



Gravel quarry adjacent to Sumac Rd (Segment J)



Rapid River bridge (Segment K)

Segment K – Rapid River Road

This section of sound gravel road is significantly narrower and in places windier than the Sumac Road. It travels through wet and mixed tall forest west of Rapid River and then predominantly through moorland towards Tayatea Road. The moorland vegetation type supports low densities of grazing mammals and is therefore likely to be a low road kill hazard. The forest containing myrtles near the Rapid River is potentially susceptible to myrtle wilt.

PC sensitive vegetation occurs in this area, hence standard soil hygiene practices need to be applied.



Rapid River Rd (Segment K)



Rapid River Rd - eastern end (Segment K)

Segment L – Tayatea Road

Much of this road segment is naturally traffic calming because the road is relatively narrow and undulating and so reducing risk of road kill. Minimal works will be required prior to sealing.

There is abundant evidence of Tasmanian devil activity in this area (latrine on road).

PC sensitive vegetation occurs in this area hence standard soil hygiene practices need to be applied.



Segment L.



Segment L – the overburden at the side of the road creates a microhabitat that supports trees adjacent to the moorland.



Segment L –junction with the Milkshakes Forest Reserve Road (Segment P).



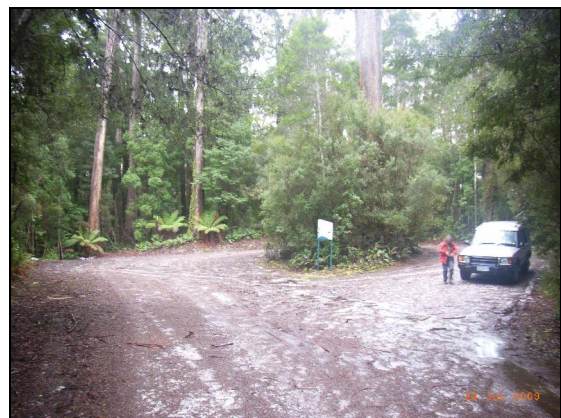
Segment L where it meets the existing sealed section that continues down to the Tayatea Bridge.

Segment M – Tayatea Road - sealed section

This section descends past steep batters to the Tayatea Bridge. Some potential for wildlife to be trapped on the road and at risk to road kill. Foxglove, an environmental weed, is common in the roadside. Soil hygiene and weed control would apply when working in this area.



The junction of Sumac Road and Lake Chisholm Rd.



Lake Chisholm Forest Reserve carpark.

Segment N – Sumac Spur 4-1 and Lake Chisholm Road

This is a detour section of Lake Chisholm Road leading to the Forest Reserve of the same name. Up to the edge of the forest reserve the surrounding vegetation is predominantly

regrowth eucalypt forest. Vegetation adjacent to the existing car park and adjacent to the road includes wet *Eucalyptus brookeriana* forest which is of high conservation value.

Segment O - Sumac Rd – Rapid River Road to Dempster Lookout

Not investigated.

This crosses areas of open moorland (Dempster Plains). The listed rare shrub – *Epacris curtisiae* occurs within moorland along this section. A detailed assessment of this low shrub would need to be undertaken if works are proposed outside the shoulder.

PC sensitive vegetation occurs in this area.

Segment P - Milkshake Reserve Access Road

Not investigated.

PC sensitive vegetation occurs in this area.

5. MITIGATION

5.1 VEGETATION MANAGEMENT

Some of the construction works may impact on important flora and fauna habitats. However the risk of unnecessary and indirect impacts outside the 'footprint' of the developments could be minimised by following certain protocols:

1. Clearly define the extent of clearance required for the project;
2. Identify the boundary of all areas of sensitive native vegetation to be retained in the vicinity of works;
3. Implement a vegetation management plan tackling key environmental weeds in the vicinity of earthworks. This should concentrate on threatened flora and significant vegetation habitat and seek management that encourages natural recruitment;
4. Reduce the risk of spread of declared and environmental weeds, during and after works, by implementing a weed management and spread prevention plan.
5. Include a plant and animal pathogen prevention plan. This will aim to minimise the introduction of feral pathogens such as root rot fungus (*Phytophthora cinnamomi*) and chytrid fungus; as well as introduce measures that minimise the risk of spread of the native chalarra fungus which causes myrtle wilt.

5.2 ROAD KILL

The guiding principles developed for Austroads that aim to achieve fauna sensitive road design¹⁶⁸ are appropriate to this project. These outline a process for incorporating management practices and a monitoring and reporting regime to manage the issue of road kill.

Bank *et al* (2002) state that mitigation measures for road kill should aim to keep wildlife off the road. Presently the most commonly used and effective method is fencing; however fences lead to fragmentation of the landscape. Fencing needs to be used in conjunction with measures to provide connectivity. Underpasses (culverts, box-culverts), overpasses and viaducts are used in Europe on major roads. Of these the underpass using a culvert/box culvert is probably the most viable for the Tarkine Forest Drive.

Hobday and Minstrell (2008) found that there were localised high-density road kill areas or 'hotspots' on the Tasmanian roads that they studied. They suggest that mitigation can be targeted at these 'hotspots' to change animal or human behaviour to reduce road kill. They suggest that the most effective mitigation strategy is to change human behaviour, particularly reducing driving speed at those locations where road kill is high ('hotspots') at particular times of the day and the year.

Shaw *et al* (2003) used predictive regression procedures to identify road kill hotspots using local-scale information. They suggest that the logistic regression model they developed could be used to identify hotspots on a road design prior to construction to identify where mitigation measures could be implemented prior to the construction or alteration of a road.

Shaw *et al* (2003) report that there are limitations to the model:

¹⁶⁸ Jungalwalla 2003

- they apply only to macropods and possums; other models may need to be developed for other species with different movement patterns and modes of behaviour when faced with traffic;
- they only apply to non-urban roads with posted speed limits $\geq 80\text{km/h}$; and
- their surveys did not attempt to quantify the role of landscape-scale features, such as habitat quality. Shaw *et al* (2003) note that these are likely to be of direct consequence to managers in the planning phase of new routes.

Management measures to mitigate road kill

Shaw *et al.* (2003) report that some features of roads are more amenable to management intervention than others and that the real strength of the predictive modelling approach based on local features is that it can be used to identify and match sites, which have a high probability of road kill, for adaptive management-type interventions. For example, it is easier to provide escape routes or manage roadside grass than it is to manipulate banks and road curviness in hilly country.

Magnus (2006) identified that there are two main mechanisms to mitigate road kill:

- Changing driver behaviour by:
 - Changing driver attitude by increasing awareness of road kill.
 - Making people aware that they are entering a road kill hotspot by the use of signs, rumble strips and/or lighting.
 - Slowing traffic through road design (more corners, less straight roads) or installing traffic calming devices.
- Changing animal behaviour by:
 - Discouraging wildlife from lingering on roads and roadsides by reducing food (removing grass cover, removing other road kill) or by making road surfaces lighter which may make animals feel more conspicuous and exposed.
 - Providing safe crossings (overpasses, underpasses) and escape routes.

Magnus *et. al.* (2006) documents good practice for road design including:

- Minimise the factors of road designs that increase danger to wildlife by avoiding the creation of roadside barriers:
 - Reduce slopes of batters or build “escape ramps” that allow animals to get off the road in the face of oncoming traffic.
 - Where guard rails are installed ensure that they are designed to not act as barriers.
 - Reduce the incidence of sharp corners to increase visibility for both driver and animal.
 - Reduce road speed through use of road design (traffic calming) and speed advisory signage for night time driving.
 - When installing culverts at creek crossings ensure that they allow for the passage of wildlife (including platypus). Consider the use of box culverts with ledges for dry crossings, consider installing bio-baffles in round culverts (devices bolted to the floor of the culvert to reduce water flow and assist with fish and platypus passage).

Road design opportunities are limited on the Tarkine Forest Drive project. The entire route is already predetermined by existing roads.

Reducing traffic speed

There is a general consensus¹⁶⁹ that 60km/h is a preferred maximum for traffic speed to ensure that road kill is minimised.

Much of the Tarkine Forest Drive is of a high standard which even in its unsealed state is providing relatively high road speeds (>80km/h). These sections may warrant mitigation measures which can be retrofitted to the road to reduce road kill.

Identifying black spots

The Shaw *et al.* (2003) model could be applied through the faster and likely busier sections from Kanunnah Bridge to Arthur River to help to identify black spots.

The vegetation character, soil fertility and biological productivity along the route are variable. This is noticeable along the west coast (Segments A and B). North of Bottle Flat there is higher fertility, as indicated by grassy paddocks and openings within shrubby forest, than is found to the south. Saggs (*Lomandra longifolia*) are a prominent component of the ground layer.

Observational evidence¹⁷⁰ is that the abundance of wildlife in this area is much higher, suggesting road kill rates may be higher also. Although studies elsewhere suggest no relationship between density and road kill rates this is contrary to anecdotal observations¹⁷¹. This road section therefore may require mitigation measures to reduce road kill if it does, as suggested, support the greatest risk to Tasmanian devils and spotted tailed quolls along the route because it passes through the most suitable habitat for these species. The coastal heathland and buttongrass moorland vegetation south of Bottle Flat, extending along the western half of Segment C, is less productive. There is no grass to attract significant numbers of grazing herbivores, although wombats and Bennett's wallabies are present. Road kill is likely to be less in this section of the road therefore requiring fewer mitigation measures.

Monitoring is perhaps the most reliable way of identifying road kill hotspots although data collection must be sufficiently comprehensive to provide reliable indicators.

Road kill mitigation should consider the nature of the risk. As described by Magnus *et al.* (2006) it should first tackle driver behaviour but also consider management of animal behaviour where appropriate. Driver behaviour can be modified to reduce road kill risk.

The following measures are recommended to address driver behaviour.

1. Tourists should be encouraged to plan for the completion of driving in daylight hours. This could be promoted to tourists at each end of the Tarkine Forest Drive and in associated tourist literature. Nocturnal wildlife observation should be promoted at sites outside the Tarkine Forest Drive section such as Marrawah.
2. Log truck and other forestry operations could be restricted to daylight hours. Some control may be able to be exerted through Forestry Tasmania arrangements with contractors. No winter harvesting and no vehicle twilight activity would be of benefit.

¹⁶⁹ Jones *pers. com.*, Hobday *pers. com.*

¹⁷⁰ A, North, K Ziegler *pers. obs.*. This is being further tested by a road kill and wildlife activity monitoring study being currently undertaken – refer Monitoring in this report

¹⁷¹ G. King *pers. com.*

3. Identify obvious hotspots where high rates of road kill are known. See Monitoring below.
4. Incorporate road design features near road kill hotspots, such as warning signs, riffle strips, fencing and underpasses.

The following road design and management measures are recommended to address animal behaviour.

1. Ensure vegetation management of verges along sections where the design speed exceeds 80km/h allow for early driver / wildlife sighting. Dense vegetation could be cleared back from the pavement edge to a predetermined width. Dense shrubs along Bottle Flat should be sufficiently cleared back to improve sight distances.
2. Minimise the growth of grassy verges, which attract grazing herbivores, especially in forest. Grass specific herbicides (e.g. Fusilade©) can be applied. There are localised patches of grassy verges along Blackwater and Sumac Roads. It is acknowledged that clearing of dense scrub from roadsides may encourage the establishment of grassy vegetation.
3. Prescribe table drain profiles that do not act as barriers to animals.
4. In steep terrain where there may be a steep bank on one side and barriers on the drop-off on the other side, consideration needs to be given to the provision of escape routes. The number and spacing of escape routes will depend on traffic speed and the barrier effect of the road. The design of the barrier fencing should allow animals to pass easily under the fence. Where there is a steep drop then some benching may be needed to provide an escape route.
5. Evaluate creek crossings to determine whether culverts and bridges meet minimum design standards to facilitate animal passage. For example, space each side of the river beneath bridges, ledges in box culverts, bio baffles in round culverts, secondary pipe culverts above water level for devils and quolls. Consider these in light of road kill monitoring to determine whether retrofitting may be necessary in the future.

The Outline Framework for Fauna Sensitive Road Design and Management¹⁷² states that a monitoring regime should address all success criteria and management objectives, be achievable with available resources, prescribe sufficient time to measure impacts, and prescribe specific instructions as to how the monitoring is to take place.

Monitoring for road kill prior to and after, if the road is constructed, provides an opportunity for adaptive management measures. These may include some retrofitting of structures to tackle any problems that arise that were not identified in the assessment phase.

Monitoring of an existing road, before and after sealing, allows for some assessment of the impact of these changes. However, the design of the monitoring study and the quality of the data is critical to enhance the probability of detecting any changes due to the road construction.

The study will need to consider issues such as the seasonality of road kill. Road kill also varies from year to year, depending on broader environmental factors such as variation

¹⁷² Jungalwalla 2003

in climatic conditions (more road kill may occur during drought periods as animals are attracted to the road for food), variation in fauna abundance, traffic volumes and timing.

The effectiveness of any mitigation measures is generally difficult to measure. For example the effectiveness of the features incorporated along the Marrawah to Arthur River Road cannot be demonstrated. Although some lessons for the design of the crossings can be taken which may improve their effectiveness e.g. longer fences larger pipes, placement of pipes so they do not fill with water when it rains.

Any attempt to monitor for changes in the impact of road kill on a particular species will also require an assessment of population densities in the area. In addition, any attempt to monitor for impact of roadwork to road kill requires the use of a reference site where no works are undertaken. The reference site should match the study site as closely as possible.

The potential risk of road kill of giant freshwater lobster has been raised in recognition of the substandard design of some culverts at creek crossings (section 4.3.5). A formal review of all crossings could be made in light of this to identify potential black spots and considered retrofitting of features to encourage lobster passage, where future monitoring identifies elevated incidences of road kill.

Monitoring

A 12 month Monitoring Project has been undertaken of the western half of the route (Segments A-L & O). The assessment and reporting of this work falls outside the scope of this report.

Following completion of each stage of the Tarkine Forest Drive project, regular monitoring for road kill should be undertaken. To make useful comparison with the baseline data, repeat surveys of the control sections will be necessary.

6. LEGISLATIVE IMPLICATIONS

6.1 COMMONWEALTH *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999*

A copy of the EPBC Act Protected Matters report is included in Appendix 5. This identifies 49 threatened species (38 fauna, 11 flora) plus 24 migratory bird species. Those with potential habitat in the area are considered in section 3.8. Those which have been confirmed or considered to potentially occur have been highlighted.

Referral under the EPBC Act is necessary if, as the Act states:

‘An action has, will have, or is likely to have a significant impact on a vulnerable / endangered species if it does, will or is likely to (amongst other things):

- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- adversely affect habitat critical to the survival of a species.’

Referral is made to Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPAC).

The western section (Segments A, B, C) pass through an area of western Tasmania which supports as many as nine nationally listed orchid species. Only one is likely to be at risk of impact from the project.

Two nationally listed fauna species may be impacted by the proposals.

6.1.1 Arthur River Greenhood

This occurs as several populations in the area but at one location (Tiger Flats – Segment B) the population is located on the very edge of the Temma Road. Two plants were observed in 2009 that had colonised the gravel road shoulder. Therefore any works in this area is likely to have a direct impact on some plants. Detailed assessment of this population suggests that the impact need be relatively minor. A similar impact is equally likely from standard road maintenance procedures. Indeed in the long term a sealed road is likely to have less impact than a gravel road, which requires regular grading. However it is critical that the core of the population is protected from inadvertent damage during the construction period as the location would be deemed suitable for storage of materials and machinery.

6.1.2 Tasmanian devil

The EPBC Tasmanian Devil Policy states that “new roads or upgrades in sensitive locations that may substantially increase the risk of Tasmanian devils being killed are likely to require referral and consideration under the EPBC Act.”¹⁷³

An increase in traffic volume and speed is likely to increase road kill, not only within the Tarkine Forest Drive but within connecting roads. This impact may be significant, especially if the Devil Facial Tumour Disease were to spread to the far Northwest.

The potential impacts on the Tasmanian devil from the proposed action to construct the Tarkine Forest Drive are likely to constitute a ‘controlled action’ by the Minister for the Environment.

¹⁷³ DEH 2006

Design features, which manage driver and wildlife behaviour, and a monitoring program, which includes an adaptive management response to any significant increases in road kill, will mitigate potential impacts on the Tasmanian devil.

6.1.3 Spotted-tailed quoll

An increase in traffic volume and speed along the Tarkine Forest Drive and connecting roads may lead to an increase in road kill of spotted-tailed quolls.

6.2 TASMANIAN THREATENED SPECIES PROTECTION ACT 1995

Although over 30 species of listed flora have been recorded within the vicinity of the road, consideration of all species and targeted surveys indicates that the number of species likely to be impacted by the works is perhaps four species:

- **Swamp doubletail (*Diuris palustris*) (Endangered)**
- **Northwest heath (*Epacris curtisiae*) (Rare)**
- **Yellow onion-orchid (*Microtidium atratum*) (Rare)**
- **Arthur River greenhood (*Pterostylis rubenachii*) (Endangered)**

Impacts to all four species are likely to be minor and significant areas of habitat can be avoided with appropriate controls.

A permit is likely to be required under this legislation for the project for direct impacts to these flora species. Further survey for flora, may be necessary to fully quantify impacts once detailed design has been undertaken.

No direct impacts to any threatened fauna species are anticipated.

6.3 TASMANIAN WEED MANAGEMENT ACT 1999

Table 8 summarises the status of declared weeds in the municipality of Circular Head according to relevant Weed Management Plans prepared under the Act. Weeds of National Significance (WONs) are identified.

It should be noted that the level of survey undertaken for this project is of insufficient resolution to pick up all weed infestations.

Table 8 – Status of Declared Weeds

Weed	WONs	Status In Circular Head
Blackberry (<i>Rubus fruticosus</i> agg.)	WONs	B, widespread
Gorse (<i>Ulex europaeus</i>)	WONs	B, localised
Spanish heath (<i>Erica lusitanica</i>)	-	A, localised
Creeping thistle (<i>Cirsium arvense</i>)	-	B, localised

According to the provisions of the *Weed Management Act 1999*, Zone A municipalities include those which are either free of the weed or host small isolated infestations which are considered eradicable. The principal management objective should be to implement an integrated control program for eradication and prevent future occurrences.

Zone B municipalities are those which host large, widespread infestations of the declared weed that are not deemed eradicable because the feasibility of effective management is low at this time, therefore the objective is containment of infestations. The objective includes preventing spread of the declared weeds from the municipality and preventing spread to properties currently free of them. There is a requirement to prevent spread of the weeds to properties containing sites for significant flora, fauna and vegetation communities such as those present here.

6.3.1 Spanish heath

Under this Act Circular Head is classed as a Zone A municipality for infestations of Spanish heath (*Erica lusitanica*).

The eradication of Spanish heath should be given particular attention as currently the infestations are limited. There are moderately low numbers of individual plants on the verges of the road on Rebecca Road and Sumac Road. The two plants at the edge of the Rebecca Road were hand pulled and bagged and later burnt. The infestations on the verges of Sumac Road and Backwater Road are between 50 and 100 sqm in area. These infestations should be treated prior to commencement of works. Annual follow up of weed treatment is critical to effectively eradicate this weed at a local level. Prescribed actions that result in the eradication and prevention of spread should be prepared. Because the infestations are all on the sides of roads, the greatest risk to spreading the Spanish heath comes from road maintenance activities such as grading or slashing the road verges.

6.3.2 Gorse

Circular Head Council is a Zone B municipality under the Act which has a management aim of containment, the localised nature of the single gorse plant recorded on the Blackwater Road and another on Rebecca Road makes it feasible to aim for eradication.

6.3.3 Blackberry

Circular Head Council is classed as Zone B municipality for infestations of blackberry. While the principal management objective under legislation is containment of infestations and to prevent spread of the declared weed from the municipality, the minor isolated infestations are outliers in areas otherwise free of blackberry so it would be feasible to apply the management aim of eradication.

A weed management plan for the Tarkine Forest Drive should be prepared that considers measures to reduce the risk of spreading or introducing weeds. The extensive nature of the road works associated with this project will require strategic planning to minimise the risk of weed translocation. Containment sites which may otherwise act as infection sites should be identified and known sites treated prior to works starting.

The locations of known weed populations should be marked to ensure road works do not involve the movement of seed infected road gravels. Future roadside maintenance in this area should respond to the presence of these infestations to ensure it does not inadvertently spread the weed

6.4 TASMANIAN LAND USE AND PLANNING APPROVALS ACT 1993

The study area is entirely confined to Circular Head Council.

LUPAA states that 'in determining an application for a permit, a planning authority must (amongst other things) seek out the objectives set out in Schedule 1'.

Schedule 1 includes 'The objectives of the Resource Management and Planning System of Tasmania' which are (amongst other things):

‘To promote sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity’.

Sustainable development includes ‘avoiding, remedying or mitigating any adverse effects of activities on the environment’.

Threatened species issues are adequately dealt with through other legislation. There is very limited vegetation clearance required for this project.

6.5 TASMANIAN *FOREST PRACTICES ACT 1985*

Public roads are exempt from this act, but activities within State Forest may require a Forest Practices Plan.

If the entire road is to become a public road then it may be entirely exempt.

The *Forest Practices Act (FPA)* requires a Forest Practices Plan (FPP) where the clearing of forest is in excess of 1 hectare or 100 tonnes of timber or involves ‘vulnerable land’ where the thresholds become less. An amendment to the *Forest Practices Act* (April 2007) precludes the approval for the clearance of threatened forest communities and extends to the regulation of clearance of listed threatened non forest communities.

The approval of a FPP will be subject to advice from the Development and Conservation Assessment Branch, DPIPW with respect to threatened species. It may also consider other values unless they are assessed through the planning approval process.

7. CONCLUSION

The Tarkine Forest Drive project is entirely confined to the sealing of existing roads and car parks with some minor infrastructure provisions. The project is located in an area near the northern fringes of a region popularly termed The Tarkine of which the Australian Government Department of Sustainability, Environment, Water, Population and Communities is currently considering a nomination for listing as the Tarkine Wilderness Area on the National Heritage List under the EPBC Act.

The aim of the project is to facilitate tourist access in the northwest Arthur River Forests area of Tasmania, resulting in an increase in the numbers of people and vehicles in the region and widening the range of user groups. It will provide improved public access through the sealing of existing roads, which will encourage hire car access.

An increase in human activity and access to isolated natural areas will bring with it environmental impacts. This assessment specifically considers the impact of the project on the natural biological values of the area.

The existing road infrastructure within the study area is extensive. This, combined with the extent of other land use activities throughout much of the corridor, is relevant to and provides context for this assessment. Much of the landscape crossed by the Tarkine Forest Drive is subject to forestry and mining. In addition, the western half of the road is already used as an alternate transport link to that part of the west coast between Arthur River and Temma.

The extent of direct impact to native vegetation systems is minor when compared to existing impacts on the vegetation in the area from activities such as forestry and mining.

There are a number of threatened flora species which may be impacted by the project. The project is unlikely to have a significant impact on the conservation status of any of the species that are known from the area, although some impacts are likely.

There are several threatened fauna species which may be impacted by the project. The most significant issue is the potential for the project to impact on the status of the Tasmanian devil which is under significant threat from DFTD. As knowledge about DFTD and its impact on the Tasmanian devil is rapidly evolving, it is difficult to conclude with confidence what the impact of the project is likely to be.

The impact of the Tarkine Forest Drive on the Tasmanian devil, and to the spotted-tailed quoll, can be minimised if mitigation measures are adopted; including design features and measures to reduce the incidence of road kill supplemented by a monitoring program which incorporates triggers for management actions when levels of impacts are exceeded.

8. SUMMARY OF RECOMMENDATIONS

Further surveys

The following specific investigations are required to assist with the impact assessment and referral review.

- **Unsurveyed sections and additional infrastructure**

Several sections not yet surveyed may require further investigation. These include new sections, not previously considered: Sumac Road, south of Spur 4.1 (part of Segment J); Rapid River Road from Sumac Rd to just past Rapid River bridge (part of Segment K); Tayatea Rd approaching Tayatea Bridge (Segment M), Sumac Rd from Rapid River Rd to Dempster Lookout (Segment O) and Milkshake Hills access road (Segment P). In total these unsurveyed sections extend over 18.3 km.

There may also be additional sites associated with the project that have not been assessed such as quarry sites or extensions to existing car parks.

- **Orchids**

Orchid habitat extends onto the road shoulder at one location on Segment B (Tiger Flats). Full quantification of the impact at this section would be dependent on further detailed design of works. This may be necessary to inform a permit application under the Tasmanian *Threatened Species Protection Act 1995*.

- ***Epacris curtisiae* – northwest heath**

This shrub is known from the roadside within the Arthur-Pieman Conservation Area along Rebecca Road. Any earthworks in this vicinity would need to be defined to enable quantification of losses. A new record of this species (2011) from Sumac Spur 8A, extending within 30m of the existing Blackwater Road suggest that the moorland section of road should be surveyed if any earthworks are planned in this area. Given this section of road is already sealed this may not be an issue. The inclusion of Dempster Lookout also incorporates new habitat for this species. Any earthworks on Dempster Plains should be assessed for impacts to this species.

- **PC survey**

Phytophthora cinnamomi is present and potentially could occur throughout sections of heathland and moorland. Although opportunistically recorded from previous work, detailed survey of all potential habitats is recommended. Select sampling of plant material exhibiting symptomatic evidence should be collected for confirmation testing. The findings from the survey can inform the best strategies for the Weed and Disease Management Plan.

- **Creek crossing assessment**

Some creek crossings are serviced by culverts that are inadequate at allowing giant freshwater lobster passage. Larger bridge crossings don't always allow for large animal passage. In both cases animals are forced to cross above the road and are at risk to road kill.

Detailed assessment of existing culverts and bridges could be undertaken to categorise all crossing for suitability. This information could be used to direct monitoring of road kill and also to consider options for retrofitting features to encourage animal passage. The design of the two new bridges are particularly relevant to this consideration.

Addendum

The results from the further surveys should be reported as an addendum to this document. Information will be used to inform planning and design. It is unlikely any of these findings will affect the outcome of any approvals but they may suggest modifications to the design or require specific management actions.

Management plans

It is recommended that the following plans are prepared prior to construction to minimise impacts on threatened flora and fauna:

- **Bridge Crossing**

This plan should investigate options for design features to permit animal passage along the riverbanks at the base of bridges.

- **Road kill Monitoring**

A 12 month road kill monitoring study was undertaken in 2009-2010. This project will provide baseline data against which monitoring post construction can be compared. Outcomes from the monitoring should help to:

- identify locations where high levels of road kill already exist (blackspots)
- inform requirements for road design changes to reduce the road kill hazard

- **Road kill Mitigation**

A road kill mitigation plan should be developed to minimise the risk of road kill resulting from the implementation of the Tarkine Forest Drive. This should include modelling of the road kill hazard presented by the road layout. The plan should identify areas where mitigation measures should be implemented and should also recommend what management measures should be implemented to reduce the risk of road kill. The existing road sections should be assessed for features that are associated with road kill including barriers, culverts, and embankments.

- **Flora and Fauna Management Plan**

This plan should consider all threatened species identified in this report and addendum that may be impacted by the construction and ongoing use of the Tarkine Forest Drive. It should prescribe measures to protect species and habitats and quantify any impacts to threatened species that may require permits.

- **Weed and Disease Management Plan**

This will consider measures to minimise the risk of introducing weeds and diseases into the area. It will also prescribe measures to control or secure existing infestations.

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APPENDIX 1 – CONSERVATION VALUES OF PLANT AND ANIMAL SPECIES

SPECIES OF NATIONAL SIGNIFICANCE

Listed in Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

The *EPBC Act* has six categories of threat status for species:

1. **Extinct** - If at a particular time there is no reasonable doubt that the last member of the species has died.
2. **Extinct in the wild** - If it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or If it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
3. **Critically endangered** - If at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
4. **Endangered** - If it is not critically endangered; and it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
5. **Vulnerable** - If at a particular time it is not critically endangered or endangered; and it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
6. **Conservation dependent** - If, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

SPECIES OF STATE SIGNIFICANCE

Listed in Tasmanian *Threatened Species Protection Act 1995 (TSP Act)*

Threatened flora and fauna species in Tasmania are listed in Schedules 3 (extinct or endangered), 4 (vulnerable) or 5 (rare). These three categories are defined in Section 15 of the Act.

1. **Extinct** - If no occurrence of the taxon in the wild can be confirmed during the past 50 years.
2. **Endangered** - If it is in danger of extinction because long-term survival is unlikely while the factors causing it to be endangered continue operating.
3. **Vulnerable** - If it is likely to become an endangered taxon while the factors causing it to be vulnerable continue operating.
4. **Rare** - If it has a small population in Tasmania that is not endangered or vulnerable but is at risk."

Species that have been nominated and approved by the Scientific Advisory Committee for listing in the Act.

SPECIES OF REGIONAL OR GENERAL SIGNIFICANCE

The following definitions are from three publications: Flora Advisory Committee 1994, Vertebrate Advisory Committee 1994, Invertebrate Advisory Committee 1994.

Flora only - Species listed as rare but not necessarily 'at risk' (**r3**).

Fauna only – Species requiring monitoring (**m**).

Both – Species of unknown risk status (**k**) in Tasmania, or thought to be uncommon within region, or a species having a declining range or populations within the area.

Species considered being outside its normal range or of an unusual form as determined and justified in the body of the report.

Species identified in regional studies as being of conservation significance that are not listed in current legislation.

Species that have been recognised, but have not been formally described in a published journal, that are thought to be significant as determined and justified in the body of the report.

Plant species that are not known to be reserved. To be so it must be known to exist in at least one secure Reserve. Secure reserves include reserves and parks requiring the approval of both Houses of Parliament for their revocation. They include: National Parks, Aboriginal Sites, Historic Sites, Nature Reserves, State Reserves, Game Reserves, Forest Reserves, Wellington Park, and insecure reserves in the World Heritage Area which is protected by international agreement under the World Heritage Convention.

APPENDIX 2 – LEGISLATIVE IMPLICATIONS OF THREATENED SPECIES**TASMANIAN STATE LEGISLATION AFFECTING THREATENED SPECIES*****Threatened Species Protection Act 1995***

Threatened flora and fauna species in Tasmania are listed in Schedules 3 (endangered) and 4 (vulnerable) of the Threatened Species Protection Act, 1995. Rare species that are considered to be 'at risk' are listed in Schedule 5 of the Act. These three categories are defined in Section 15 of the Act.

1. "An extant taxon of native flora or fauna may be listed as **endangered** if it is in danger of extinction because long-term survival is unlikely while the factors causing it to be endangered continue operating.
2. A taxon of native flora or fauna may be listed as **vulnerable** if it is likely to become an endangered taxon while the factors causing it to be vulnerable continue operating.
3. A taxon of native flora or fauna may be listed as **rare** if it has a small population in Tasmania that is not endangered or vulnerable but is at risk."

The Act provides mechanisms for protecting these species from threatening processes the implementation of 'recovery plans', 'threat abatement plans', 'land management plans', public authority agreements', and 'interim protection orders'.

Section 51 (a) of the TSPA states that: "A person must not knowingly, without a permit - take, trade in, keep or process any listed flora or fauna". The Act defines 'take' as including: "kill, injure, catch, damage, destroy and collect. A land manager is therefore required to obtain a permit from the Tasmanian Department of Primary Industries, Water and Environment (DPIWE) to carry out management that may adversely affect any of the species listed in the Act.

Commonwealth of Australia Legislation Affecting Threatened Species

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act establishes a process for assessing actions that are likely to have impacts of *national environmental significance*. Such impacts include World Heritage Areas, RAMSAR Wetland sites of international importance, migratory species protected under international agreements, nuclear actions, the Commonwealth marine environment and **nationally threatened species and communities**.

Threatened species are defined in several categories:

1. Extinct

- If at a particular time there is no reasonable doubt that the last member of the species has died.

2. Extinct in the wild

- If it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
- If it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

3. Critically endangered

- If at a particular time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

4. Endangered

- If it is not critically endangered; and it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

5. Vulnerable

- If at a particular time it is not critically endangered or endangered; and it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

6. Conservation dependent

- If, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

An action that is likely to affect species that are listed in any of the above categories may require ministerial approval unless the Commonwealth Environment Minister has granted an exemption. The Act establishes a **referral process** to Environment Australia to determine whether an action requires a formal **approval** and thus would be required to proceed through the **assessment and approval process**.

A referral must provide sufficient information to allow the Minister to make a decision. The Minister is then required to make a decision within 20 business days of the referral. The Minister may decide an approval is not necessary if the action is taken in a specified manner. The action may not require approval but may require a **permit** if undertaken on Commonwealth land. If an approval is required then an **environmental assessment** must be carried out. In such instances the environmental assessment approach will be determined by the Minister and may vary from preliminary documentation to a full public inquiry depending on the scale and complexity of the impact.

APPENDIX 3 – PLANT COMMUNITIES**Community: DNI**

Trees:	<i>Allocasuarina monilifera</i> , <i>Eucalyptus nitida</i>
Tall Shrubs:	<i>Banksia marginata</i> , <i>Leptospermum lanigerum</i> , <i>Leptospermum nitidum</i> , <i>Leptospermum scoparium</i> , <i>Melaleuca squarrosa</i>
Shrubs:	<i>Bauera rubioides</i> , <i>Dillwynia glaberrima</i> , <i>Epacris impressa</i> , <i>Epacris lanuginosa</i> , <i>Melaleuca squamea</i> , <i>Persoonia juniperina</i> var. <i>brevifolia</i> , <i>Philotheca virgata</i> , <i>Pultenaea juniperina</i> , <i>Sprengelia incarnata</i>
Low Shrubs:	<i>Aotus ericoides</i>
Herbs:	<i>Stylidium graminifolium</i>
Graminoids:	<i>Empodisma minus</i> , <i>Eurychorda complanata</i> , <i>Gahnia grandis</i> , <i>Gymnoschoenus</i> <i>sphaerocephalus</i> , <i>Lepidosperma filiforme</i> , <i>Patersonia fragilis</i> , <i>Schoenus</i> <i>lepidosperma</i> subsp. <i>lepidosperma</i>
Ferns:	<i>Gleichenia dicarpa</i> , <i>Lycopodium deuterodensum</i> , <i>Selaginella uliginosa</i>

Community: GHC

Low Shrubs:	<i>Hibbertia sericea</i> var. <i>sericea</i>
Graminoids:	<i>Ficinia nodosa</i> , <i>Juncus kraussii</i> subsp. <i>australiensis</i> , <i>Lomandra longifolia</i>
Grasses:	<i>Austrodanthonia</i> sp., <i>Themeda triandra</i>

Community: MBW

Tall Shrubs:	<i>Banksia marginata</i> , <i>Leptospermum glaucescens</i> , <i>Leptospermum nitidum</i>
Shrubs:	<i>Baeckea leptocaulis</i> , <i>Bauera rubioides</i> , <i>Boronia citriodora</i> , <i>Dillwynia glaberrima</i> , <i>Epacris impressa</i> , <i>Melaleuca squamea</i> , <i>Monotoca submutica</i> , <i>Philotheca virgata</i> , <i>Sprengelia incarnata</i>
Graminoids:	<i>Chordifex hookeri</i> , <i>Empodisma minus</i> , <i>Eurychorda complanata</i> , <i>Gymnoschoenus</i> <i>sphaerocephalus</i> , <i>Lepidosperma filiforme</i> , <i>Leptocarpus tenax</i> , <i>Patersonia fragilis</i> , <i>Schoenus lepidosperma</i> subsp. <i>lepidosperma</i> , <i>Xyris operculata</i>
Ferns:	<i>Selaginella uliginosa</i>

Community: MSW

Tall Shrubs:	<i>Leptospermum lanigerum</i> , <i>Leptospermum nitidum</i>
Shrubs:	<i>Allocasuarina zephyrea</i> , <i>Melaleuca gibbosa</i> , <i>Melaleuca squamea</i> , <i>Philotheca virgata</i> , <i>Sprengelia incarnata</i>
Graminoids:	<i>Chordifex hookeri</i> , <i>Empodisma minus</i> , <i>Gymnoschoenus sphaerocephalus</i> , <i>Hypolaena fastigiata</i> , <i>Lepidosperma filiforme</i> , <i>Leptocarpus tenax</i> , <i>Sporadanthus</i> <i>tasmanicus</i> , <i>Xyris</i> sp.

Community: RMS

Trees:	<i>Acacia melanoxylon</i> , <i>Atherosperma moschatum</i> subsp. <i>moschatum</i> , <i>Eucryphia</i> <i>lucida</i> , <i>Nothofagus cunninghamii</i>
Tall Shrubs:	<i>Anodopetalum biglandulosum</i> , <i>Anopterus glandulosus</i> , <i>Leptospermum lanigerum</i> , <i>Melaleuca squarrosa</i>
Shrubs:	<i>Cenarrhenes nitida</i> , <i>Trochocarpa cunninghamii</i>
Graminoids:	<i>Juncus pauciflorus</i> , <i>Uncinia riparia</i>
Ferns:	<i>Histiopteris incisa</i> , <i>Hymenophyllum rarum</i> , <i>Hypolepis rugosula</i>

Community: RMT

- Trees: *Atherosperma moschatum* subsp. *moschatum*, *Eucalyptus nitida*, *Eucryphia lucida*, *Nothofagus cunninghamii*, *Phyllocladus aspleniifolius*
- Tall Shrubs: *Anodopetalum biglandulosum*, *Anopterus glandulosus*
- Shrubs: *Aristolelia peduncularis*, *Cenarrhenes nitida*, *Pimelea drupacea*, *Tasmannia lanceolata*
- Ferns: *Asplenium appendiculatum* subsp. *appendiculatum*, *Blechnum wattsi*, *Dicksonia antarctica*, *Grammitis magellanica* subsp. *nothofageti*, *Hymenophyllum peltatum*, *Rumohra adiantiformis*

Community: SMR

- Trees: *Eucalyptus brookeriana*
- Tall Shrubs: *Banksia marginata*, *Leptospermum lanigerum*, *Leptospermum scoparium*, *Melaleuca squarrosa*, *Nematolepis squamea*
- Shrubs: *Bauera rubioides*, *Epacris impressa*, *Euryomyrtus ramosissima*, *Leucopogon collinus*, *Melaleuca squamea*, *Persoonia juniperina*, *Philothea virgata*, *Sprengelia incarnata*, *Tasmannia lanceolata*
- Low Shrubs: *Aotus ericoides*
- Herbs: *Abrotanella forsteroides*, *Xanthosia tasmanica*
- Graminoids: *Baloskion tetraphyllum* subsp. *tetraphyllum*, *Chordifex hookeri*, *Eurychorda complanata*, *Gahnia grandis*, *Gymnoschoenus sphaerocephalus*, *Hypolaena fastigiata*, *Lepidosperma concavum*, *Leptocarpus tenax*, *Patersonia fragilis*, *Xyris operculata*
- Grasses: *Ehrharta distichophylla*
- Ferns: *Blechnum wattsi*, *Selaginella uliginosa*
- Climbers: *Cassytha glabella*

Community: SWW

- Tall Shrubs: *Leptospermum glaucescens*, *Leptospermum scoparium*, *Melaleuca squarrosa*
- Shrubs: *Bauera rubioides*, *Bossiaea cinerea*, *Epacris impressa*, *Monotoca submutica*, *Persoonia juniperina*, *Sprengelia incarnata*
- Low Shrubs: *Aotus ericoides*

Community: WBR

- Trees: *Acacia melanoxylon*, *Atherosperma moschatum* subsp. *moschatum*, *Eucalyptus brookeriana*, *Eucalyptus obliqua*, *Eucryphia lucida*, *Nothofagus cunninghamii*, *Phyllocladus aspleniifolius*
- Tall Shrubs: *Anopterus glandulosus*, *Leptospermum lanigerum*, *Leptospermum scoparium*, *Monotoca glauca*, *Nematolepis squamea*, *Zieria arborescens*
- Graminoids: *Gahnia grandis*
- Ferns: *Blechnum nudum*, *Blechnum wattsi*, *Dicksonia antarctica*, *Gleichenia dicarpa*, *Pteridium esculentum*

Community: WNL

- Trees: *Eucalyptus nitida*, *Eucalyptus obliqua*, *Nothofagus cunninghamii*, *Phyllocladus aspleniifolius*
- Tall Shrubs: *Acacia mucronata*, *Acacia mucronata* subsp. *dependens*, *Acacia verticillata*, *Banksia marginata*, *Leptospermum glaucescens*, *Leptospermum lanigerum*,

	<i>Leptospermum nitidum</i> , <i>Leptospermum scoparium</i> , <i>Melaleuca squarrosa</i> , <i>Monotoca glauca</i> , <i>Nematolepis squamea</i> , <i>Oxylobium arborescens</i>
Shrubs:	<i>Bauera rubioides</i> , <i>Cenarrhenes nitida</i> , <i>Leptecophylla juniperina</i> , <i>Melaleuca squamea</i> , <i>Tasmannia lanceolata</i>
Herbs:	<i>Dianella tasmanica</i> , <i>Drymophila cyanocarpa</i>
Graminoids:	<i>Baloskion tetraphyllum subsp. tetraphyllum</i> , <i>Gahnia grandis</i>
Ferns:	<i>Blechnum wattsii</i> , <i>Gleichenia dicarpa</i> , <i>Gleichenia microphylla</i>

Community: WNR

Trees:	<i>Eucalyptus nitida</i> , <i>Nothofagus cunninghamii</i> , <i>Phyllocladus aspleniifolius</i>
Tall Shrubs:	<i>Acacia mucronata</i> , <i>Anodopetalum biglandulosum</i> , <i>Anopterus glandulosus</i> , <i>Leptospermum nitidum</i> , <i>Leptospermum scoparium</i> , <i>Melaleuca squarrosa</i> , <i>Monotoca glauca</i> , <i>Nematolepis squamea</i>
Shrubs:	<i>Bauera rubioides</i> , <i>Cenarrhenes nitida</i> , <i>Leptecophylla juniperina</i> , <i>Sprengelia incarnata</i>
Graminoids:	<i>Gahnia grandis</i>
Ferns:	<i>Gleichenia dicarpa</i>

Community: WOB

Trees:	<i>Acacia melanoxylon</i> , <i>Eucalyptus obliqua</i>
Tall Shrubs:	<i>Acacia mucronata</i> , <i>Acacia verticillata</i> , <i>Leptospermum lanigerum</i> , <i>Leptospermum scoparium</i> , <i>Melaleuca squarrosa</i> , <i>Nematolepis squamea</i> , <i>Pomaderris apetala</i> , <i>Zieria arborescens</i>
Shrubs:	<i>Acacia longifolia</i> , <i>Olearia lirata</i>
Graminoids:	<i>Gahnia grandis</i> , <i>Juncus bassianus</i>
Ferns:	<i>Dicksonia antarctica</i>

Community: WOR

Trees:	<i>Acacia melanoxylon</i> , <i>Eucalyptus obliqua</i> , <i>Eucryphia lucida</i> , <i>Nothofagus cunninghamii</i> , <i>Phyllocladus aspleniifolius</i>
Tall Shrubs:	<i>Acacia verticillata</i> , <i>Anodopetalum biglandulosum</i> , <i>Anopterus glandulosus</i> , <i>Melaleuca squarrosa</i> , <i>Monotoca glauca</i> , <i>Olearia argophylla</i> , <i>Pomaderris apetala</i>
Shrubs:	<i>Cenarrhenes nitida</i> , <i>Coprosma quadrifida</i> , <i>Olearia lirata</i>
Herbs:	<i>Correa lawrenceana var. lawrenceana</i>
Graminoids:	<i>Gahnia grandis</i>
Ferns:	<i>Blechnum nudum</i> , <i>Dicksonia antarctica</i> , <i>Histiopteris incisa</i> , <i>Hypolepis rugosula</i>

APPENDIX 4 – SURVEY FROM WESTERN SECTION (SEGMENTS A, B & C).**SSC - coastal scrub SEGMENT A**

Grid Reference: 306212E, 5450183N
 Accuracy: within 1 kilometre
 Recorder: Karen Ziegler
 Date of Survey: 4 Nov 2009

Trees: *Eucalyptus nitida*, *Eucalyptus viminalis* subsp. *viminalis*
 Tall Shrubs: *Banksia marginata*, *Leptospermum laevigatum*
 Shrubs: *Acacia longifolia* subsp. *sophorae*, *Leucopogon parviflorus*, *Persoonia juniperina*
 Low Shrubs: *Hibbertia sericea* var. *sericea*
 Herbs: *Acaena novae-zelandiae*, *Caladenia carnea*, *Comesperma vulgaris*, *Hydrocotyle hirta*,
Microtis arenaria, *Pterostylis pedunculata*
 Graminoids: *Ficinia nodosa*, *Lepidosperma concavum*, *Lomandra longifolia*
 Ferns: *Pteridium esculentum*

WBR SEGMENT A

Grid Reference: 305553E, 5451872N
 Accuracy: within 50 metres
 Recorder: Karen Ziegler
 Date of Survey: 4 Nov 2009

Trees: *Eucalyptus brookeriana*
 Tall Shrubs: *Acacia verticillata*, *Leptospermum lanigerum*, *Melaleuca ericifolia*, *Monotoca glauca*,
Pomaderris apetala
 Shrubs: *Coprosma quadrifida*, *Leucopogon parviflorus*
 Ferns: *Dicksonia antarctica*, *Pteridium esculentum*

DVC SEGMENT B

Grid Reference: 306012E, 5448933N
 Accuracy: within 50 metres
 Recorder: Karen Ziegler
 Date of Survey: 4 Nov 2009

Trees: *Eucalyptus viminalis* subsp. *viminalis*
 Tall Shrubs: *Banksia marginata*, *Leptospermum laevigatum*
 Shrubs: *Acacia longifolia* subsp. *sophorae*, *Leucopogon parviflorus*
 Low Shrubs: *Hibbertia sericea* var. *sericea*
 Herbs: *Ajuga australis*, *Dichondra repens*, *Geranium potentilloides*
 Graminoids: *Ficinia nodosa*, *Lomandra longifolia*

SCH coastal heathland influenced by microhabitat along rd SEGMENT B

Grid Reference: 305862E, 5443183N
 Accuracy: within 1 kilometre
 Recorder: Karen Ziegler
 Date of Survey: 4 Nov 2009

Trees: *Allocasuarina monilifera*, *Eucalyptus nitida*
 Tall Shrubs: *Acacia mucronata*, *Acacia verticillata*, *Acacia verticillata* subsp. *ovoidea*, *Banksia marginata*, *Leptospermum laevigatum*, *Leptospermum lanigerum*, *Leptospermum scoparium*, *Melaleuca ericifolia*, *Melaleuca squarrosa*, *Pultenaea daphnoides* var. *obcordata*
 Shrubs: *Acacia longifolia* subsp. *sophorae*, *Amperea xiphoclada* var. *xiphoclada*, *Bauera rubioides*, *Bossiaea cordigera*, *Daviesia ulicifolia*, *Epacris impressa*, *Leucopogon collinus*, *Leucopogon ericoides*, *Leucopogon parviflorus*, *Melaleuca gibbosa*, *Persoonia juniperina*, *Pomaderris elliptica*
 Low Shrubs: *Acacia myrtifolia*, *Aotus ericoides*, *Astroloma humifusum*, *Hibbertia sericea* var. *sericea*
 Herbs: *Acaena novae-zelandiae*, *Caladenia carnea*, *Calochilus paludosus*, *Comesperma*

	<i>vulgaris</i> , <i>Kennedia prostrata</i> , <i>Microtis arenaria</i> , <i>Mitrasacme pilosa</i> var. <i>pilosa</i> , <i>Rhytidosporum procumbens</i> , <i>Sphaerolobium</i> sp., <i>Thelymitra juncifolia</i> , <i>Thelymitra rubra</i>
Graminoids:	<i>Diplarrena latifolia</i> , <i>Gahnia grandis</i> , <i>Lepidosperma</i> sp., <i>Leptocarpus tenax</i> , <i>Lomandra longifolia</i> , <i>Patersonia fragilis</i>
Grasses:	<i>Ehrharta distichophylla</i>
Ferns:	<i>Gleichenia microphylla</i> , <i>Pteridium esculentum</i>
Climbers:	<i>Comesperma volubile</i>
Weeds:	<i>Hypochoeris radicata</i> , <i>Ulex europaeus</i>

Orchids along Temma Road SEGMENT B

Grid Reference:	306212E, 5441183N
Accuracy:	within 5 kilometre
Recorder:	Karen Ziegler
Date of Survey:	5 Nov 2009
Herbs:	<i>Caladenia carnea</i> , <i>Calochilus herbaceus</i> , <i>Calochilus paludosus</i> , <i>Calochilus platyphila</i> , <i>Microtis arenaria</i> , <i>Prasophyllum rostratum</i> , <i>Pterostylis tasmanica</i> , <i>Thelymitra aristata</i> , <i>Thelymitra exigua</i> , <i>Thelymitra juncifolia</i> , <i>Thelymitra nuda</i> , <i>Thelymitra pauciflora</i> , <i>Thelymitra rubra</i>

Orchid sp. along Rebbecca Rd. SEGMENT C

Grid Reference:	307612E, 5439483N
Accuracy:	within 1 kilometre
Recorder:	Karen Ziegler
Date of Survey:	5 Nov 2009
Herbs:	<i>Caladenia dienema</i> , <i>Calochilus paludosus</i> , <i>Calochilus platyphila</i> , <i>Microtis arenaria</i> , <i>Prasophyllum rostratum</i> , <i>Thelymitra juncifolia</i> , <i>Thelymitra rubra</i>

GHC - Tiger Flat SEGMENT B

Grid Reference:	305650E, 5447600N
Accuracy:	within 50 metres
Recorder:	Andrew J. North
Date of Survey:	4 Nov 2009
Tall Shrubs:	<i>Acacia verticillata</i> subsp. <i>ovoidea</i> , <i>Leptospermum scoparium</i>
Shrubs:	<i>Melaleuca gibbosa</i>
Low Shrubs:	<i>Acrotriche serrulata</i> , <i>Astroloma humifusum</i>
Herbs:	<i>Acaena echinata</i> , <i>Diuris palustris</i> , <i>Drosera pygmaea</i> , <i>Hypoxis hygrometrica</i> , <i>Microtis</i> sp., <i>Oxalis perennans</i> , <i>Plantago coronopus</i> , <i>Pterostylis rubenachii</i> , <i>Thelymitra</i> sp., <i>Wurmbea dioica</i> subsp. <i>dioica</i>
Graminoids:	<i>Baumea juncea</i> , <i>Ficinia nodosa</i> , <i>Isolepis levynsiana</i> , <i>Juncus astreptus</i> , <i>Lomandra longifolia</i>
Grasses:	<i>Austrodanthonia</i> sp.
Ferns:	<i>Pteridium esculentum</i>
Weeds:	<i>Acetosella vulgaris</i> , <i>Anthoxanthum odoratum</i> , <i>Briza minor</i> , <i>Centaureum erythraea</i> , <i>Hypochoeris radicata</i> , <i>Lotus</i> sp., <i>Prunella vulgaris</i> , <i>Trifolium dubium</i>

AHF - creek - SEGMENT B

Grid Reference:	305700E, 5447950N
Accuracy:	within 50 metres
Recorder:	Andrew J. North
Date of Survey:	4 Nov 2009
Tall Shrubs:	<i>Leptospermum lanigerum</i>
Shrubs:	<i>Epacris lanuginosa</i>
Herbs:	<i>Crassula helmsii</i> , <i>Hydrocotyle sibthorpioides</i> , <i>Hypericum japonicum</i> , <i>Lythrum hyssopifolia</i> , <i>Nymphoides exigua</i> , <i>Ranunculus glabrifolius</i> , <i>Villarsia reniformis</i>
Graminoids:	<i>Juncus planifolius</i> , <i>Lepidosperma filiforme</i> , <i>Schoenus nitens</i>
Ferns:	<i>Gleichenia microphylla</i>
Weeds:	<i>Parentucellia viscosa</i> , <i>Plantago major</i>

Grassy swale on sand - SEGMENT B

Grid Reference: 305637E, 5448133N
 Accuracy: GPS (within 10 metres)
 Recorder: Andrew J. North
 Date of Survey: 4 Nov 2009

Herbs: *Craspedia aff. glauca* "Tunbridge"
 Grasses: *Themeda triandra*
 Weeds: *Potentilla anserina*

SCH - SEGMENT B

Grid Reference: 305560E, 5446530N
 Accuracy: within 50 metres
 Recorder: Andrew J. North
 Date of Survey: 5 Nov 2009

Trees: *Allocasuarina monilifera*
 Tall Shrubs: *Acacia verticillata subsp. ovoidea*, *Banksia marginata*, *Leptospermum laevigatum*,
Leptospermum scoparium
 Shrubs: *Bossiaea cordigera*, *Epacris impressa*, *Leucopogon collinus*, *Leucopogon ericoides*,
Phyllota diffusa
 Low Shrubs: *Aotus ericoides*, *Astroloma humifusum*, *Hibbertia prostrata*, *Hibbertia sericea var.*
sericea, *Leucopogon virgatus*
 Herbs: *Comesperma retusum*, *Coronidium scorpioides*, *Gonocarpus tetragynus*, *Kennedia*
prostrata, *Opercularia varia*,
Sphaerolobium sp., *Thelymitra aggericola*, *Thelymitra exigua*
 Graminoids: *Ficinia nodosa*, *Hypolaena fastigiata*, *Lepidosperma concavum*, *Leptocarpus tenax*,
Lomandra longifolia, *Patersoniafragilis*
 Ferns: *Pteridium esculentum*
 Climbers: *Cassytha pubescens*, *Comesperma volubile*

SMR - SEGMENT B

Grid Reference: 305720E, 5445890N
 Accuracy: within 50 metres
 Recorder: Andrew J. North
 Date of Survey: 5 Nov 2009

Shrubs: *Amperea xiphioclada var. xiphioclada*, *Bauera rubioides*, *Boronia nana var.*
hyssopifolia, *Dillwynia glaberrima*, *Euryomyrtus ramosissima*, *Melaleuca squamea*,
Philotheca virgata, *Pimelea linifolia subsp. linifolia*, *Sprengelia incarnata*
 Low Shrubs: *Acacia myrtifolia*
 Herbs: *Caesia parviflora*, *Caladenia carnea*, *Calochilus herbaceus*, *Gastrodia sesamoides*,
Poranthra microphylla, *Pterostylis tasmanica*, *Thelymitra aristata*, *Thelymitra erosa*,
Thelymitra nuda, *Thelymitra rubra*, *Viola hederacea*
 Graminoids: *Chordifex hookeri*, *Eurychorda complanata*
 Grasses: *Ehrharta distichophylla*
 Ferns: *Blechnum nudum*, *Blechnum wattsii*, *Lindsaea linearis*

SRI - Little Sundown Creek - SEGMENT B

Grid Reference: 305770E, 5445600N
 Accuracy: within 50 metres
 Recorder: Andrew J. North
 Date of Survey: 5 Nov 2009

Tall Shrubs: *Acacia mucronata subsp. mucronata*, *Acacia verticillata subsp. verticillata*, *Melaleuca*
ericifolia, *Pomaderris apetala*, *Pultenaea daphnoides var. obcordata*
 Shrubs: *Leucopogon parviflorus*, *Persoonia juniperina*, *Pomaderris pilifera*
 Low Shrubs: *Styphelia adscendens*
 Herbs: *Calochilus paludosus*, *Calochilus platychila*, *Dianella tasmanica*, *Drosera binata*,
Gonocarpus micranthus subsp. micranthus, *Gratiola nana*, *Lobelia alata*, *Selliera*
radicans
 Graminoids: *Baumea acuta*, *Calorophus elongatus*, *Juncus procerus*
 Weeds: *Vellereophyton dealbatum*

APPENDIX 5 – EPBC PROTECTED MATTERS



EPBC Act Protected Matters Report: Coordinates

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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Report created: 06/10/11 09:37:38

[Summary](#)

[Details](#)

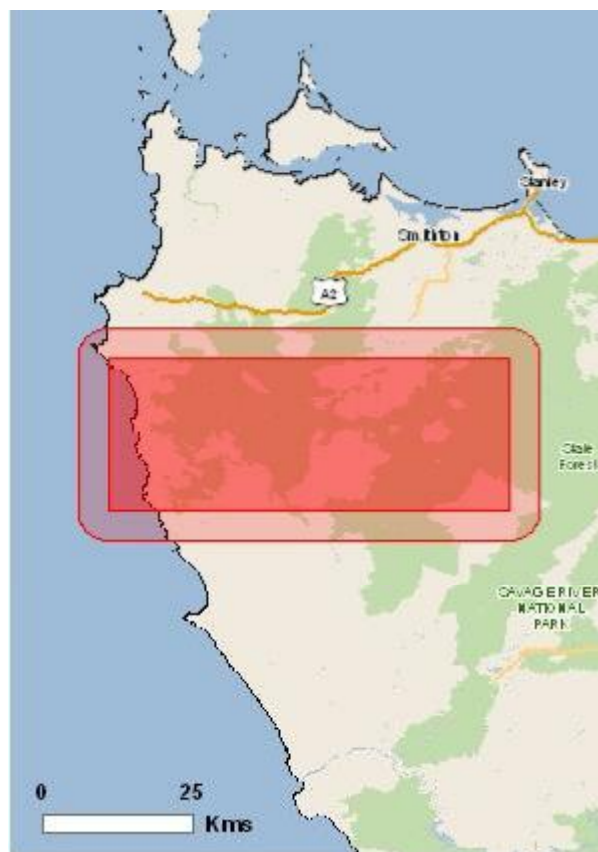
[Matters of NES](#)

[Other matters protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 5.0Km

Summary

Matters of National Environmental 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 - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Significance (Ramsar Wetlands):	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	Relevant
Threatened Ecological Communities:	1
Threatened Species:	46
Migratory Species:	32

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 and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

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. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	44
Whales and Other Cetaceans:	11

Critical Habitats:	None
Commonwealth Reserves:	None

Report Summary for Extra Information

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

Place on the RNE:	31
State and Territory Reserves:	25
Regional Forest Agreements:	1
Invasive Species:	7
Nationally Important Wetlands:	2

Details

Matters of National Environmental Significance

National Heritage Places [\[Resource Information \]](#)

Name	Status
Natural	
The Tarkine TAS	Nominated place

Commonwealth Marine Areas [\[Resource Information \]](#)

Approval may be required for a proposed activity that is likely to have a significant impact on the environment in a Commonwealth Marine Area, when the action is outside the Commonwealth Marine Area, or the environment anywhere when the action is taken within the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

EEZ and Territorial Sea

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.

Name	Status	Type of Presence
Lowland Native Grasslands of Tasmania	Critically Endangered	Community likely to occur within area

Threatened Species [\[Resource Information \]](#)

Name	Status	Type of Presence
BIRDS		
Aquila audax fleayi		
Wedge-tailed Eagle (Tasmanian) [64435]	Endangered	Breeding likely to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Ceyx azureus diemenensis		
Tasmanian Azure Kingfisher	Endangered	Breeding known to occur within area

[25977]			
Diomedea epomophora epomophora			
Southern Royal Albatross [25996]	Vulnerable		Species or species habitat may occur within area
Diomedea epomophora sanfordi			
Northern Royal Albatross [82331]	Endangered		Species or species habitat may occur within area
Diomedea exulans amsterdamensis			
Amsterdam Albatross [82330]	Endangered		Species or species habitat may occur within area
Diomedea exulans exulans			
Tristan Albatross [82337]	Endangered		Foraging, feeding or related behaviour may occur within area
Diomedea exulans gibsoni			
Gibson's Albatross [82271]	Vulnerable		Species or species habitat may occur within area
Diomedea exulans (sensu lato)			
Wandering Albatross [1073]	Vulnerable		Species or species habitat may occur within area
Fregetta grallaria grallaria			
White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable		Species or species habitat likely to occur within area
Halobaena caerulea			
Blue Petrel [1059]	Vulnerable		Species or species habitat may occur within area
Lathamus discolor			
Swift Parrot [744]	Endangered		Species or species habitat may occur within area
Macronectes giganteus			
Southern Giant-Petrel [1060]	Endangered		Species or species habitat may occur within area
Macronectes halli			
Northern Giant-Petrel [1061]	Vulnerable		Species or species habitat may occur within area
Neophema chrysogaster			
Orange-bellied Parrot [747]	Critically Endangered		Species or species habitat known to occur within area
Pterodroma mollis			
Soft-plumaged Petrel [1036]	Vulnerable		Species or species habitat may occur within area
Sternula nereis nereis			
Fairy Tern (Australian) [82950]	Vulnerable		Species or species habitat likely to occur within area
Thalassarche bulleri			
Buller's Albatross [64460]	Vulnerable		Species or species habitat may occur within area
Thalassarche cauta cauta			
Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable		Species or species habitat may occur within area
Thalassarche cauta salvini			
Salvin's Albatross [82343]	Vulnerable		Species or species habitat may occur within area
Thalassarche chrysostoma			
Grey-headed Albatross [66491]	Endangered		Species or species habitat may occur within area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable		Species or species habitat may occur within area
Thalassarche melanophris impavida			
Campbell Albatross [82449]	Vulnerable		Species or species habitat may occur within area
Tyto novaehollandiae castanops			
Masked Owl (Tasmanian)	Vulnerable		Breeding known to occur within area

[67051]

CRUSTACEANS[Astacopsis gouldi](#)

Tasmanian Giant Freshwater Lobster, Giant Lobster, Giant Freshwater Crayfish [64415]	Vulnerable	Species or species habitat known to occur within area
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FISH[Prototroctes maraena](#)

Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area
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FROGS[Litoria raniformis](#)

Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
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INSECTS[Oreisplanus munionga larana](#)

Marrawah Skipper, Alpine Sedge Skipper, Alpine Skipper [77747]	Vulnerable	Species or species habitat known to occur within area
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MAMMALS[Balaenoptera musculus](#)

Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
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[Dasyurus maculatus maculatus \(Tasmanian population\)](#)

Spotted-tail Quoll, Spot-tailed Quoll, Tiger Quoll (Tasmanian population) [75183]	Vulnerable	Species or species habitat likely to occur within area
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[Eubalaena australis](#)

Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
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[Megaptera novaeangliae](#)

Humpback Whale [38]	Vulnerable	Species or species habitat may occur within area
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[Perameles gunnii gunnii](#)

Eastern Barred Bandicoot (Tasmania) [66651]	Vulnerable	Species or species habitat likely to occur within area
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[Sarcophilus harrisii](#)

Tasmanian Devil [299]	Endangered	Species or species habitat likely to occur within area
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PLANTS[Barbarea australis](#)

Native Wintercress, Riverbed Wintercress [12540]	Critically Endangered	Species or species habitat likely to occur within area
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[Caladenia caudata](#)

Tailed Spider-orchid [17067]	Vulnerable	Species or species habitat likely to occur within area
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[Caladenia dienema](#)

Windswept Spider-orchid [64858]	Endangered	Species or species habitat known to occur within area
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[Diuris lanceolata](#)

Snake Orchid [10231]	Endangered	Species or species habitat likely to occur within area
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[Genoplesium brachystachyum](#)

Short-spiked Midge-orchid [32155] Endangered Species or species habitat likely to occur within area

[Hypolepis distans](#)

Scrambling Ground-fern [2148] Endangered Species or species habitat likely to occur within area

[Prasophyllum favonium](#)

Western Leek-orchid [64949] Critically Endangered Species or species habitat likely to occur within area

[Prasophyllum pulchellum](#)

Pretty Leek-orchid [64953] Critically Endangered Species or species habitat likely to occur within area

[Prasophyllum secutum](#)

Northern Leek-orchid [64954] Endangered Species or species habitat likely to occur within area

[Pterostylis rubenachii](#)

Arthur River Greenhood [64536] Endangered Species or species habitat likely to occur within area

[Pterostylis ziegeleri](#)

Grassland Greenhood, Cape Portland Greenhood [64971] Vulnerable Species or species habitat may occur within area

SHARKS[Carcharodon carcharias](#)

Great White Shark [64470] Vulnerable Species or species habitat may occur within area

Migratory Species**[Resource Information]**

Name	Status	Type of Presence
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Migratory Marine Birds[Apus pacificus](#)

Fork-tailed Swift [678] Species or species habitat may occur within area

[Ardea alba](#)

Great Egret, White Egret [59541] Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542] Species or species habitat may occur within area

[Diomedea amsterdamensis](#)

Amsterdam Albatross [64405] Endangered* Species or species habitat may occur within area

[Diomedea dabbenena](#)

Tristan Albatross [66471] Endangered* Foraging, feeding or related behaviour may occur within area

[Diomedea epomophora \(sensu stricto\)](#)

Southern Royal Albatross [1072] Vulnerable* Species or species habitat may occur within area

[Diomedea exulans \(sensu lato\)](#)

Wandering Albatross [1073] Vulnerable Species or species habitat may occur within area

[Diomedea gibsoni](#)

Gibson's Albatross [64466] Vulnerable* Species or species habitat may occur within area

[Diomedea sanfordi](#)

Northern Royal Albatross [64456] Endangered* Species or species habitat may occur within area

[Macronectes giganteus](#)

Southern Giant-Petrel [1060] Macronectes halli	Endangered	Species or species habitat may occur within area
Northern Giant-Petrel [1061] Thalassarche bulleri	Vulnerable	Species or species habitat may occur within area
Buller's Albatross [64460] Thalassarche cauta (sensu stricto)	Vulnerable	Species or species habitat may occur within area
Shy Albatross, Tasmanian Shy Albatross [64697] Thalassarche chrysostoma	Vulnerable*	Species or species habitat may occur within area
Grey-headed Albatross [66491] Thalassarche impavida	Endangered	Species or species habitat may occur within area
Campbell Albatross [64459] Thalassarche melanophris	Vulnerable*	Species or species habitat may occur within area
Black-browed Albatross [66472] Thalassarche salvini	Vulnerable	Species or species habitat may occur within area
Salvin's Albatross [64463]	Vulnerable*	Species or species habitat may occur within area
Migratory Marine Species		
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata		
Pygmy Right Whale [39] Carcharodon carcharias		Species or species habitat may occur within area
Great White Shark [64470] Eubalaena australis	Vulnerable	Species or species habitat may occur within area
Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43] Lamna nasus		Species or species habitat may occur within area
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38] Orcinus orca	Vulnerable	Species or species habitat may occur within area
Killer Whale, Orca [46]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682] Myiagra cyanoleuca		Species or species habitat may occur within area
Satin Flycatcher [612] Neophema chrysogaster		Breeding likely to occur within area
Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret		Species or species habitat may occur within area

[59541]

[Ardea ibis](#)

Cattle Egret [59542]

Species or species habitat may occur within area

[Gallinago hardwickii](#)Latham's Snipe, Japanese Snipe
[863]

Species or species habitat may occur within area

Other Matters Protected by the EPBC Act**Commonwealth Lands****[[Resource Information](#)]**

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land -

Listed Marine Species**[[Resource Information](#)]**

Name

Status

Type of Presence

Birds[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species habitat may occur within area

[Ardea alba](#)Great Egret, White Egret
[59541]

Species or species habitat may occur within area

[Ardea ibis](#)

Cattle Egret [59542]

Species or species habitat may occur within area

[Catharacta skua](#)

Great Skua [59472]

Species or species habitat may occur within area

[Diomedea amsterdamensis](#)

Amsterdam Albatross [64405] Endangered*

Species or species habitat may occur within area

[Diomedea dabbenena](#)

Tristan Albatross [66471] Endangered*

Foraging, feeding or related behaviour may occur within area

[Diomedea epomophora \(sensu stricto\)](#)Southern Royal Albatross Vulnerable*
[1072]

Species or species habitat may occur within area

[Diomedea exulans \(sensu lato\)](#)

Wandering Albatross [1073] Vulnerable

Species or species habitat may occur within area

[Diomedea gibsoni](#)

Gibson's Albatross [64466] Vulnerable*

Species or species habitat may occur within area

[Diomedea sanfordi](#)Northern Royal Albatross Endangered*
[64456]

Species or species habitat may occur within area

[Gallinago hardwickii](#)Latham's Snipe, Japanese Snipe
[863]

Species or species habitat may occur within area

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943]

Species or species habitat likely to occur within area

[Halobaena caerulea](#)

Blue Petrel [1059] Vulnerable

Species or species habitat may occur within area

[Hirundapus caudacutus](#)

White-throated Needletail [682]

Species or species habitat may occur within area

[Lathamus discolor](#)

[Phyllopteryx taeniolatus](#)

Common Seadragon, Weedy Seadragon [66268]

Species or species habitat may occur within area

[Pugnaso curtirostris](#)

Pugnose Pipefish, Pug-nosed Pipefish [66269]

Species or species habitat may occur within area

[Solegnathus robustus](#)

Robust Pipehorse, Robust Spiny Pipehorse [66274]

Species or species habitat may occur within area

[Stigmatopora argus](#)

Spotted Pipefish, Gulf Pipefish [66276]

Species or species habitat may occur within area

[Stigmatopora nigra](#)

Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]

Species or species habitat may occur within area

[Urocampus carinirostris](#)

Hairy Pipefish [66282]

Species or species habitat may occur within area

[Vanacampus phillipi](#)

Port Phillip Pipefish [66284]

Species or species habitat may occur within area

[Vanacampus poecilolaemus](#)

Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]

Species or species habitat may occur within area

Mammals[Arctocephalus forsteri](#)

New Zealand Fur-seal [20]

Species or species habitat may occur within area

[Arctocephalus pusillus](#)

Australian Fur-seal, Australo-African Fur-seal [21]

Species or species habitat may occur within area

Whales and Other Cetaceans**[Resource Information]**

Name

Status

Type of Presence

Mammals[Balaenoptera acutorostrata](#)

Minke Whale [33]

Species or species habitat may occur within area

[Balaenoptera musculus](#)

Blue Whale [36]

Endangered

Species or species habitat likely to occur within area

[Caperea marginata](#)

Pygmy Right Whale [39]

Species or species habitat may occur within area

[Delphinus delphis](#)

Common Dolphin, Short-beaked Common Dolphin [60]

Species or species habitat may occur within area

[Eubalaena australis](#)

Southern Right Whale [40]

Endangered

Species or species habitat known to occur within area

[Globicephala macrorhynchus](#)

Short-finned Pilot Whale [62]

Species or species habitat may occur within area

[Grampus griseus](#)

Risso's Dolphin, Grampus [64]

Species or species habitat may occur within area

[Lagenorhynchus obscurus](#)

Dusky Dolphin [43]

Species or species habitat may occur within area

[Megaptera novaeangliae](#)

Humpback Whale [38] Vulnerable Species or species habitat may occur within area

[Orcinus orca](#)

Killer Whale, Orca [46] Species or species habitat may occur within area

[Tursiops truncatus s. str.](#)

Bottlenose Dolphin [68417] Species or species habitat may occur within area

Extra Information**Places on the RNE****[Resource Information]**

Note that not all Indigenous sites may be listed.

Name	Status
Natural	
Arthur River Fauna Type locality TAS	Indicative Place
Bond Tier - Dismal Swamp Area TAS	Indicative Place
Duck River Forest Reserve TAS	Indicative Place
Julius River Forest Reserve and Adjacent Area TAS	Indicative Place
Leensons Road Area TAS	Indicative Place
Lerunna Road Fauna Type Locality North TAS	Indicative Place
Lerunna Road Fauna Type Locality South TAS	Indicative Place
Lovells Creek Area TAS	Indicative Place
Luncheon Hill Forest Reserve and Adjacent Area TAS	Indicative Place
Mawson Bay Area TAS	Indicative Place
Montagu Swamp Forest Reserve TAS	Indicative Place
Tarkine TAS	Indicative Place
Trowutta Plateau TAS	Indicative Place
Wes Beckett Forest Reserve TAS	Indicative Place
Arthur River Geological Monument TAS	Registered
Dismal Swamp Area TAS	Registered
Lake Chisholm Forest Reserve TAS	Registered
Norfolk Range Area TAS	Registered
Roger River State Reserve TAS	Registered
Savage River Region TAS	Registered
Sumac Rivulet Region TAS	Registered
Tarkine Wilderness Area TAS	Registered
Trowutta Caves State Reserve TAS	Registered
Indigenous	
Rebecca Creek Spongolite Quarry Complex TAS	Indicative Place
Bluff Hill Point TAS	Registered
Nelson Bay Area TAS	Registered
Sundown Point Aboriginal Site TAS	Registered
Temma Coastal Area TAS	Registered
Historic	
E.H.Fentons Salmon River Sawmill TAS	Indicative Place
Milkshake Hills Forest Reserve Area TAS	Indicative Place
Balfour Track TAS	Registered

State and Territory Reserves**[Resource Information]**

Nabageena, TAS

Julius River, TAS

Sumac, TAS
 Temma, TAS
 Whitewater Smithton, TAS
 Montagu River, TAS
 Wes Beckett, TAS
 Luncheon Hill, TAS
 Lovells Creek, TAS
 Duck River, TAS
 Arthur-Pieman, TAS
 Balfour Track, TAS
 Warra Creek, TAS
 Rebecca Creek, TAS
 Trowutta Caves, TAS
 Montagu Swamp, TAS
 Milkshake Hills, TAS
 Kings Run, TAS
 Sundown Point, TAS
 Trowatta, TAS
 Donaldson River, TAS
 Trowutta, TAS
 Savage River Pipeline, TAS
 Roger River, TAS
 Lake Chisholm, TAS

Regional Forest Agreements

[[Resource Information](#)]

Note that all areas with completed RFAs have been included.

[Tasmania RFA, Tasmania](#)

Invasive Species

[[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Mammals		
Capra hircus		
Goat [2]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Plants		
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtiji		

Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] Ulex europaeus	Species or species habitat likely to occur within area
Gorse, Furze [7693]	Species or species habitat likely to occur within area

Nationally Important Wetlands

[Resource Information]

[Unnamed Wetland, TAS](#)

[Lake Chisholm, TAS](#)

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

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

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

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

Coordinates

-41.02843 144.6335,-41.02843 145.23788,-41.25685 145.23788,-41.25685 144.6335,-41.02843 144.6335

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:

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA 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, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- 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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Last updated: Thursday, 16-Sep-2010 09:13:25 EST

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APPENDIX 6 – VERTEBRATE CARNIVORE ASSESSMENT FORUM

Event: Tarkine Forest Drive - Carnivore Assessment Forum

Date/time: 22 July 2009, 0900-1230

Attendees

- Randy Rose (retired academic from the School of Zoology at the University of Tasmania)
- Barrie Wells (Veterinarian)
- Chloe Lucas (Road kill Network)
- Clare Hawkins (Threatened Species Zoologist, DPIPWE)
- Nick Mooney (Section Head, Wildlife Monitoring and Management, DPIPWE)
- David Pemberton (Threatened Species Section, DPIPWE)
- Andrew Sharman (Program Manager, Devil Disease Project Team, DPIPWE)
- Rodrigo Hamede (PhD student, “Contact Networks in Wild Tasmanian Devils: Social Behaviour & Devil Facial Tumour Disease”)
- Shannon Troy (PhD student “Landscape Ecology of the Tasmanian Spotted-Tailed Quoll”)
- Phil Cantillon (Tarkine Forest Drive Project Director, DIER)
- Andrew North (Ecologist, North Barker, for P&S)
- Karen Ziegler (Ecologist, North Barker, for P&S)
- Menna Jones (Researcher, Devil Disease Project Team)
- Andrew Harvey (Senior Natural Values Assessment Officer, Development and Conservation Assessment Section, DPIPWE)
- Gar Foong (Tarkine Forest Drive Project Manager, DIER)
- Raymond Brereton (Senior Ecologist, Hydro Consulting, for P&S)
- Gavan Banks - Senior Project Engineer - Roads (Pitt & Sherry)
- Brian Williams - Principal Engineer Road Design (Pitt & Sherry)

Apologies: Dion Lester (Pitt & Sherry)

Facilitator: Timothy Phillips (Resonance Sustainability Services, for P&S)



NB: The following are summary notes of key discussion points from the Forum. They are not intended to be a verbatim record of discussions. They have been prepared based on the notes taken by the facilitator and members of the fauna/flora assessment project team. Furthermore, the views expressed in these notes are not necessarily those of the Tasmanian Government.

Background and welcome

Group was welcomed by the facilitator, who also explained his role, i.e. keeping group on track, following agenda, ensuring all attendees were given opportunity to speak etc.

It was noted that this is a controversial project with many divergent views and that attendance at this forum does not necessarily imply support for the project.

The forum objectives were presented and discussed.

- Provide attendees a briefing on the status of the Tarkine Forest Drive assessment project, with particular reference to the assessment of impacts on vertebrate carnivores
- Provide update on preliminary field work undertaken by North Barker within study area
- Identify and discuss information/ data requirements and sources for the assessment
- Identify and discuss potential issues and impacts regarding road kill - priority areas, methodology, designs and treatments
- Identify and discuss potential issues and impacts regarding devil facial tumour disease

The program was revisited. There were no major questions or comments regarding the workshop objectives or program.

Introductions

All attendees were asked to introduce themselves and identify a specific issue they would like discussed at the forum. Issues raised included:

- Additional information about the project
- Role of the Tasmanian Devil program in this process and identify the existing relevant information as well as information gaps
- How animals use the landscape and roads
- The need for a facts and evidence based assessment
- Impact of vehicle speed
- Increase understanding of the traffic information, both existing and proposed
- Fauna assessment
- Just here to listen and learn
- Identify the potential increased risk regarding Devil Facial Tumour Disease (DFTD)
- What is the existing road network?
- Impact of road on quoll
- What is unique or different regarding NW devils
- Strong informative process
- Conflict between user expectations and mitigation
- DFTD
- Traffic information and road kill
- Mitigation strategies
- Transferable outcomes, i.e. improved road kill mitigation across road network

Project overview – Phil Cantillon (DIER)

Road will be built in three stages

- Stage 1. West Coast
- Stage 2. Middle section

- Stage 3. Wynyard section

The West Coast section of the road will have a 6 m pavement width with a 0.5 m verge on either side of the road.

The Wynyard section will have a 4 m pavement width with a 0.75 m verge on either side of the road.

Of the \$23 million budget for the road, \$2.5 million is allocated to tourism infrastructure.

An understanding of the existing road use is critical to the assessment, including:

- Amount of use
- Nature of the use (e.g. forestry contractors, mining contractors, tourists)

Route and design as described is just a starting point, there is the possibility that it may change as new information comes in.

It is intended to seal the entire route.

Q. Why the Southern Spur?

A. There is access to a trig station with significant views, as well as a starting point for a walk into Tarkine Falls.

Q. What are the actual traffic volumes?

A. We are gathering that information and have a report in preparation.

Andy North – The current status of the assessment process

The three handouts (maps) were mentioned and discussed (see attached).

North Barker are using TASVEG to describe the habitats within the study area along with Forestry Tasmanian PI typing, other API and ground truthing.

Land use within the study area will also be described, existing and potential.

The study area covers 500 m either side of the road.

The difficulty of obtaining abundance data on devils and quolls was then discussed. In one study, 2 months of trapping had captured 15 spotted-tailed quolls and 137 Tasmanian devils, another study had trapped 22 spotted-tailed quolls over a year.

It was noted that quolls inhabit a range of habitats and that the highest densities had been found in coastal scrub.

It was suggested that walking the road verges to look for signs (scats, tracks) of devils and quolls would give some indication of presence/absence, which may help to identify areas of activity along the road.

Other sources of data included the RFA report "*Preliminary assessment of distribution and habitat associations of the spotted-tailed quoll and eastern quoll in Tasmania*" Jones, M.E., and Rose R. (1997).

Road kill –facilitated discussion

There was discussion about the value of having traffic data prior to construction. The projection for traffic volumes after construction, when all components of the road have been completed including tourist infrastructure, is in the order of 100,000 vehicles per year. It was noted that this was an estimate at the higher end.

It was noted that it is not only the volume of traffic that is important but also the type of traffic and it was necessary to measure the different types of traffic and when the use the road (e.g. forestry workers compared with tourist traffic).

Traffic variables to measure before and after construction of the road:

- type of traffic (e.g. forestry workers, tourists, locals, mining workers)
- time of day of vehicle movements
- traffic volume
- vehicle speed

The main risk periods for road kill are dawn and dusk. The main risk factors for road kill are where the traffic is local and commercial as evidenced by the Cradle Mountain road upgrade (Jones, M.E. 2000. Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research* 27:289-296) and the Arthur River road upgrade (Landscape impressions. 2008. *Assessment Report: Arthur River Road EPBC Decision 2003/90*. Report to Circular Head Council).

The “Warren Report” that DIER has had prepared has some data on current traffic use of roads within the study area.

Monitoring of road kill impacts post upgrade / construction of the Tarkine Forest Drive will be required to mitigate potential road kill hotspots.

Q.Is this the final route?

A. More or less +/- 150 metres (depending on site specific conditions)

Discussion on EPBC Assessment

The EPBC assessment of the proposed action will be about the change in use of the existing roads and new sections and the impact of the consequential impacts resulting from the change in use, i.e. the change in the risk profile of the road resulting from the:

- the increase in traffic volumes
- the increase in road use from other activities (e.g. forestry and mining)
- increase in traffic speed

The assessment will require a description of the baseline traffic profile and a description of the change to the projected traffic profile following the construction of the road.

Road kill continued

A risk profile of factors contributing to road kill are identified in Hobday, A. J. and Minstrell, M.L. 2008. Distribution and abundance of road kill on Tasmanian highways: human management options. *Wildlife Research* 35: 712-716.

M. Jones (unpublished data from a study on Class C roads on the east coast of Tasmania) has identified predictors of road kill:

visibility (poor straight line visibility resulted in increased road kill)
 roadside barriers (e.g. fences and cuttings); (the presence of roadside barriers which prevented animals from getting off the road increased road kill)
 escape routes (runways);
 increased traffic speed

A combination of features can increase the risk of road kill. It was noted that a higher incidence of road kill was observed in the inside of corners especially when associated with grassy habitats that attract herbivores.

Devil Facial Tumour Disease (DFTD)

Extent of DFTD

The western most occurrence of DFTD is at Upper Natone and Surrey Hills, however this is not a definitive boundary and this data is 12 months old.

The Program will be undertaking a new round of monitoring on the “front” in September and October.

The identification of DFTD relies on gross pathology. Disease front monitoring is based on clinical testing. There is no pre-clinical test available yet. The development of a pre-clinical test is currently underway and trials are happening however, it is unlikely to be available until September or October at the earliest if it proves to be viable.

The disease front is not a straight line and “fingers” of the disease can occur following particular landscape features, for example as it moves up valleys. The disease could be further west of the current known localities.

On average, the current rate of DFTD spread is estimated to be 7 km/year. Although, there have been instances of spread at higher rates in some local areas of up to 50 km/year.

There have been no local extinctions as a result of the disease. However, in the north east the devil population is at a very low level. It has declined significantly and the age structure of the population has changed. There are no animals over two years old. It is thought that in the northeast the disease has been 100% fatal. There is evidence that animals are breeding much earlier due to a combination of reasons including greater availability of food, denning habitat and lack of sexual suppression of young females that normally would have been living with their mothers for longer. When a population is very low stochastic events may impact severely on remaining animals.

It is inevitable that the disease will get into the north west, it is just a matter of when.

DFTD and Road kill

Road kill then becomes a much greater threat because of declining population levels. Road kill could have a significant impact in the north west after the disease arrives.

If there is road kill monitoring it is essential that it is related to local devil or quoll population densities to assess the impact on these populations. The background populations may be slowly decreasing while road kill remains at static levels for a period.

The paper by “McCallum, H., D. M. Tompkins, M. Jones, S. Lachish, S. Marvanek, B. Lazenby, G. Hocking, J. Wiersma, and C. Hawkins. (2007) Distribution and impacts of Tasmanian devil facial tumor disease. *EcoHealth* 4(3): 318-325” has the most up to date published information on the distribution and impact of the disease.

Different genetic provenance

There is evidence that the north west devil population is a different genetic provenance. Therefore DFTD may have a different impact on this population, mortality rates may be lower.

The pinch point for the genetic separation is at Mawbanna. The devil genetic provenance starts to change at about Devonport. There is a grey zone in the genetic provenance from Devonport to Stanley.

General discussion

The rate of the spread of DFTD will affect the nature of the response from the Devil Task Force. If there is an opportunity for DFTD to leap frog into new areas this would have a major impact on the Devil Disease Program.

Need a landscape context for the road as adjoining landuse could also impact devil movement. Therefore it is necessary to know forestry three and ten year plans.

There was a discussion about the use of roads by devils. Devils are forest and woodland animals that do not necessarily use roads to move around the landscape. They use runways in forests.

A landscape with many roads does not necessarily increase the home range of devils. There is published data on devil movements.

An increase in road killed herbivores does not necessarily lead to an increase in devil road kill

Quolls and road kill

Spotted-tailed quolls will sometimes use roads but to a lesser degree. Quolls prefer vegetation with an implicate structure (e.g. wet forest, but also occur in coastal scrub).

There is a predictive model for spotted-tailed quoll occurrence across Tasmania in the RFA report “*Preliminary assessment of distribution and habitat associations of the spotted-tailed quoll and eastern quoll in Tasmania*” Jones, M.E., and Rose R. (1997). However, further work is needed to define high quality habitat for quolls and devils.

There is little information on how quolls use the landscape (information gap). Questions include:

- How do they move in the landscape?
- Do they use roads?
- Do they use forests?
- Do they use coastal scrubs?

General discussion

The change in the rate of spread of DFTD is related to home range. The Devil Program is investigating the fencing of a disease free population in north west as a secure population. The implementation of this project requires information on how devils use the landscape. A study is planned for the north west at Woolnorth.

The new section of road at the eastern end may promote movement across a possible genetic barrier comprised of the rainforest in this area. Though this doesn't seem likely for the high frequency of devil scats seems on section 9 between the Lyons River and Wynsmith Track.

Is the opening up of the new section of road creating access to a landscape that would normally be a barrier/potential barrier to devils and will that change the rate spread of DFTD and allow access to a population that is not yet exposed to the disease.

Mitigation of movement of devils along the new section of road - can the road be fenced to keep devils out?

Road kill revisited

Need information on traffic and the potential risk of road kill to design mitigation measures. Some mitigation features e.g. straighter roads, decrease the value of road for tourist traffic.

The road should be designed for a traffic speed of 60 kmh or less to reduce the incidence of road kill.

Road ecology is a large field and there is a range of available information on mitigation measures to reduce road kill out there.

Adaptive management will come out of monitoring post construction.

Removal of road kill herbivores on the Tasman Peninsula has shown to decrease devil road kill.

Devil dens

Maternity dens are an important resource for devils because they may only have one breeding attempt in a diseased population. Therefore any impacts on maternity dens from road construction and operation should be avoided. The location of dens is related to suitable denning habitat including rock outcrops, rock shelters, fallen large logs, and large tree root bowls.

A den survey is recommended for the new road construction. The survey area should be 30-50 m?? either side of the road. (There did not appear to be consensus on the survey area and we may need to go back to the Threatened Species Section and the Development and Conservation Assessment Section of DPIPW for advice).

Roadside walks are recommended to identify hotspots for devil and quoll activity.

General discussion

The impacts on devil and quoll populations of road kill can/could lead to local extinction in some circumstances where the population is already impacted by road kill.

A study on the Freycinet Peninsula (Jones unpublished data) found that in a 12 month period 20% of the devil population was removed due to road kill. The removal of road kill herbivores from the road reduced the incidence of road kill.

The Freycinet devil population was able to sustain this 20% loss without significant impact on the overall population. However, in the presence of DFTD this loss is unlikely to be sustainable.

It was recommended that a snapshot of the current incidence of road kill is obtained based on the current levels of vehicle use. This information may be available from DIER and Forestry Tasmania.

It was suggested that overall best practice would be to mitigate the level of road kill across the landscape within the study area by addressing the issue of traffic movements at night. This approach would require the involvement of Forestry Tasmania and other road users.

This landscape scale approach to mitigating road kill may result in lowering the incidence of road kill below current levels. This approach is unlikely to be considered an offset for the action in the EPBC assessment.

Other threatened species within the study area that need to be addressed in the impact assessment included the grey goshawk and the wedge-tailed eagle.

The induction of contractors with regard to road kill should be included in the environmental management plans for the construction and operation of the road. Construction /Maintenance of the road could stipulate travel in daylight hours.

The road design should consider the road design speed, visibility and the different classes of use. The road should be designed for low speeds, however, there is limited information on designing low speed roads as existing standards and guidelines focus on performance issues associated with the road, and road safety.

There is some evidence that road pavement colour can influence the incidence of road kill. Pale road surfaces may reduce road kill because animals are more visible on a lighter surface compared to a dark surface where they tend to blend in particularly at night.

Conclusion

The road designers, scientific team and project sponsors were asked for some concluding comments:

- Speed is obviously an issue, as well as the types of use
- There are limited design guidelines for lower speed roads, a real gap
- Impact of colour will be looked at further
- We need to know who will be driving this at night.

Attendees were advised that notes of the forum would be written up and distributed in the next few weeks. Members of the assessment team are likely to contact attendees for clarifications and/or additional information.

Attendees were thanked for coming along and invited to stay for a light lunch.

END NOTES

APPENDIX 7 – PREDICTED FORESTRY OPERATIONS ¹⁷⁴

Projected wood volume flow in South Arthur Forests 2009-2023 and consequential vehicle movements							
Harvest zone and principal cart network roads	Tarkine Drive sections used	Average tonnes per year (x1000 tonnes)	Total loads/year (ave.= 35t/load)	Average loads/day	Truck movements /day	Contractor & misc vehicle movements /day	FT mgt, mis & service movements /day
Holder & Tayetea Rds (crossing Tayetea Bridge)	Parts of 17 & 18	15.21	435	1.7	3.4	1.7	0.85
Mt Berth & Balfour blocks via Sumac Road (crossing Kannunah)	22 & existing sealed sections of Sumac Rd	12.24	350	1.4	2.8	1.4	0.7
Wuthering Heights and Rebecca via Blackwater Road (crossing Kannunah bridge)	23, 24 & existing sealed sections of Blackwater Rd	22.31	637	2.6	5.2	2.6	1.3
Totals		49.76	1422	5.7	11.4	5.7	2.9
Notes:							
Activity/movements based on operations on 250 days/year							
Contractor movements are projected to be 50% of truck movements (generally one crew cab vehicle only)							
FT supervisors, mgt & service movements are projected to be 25% of truck movements (generally one crew cab vehicle only)							
Timber cart is directed to nearest bridge over the Arthur River							
Forestry Tasmania controls routes that log trucks MUST use.							
Log cartage, contractor and other vehicle movements generally occur in daylight hours, particularly in summer.							
The sealing of forest roads will not significantly increase traffic speeds.							
FT will endeavour to schedule cart routes and harvest operations to minimise interaction with tourist traffic.							
Relatively low carts (average of 5.7 loads per day) indicate tourists will be unlikely to encounter log trucks							

¹⁷⁴ Supplied by Forestry Tasmania, by email from Mike Peterson 24 08 2009

APPENDIX 8 – ROAD KILL MONITORING PLAN

MEMO

To: Various
 From: Dion Lester
 Date: 29 September 2009
 RE: **Tarkine Forest Drive Project - Road kill**

The Tasmanian Government has identified an opportunity to improve tourism access to the Northwest of Tasmania through the development of a tourist road. If completed, the project will provide a sealed tourism road totalling some 134.0 km and will take visitors from the Wynyard area, through forest, accessing the Tarkine's attractions and connecting with the end of the Great Nature Trail at Arthur River, to complete a tourist loop through to Smithton and Stanley.

An extensive program of environmental investigations is underway as part of the design development for the Tarkine Road, including the following:

- A Botanical Survey and Fauna Habitat Assessment has been undertaken for the majority of the route, when complete the field survey will provide a description of the flora and fauna species and vegetation communities that are present along the route and any contextual information of any significant values identified within the study area. This will establish whether any threatened flora and fauna species, habitats or significant vegetation communities are present. The survey will also determine the distribution of Phytophthora and any weeds.

In addition to the typical Botanical Survey and Fauna Habitat Assessment, some further more specific investigations are underway.

Northwest Tasmania is considered to support relatively high densities of devils that are not infected by the Devil Facial Tumour Disease (DFTD). As a result additional studies are being implemented to investigate the potential impacts on vertebrate carnivores. The aims of the studies are to assess the current rate of road kill and investigate the possible impacts of the project on the potential spread of DFTD.

1) Road kill

This study will consider the current rate of road kill in the area and will review previous studies on the relationship between traffic and road kill elsewhere in Tasmania. A number of scenarios will be investigated to determine the potential scale of the impact from road kill.

2) Devil Facial Tumour Disease (DFTD)

Investigate the possible impacts of the project on the potential spread of DFTD, including an assessment of whether the construction of the road:

- Is likely to increase the rate and distance of movement of devils;
- Will facilitate the migration of animals from areas of infection to areas currently free of the disease



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- Is likely to significantly change existing (if any) natural barriers to devil movement in northwest Tasmania.

A Carnivore Assessment Forum was held in late July. This forum consisted of scientists and professionals with recent and relevant expertise and experience in road kill, vertebrate carnivores and DFTD, a veterinarian, and State and Federal Government regulators.

Two of the key recommendations emerging from this forum were for the project team to gain an understanding of both the current incidence of road kill and traffic data prior to the detailed environmental assessment and construction of the route. This will provide some baseline information of current road kill rates to compare against the future impacts. Any observable increases that reach a predetermined threshold, could be used to trigger adaptive management responses to minimise road kill.

Accordingly the following work is proposed:

1. Road kill Monitoring

- The proposed route of the Tarkine Forest Drive between Sections 21-27. Sumac Spur 4 to Arthur River township - following Sumac Rd, Blackwater Rd, Rebecca Rd, Temma Rd, will be monitored once per week for 12 months beginning in October 2009
- The proposed route between Couta Rocks and Arthur River will be monitored daily because this section is of greatest concern
- Road kill monitoring will be done daily during the period that the traffic counters are installed in October 2009, January and April 2010
- The data that will be recorded is the GPS location of the road kill, the species, evidence of scavenging will be also be recorded. The observer where possible will distinguish between feeding by devils, quolls or crows
- After the road kill has been initially recorded, the animals will not to be moved. This will ensure the monitoring program does not skew the road kill data, e.g. if the road kill is removed it may prevent the target species from scavenging road kill and therefore prevent the typical road kill of these species during the pre-construction period.

2. Headlight survey

- The aim of the headlight survey is to provide abundance data on animals to compare with the road kill observations.
- Surveys will be undertaken at dusk daily.
- The headlight survey will be done over a period of three weeks at three different times during the year. The survey will be done at the same time as the traffic counts (October 2009, January and April 2010) to assist with monitoring and basic maintenance of counters.
- The data that will be recorded is the GPS location, time of sighting and species.
- The method of the headlight survey is:
 - The survey will be done at a speed of between 50-60 km/h,
 - Commencing at last light, approx 30 mins after sunset,

- Two people will be required to do the headlight surveys, one to drive and one to record the observations.

The location / study area for both the road kill monitoring and headlight survey will encompass the “busier” sections of the proposed route where existing impacts are likely to be measurable, e.g. from the Sumac Road (Section 21 of the proposed route) to Arthur River township (Section 27). There are also two reference sections where no modifications to traffic conditions are proposed. These are approx 15km along Roger River Road from Roger River to Kanunnah Bridge and 15km south from Sumac Spur 4 along Sumac Road.

3. Traffic counts

- Most of the existing road is very lightly trafficked and has no reliable traffic data.
- There is a requirement to understand the existing traffic flows and speed to provide baseline data for a number of the assessments.
- Eight sites for traffic counts have been identified and three of the sites are on gravel roads.
- Because of the low and highly variable traffic flows the traffic counters will be in place for three weeks.
- Traffic counts will occur in October 2009, January and April 2010 because of the seasonal nature of recreational uses on the northern part of the west coast and the variation in timber harvesting.

APPENDIX 9 – NORTHWEST HEATH (*EPACRIS CURTISIAE*) SURVEY



Tarkine Forest Drive
North West Tasmania

***Epacris curtisiae* Survey**

4 October 2011
PAS051

Introduction

The Flora and Fauna Impact assessment of the Tarkine Drive project¹⁷⁵ identified a list of threatened flora that potentially could occur within the immediate vicinity of the road.

One of these is the north west heath - *Epacris curtisiae*, listed as rare on the Tasmanian *Threatened Species Protection Act 1995*. This is a Tasmanian endemic which occurs in heathland and moorland in a localised area mainly confined to the the Dempster Plains, Frankland River catchment and western slopes of the Norfolk Range between the Arthur and Pieman Rivers. The Rebecca Road section of Tarkine Forest Drive bisects the range. There are numerous records on the Natural Values Atlas along the road between the Norfolk Rd junction and Nelson Bay River.

Survey

The survey¹⁷⁶ was undertaken in September 2009 along the Rebecca Road between the Frankland River bridge and Temma Rd to map and define the populations of *Epacris curtisiae*. Additional opportunistic observations were also collated during the course of other work in November 2009. The main survey was timed to coincide with peak flowering of *Epacris curtisiae* and to take place before other white flowering shrubs had commenced full flowering.

The survey involved targeted inspection of all records on Natural Values Atlas. A reconnaissance of the road for the remainder of the study area was undertaken by a slow drive past (<50km /hr). Where plants or likely habitat were identified, on ground survey was undertaken to determine the extent and size of the population. Hand held GPS was used to plot locations and site data collected to determine the population scale and to identify evidence of *Phytophthora cinnamomi*.

Where large or extensive populations were encountered survey was limited to mapping the boundary close to the road. The full extent of distribution away from the road was not able to be determined in all instances.

Results

Figure 1 presents the mapped extent of *Epacris curtisiae* plus records on the Natural Values Atlas that could not be verified. Some of these are of low accuracy suggesting that additional mapping occurs.

Most previous recorded populations could be verified, although two were not. Minor extension range was recorded along the Rebecca Rd with an outlier 5km west of the core population which is associated with the moorland east of Nelson Bay River.

The size of some patches was found to be large and estimated to number 10s of thousands with others much smaller. Populations extend to the road verge in some places, being located immediately outside the very deep table drains.

Phytophthora cinnamomi symptoms were evident at a number of sites. This evidence mainly took the form of dying *Sprengelia incarnata* plants, at one site there was also dying *Banksia marginata*. At two sites *Epacris curtisiae* plants showed symptomatic evidence of *Phytophthora cinnamomi*.

¹⁷⁵ North Barker Ecosystem Services, Tarkine Drive Vegetation Survey And Fauna Habitat Assessment 15 October 2009

¹⁷⁶ Survey and Photos were undertaken by Anthea Fergusson of Natural Values Consulting as a sub consultancy to NBES



Epacris curtisiae plant A. Fergusson



Epacris curtisiae flower A. Fergusson