

# Caroona Coal Project

## Ecological Studies of the Caroona EL Area

Presentation to the Community Consultative Committee



7 February 2011



# Introduction

- Purpose of presentation:
  - Provide an overview of the process of conducting flora and fauna surveys;
  - Provide an overview of the flora and fauna survey effort and results to date;
  - Discuss how flora and fauna are being managed during exploration drilling; and
  - Provide an overview of future ecological works for the Caroona Coal Project.

# Caroona Exploration Licence (EL) Area

- Caroona Exploration Licence (EL) Area is approximately 344 km<sup>2</sup>
- Predominantly flat open plains (floodplains) with hilly outcrops associated with Doona Ridge, Nicholas Ridge and Georges Island Hill (ridge country).
- Pre-European settlement vegetation consisted of woodland vegetation on ridgelines and both open woodlands and grasslands on the flatter alluvial floodplains.
- Environment within Caroona EL Area has been historically modified for agricultural purposes and by forestry.
- Floodplains are dominated by a mixture of cropping and, to a lesser extent, grazing land uses.
- Doona State Forest is the largest area of remnant native woodland within Caroona EL and supports a variety of native flora and fauna species.
- Areas within EL not used for agricultural purposes (including road reserves) comprise small extents of modified native grasslands with scattered eucalypts and shrubs.

# Previous Ecological Records

- No reports documenting targeted ecological surveys within the Caroona EL have been identified.
- We are currently seeking Forests NSW records and regional vegetation mapping from Namoi CMA.
- The following threatened species records within the Caroona EL were identified from the DECCW Atlas of NSW Wildlife and the Birds Australia database:
  - Brown treecreeper - eastern subspecies (*Climacteris picumnus victoriae*) (TSC – V)
  - Diamond firetail (*Stagonopleura guttata*) (TSC – V)
  - Hooded robin - south-eastern form (*Melanodryas cucullata cucullata*) (TSC – V)
  - Varied sittella (*Daphoenositta chrysoptera*) (TSC – V)
  - Little eagle (*Hieraaetus morphnoides*) (TSC – V)
  - Speckled warbler (*Pyrrholaemus sagittata*) (TSC – V)
  - Koala (*Phascolarctos cinereus*) (TSC – V)
  - Spotted-tailed quoll - SE mainland (*Dasyurus maculatus maculatus*) (EPBC – V)  
(TSC – V)

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## Ecological Survey Methods



# Flora Survey Methods

- To date, targeted flora surveys have been undertaken in November 2008, February 2009, October 2009 and November 2009.
- Plot-based flora surveys were undertaken using methods also used by most NSW government vegetation management agencies (e.g. DECCW, Royal Botanic Gardens Sydney, I&I NSW).
- Plots are located to sample each vegetation community as representatively as possible.
- Within each plot, roughly 45 to 60 minutes are spent searching for all vascular flora species present – their cover-abundance is recorded.
- The locations of each plot are recorded using a 1:25,000 topographic map sheet and a GPS. 39 plots have been sampled during the flora surveys to date. Further sampling will be undertaken in the future.
- Due diligence surveys of proposed locations of exploration activities have also been undertaken.

# Flora Survey Locations



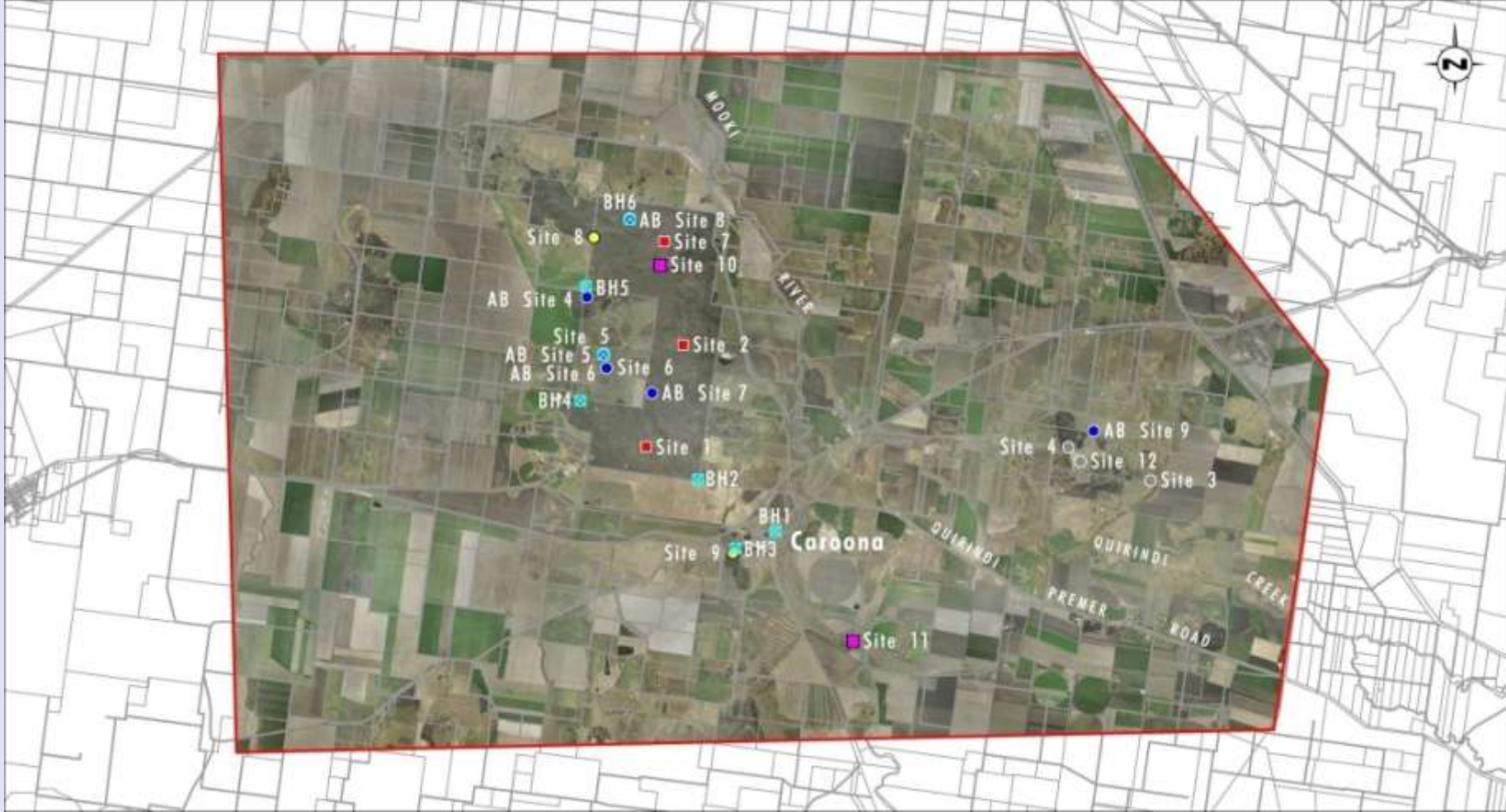
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









	Caroona Exploration Area
	Flora Survey Site 10 x 40
	Flora Survey Site 10 x 50
	Flora Survey Site 20 x 20
	Flora Survey Site 20 x 40
	Flora Survey Site 20 x 50

# Fauna Survey Methods

- Three periods of fauna survey (of 5 days duration each) were completed within the EL area between 2009 and 2010.
- Detailed systematic fauna surveys were undertaken in March 2009, July 2009 and February 2010.
- Fauna surveys were undertaken during the following seasons:
  - Autumn 2009      2 full fauna survey sites, 4 partial fauna survey sites
  - Winter 2009      1 full fauna survey site, 2 partial fauna survey sites, 22 targeted migratory bird survey sites
  - Summer 2010      2 full fauna survey sites, 7 partial fauna survey sites
- Opportunistic fauna sightings are recorded and the presence of significant fauna habitat is assessed during due diligence surveys

# Fauna Survey Locations



Legend			
	Caroona Exploration Area		Full Survey Site Comprising:
	Bird and Herpetofauna Survey		- Elliot Traps
	Hair Funnel		- Cage Traps
	Anabat		- Hair Funnels
	Full Site plus Pitfalls		- Harp Trap
			Partial Survey Site Comprising:
			- Spotlighting (walking)
			- Call Playback
			- Bird and Herpetofauna Survey
			- Bird and Herpetofauna Survey

# Fauna Survey Methods

## TRAPPING SURVEYS

- A variety of different types of traps, targeting a wide range of species, are used during the trapping surveys including:
  - Terrestrial and arboreal Elliot traps
  - Terrestrial and arboreal hair funnels
  - Terrestrial cage traps
  - Harp traps
  - Pitfall traps



# Fauna Survey Methods (cont)

## AREA SEARCHES

- A variety of area searches of differing duration and purpose are undertaken as part of the fauna survey including:
  - Spotlighting searches
  - Diurnal and nocturnal reptile and amphibian searches
  - Bird searches
  - Micro-bat echolocation recordings
  - Nocturnal call playback
  - Diurnal call playback for migratory birds
  - Tracks, scats and other signs



# Fauna Survey Methods (cont)



# Fauna Survey Methods (cont)

## HABITAT ASSESSMENTS

The following fauna habitat attributes are assessed during surveys

- The presence (and number / % cover) of:
  - Logs
  - Stumps
  - Rocks and outcropping
  - Stags and hollow-bearing trees (including the size and orientation of tree hollows)
  - Vegetation structure and density
  - Mistletoes
  - Feed tree species for the koala and glossy black-cockatoo
  - Old growth, mature, regenerating and sapling trees

# Fauna Survey Methods (cont)

## Koala Habitat Survey Methods

- State Environmental Planning Policy (SEPP) 44 is used to determine if an area contains potential or core koala habitat.
- SEPP 44 assessments are undertaken at each of the plot-based flora sampling sites, which assesses the proportion of koala feed tree species in the canopy.
- The Spot Assessment Technique (SAT) is also used to assess koala activity within the immediate area surrounding a tree that is known to have been utilised by a koala, or is considered to be of importance to the species. SAT involves a search of koala scats beneath a minimum of 30 trees at each site. This technique is an abbreviated form of a methodology developed by the Australian Koala Foundation.

# Caroona Coal Project

## Ecological Survey Results



# Flora Species Recorded

- Umwelt has recorded a total of 304 species during surveys for this project within the EL area, of which 231 (76%) are native and 73 (24%) are introduced species.
- Of the total flora species recorded, 1 species was from the Class Coniferopsida (Conifers), 4 species were from Filicopsida (ferns), and 299 from Magnoliopsida (flowering plants) - of which 101 were from sub-class Liliidae (monocots) and 198 from sub-class Magnoliidae (dicots).
- Flora species were recorded from a wide representation of plant families, 60 in total.
- No threatened flora species have been recorded in the EL area during the surveys.
- Several noxious and environmental weed species have been recorded in the EL area including Paterson's curse (*Echium plantagineum*), common prickly pear (*Opuntia stricta* var. *stricta*) and African boxthorn (*Lycium ferocissimum*).

# Fauna Habitat Recorded

- Several general fauna habitat types are located within the EL area.
- Each of these broad habitat types has a range of characteristics which influence the habitat value, and the range of fauna species which are likely to be identified within each type.
- The broad habitat types recorded within the EL area consist of:
  - woodland
  - grassland
  - riparian
  - aquatic habitat



# Fauna Species Recorded

- A total of 162 fauna species have been recorded by Umwelt during surveys of the EL area, consisting of:
  - 111 birds
  - 12 reptiles
  - 7 amphibians
  - 32 mammals
- Some of the species recorded occur in very specific habitat types (such as geckoes), while others are very mobile and will occur in a variety of habitat types within the Caroona EL area (such as many birds species).



# Threatened Species

- A number of threatened flora and fauna species are either known or considered to potentially occur within the EL area.
- No records of threatened flora species from the NSW Department of Environment, Climate Change and Water (DECCW) Atlas of NSW Wildlife occur within the EL area and none have been recorded during surveys.
- A total of 13 listed threatened fauna species have been recorded in the EL area during Umwelt surveys and site, including 4 of the 8 species identified through database searches.



# Threatened Fauna Species

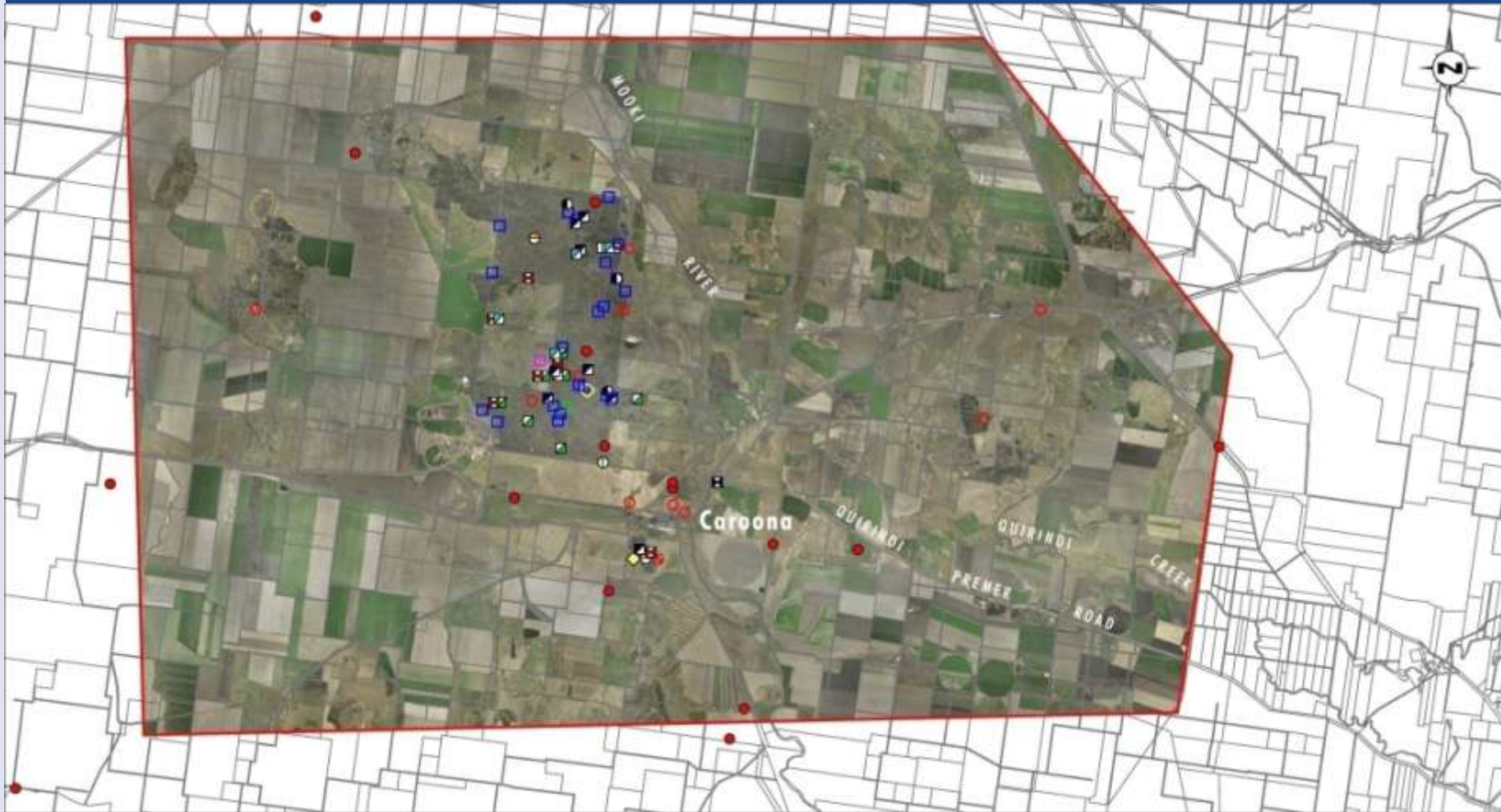
- Threatened fauna species that have been recorded by Umwelt include:
  - spotted harrier (*Circus assimilis*) (TSC – V)
  - little lorikeet (*Glossopsitta pusilla*) (TSC – V)
  - turquoise parrot (*Neophema pulchella*) (TSC – V)
  - brown treecreeper - eastern subspecies (*Climacteris picumnus victoriae*) (TSC – V)
  - speckled warbler (*Pyrrholaemus sagittata*) (TSC – V)
  - diamond firetail (*Stagonopleura guttata*) (TSC – V)
  - grey-crowned babbler - eastern subspecies (*Pomatostomus temporalis temporalis*) (TSC – V)

# Threatened Fauna Species (cont)

- koala (*Phascolarctos cinereus*) (TSC – V)
  - eastern freetail-bat (*Mormopterus norfolkensis*) (TSC – V)
  - large-eared pied bat (*Chalinolobus*) (TSC – V) (EPBC – V)
  - large-footed myotis (*Myotis adversus*) (TSC – V)
  - greater broad-nosed bat (*Scoteanax rueppellii*) (TSC – V)
  - eastern cave bat (*Vespadelus troughtoni*) (TSC – V)
- 39 migratory and marine species listed under the EPBC Act were recorded during the field surveys conducted by Umwelt.
  - The EL area is not considered likely to provide habitat for any listed endangered fauna populations



# Threatened Fauna Locations



Legend		Atlas of NSW Wildlife Records:		Umwelt Threatened Fauna Records:		Birds Australia Records:	
Carroona Exploration Area	Diamond Firetail	Brown Treecreeper	Grey-crowned Babbler	Greater Broad-nosed Bat	Spotted Harrier	Brown Treecreeper	
	Hooded Robin	Koala	Turquoise Parrot	Large-eared Pied Bat		Diamond Firetail	
	Spotted-tailed Quoll	Varied Sittella	Eastern Cave Bat	Large-footed Myotis		Hooded Robin	
			Eastern Freetail-bat	Diamond Firetail		Little Eagle	
				Little Lorikeet		Speckled Warbler	
				Speckled Warbler			

# Vegetation Communities

- The vegetation communities present in the EL area have been broadly mapped through aerial photograph interpretation (API) and ground-truthed as part of the vegetation surveys conducted to date. This will be an ongoing process of refinement as further survey work is completed.
- Vegetation communities present in the EL area:
  - Bimble Box Woodland
  - Yellow Box Woodland
  - Yellow Box – Red Gum Woodland
  - Ironbark - White Cypress Pine Forest
  - White Cypress Pine Forest
  - White Box - White Cypress Pine Woodland
  - White Box Woodland
  - Modified White Box Woodland

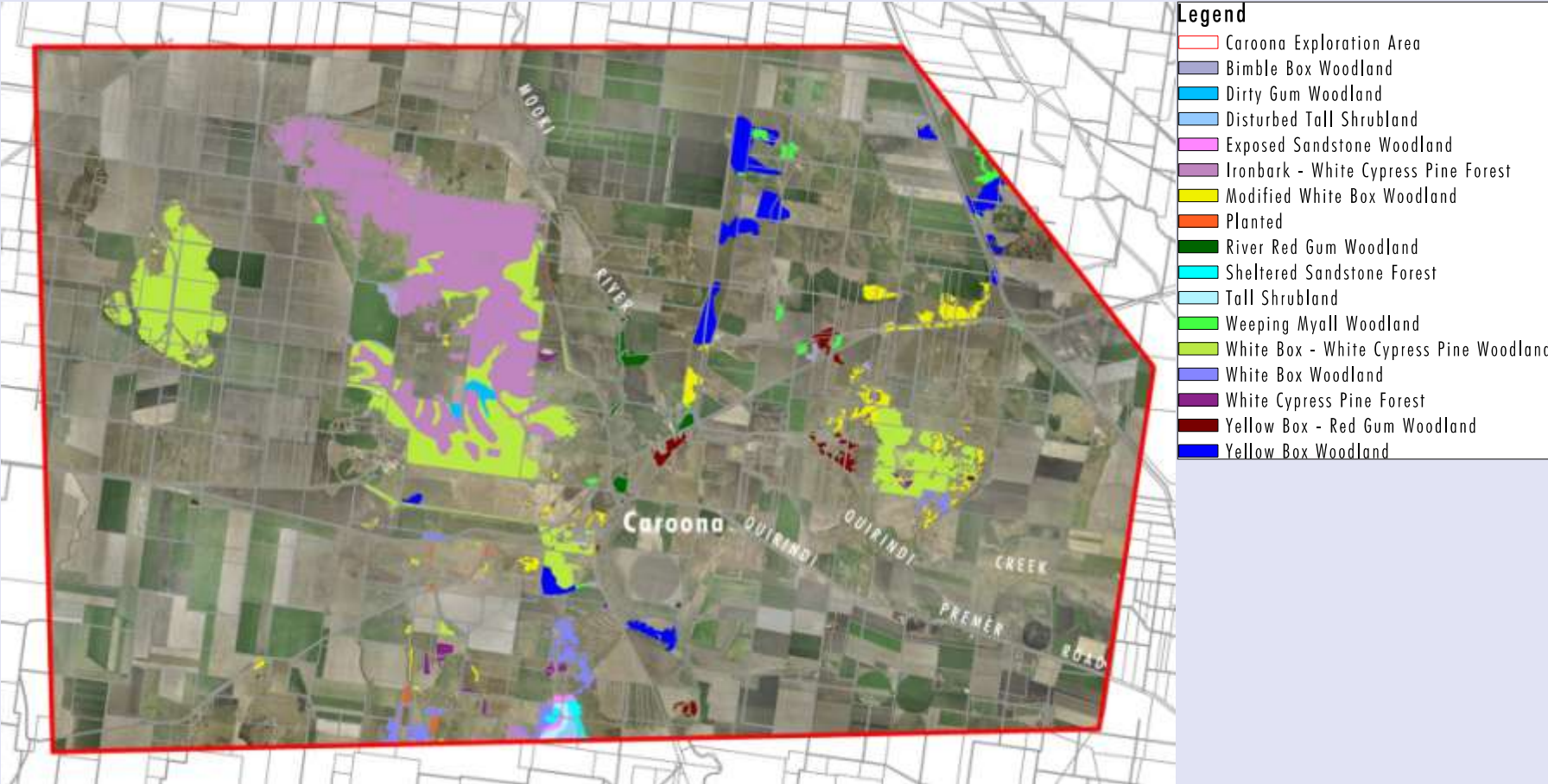


# Vegetation Communities (cont)

- Vegetation communities present in the EL area (cont):
  - Dirty Gum Woodland
  - Weeping Myall Woodland
  - River Red Gum Woodland
  - Derived Native Grassland
  - Native Grassland on Cracking Clay Soil
  - Native Grassland
  - Tall Shrubland (API-mapped only)
  - Exposed Sandstone Woodland (API-mapped only)
  - Sheltered Sandstone Forest (API-mapped only)
  - Planted (including wind breaks)
  - Non-native Pasture and Crops (not mapped)



# Preliminary Woodland Community Mapping



## Threatened Ecological Communities (TECs)

- 7 threatened ecological communities (TECs) are known, or considered likely, to occur within the EL area based on ecological survey work and environmental due diligence inspections conducted to date.
- These TECs include 4 communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) and three listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).



## Threatened Ecological Communities (TECs) - cont

- TECs known, or with potential, to occur in the EL area:
  - Native Vegetation on Cracking Clay Soils of the Liverpool Plains (TSC Act)
  - Natural Grasslands on Basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland (EPBC Act)
  - White Box – Yellow Box – Blakely’s Red Gum Woodland (TSC Act)
  - White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)
  - Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregions (TSC Act)
  - Weeping Myall Woodlands (EPBC Act)
  - Inland Grey Box Woodland in the Riverina, NSW Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South Bioregions (TSC Act)

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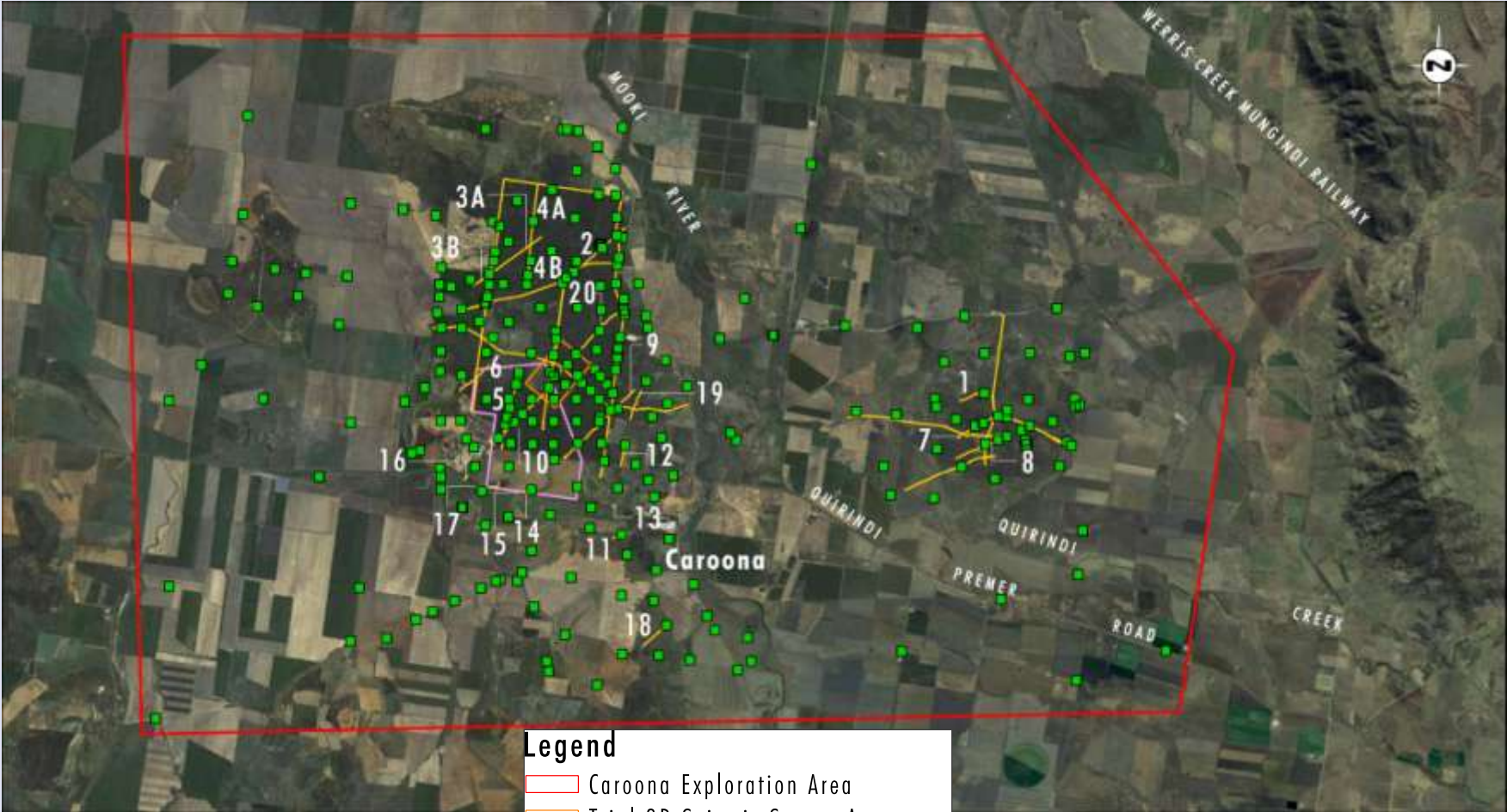
## Managing Flora and Fauna during Exploration









# Due Diligence Surveys - Exploration Activities

- Due diligence inspections are carried out for all proposed exploration activity areas for the presence of threatened flora and fauna species, or their habitats, and other significant ecological values.
- The results of the assessments are used to determine what steps should be undertaken to manage potential impacts of exploration activities if threatened species, populations or ecological communities or other significant values are present.

# Due Diligence Inspection Sites



**Legend**

-  Caroona Exploration Area
-  Trial 3D Seismic Survey Area
-  Proposed 3D Seismic Program Area
-  Shot Lines
-  Seismic Tracks
-  Due Diligence Inspection Sites

# Potential Flora Impacts - Exploration Activities

- Exploration activities have the potential to impact on vegetation in the following ways:
  - Slashing of vegetation along seismic lines and in drilling compounds
  - Removal of fallen timber to facilitate machinery access
  - Small juvenile trees may need to be removed to allow vehicle access
  - Excavation of drilling sumps and stockpiling of soil
  - Larger trees may be harmed due to equipment being maneuvered through the forest
  - Vehicle movement onto drilling compound and seismic lines
  - Potential for weeds to be introduced due to vehicle movement
  - Drill cuttings brought to surface around shot holes

# Flora Control Measures - Exploration Activities

- Ecological mitigation measures include:
  - due diligence inspections
  - locate exploration activities and access roads in areas that will require only minimal ground disturbance;
  - where possible, locate exploration activities in previously disturbed areas such as paddocks or road verges;
  - re-locate boreholes if they have potential to significantly impact on threatened species, populations or ecological communities;
  - design exploration activities to minimise surface disturbance;
  - fencing of work areas to define the disturbance area;
  - clean machinery to remove soil and seed prior to leaving each location;
  - rehabilitation of each site, including re-spreading of topsoil to allow for natural regeneration; and
  - monitor rehabilitated sites to ensure that rehabilitation has been successful and undertake further rehabilitation where necessary.

# Potential Fauna Impacts - Exploration Activities

- Exploration activities can disturb fauna in the following ways:
  - Removal of habitat through vegetation clearing or log/stump removal
  - Noise and vibration from the activities and vehicle movements
  - Disturbance from equipment/personnel activity

# Fauna Control Measures - Exploration Activities

- Ecological mitigation measures include:
  - due diligence inspections
  - activities relocated to avoid impacts where possible
  - prior to clearing of shrubs and juvenile trees, inspections are undertaken within two weeks of clearing to determine if bird nests are present in the vegetation to be cleared – if nests are present, the best course of action will be determined by a qualified ecologist
  - only stumps and small trees that cannot be worked around are removed
  - no hollow-bearing trees are removed
  - fallen timber and stumps removed from work area are set aside – habitat provided by fallen timber and stumps is unlikely to be moved more than 5 metres from its original location. Stumps and logs replaced following cessation of activities unless otherwise requested by landowner
  - activities are carried out during daylight hours, minimising potential impacts to nocturnal fauna such as bats and owls

# Due Diligence Survey Results - Exploration Activities

- Exploration activities undertaken to date have not resulted in significant impacts on threatened species, populations or ecological communities.
- No threatened flora species or populations have been recorded at any of the drilling or seismic survey locations.
- Drilling and seismic survey activities undertaken have required small-scale slashing of mostly groundcover species, which are expected to regenerate following disturbance.
- No significant fauna habitat has been removed as a result of exploration activities.
- Rehabilitation of sites has been successful to date with only minor subsequent action required to control weed growth.
- All future locations subject to exploration activities will continue to be inspected through due diligence surveys to ensure flora and fauna issues are adequately assessed and managed.

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Where to from here?



# Where to from here?

- Further ecological studies need to be undertaken in areas not previously surveyed.
- Further seasonal ecological surveys required (eg autumn and early spring surveys).
- Further ground truthing required to improve accuracy of vegetation mapping.
- Further ecological surveys targeting potentially occurring threatened species, populations and ecological communities will be also be undertaken.
- Due diligence surveys will continue to be carried out for exploration activities.
- Future project planning and location and design of exploration activities will take into account ecological values.

# Where to from here?

- The results of the ecological studies will continue to be discussed with the community.
- If a mining project is put forward for approval, these detailed ecological studies will provide high quality information for the preparation of the environmental assessment (EA). A detailed ecological assessment will be prepared as part of the EA.
- The project design would incorporate mitigation measures to deal with predicted impacts and biodiversity offsets may be required to be established to address any ecological impacts.
- The results of the ecological assessment will be fully reported, publicly available and discussed with the community and the relevant government agencies as part of the EA process.

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Questions/Discussion

