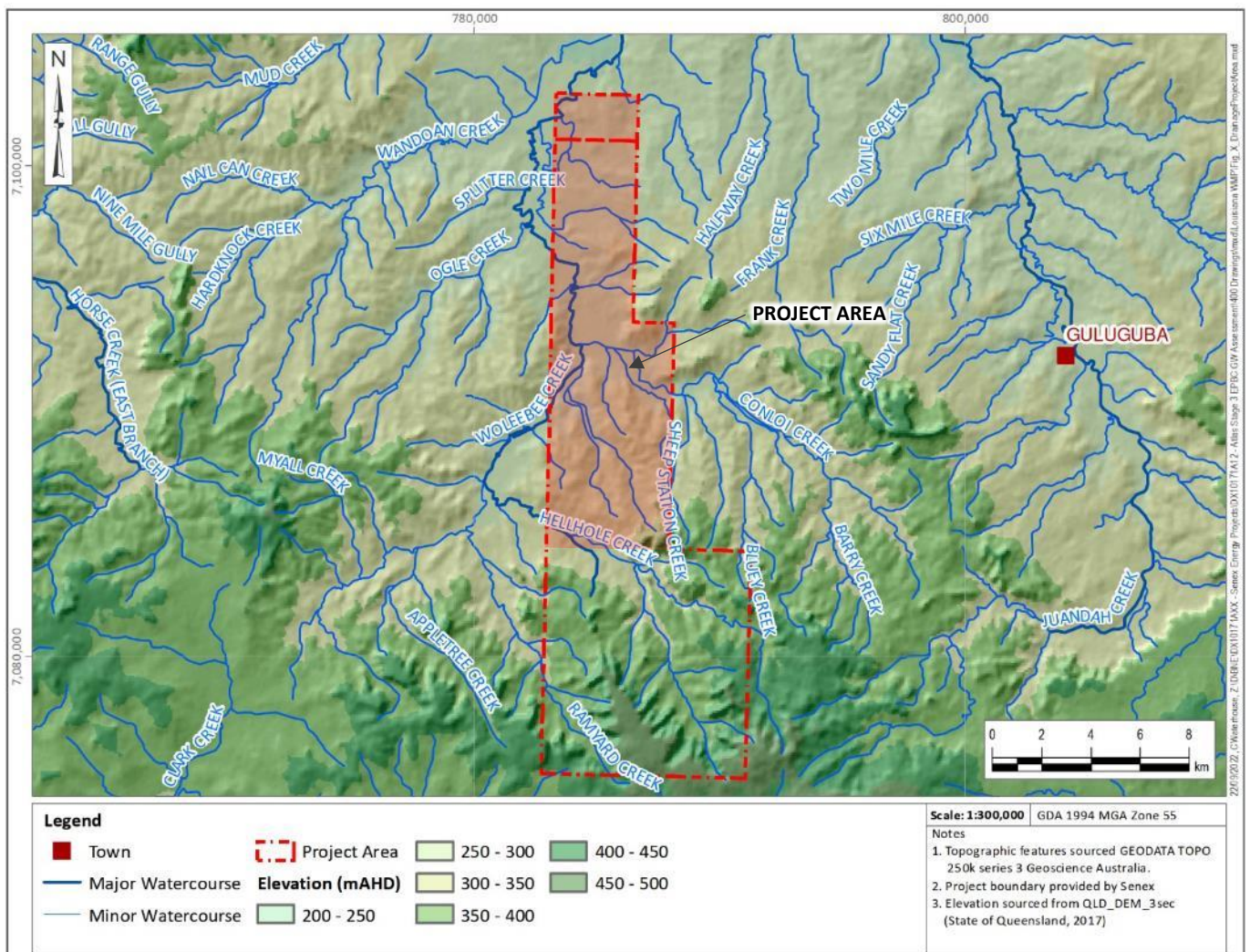


FIGURE 1: SURROUNDING AND DOWNSTREAM DRAINAGE FEATURES (SENEX, 2022)

## Groundwater

Groundwater within the project area is associated with aquifers of the Surat Basin, which forms part of the Great Artesian Basin (GAB). Groundwater is used within the vicinity of the Louisiana Project Area for stock and domestic, agriculture, and town water supply purposes.

There are 410 registered third-party groundwater bores that have been identified (within a 25 km radius of PL 445 and PL 209) as being used for water supply purposes (Senex, 2022).

The location of all existing registered bores within 25 km are shown on Figure 2.

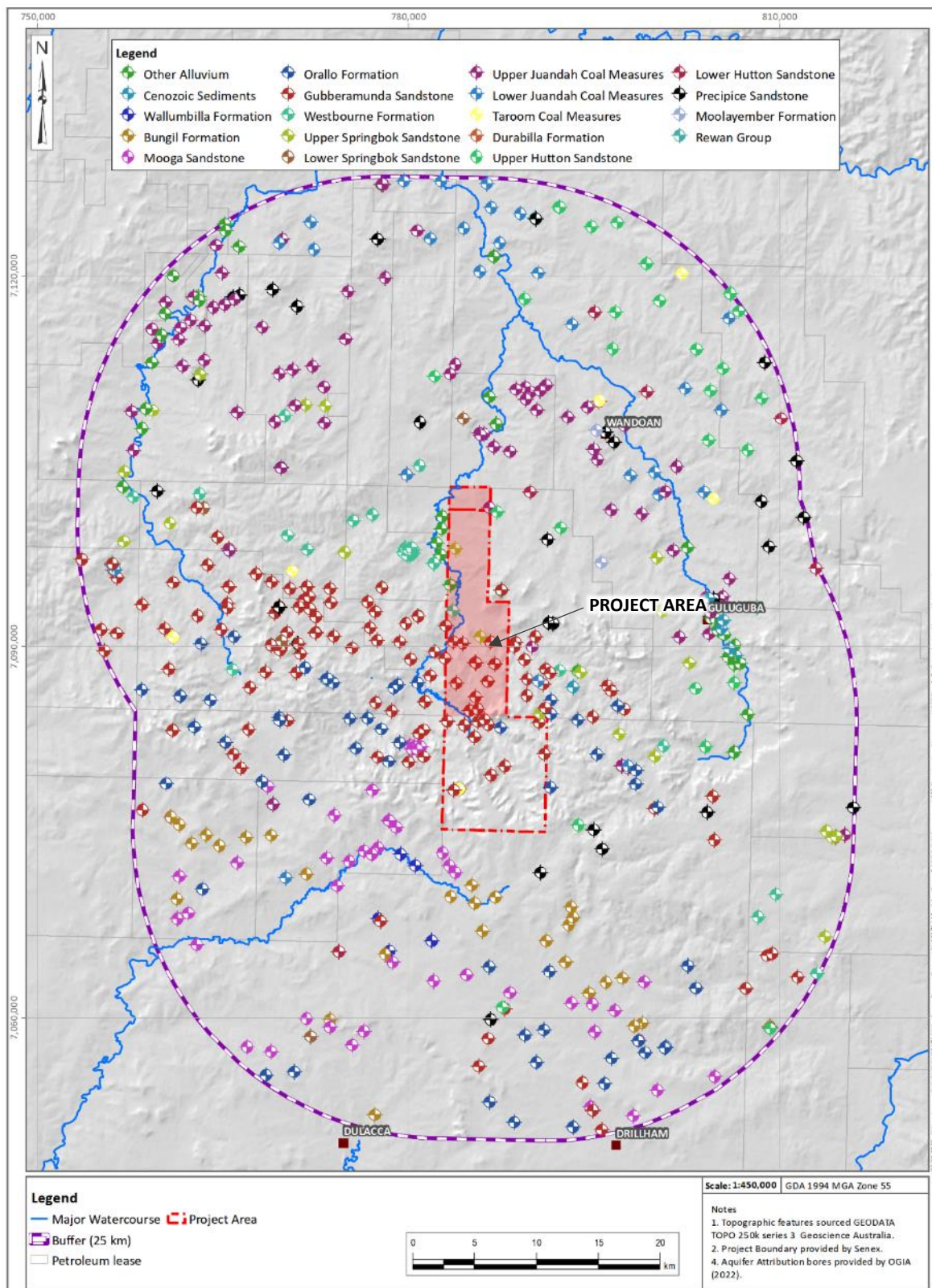


FIGURE 2: SURROUNDING AND DOWNSTREAM GROUNDWATER USERS (SENX, 2022)

Potential surface expression Groundwater Dependent Ecosystems (GDEs), subsurface GDEs and watercourse springs are mapped as potentially being present in the vicinity of the project area (Senex, 2022). These generally correspond with the location of the mapped alluvium associated with Woleebee Creek. Locations of potential GDEs and watercourse springs are illustrated in Figure 3.

Reaches of Woleebee Creek within the PL 209 area were assessed during the Senex field verification program undertaken in 2018 by KCB. The field verification identified that expression of groundwater within the alluvium into Woleebee Creek is likely to occur during some periods (Senex, 2022).

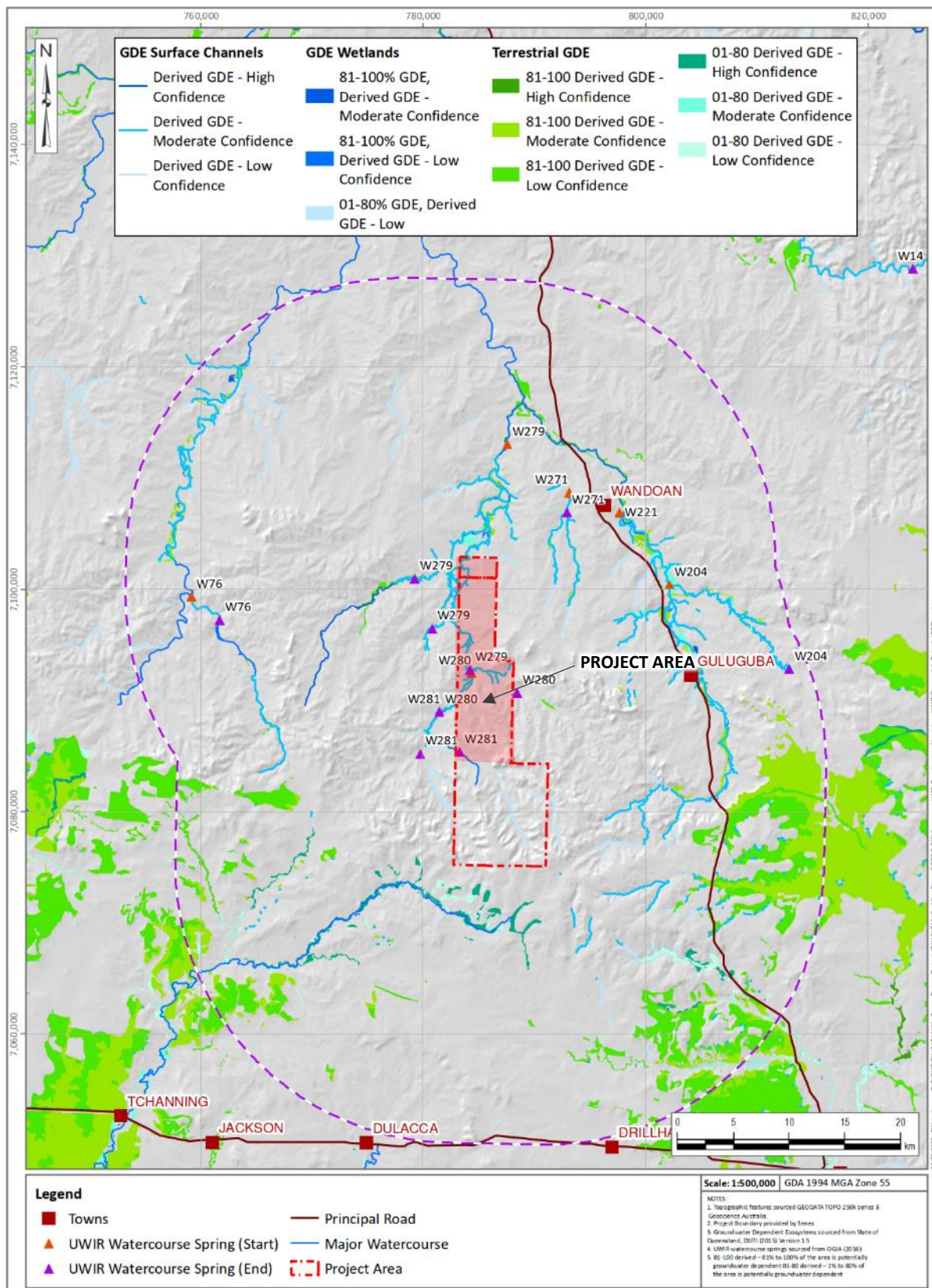


FIGURE 3: LOCATION OF POTENTIAL GDES AND WATERCOURSE SPRINGS

## Land Use

The dominant land uses within and downstream of the Louisiana Project Area consists mainly of low intensity beef cattle grazing with some areas of dryland and irrigated cropping present within the northern extremities of the project area.

## Environmental Values

Environmental values (EVs) for the Upper Dawson River sub-basin of the Fitzroy River catchment have been determined by the Queensland Government (DEHP, 2013). The plan showing the EVs identified for the Upper Dawson River sub-basin is included in Appendix B. The surface water EVs identified for the Upper Dawson River sub-basin are summarised in Table 3 below.

**TABLE 3: EVS FOR THE DAWSON RIVER SUB-BASIN WATERS WITHIN THE VICINITY OF THE PROJECT**

Water	Environmental Values											
	Aquatic Ecosystem	Irrigation	Farm supply / Use	Stock Water	Aquaculture	Human Consumer	Primary Recreation	Secondary recreation	Visual Recreation	Drinking Water	Industrial Use	Cultural and Spiritual values
<b>Upper Dawson – Taroom Area (WQ1308)</b>												
Southern Tributaries – Developed Areas	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Groundwater	✓	✓	✓	✓			✓		✓	✓	✓	✓
Undeveloped Areas	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓

Given the land use activities that are known to occur downstream of project area, the primary uses of surface water along the receiving waters in the vicinity of the Project Area are considered to be aquatic ecosystems, irrigation, stock water, and cultural and spiritual values.

There are no High Ecological Value waters between the project area and the Dawson River.

## Matters of State Environmental Significance

- Matters of State Environmental Significance (MSES) are defined under Schedule 2 of the Environmental Offsets Regulation 2019 and include: Protected areas (all classes except coordinated conservation areas) – Nature Conservation Act 1992.
- Marine Parks (Marine National Park, Marine Conservation Park, Scientific Research, Preservation and Buffer zones) – Marine Parks Act 2004.
- Fish Habitat Areas (A and B) and Dugong Protection Areas – Fisheries Act 1994.
- High Conservation Value wetlands – Environmental Protection Act 1994.
- Wild River high preservation areas – Wild Rivers Act 2005.
- Threatened species (listed as ‘endangered’ or ‘vulnerable’) – Nature Conservation Act 1992.
- Threatened species essential habitat (‘endangered’ or ‘vulnerable’) – Nature Conservation Act 1992 and Vegetation Management Act 1999.
- Regulated vegetation – Category A, B or C areas containing regional ecosystems (classified as ‘endangered’ or ‘of concern’), wetlands and watercourses. Vegetation in Category R areas – Vegetation Management Act 1999.
- Legally secured offset areas – protected by a registered covenant, easement, agreement, or a development approval condition.

MSES wildlife habitat (endangered or vulnerable) is located downstream of the project area along Woleebee Creek (refer Appendix C).

Regulated vegetation (category ‘B’, ‘C’, ‘R’ and essential habitat) is located within the project area and downstream of the project area along Woleebee Creek (refer Appendix C).

Ground truthed regulated vegetation (category ‘B’ and ‘C’) mapping is also included in Appendix C.

# Matters of National

# Significance

Matters of National Environmental Significance (MNES) are those natural matters given statutory protection under Commonwealth’s Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), including (DEHP, 2013a):

- World Heritage Areas properties listed for natural values.
- National Heritage Areas places listed for natural values.
- Wetlands of international importance (listed under the Ramsar convention).
- Migratory species (protected under international agreements).
- Listed threatened species.
- Listed threatened ecological communities.
- Great Barrier Reef Marine Park.
- Commonwealth marine areas.

Use of the Australian Government Department of the Environment Protected Matters Search Tool (<http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf>) indicates there are listed threatened ecological communities, listed threatened species and listed migratory species present within and downstream of the project area. An EPBC Act Protected Matters Report for the project area is included in Appendix D.

## Ecological Constraints Mapping

Ground truthed ecological constraints mapping which includes both MNES and MSES within the project area is illustrated in Figure 4.

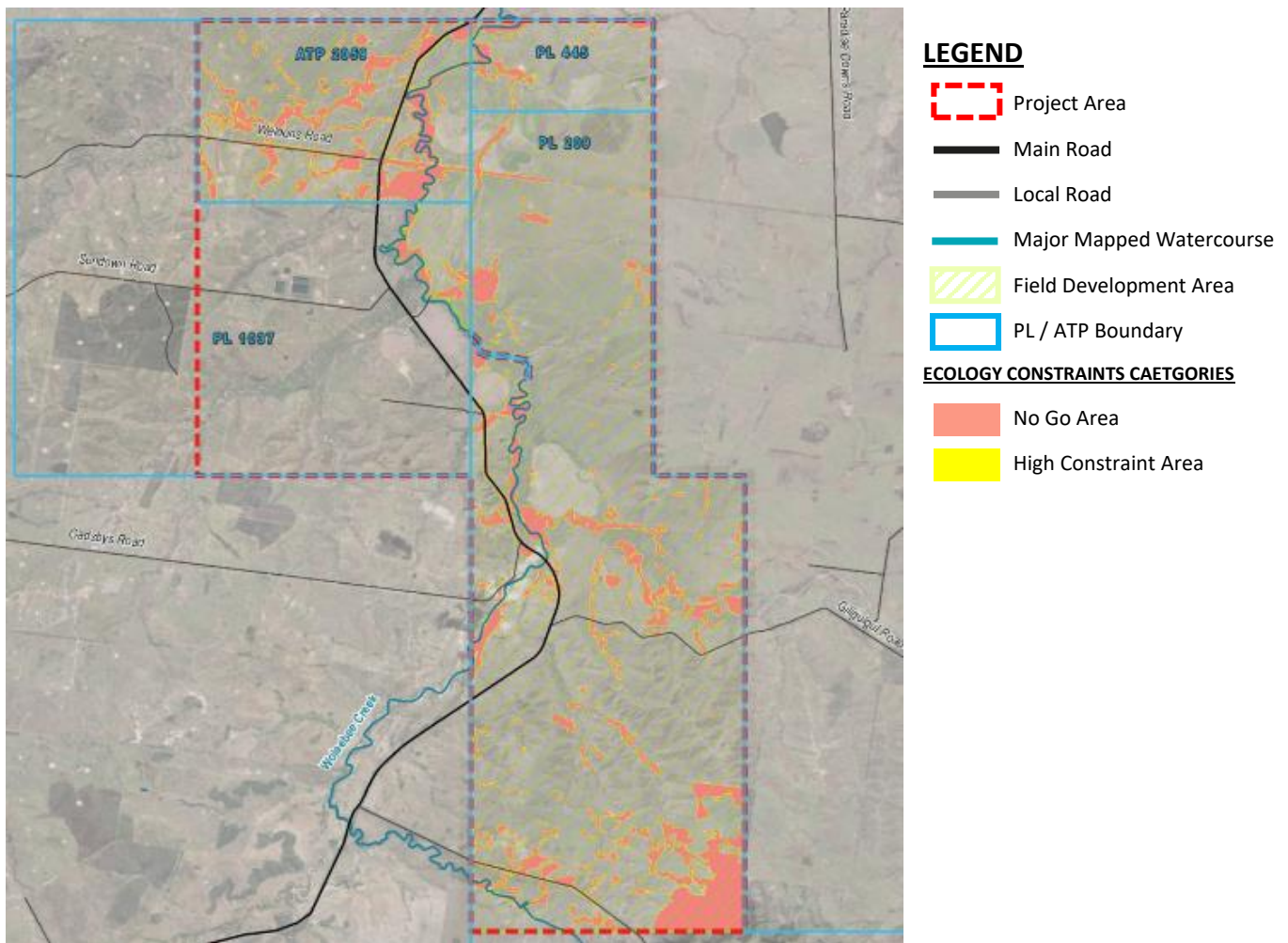


FIGURE 4: ECOLOGICAL CONSTRAINTS MAPPING

# Habitable Dwellings and Third-Party Infrastructure

There are several agricultural farming properties and associated habitable dwellings located downstream of the project area along Woleebee Creek. Woleebee Creek is categorised as a Stream Order 5 (major) watercourse which has significant capacity to convey floodwaters from the upstream catchments. It is expected that dam breach discharges from structures within the project area would be generally confined within the primary channel and flood plain of Woleebee Creek. Consequently, habitable dwellings along Woleebee Creek are not considered at risk of inundation by any dam failure events from structures within the project area.

Jackson Wandoan Road is located within and immediately downstream of the project area and dam breach discharges from the structures could potentially pose a risk of inundation to road users along Jackson Wandoan Road.

## CONSEQUENCE CATEGORY ASSESSMENT

### Overview

A consequence category assessment was undertaken for the proposed produced water and brine storage dams in accordance with Version 5 of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures. The Manual sets out requirements for consequence category assessment and certification of the design of regulatory structures, constructed as part of environmentally relevant activities (ERAs) under the Environmental Protection Act 1994 (Qld).

The term regulated structures includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity. Structures may be assessed using this Manual as being in one of three consequence categories: low, significant or high. Where categorised as a significant or high consequence, the structure is referred to as a regulated structure.

### Methodology

The Manual for Assessing Consequence Categories and Hydraulic Performance of Structures requires the assessment of the consequences of the following failure event scenarios:

- ‘Failure to contain – seepage’ – spills or releases to ground and/or groundwater via seepage from the floor and/or sides of the structure.
- ‘Failure to contain – overtopping’ – spills or releases from the structure that result from loss of containment due to overtopping of the structure.
- ‘Dam break’ – collapse of the structure due to any possible cause.

For each failure event scenario, the consequences need to be assessed for the following categories of harm:

- Harm to humans.
- General environmental harm.
- General economic loss or property damage.

The consequence category for each type of harm is assigned based on the severity of harm as defined in Table 4.

TABLE 4: CONSEQUENCE CATEGORY ASSESSMENT CRITERIA (TABLE 1 OF THE MANUAL)

Environmental Harm	Consequence Category		
	High	Significant	Low
Harm to Humans	A location such that people are routinely present in the failure path and if present loss of life to greater than 10 people is expected <sup>1</sup> . Note: The requirement to consider the location of people in the failure	Location such that people are routinely present in the failure path and if present loss of life to 1 person or greater but less than 10 people is expected <sup>1</sup> .	Location such that people are not routinely present in the failure path and loss of life is not expected <sup>1</sup> . Note: The requirement to consider the location of people in the failure



Environmental Harm	Consequence Category		
	High	Significant	Low
	path is only relevant to the 'dam break' scenario.	Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.	path is only relevant to the 'dam break' scenario.
	Location such that contamination of waters (surface and/or groundwater <sup>2</sup> ) used for human consumption could result in the health of 20 or more people being affected <sup>3</sup> .	Location such that contamination of waters (surface and/or groundwater <sup>2</sup> ) used for human consumption could result in the health of 10 or more people but less than 20 people being affected <sup>3</sup> .	Location such that contamination of waters (surface and/or groundwater <sup>2</sup> ) used for human consumption could result in the health of less than 10 people being affected <sup>3</sup> .
General Environmental Harm	<p>Location such that:</p> <ul style="list-style-type: none"> <li>a) Contaminants may be released to areas of MNES, MSES or HEV waters that are not already authorised to be disturbed to at least the same extent under other conditions of this authority subject to any applicable offset commitment (Significant Values); and</li> <li>b) Adverse effects<sup>4</sup> on Significant Values are likely; and</li> <li>c) The adverse effects<sup>4</sup> are likely to cause at least one of the following: <ul style="list-style-type: none"> <li>i) loss or damage or remedial costs greater than \$50,000,000; or</li> <li>ii) remediation of damage is likely to take 3 years or more; or</li> <li>iii) permanent alteration to existing ecosystems;</li> </ul> </li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>iv) the area of damage (including downstream effects) is likely to be at least 5km<sup>2</sup>.</li> </ul>	<p>Location such that contaminants may be released so that adverse effects<sup>4</sup> (that are not already authorised to be disturbed to at least the same extent under other conditions of the authority subject to any applicable offset commitment) either:</p> <ul style="list-style-type: none"> <li>a) Would be likely to be caused to Significant Values but those adverse effects<sup>4</sup> would not be likely to meet the thresholds for the High consequence category and instead would be likely to cause at least one of the following: <ul style="list-style-type: none"> <li>i) loss or damage or remedial costs greater than \$10,000,000 but less than \$50,000,000; or</li> <li>ii) remediation of damage is likely to take more than 6 months but less than 3 years; or</li> <li>iii) significant alteration to existing ecosystems; or</li> </ul> </li> <li>iv) the area of damage (including downstream effects) is likely to be at least 1km<sup>2</sup> but less than 5km<sup>2</sup>.</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>b) Would be likely to be caused to environmental values classed as slightly or moderately disturbed waters<sup>5</sup>, wetland of general ecological significance<sup>6</sup>, riverine areas, springs or lakes and associated flora and fauna (Moderate Values), and the adverse effects<sup>4</sup> are likely to cause at least one of the following: <ul style="list-style-type: none"> <li>i) loss or damage or remedial costs greater than \$20,000,000;</li> </ul> </li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>ii) remediation of damage is likely to take more than 1 year;</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>iii) significant alteration to existing ecosystems; or</li> </ul>	<p>Location such that either:</p> <ul style="list-style-type: none"> <li>a) Contaminants are unlikely to be released to areas of Significant Values or Moderate Values; or</li> <li>b) Contaminants are likely to be released to those areas, but would be unlikely to meet any of the minimum thresholds specified for the Significant Consequence Category for adverse effects<sup>4</sup></li> </ul>

Environmental Harm	Consequence Category		
	High	Significant	Low
		iv) the area of damage (including downstream effects) is likely to be at least 2 km <sup>2</sup>	
General economic loss or property damage	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require \$10 million or greater in rehabilitation, compensation, repair or rectification costs <sup>7</sup>	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require \$1 million and greater but less than \$10 million in rehabilitation, compensation, repair or rectification costs <sup>7</sup> .	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require less than \$1 million in rehabilitation, compensation, repair or rectification costs <sup>7</sup> .

1. 'People routinely present in the failure path' could be considered to be people who occupy buildings or other places of occupation that lie within the failure impact zone. For the purposes of this Manual, this should refer to people other than site personnel engaged by the resource operation and located on the tenements and tenure associated with the resource operation; for other ERAs, it would be the 'premises referred to in the authority'. It should be noted that while this is appropriate for the assessment of consequence categories in accordance with this Manual, adherence to the requirements of this Manual does not limit, amend or change in any way, any other requirements to be complied with under relevant health and safety acts or legislation that requires the safety of site personnel to be considered.
2. When considering potential impacts on groundwater, it is not envisaged that a full hydrogeological assessment will be required in all cases. Any consideration of potential impacts on groundwater systems should consider the water quality of the potential receiving aquifer as well as the quality of fluid stored in the regulated dam. Existing groundwater drawdown in areas surrounding resource operations (e.g., drawdown as a result of mine pit or underground mine dewatering) can also be considered when assessing the consequence of dam seepage on groundwater systems.
3. 'An adverse effect on human health means a physiological effect on human health and does not include an impact on the quality of downstream water that merely negatively affects the taste, and which is unlikely to cause persons to become physically ill.
4. Adverse effects includes chronic and acute effects where an acute effect is on living organism/s which results in severe symptoms that develop rapidly, and a chronic effect is an adverse effect on a living organism/s which develops slowly. In some instances, it may be necessary to carry out or reference existing ecological/toxicological studies to assess the impacts of contaminants on living organisms.
5. See Water EPP for definitions.
6. Wetland of general ecological significance' means a wetland shown on a map of referable wetland as a 'general ecologically significant wetland' or 'wetland of other environmental value'.
7. This does not include the holder's own mine or gas production, on-site industrial or commercial assets, the holder's workers' accommodation, agricultural facilities on the holder's land such as a farm shed or farm dam or infrastructure solely for servicing the holder.

## Assessment of Consequence Categories

### Failure to Contain – Seepage

The consequences of the failure to contain – seepage scenario for the produced water and brine storage dams is assessed in Table 5.

**TABLE 5: CONSEQUENCE CATEGORY ASSESSMENT – FAILURE TO CONTAIN (SEEPAGE) SCENARIO**

Environmental Harm	Consequences of Seepage	Produced Water Dam Consequence Category	Brine Dam Consequence Category
Harm to Humans	Groundwater in the vicinity of the project area is not utilised for human consumption. It is considered unlikely that health of more than 10 people would be affected.	Low	Low
General Environmental Harm	It is considered that seepage from the dam may impact on endangered and of-concern regional ecosystems, regulated vegetation and GDEs if expressed within Woleebee Creek. Seepage to groundwater and surface water will be slow moving and of relatively small magnitude. For the produced water dam, the severity of the adverse effects on endangered and of-concern regional ecosystems, regulated vegetation	Low	Significant

	<p>and GDEs are not expected to exceed the range of effects defined for the Significant consequence category in Table 1 of the Manual.</p> <p>For the brine storage dam, the severity of the adverse effects on endangered and of-concern regional ecosystems, regulated vegetation and GDEs are expected to be in the range of effects defined for the Significant consequence category in Table 1 of the Manual.</p>		
General Economic Loss or Property Damage	<p>The predominant land use and downstream of the project area is cattle grazing with some areas of dryland and irrigated cropping.</p> <p>The water within the dam is expected to exceed stock watering and cropping irrigation limits. It is considered likely that seepage from the dam will impact third party farming operations if it contaminates groundwater or is expressed in Woleebee Creek.</p> <p>For the produced water dam, it is considered unlikely that seepage from the dam will cause significant economic loss or property damage greater than \$1 million.</p> <p>For the brine storage dam, it is considered unlikely that seepage from the dam will cause significant economic loss or property damage greater than \$1 million.</p>	Low	Low
<b>'Failure to Contain – Seepage' Consequence Category</b>		<b>Low</b>	<b>Significant</b>

## Failure to Contain – Overtopping

The consequences of the failure to contain – overtopping scenario for the produced water and brine storage dams is assessed in Table 6.

**TABLE 6: CONSEQUENCE CATEGORY ASSESSMENT – FAILURE TO CONTAIN (OVERTOPPING) SCENARIO**

Environmental Harm	Consequences of Overtopping	Produced Water Dam Consequence Category	Brine Dam Consequence Category
Harm to Humans	<p>The Glebe Weir is located along the Dawson River more than 90 km downstream of the project area which supplies drinking water for urban communities in Central Queensland.</p> <p>Due to the expected small catchment area of the dams relative to the receiving waterways, overflows are likely to be of small magnitude and short duration and will only occur during periods of significant stream flow in the receiving waterways, resulting in dilution of overflows from the structures. Due to the expected downstream dilution effects and the large distance to downstream water storages used to supply drinking water it is considered unlikely that the health of more than 10 people would be affected in the event of a dam overflow.</p>	Low	Low
General Environmental Harm	<p>Endangered and of-concern regional ecosystems and regulated vegetation are present within the project area and along Woleebee Creek.</p> <p>Due to the small catchment area of the dams relative to the receiving waterways, overflows are likely to be of small magnitude and short duration and will only occur during periods of significant stream flow, resulting in dilution of the high salinity overflows from the structures.</p> <p>For the produced water dam, overflows may cause adverse effects on the ecosystems within the receiving waterways, and these effects are considered unlikely to meet the minimum thresholds of environmental harm defined for the Significant consequence category in Table 1 of the Manual.</p> <p>For the brine storage dam, overflows are expected to cause adverse effects on the ecosystems within the receiving waterways, and these effects are considered likely to meet the thresholds of environmental harm defined for the Significant consequence category in Table 1 of the Manual.</p>	Low	Significant

Environmental Harm	Consequences of Overtopping	Produced Water Dam Consequence Category	Brine Dam Consequence Category
General Economic Loss or Property Damage	<p>The predominant land use and downstream of the project area includes irrigation of crops, farm use and stock watering.</p> <p>Due to the small catchment area of the dams relative to the receiving waterways, overflows are likely to be of small magnitude and short duration and will only occur during periods of significant stream flow, resulting in dilution of the high salinity overflows from the structures.</p> <p>There may be some adverse effects to cropping and livestock that drink water from the receiving waterways following an overflow event, however any economic loss or property damage are expected to be lower than \$1 million.</p>	Low	Low
<b>'Failure to Contain – Overtopping' Consequence Category</b>		<b>Low</b>	<b>Significant</b>

## Dam Break

The consequences of the dam break scenario for the produced water and brine storage dams are assessed in Table 7.

**TABLE 7: CONSEQUENCE CATEGORY ASSESSMENT – DAM BREAK SCENARIO**

Environmental Harm	Consequences of Dam Break	Produced Water Dam Consequence Category	Brine Dam Consequence Category
Harm to Humans	<p>There are several agricultural farming properties and associated habitable dwellings located downstream of the project area along Woleebee Creek. These buildings are not considered at risk of inundation as dam break flows are expected to be generally confined within the primary channel and flood plain of Woleebee Creek.</p> <p>Given the size of the structures, the failure impact zone of the dams are anticipated to propagate approximately 10 to 15 km downstream based on Table 5 of <i>the Guideline for failure impact assessment of water dams</i> (DNMRE, 2018).</p> <p>Contamination of surface water used for human consumption may occur if the dams fail, however it is not expected that more than 10 people would be affected due to the small number of dwellings located along the receiving waterways downstream of the project area and the minimal use of these waterways as a drinking water source. Glebe Weir is too far downstream from the project area to be affected.</p>	Low	Low
General Environmental Harm	<p>Endangered and of-concern regional ecosystems and regulated vegetation are present within the project area and along Woleebee Creek.</p> <p>Significant adverse effects on these ecosystems are considered likely in the event of a sunny day failure of the dam due to the high salinity of the water in the dams and the lack of downstream dilution capacity if the dam failure occurs under sunny day conditions.</p> <p>For the produced water dam, the severity of the adverse effects on the ecosystems within the receiving waterways are difficult to quantify but are expected to be in the range of effects defined for the Significant consequence category in Table 1 of the Manual.</p> <p>For the brine storage dam, the severity of the adverse effects on the ecosystems within the receiving waterways are difficult to quantify but are expected to be in the range of effects defined for the High consequence category in Table 1 of the Manual.</p>	Significant	High
General Economic Loss or Property Damage	<p>Potential economic loss and property damage in the event of a dam failure includes the potential damage to Jackson Wandoan Road, Sundown Road, and private access roads, and the disruption and</p>	Significant	Significant

Environmental Harm	Consequences of Dam Break	Produced Water Dam Consequence Category	Brine Dam Consequence Category
	<p>damage to grazing and cropping irrigation activities caused by the contamination of the receiving waterways.</p> <p>The potential magnitude of rehabilitation, compensation, repair or rectification costs is estimated to be greater than \$1 million but less than \$10 million.</p>		
<b>Dam Break Consequence Category</b>		<b>Significant</b>	<b>High</b>

## CONCLUSION

The preliminary consequence category of produced water and brine storage dams was assessed in accordance with Version 5 of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (DES, 2016). The overall outcomes of the preliminary consequence category assessment are summarised in Table 8. The produced water and brine storage are considered likely to be classified as regulated structures primarily due to the potential environmental consequences of the dams releasing water into the receiving environment in the event of seepage, overtopping or dam break failure.

Final certification of the consequence category assessment by a suitably qualified and experienced person will need to be completed during detailed design of the produced water and brine storage dams.

**TABLE 8: PRELIMINARY CONSEQUENCE CATEGORY ASSESSMENT – RESULTS SUMMARY**

Structure	Comments	Consequence Category	Overall Consequence Category
Produced water dam	Failure to contain – ‘Seepage’	Low	Significant
	Failure to contain – ‘Overtopping’ Dam break	Low Significant	
	Regulated Structure?	Yes	-
Brine storage dam	Failure to contain – ‘Seepage’	Significant	High
	Failure to contain – ‘Overtopping’ Dam break	Significant High	
	Regulated Structure?	Yes	-

# REFERENCES

- ANZECC (2000), Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Paper No. 4, October 2000.
- Department of Environment and Heritage Protection (2013a). Queensland Water Quality Guidelines 2009. Version3. July 2013.
- Department of Environment and Heritage Protection (2013b). Dawson River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Dawson River Sub-basin except the Callide Creek Catchment. July 2013.
- Department of Environment, Science and Innovation (2024a). Manual for Assessing Consequence Categories and Hydraulic Performance of Structures. Version 5.03 (ESR/2016/1933). February 2024.
- Department of Environment, Science and Innovation (2024b). Structures which are dams or levees constructed as part of environmentally relevant activities. Version 9.03 (ESR/2016/1934). February 2024.
- Department of Environment and Science (2021). Environmental Authority P-EA-100112777. Effective 23 August 2021.
- Department of Environment and Science (2020). Method for Mapping Matters of State environmental significance. Version 6.0 (ESR/2016/1934). December 2020.
- Department of Natural Resources, Mines and Energy (2018), Guideline for failure impact assessment of water dams. November 2018.
- Queensland Government (2019). Environmental Protection (Water and Wetland Biodiversity) Policy 2019.
- Senex Energy (2022). PL 445 and PL 209 Coal Seam Gas Water Management Plan. SENEX-ATLS-EN-PLN-014. October 2022.

## DISCLAIMER

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# APPENDIX A: RECEIVING WATERWAYS



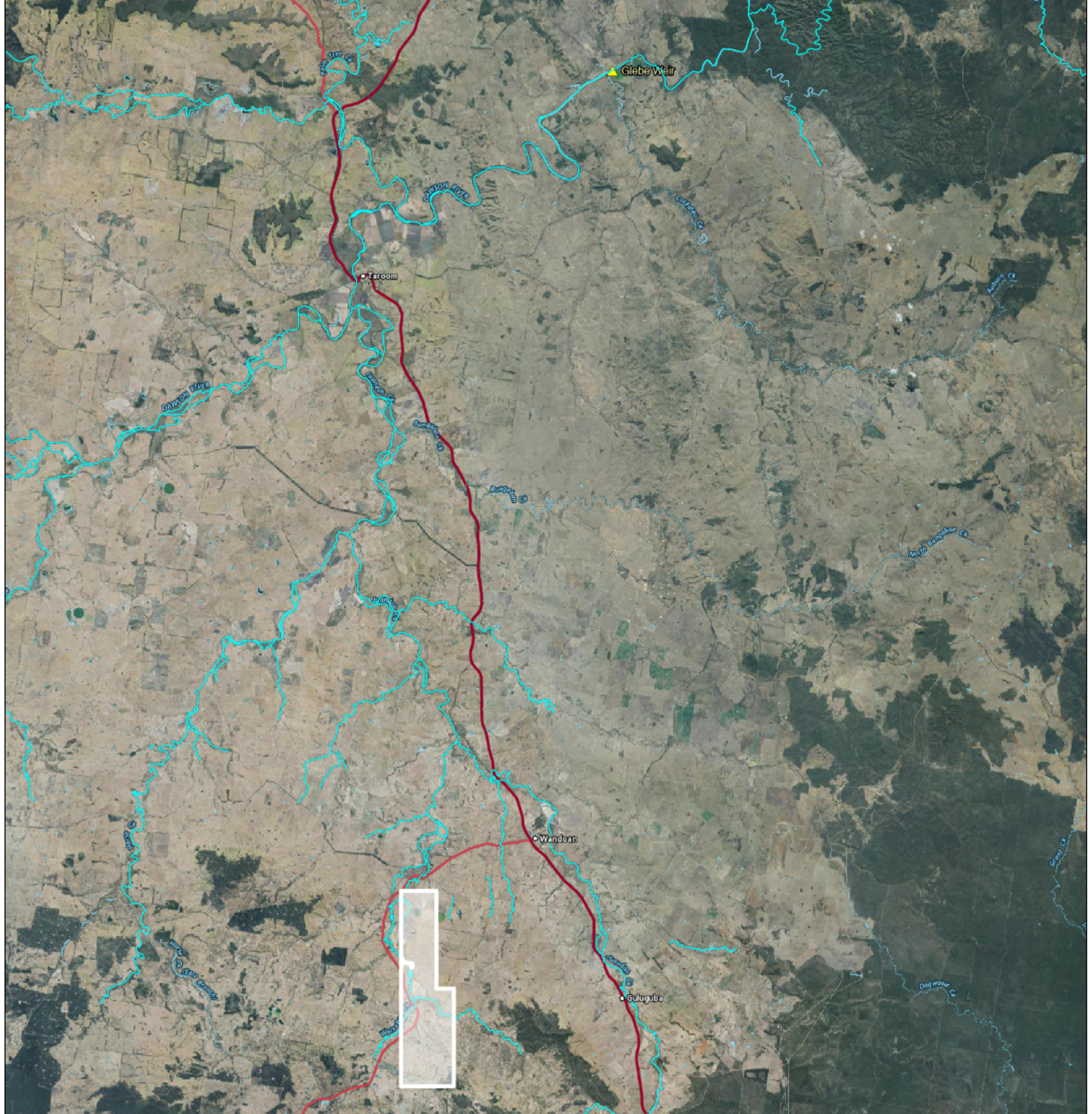


# Louisiana Dams Study Area

## Receiving Waterways

747363.05E 7188100.60N (Zone 55)

246876.28E 7187993.24N (Zone 56)



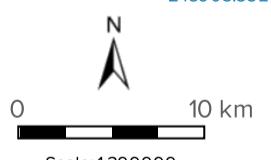
745382.21E 708242317N (Zone 55)

248903.35E 7082312.95N (Zone 56)

A product of



Legend located on next page



Scale: 1:399999

Printed at: A3  
Print date: 24/4/2024

Not suitable for accurate measurement.  
Projection: Web Mercator EPSG 102100 (3857)

For more information, visit <https://qldglobe.information.qld.gov.au/help-info/Contact-us.html>

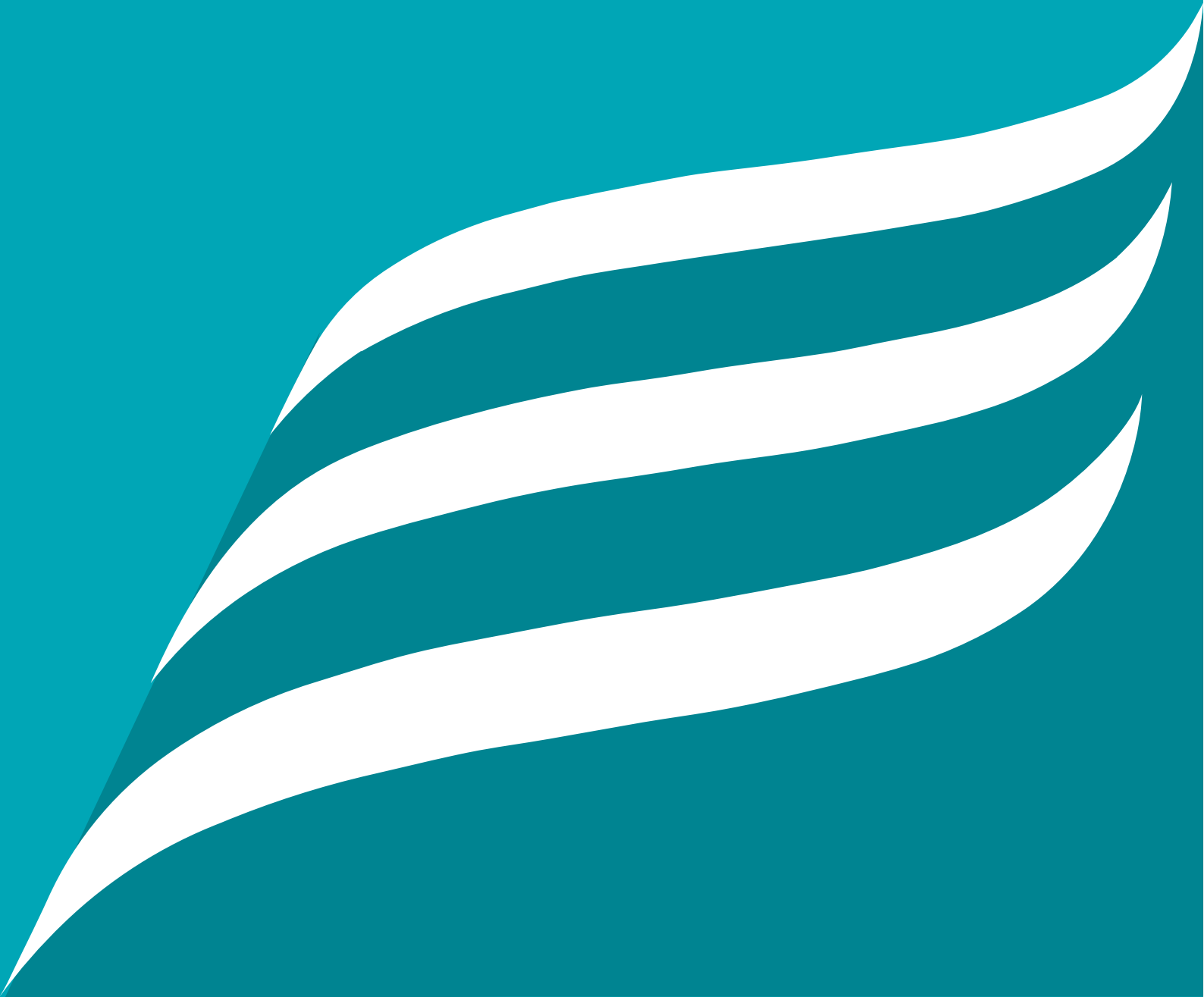
Includes material © State of Queensland 2024. You are responsible for ensuring that the map is suitable for your purposes. The State of Queensland makes no representation or warranties in relation to the map contents and disclaims all liability.

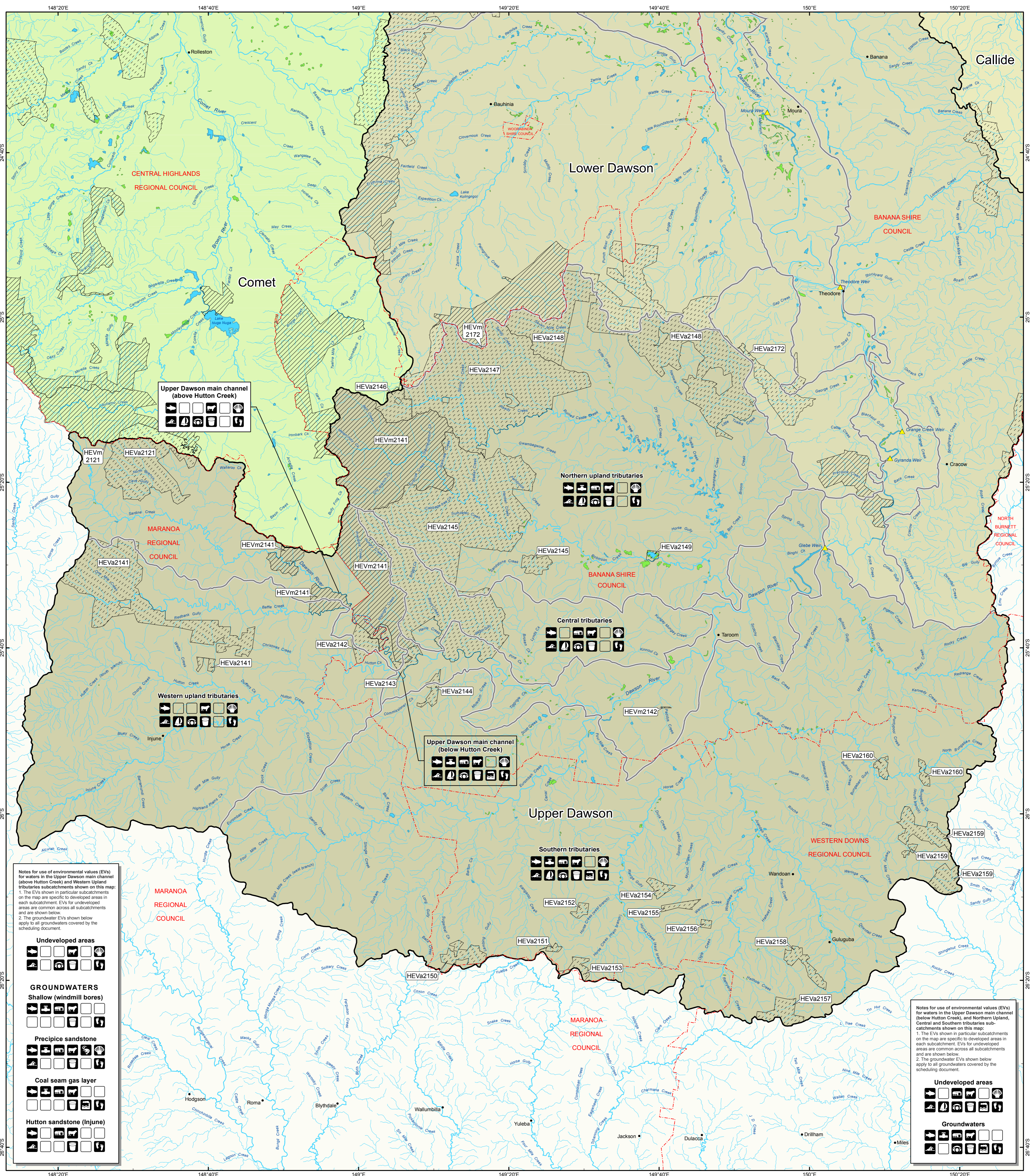
If imagery is displayed, imagery includes material © CNES reproduced under license from Airbus DS, all rights reserved © 21AT © Earth-i, all rights reserved, © Planet Labs PBC, 2023



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# APPENDIX B: ENVIRONMENTAL VALUES





**Notes for use of environmental values (EVA) for waters in the Upper Dawson main channel (above Hutton Creek) and Western Upland tributaries subcatchments shown on this map:**

- The EVs shown in particular subcatchments on the map are specific to developed areas in each subcatchment. EVs for undeveloped areas are common across all subcatchments and are shown below.
- The groundwater EVs shown below apply to all groundwaters covered by the scheduling document.

**Undeveloped areas**

**GROUNDWATERS**

**Shallow (windmill bores)**

**Precipice sandstone**

**Coal seam gas layer**

**Hutton sandstone (Injune)**

**Notes for use of environmental values (EVA) for waters in the Upper Dawson main channel (below Hutton Creek), and Northern Upland, Central and Southern tributaries subcatchments shown on this map:**

- The EVs shown in particular subcatchments on the map are specific to developed areas in each subcatchment. EVs for undeveloped areas are common across all subcatchments and are shown below.
- The groundwater EVs shown below apply to all groundwaters covered by the scheduling document.

**Undeveloped areas**

**Groundwaters**

**Legend**

- Town
- Dam / weir / barrage
- River / creek
- Subcatchment boundary
- Boundary of waters covered by the scheduling document
- Local government boundary

**Management Intent for Waters**

- High ecological value fresh waters (maintain)
- High ecological value fresh waters (achieve)

**Water Types**

- Fresh waters
- Upper Dawson River catchment fresh waters
- Lower Dawson River catchment fresh waters
- Comet River catchment fresh waters
- Callide Creek catchment fresh waters
- Wetlands (palustrine)
- Lakes / reservoirs

**Key to Environmental Values**

- Aquatic Ecosystems
- Irrigation
- Farm Supply
- Stock Water
- Appreciation
- Human Consumption
- Primary Recreation
- Secondary Recreation
- Drinking Water
- Industrial Use
- Cultural & Spiritual Values
- Visual Recreation

**Notes:**

- For areas outside of the waters covered by the scheduling document please refer to the relevant plan.
- Waterways in the catchment that are not shown on this map as having a management intent of high ecological values (maintain or achieve) have a management intent of moderately disturbed.
- Refer to plan WQ1310 for mapping of groundwater chemistry zones.
- Wetlands shown on this map are sourced from the Queensland Wetland Data Version 2.0 developed by the Queensland Wetlands Program. Refer to the WetlandInfo website ([www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)) for the most current information on Queensland wetlands.

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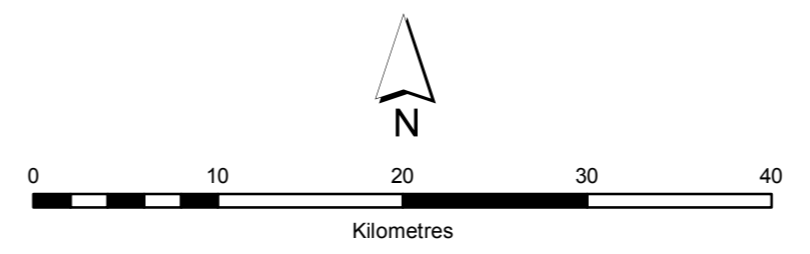
**WQ1308 - Upper Dawson River Sub-basin**  
Part of basin 130

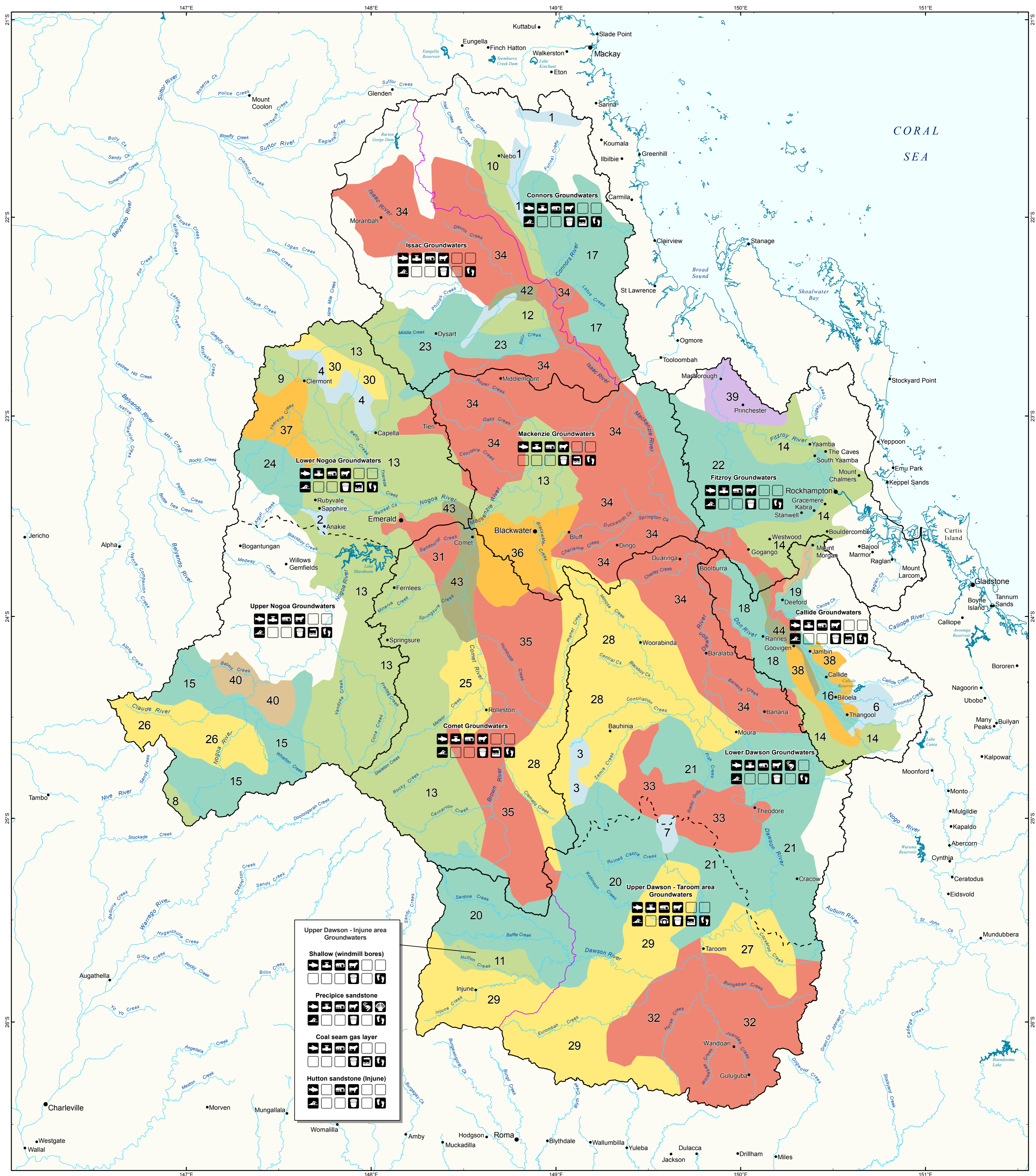
**Environmental Protection (Water) Policy 2009**  
**Central Queensland Map Series**

This plan forms part of the Dawson River Sub-basin Environmental Values and Water Quality Objectives scheduling document, prepared pursuant to the *Environmental Protection (Water) Policy 2009*.



Publication date: September 2011 (Re-published in July 2013)





**Legend**

- Boundary of waters covered by the scheduling documents
- Catchment boundary
- Environmental value boundary (groundwater)
- Lakes
- River / creek
- Coastline
- Major town
- Other town

**Groundwater Chemistry Zones**

**Alluvial sequence**

- Low-moderate salinity: balanced cations, HCO<sub>3</sub>, Cl
- Moderate salinity: Na > Mg > Ca, Cl (SO<sub>4</sub> above average)
- Low salinity: balanced cations, HCO<sub>3</sub>
- Saline: Na, Cl

**Sodic sequence**

- Low-moderate salinity: Na, Cl > HCO<sub>3</sub>
- Saline: Na, Cl
- Low-moderate salinity: Na, HCO<sub>3</sub> > Cl

**Other**

- Moderate salinity: Mg, HCO<sub>3</sub>
- Moderate salinity: balanced cations, SO<sub>4</sub>

**Notes:**

- Parts of the Fitzroy Basin shown on this plan are not shaded with a groundwater chemistry zone. Refer to the relevant scheduling document for further information.
- Chemistry zones are labelled with a zone identifier. Refer to Table 14 of the relevant scheduling document for further information.
- Refer to individual scheduling documents and plans for further information on groundwaters and surface waters in the Fitzroy Basin.

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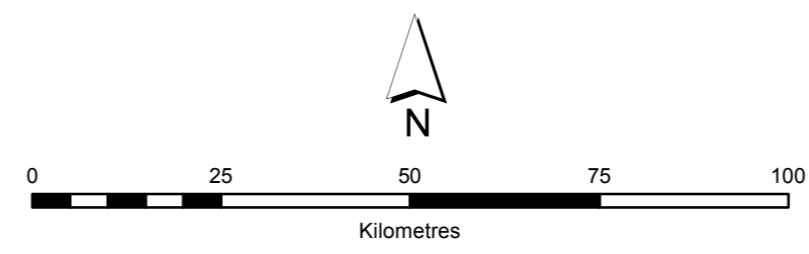
### WQ1310 - Fitzroy Basin Groundwater Zones Basin 130

**Environmental Protection (Water) Policy 2009**  
**Central Queensland Map Series**

This plan forms part of the series of Environmental Values and Water Quality Objectives scheduling documents for the Fitzroy Basin, prepared pursuant to the *Environmental Protection (Water) Policy 2009*.



Publication date: September 2011 (Re-published in July 2013)



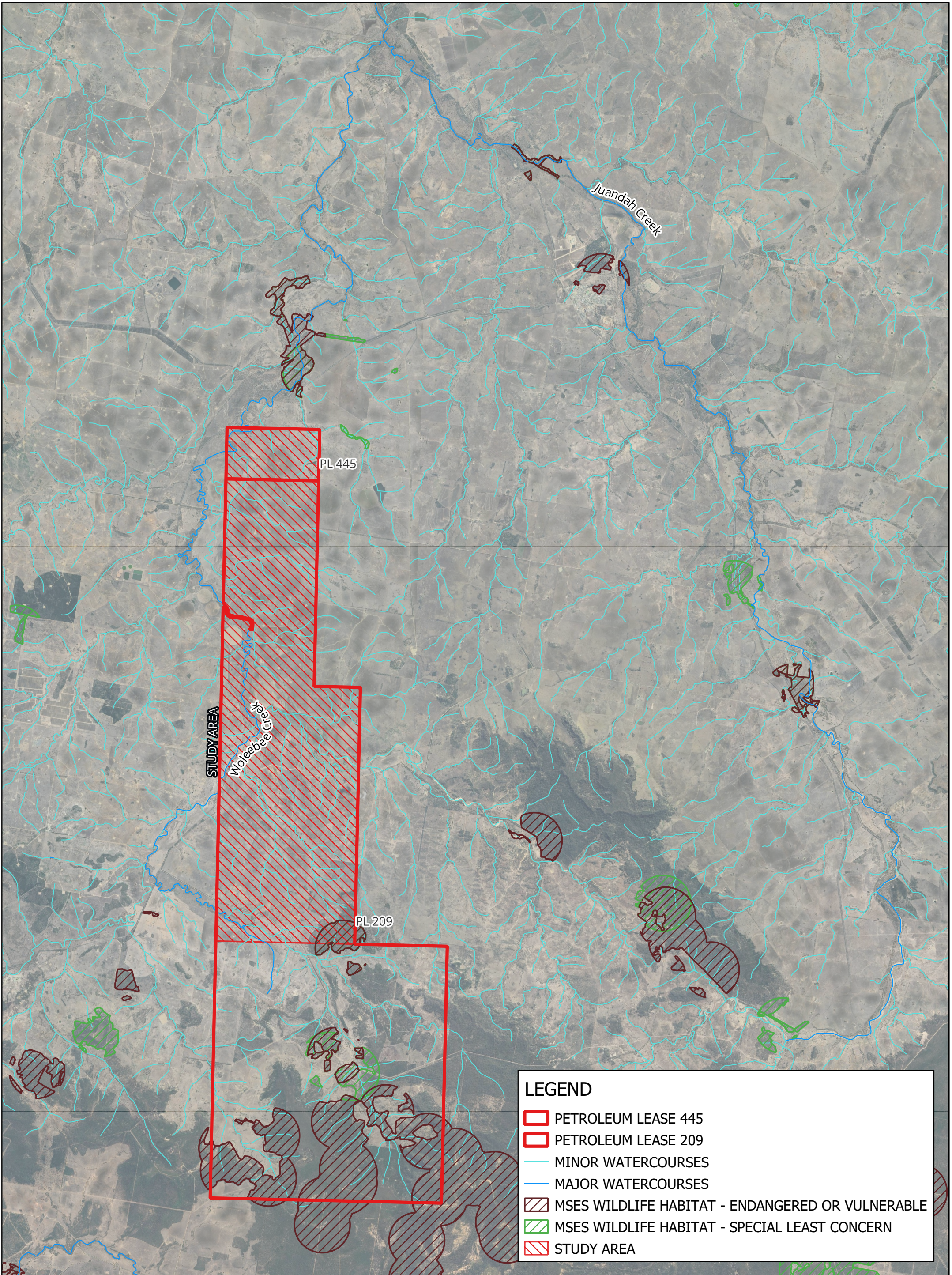
Projection: Mercator  
Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)










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# APPENDIX C: MSES MAPPING






**LEGEND**

-  PETROLEUM LEASE 445
-  PETROLEUM LEASE 209
-  MINOR WATERCOURSES
-  MAJOR WATERCOURSES
-  MSES WILDLIFE HABITAT - ENDANGERED OR VULNERABLE
-  MSES WILDLIFE HABITAT - SPECIAL LEAST CONCERN
-  STUDY AREA

R DETAILS		DATE	© COPYRIGHT Engeny This drawing is confidential and shall only be used for the purpose of this project.			
1	Final Issue	28-03-2024	DRAWN	TM	CHECKED	MTJ
			APPROVED	AV	DATE	28-03-2024
		0 1 2 km		SCALE: 1:120,000		

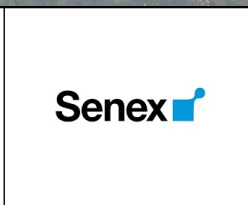
N



HORIZONTAL DATUM: GDA2020 MGA\_ZONE: 95  
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM

**DISCLAIMER**  
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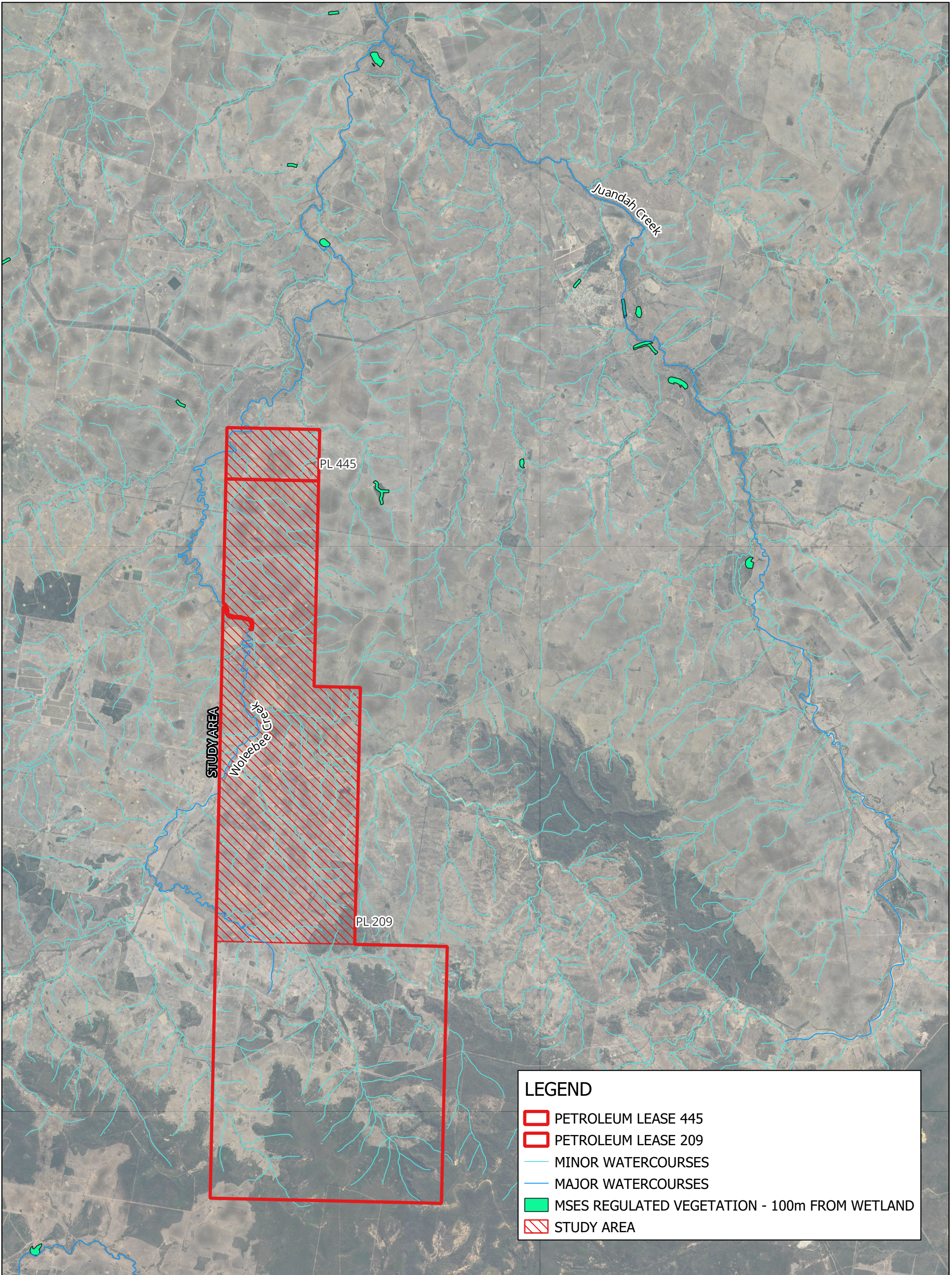
**DATA SOURCE**  
QLD Government Open Data Source



**SENEX ENERGY PTY LTD**

LOUISIANA PROJECT AREA  
PRELIMINARY CONSEQUENCE CATEGORY  
ASSESSMENT  
SHEET 1 OF 3

Orig Ref:  
QC1051-006-SKE-0002



**LEGEND**

- PETROLEUM LEASE 445
- PETROLEUM LEASE 209
- MINOR WATERCOURSES
- MAJOR WATERCOURSES
- MSES REGULATED VEGETATION - 100m FROM WETLAND
- STUDY AREA

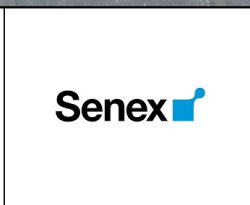
<b>R</b>	<b>DETAILS</b>	<b>DATE</b>	© COPYRIGHT Engeny This drawing is confidential and shall only be used for the purpose of this project.			
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			APPROVED	AV	DATE	28-03-2024
			0 1 2 km SCALE: 1:120,000			

N

HORIZONTAL DATUM: GDA2020 MGA\_ZONE 95  
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM 95

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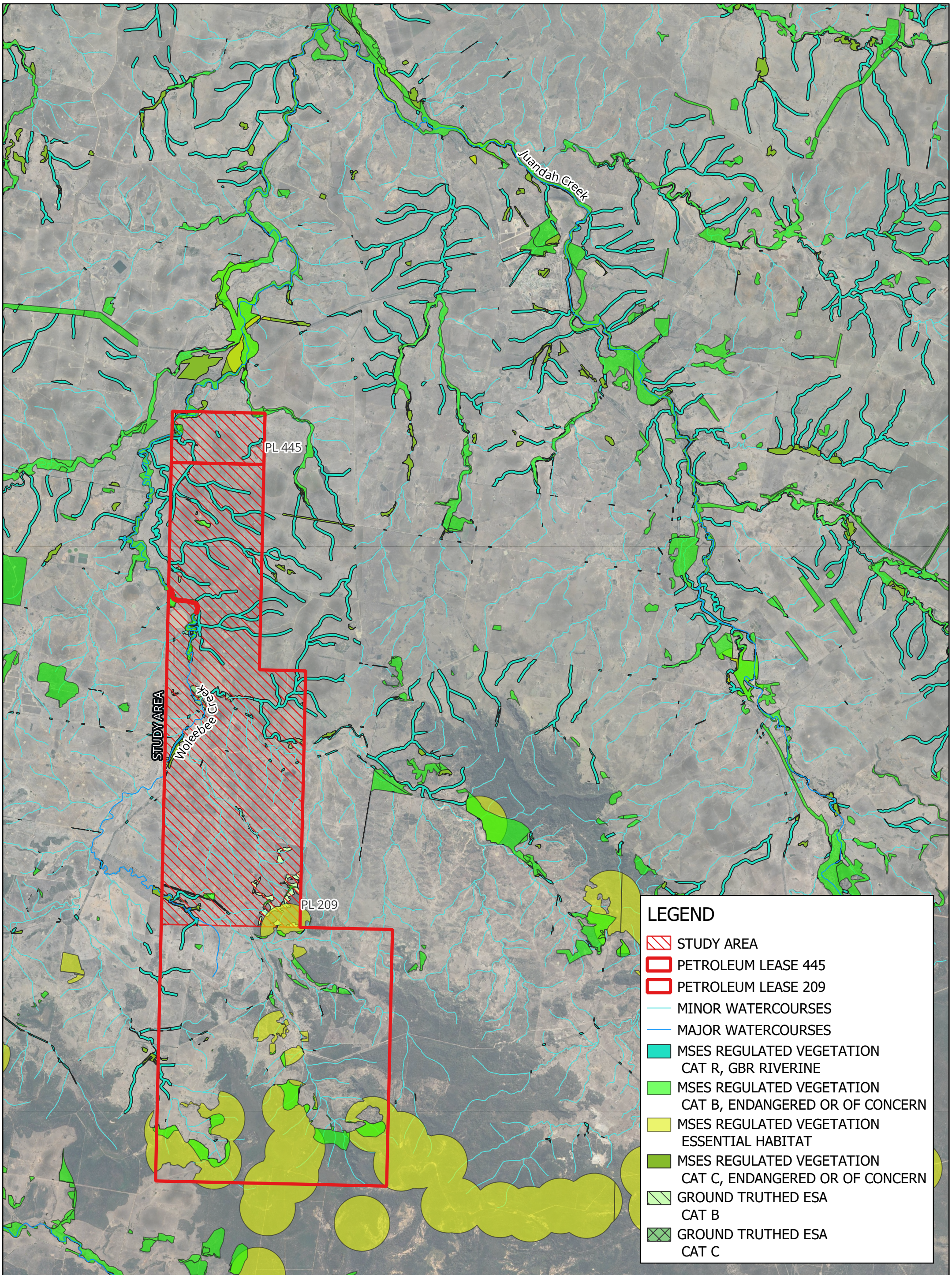
**DATA SOURCE**  
QLD Government Open Data Source














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LOUISIANA PROJECT AREA  
PRELIMINARY CONSEQUENCE CATEGORY  
ASSESSMENT  
SHEET 2 OF 3

Orig Ref:  
QC1051-006-SKE-0002




**LEGEND**

-  STUDY AREA
-  PETROLEUM LEASE 445
-  PETROLEUM LEASE 209
-  MINOR WATERCOURSES
-  MAJOR WATERCOURSES
-  MSES REGULATED VEGETATION CAT R, GBR RIVERINE
-  MSES REGULATED VEGETATION CAT B, ENDANGERED OR OF CONCERN
-  MSES REGULATED VEGETATION ESSENTIAL HABITAT
-  MSES REGULATED VEGETATION CAT C, ENDANGERED OR OF CONCERN
-  GROUND TRUTHED ESA CAT B
-  GROUND TRUTHED ESA CAT C

R DETAILS		DATE	© COPYRIGHT Engeny This drawing is confidential and shall only be used for the purpose of this project.			
1	Final Issue	28-03-2024	DRAWN	TM	CHECKED	MTJ
			APPROVED	AV	DATE	28-03-2024
		0 1 2 km		SCALE: 1:120,000		

N



HORIZONTAL DATUM: GDA2020 MGA\_ZONE: 95  
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM

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PRELIMINARY CONSEQUENCE CATEGORY  
ASSESSMENT  
SHEET 3 OF 3

Orig Ref:  
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# APPENDIX D: EPBC ACT PROTECTED MATTERS REPORT





Australian Government

Department of Climate Change, Energy,  
the Environment and Water

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 24-Apr-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

# Summary

## Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance (Ramsar)</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	4
<a href="#">Listed Threatened Species:</a>	40
<a href="#">Listed Migratory Species:</a>	11

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	16
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">EPBC Act Referrals:</a>	12
<a href="#">Key Ecological Features (Marine):</a>	None
<a href="#">Biologically Important Areas:</a>	None
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None

# Details

## Matters of National Environmental Significance

### Listed Threatened Ecological Communities

[\[ Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
<a href="#">Brigalow (Acacia harpophylla dominant and co-dominant)</a>	Endangered	Community may occur within area
<a href="#">Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions</a>	Endangered	Community may occur within area
<a href="#">Poplar Box Grassy Woodland on Alluvial Plains</a>	Endangered	Community likely to occur within area
<a href="#">Weeping Myall Woodlands</a>	Endangered	Community likely to occur within area

### Listed Threatened Species

[\[ Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
<b>BIRD</b>		
<a href="#">Aphelocephala leucopsis</a> Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calyptorhynchus lathami lathami</a> South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
<a href="#">Climacteris picumnus victoriae</a> Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
<a href="#">Erythrotriorchis radiatus</a> Red Goshawk [942]	Endangered	Species or species habitat may occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area
<a href="#">Geophaps scripta scripta</a> Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
<a href="#">Grantiella picta</a> Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Stagonopleura guttata</a> Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area
<b>MAMMAL</b>		
<a href="#">Chalinolobus dwyeri</a> Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area
<a href="#">Nyctophilus corbeni</a> Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Petauroides volans</a> Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area
<a href="#">Petaurus australis australis</a> Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
<b>PLANT</b>		
<a href="#">Acacia curranii</a> Curly-bark Wattle [3908]	Vulnerable	Species or species habitat may occur within area
<a href="#">Arthraxon hispidus</a> Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
<a href="#">Cadellia pentastylis</a> Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Calytrix gurlmundensis</a> [24241]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dichanthium setosum</a> bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Homopholis belsonii</a> Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
<a href="#">Lepidium monoplocoides</a> Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area
<a href="#">Polianthion minutiflorum</a> [82772]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thesium australe</a> Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
<a href="#">Vincetoxicum forsteri listed as Tylophora linearis</a> [92384]	Endangered	Species or species habitat may occur within area
<a href="#">Xerothamnella herbacea</a> [4146]	Endangered	Species or species habitat may occur within area

## REPTILE

<a href="#">Anomalopus mackayi</a> Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area
<a href="#">Delma torquata</a> Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
<a href="#">Elseya albagula</a> Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Furina dunmalli</a> Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
<a href="#">Hemiaspis damelii</a> Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
<a href="#">Rheodytes leukops</a> Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area

### SNAIL

<a href="#">Adclarkia cameroni</a> Brigalow Woodland Snail [83886]	Endangered	Species or species habitat may occur within area
<a href="#">Adclarkia dulacca</a> Dulacca Woodland Snail [83885]	Endangered	Species or species habitat likely to occur within area

### Listed Migratory Species [ [Resource Information](#) ]

Scientific Name	Threatened Category	Presence Text
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area

### Migratory Terrestrial Species

<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat may occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat may occur within area

### Migratory Wetlands Species

<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
--	--	--



Scientific Name	Threatened Category	Presence Text
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area

## Other Matters Protected by the EPBC Act

Listed Marine Species		[ <a href="#">Resource Information</a> ]
Scientific Name	Threatened Category	Presence Text
Bird		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
<a href="#">Bubulcus ibis as Ardea ibis</a> Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
<a href="#">Chalcites osculans as Chrysococcyx osculans</a> Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area overfly marine area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area
<a href="#">Rostratula australis as Rostratula benghalensis (sensu lato)</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

## Extra Information

EPBC Act Referrals			[ Resource Information ]
Title of referral	Reference	Referral Outcome	Assessment Status
<a href="#">Atlas Stage 3 Gas Project</a>	2022/09410		Assessment
<a href="#">Atlas to Reedy Creek Pipeline</a>	2023/09585		Assessment
<a href="#">Development of Existing Coal Seam Gas Fields</a>	2008/4398		Post-Approval
<b>Controlled action</b>			
<a href="#">Construct and operate 447km high pressure gas transmission pipeline</a>	2009/4976	Controlled Action	Post-Approval
<a href="#">Expansion of Coal Seam Gas Fields</a>	2009/4974	Controlled Action	Post-Approval
<a href="#">Queensland Curtis LNG Project - Pipeline Network</a>	2008/4399	Controlled Action	Post-Approval
<a href="#">Santos GLNG Gas Field Development Project, QLD</a>	2012/6615	Controlled Action	Post-Approval
<a href="#">Wandoan Coal Mine and Infrastructure Project</a>	2008/4284	Controlled Action	Post-Approval
<a href="#">Wandoan Coal Project - Coal Seam Methane Water Supply South</a>	2008/4287	Controlled Action	Post-Approval
<b>Not controlled action</b>			
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed
<a href="#">Project Atlas CSG Project, between Wollumbilla and Wandoan, Qld</a>	2018/8329	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Referral decision			
<a href="#">Development of an underground longwall coal mine</a>	2011/6129	Referral Decision	Completed

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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