A PRELIMINARY ASSESSMENT OF THE BAT FAUNA AT THE PROPOSED GLEN INNES WIND FARM, NSW

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for Connell Wagner Pty Ltd, August 2007

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EXECUTIVE SUMMARY

The consultant was commissioned by Connell Wagner Pty Ltd to conduct a preliminary assessment of the bat fauna at the proposed Glen Innes Wind Farm, to identify the potential for the presence of any threatened species, and to establish whether during its construction and operation there would be any potential impact upon threatened species.

The proposed wind farm site is located approximately 12-15 km west of Glen Innes, NSW. The project area has extensive areas of open pasture, interspersed with woodland remnants, with some turbine sites being at the edges of larger tracts of potential bat habitat.

A search of the consultant's database of bat distribution records was conducted to generate a list of species that could be expected in the project area and surrounds. A Protected Matters Search Report, which identifies threatened species and communities that are listed as nationally significant under the *Environment Protection and Biodiversity Conservation Act 1999*, was also carried out.

Twenty-one species have been recorded from the region including nine that are listed as threatened in the NSW Threatened Species Conservation Act and the EPBC Act respectively. However, based on distribution patterns and ecological characteristics, it was concluded that in reality 16 species is the most likely species count, four of these being listed as threatened.

The majority of the project area is cleared agricultural land which, as indicated by numerous studies elsewhere by the consultant and others, provides very little in the way of resources for bats, such as tree roost sites and insect prey. However, at many turbine sites in the project area a number appear to be located near occasional isolated trees, others are near scattered remnants, and others appear to be at the edges of larger remnants. A preliminary assessment of each of the proposed turbine sites was conducted.

The foraging characteristics of species identified from database searches as being expected in the project area were assessed to indicate their potential to intercept turbines. Four species in the *above canopy – prey intercept* category would be those most likely to fly in the rotor swept area of turbines. These included four species: the White-striped and Eastern Freetail Bats, the Yellow-bellied Sheathtail Bat, and the Large Bentwing Bat. The latter two species are listed in the NSW TSC Act.

It was concluded that it would be essential to conduct a field survey to determine the structure of the bat community in the project area, and the distribution of species within the various habitats on the site.

INTRODUCTION

The consultant was commissioned by Connell Wagner Pty Ltd to conduct a preliminary assessment of the bat fauna at the proposed Glen Innes Wind Farm, to identify the potential for the presence of any threatened species, and to establish whether during its construction and operation there would be any potential impact upon threatened species.

This preliminary ("desktop") assessment has been conducted with the view to the later design of targeted surveys of the bat fauna that will be conducted when seasonal conditions are optimal.

The site has not been inspected prior to the production of this study, but the consultant has been provided with enough material to adequately conduct the assessment, including aerial photographs, maps of turbine locations, and site photographs.

PROJECT AREA

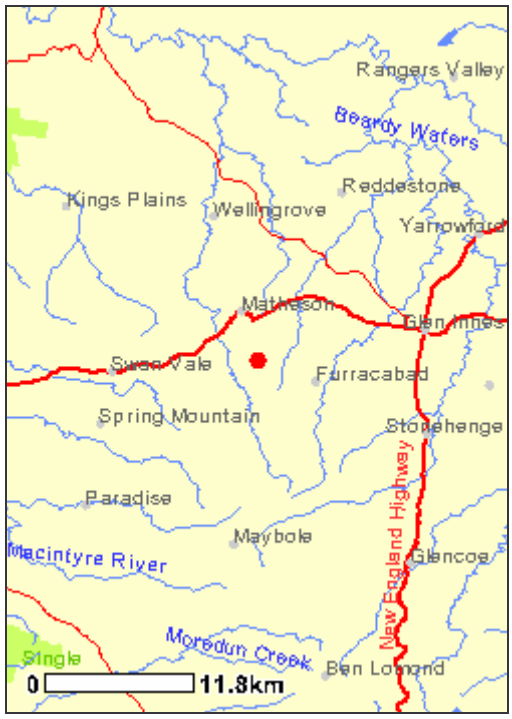
The proposed wind farm site is located approximately 12-15 km west of Glen Innes, NSW. The project area has extensive areas of open pasture, interspersed with woodland remnants, with some turbine sites being at the edges of larger tracts of potential bat habitat. None of these tracts of woodland appear to join any national park or reserve.

METHODS

A search of the consultant's database of bat distribution records was conducted to generate a list of species that could be expected in the project area and surrounds. The database included records from museums and fauna agencies, field records, and relevant and current literature, which has been compiled over the last three decades. The search area was a 50 x 50 km block (2500 km^2) centred upon the project area, which had the boundaries 151°00' S to 151°20'S by 29°20'E to 30°20'E.

A Protected Matters Search Report (PMSR), which identifies threatened species and communities that are listed as nationally significant under the *Environment Protection and Biodiversity Conservation Act 1999*, was generated using coordinates approximating the centre of the project area, with a buffer of 20 km (Figure 1).

Figure 1: Areas surrounding the proposed Glen Innes Wind Farm that were covered by a Protected Matters Search Report. The report was generated using the wind farm as a centroid (red dot) with a buffer zone of 20 km from that point.



RESULTS and DISCUSSION

A list of the 21 species recorded from the region is shown in Table 1, which includes nine that are listed as threatened in State and Commonwealth legislation, the NSW Threatened Species Conservation Act and the EPBC Act respectively.

Habitat Resources for the Bat Fauna

The majority of the project area is cleared agricultural land which, as indicated by numerous studies elsewhere by the consultant and others, provides very little in the way of resources for bats, such as tree roost sites and insect prey. However, at many turbine sites in the project area a number appear to be located near occasional isolated trees, others are near scattered remnants, and others appear to be at the edges of larger remnants. A preliminary assessment of each of the 26[2] proposed turbine sites is shown in Table 2.

[2] The proposal has involved assessment of up to 27 turbine sites, not all of which may be developed, Site 16 may allow for two turbines. The final number installed will depend on the grid connection voltage, turbine capacity and individual site suitability from technical and environmental perspectives.

Sixteen of the locations were in open pasture, with foraging resources such as dense woodland being distant from the turbine site, but at some (7) there may be issues if bats commute past turbines from one remnant to another. The remainder of sites ranged in potential bat habitat quality from occasional scattered trees on the turbine site to good bat habitat that may support a number of threatened species.

Table 1: List of species expected in the study area, showing those that are listed in the NSW Threatened Species Conservation Act and the Commonwealth Environment Protections and Biodiversity Conservation Act.

Common Name	**Species**	**TSC Act**	**EPBC Act**
Fruit Bats	Pteropodidae		
Grey-headed Flying Fox	*Pteropus poliocephalus*	●	●
Sheathtail bats	Emballonuridae		
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	●	
Horseshoe Bats	Rhinolophidae		
Eastern Horseshoe Bat	*Rhinolophus megaphyllus*		
Bentwing Bats	Miniopteridae		
Little Bentwing Bat	*Miniopterus australis*	●	
Large Bentwing Bat	*Miniopterus schreibersii*	●	
Ordinary bats	Vespertilionidae		
Large-eared Pied Bat	*Chalinolobus dwyeri*	●	●
Gould's Wattled Bat	*Chalinolobus gouldii*		
Chocolate Wattled Bat	*Chalinolobus morio*		
Eastern Falsistrelle	*Falsistrellus tasmaniensis*	●	
Golden-tipped Bat	*Kerivoula papuensis*	●	
Lesser Longeared Bat	*Nyctophilus geoffroyi*		
Gould's Longeared Bat	*Nyctophilus gouldi*		
Greater Longeared Bat (Southeastern Form)	*Nyctophilus timoriensis*	●	●
Greater Broadnosed Bat	*Scoteanax rueppellii*	●	
Eastern Broadnosed Bat	*Scotorepens orion*		
Large Forest Bat	*Vespadelus darlingtoni*		
Eastern Forest Bat	*Vespadelus pumilus*		
Southern Forest Bat	*Vespadelus regulus*		
Little Forest Bat	*Vespadelus vulturnus*		
Freetail bats	Molossidae		
Eastern Freetail Bat	*Mormopterus* sp. 2		
White-striped Freetail Bat	*Tadarida australis*		

Table 2: Summarised habitat descriptions taken from site photographs and aerial photography provided for the preliminary assessment, and a broad outline of potential issues that may arise from the Glen Innes Wind Farm.

	Habitat description from site photographs	Location of turbines in relation to large portions of potential bat habitat (aerial photography)	Potential issues
T1	Open pasture, three large eucalypts nearby	Open pasture on ridgetop, exposed to west. Remnant woodland to north of site	None
T2	Open pasture, small clump of eucalypts nearby	Open pasture on ridgetop - exposed site	None
T3	Open pasture	Open pasture on ridgetop - exposed site	None
T4	Open pasture, small eucalypt remnants nearby	Less than 1 km from large tract of bat habitat on steep slopes to the west of site – exposed site	Bat foraging area, probably just common species, not good threatened species habitat
T5	Open pasture, small patches of eucalypts distant from site	Less than 1 km from large tract of bat habitat on steep slopes to the west of site – exposed site	Bat foraging area, probably just common species, not good threatened species habitat
T6	Open pasture, small patch of eucalypts and a few scattered isolated eucalypts nearby	Near small remnants with large mature trees	Bat foraging area, probably just common species, not good threatened species habitat
T7	Open pasture, occasional eucalypts	Open pasture on elevated knoll above most trees	None
T8	Open pasture, some remnant woodland on slopes to the east and west at lower levels	Open pasture - exposed location	None (see T9)
T9	Open pasture, some remnant woodland on slopes to the east and west at lower levels	Open pasture - exposed location	Possible issues if remnant is large. This site is very similar to T8 and same potential issues expected
T10	Open woodland remnant surrounding turbine location which is on top of a steep sided knoll. Some clearing needed for approach to top of knoll.	Less than 1 km from large tract of potential bat habitat	Bat foraging area, probably just common species, probably not good threatened species habitat (small remnant)
T10B	Open pasture, small patch of immature eucalypts nearby	Remnant woodland on lower slope to the west provides potential bat habitat	None
T11	Open pasture, large remnants around edges of site	Less than 1 km from large tract of potential bat habitat	Good bat habitat which may have some threatened species present
T11B	Open pasture with scattered eucalypts, large remnant in vicinity either side of ridgeline	Less than 1 km from large tract of potential bat habitat	Possible issues if bats commute between remnants
T12B	Open pasture, occasional scattered eucalypts, near rocky knoll	Less than 1 km from large tract of potential bat habitat. Woodland particularly on western slope	None

T12C	Open pasture, large remnant distant from turbine site	Less than 1 km from large tract of potential bat habitat. Woodland particularly on western slope	None
T13	Open pasture and scattered mature eucalypts	Less than 1 km from large tract of potential bat habitat	Possible issues if bats commute between remnants
T13B	Open pasture, large eucalypts nearby which may be at edge of a remnant running downhill	Less than 1 km from large tract of potential bat habitat	Possible issues if bats commute between remnants
T14B	Turbine site in open pasture but extensive foraging habitat in immediate vicinity which appears to extend downhill	Less than 1 km from large tract of potential bat habitat	Good bat habitat in vicinity which may have some threatened species present
T15	Open pasture, occasional scattered eucalypts	Open pasture but includes areas of mature eucalypts	Possible issues if bats commute between remnants
T16	Open pasture on elevated hilltop, remnants around sides of hilltop	Open pasture with nearby mature eucalypts	Possible issues if bats commute between remnants
T17	Quite open but large remnant appears to be quite close to turbine site	Open pasture surrounded by large eucalypts	Good bat habitat in vicinity which may have some threatened species present
T18	Quite open but large remnant quite close to turbine site	Less than 1 km from large tract of potential bat habitat	Good bat habitat in vicinity which may have some threatened species present
T19	Quite open but large remnant quite close to turbine site	Less than 1 km from large tract of potential bat habitat	Good bat habitat in vicinity which may have some threatened species present
T20	Open woodland remnant in vicinity of turbine site	Less than 1 km from large tract of potential bat habitat	Bat foraging area, probably just common species, probably not good threatened species habitat (small remnant)
T21	Open pasture, some mature eucalypts nearby	Open pasture and some nearby large eucalypts on slopes surrounding the hill top	Possible issues if bats commute between remnants
T22	Open pasture, remnants in vicinity	Open pasture and some nearby large eucalypts on slopes surrounding the hill top	Possible issues if bats commute between remnants

Potential for Presence of Threatened Species

Database searches and the PMSR revealed that nine species listed under the TSC Act have the potential to be present in the area, three of which were also listed as Vulnerable under the EPBC Act. The potential for each of these species to be present on the site is outlined as follows:

Grey-headed Flying Fox

This species would forage in the project area during seasons when eucalypts are extensively flowering, whilst at the same time blossom (nectar) resources closer to the coast were not available. Presence would therefore be infrequent.

Yellow-bellied Sheathtail Bat

This species may be present at sites where very large remnants are in the vicinity. Studies in the Orange district have shown that viable local populations of Yellow-bellied Sheathtail Bats require remnant larger than 150-200 ha (Richards, unpublished). The aerial photograph of the project area shows that this habitat is extensive but may not be present near many of the turbine locations.

Little Bentwing Bat

If in fact present in the area, this species would be at the edge of its range, being primarily distributed east of the Great Dividing Range. Furthermore, being an underground-roosting species, its presence would be limited by the availability of warm caves or disused mines in the region. Connell Wagner has advised that it has not observed any such habitat on the ridge top areas.

Large Bentwing Bat

This species has a high potential to be present in the project area, which is well within its distribution range. It is a underground-roosting species, and would occupy caves or disused mines in the region. As above, Connell Wagner has advised that this habitat is not apparent on the Waterloo Range. Records are known from Kingsgate and Sheepstation Creek mining areas. With the ability to fly long distances to access foraging areas, it would be expected to use large remnants near some of the turbine locations.

Large-eared Pied Bat

The type locality of this species is near Inverell, where specimens were collected from a disused mine that is now submerged beneath Copeton Dam, approximately 60 km to the west of the projects area. Colonies

are usually small and can be found in crevices in escarpments and cliffs. The potential for this species to be present is unknown.

Eastern Falsistrelle

This species roosts in tree hollows, appears to prefer montane habitats and forages above and around woodland or forested remnants. It is therefore highly likely to be found in the area.

Golden-tipped Bat

Because it prefers dense coastal forests, it is highly doubtful that this species would be present in the project area. There was only one record in the database search block, from Chaelundi State Forest, which is approximately 70 km to the east.

Greater Longeared Bat (Southeastern Form)

Scattered records and a number of publications (Lumsden 1994; Lumsden and Bennett 1995a, 1995b; Parnaby 1995; Richards 1983) indicate that the Greater Longeared Bat is generally regarded as being an arid or semi-arid species, with the nearest records of viable populations being the Pilliga Scrub. It is considered to be doubtfully present in the project area.

Greater Broadnosed Bat

This species roosts in tree hollows, but appears to prefer coastal forested habitats, and may be allopatric with the ostensibly similar Eastern Falsistrelle. The nearest known record is from Gibraltar Range National Park, approximately 70 km east of the project area. Although there is some potential for it to be present, the cool climate of the New England region may preclude utilisation of the project area by large numbers of individuals.

IMPACT ASSESSMENT

Foraging Characteristics of Expected Species

The foraging characteristics of species identified from database searches as being expected in the project area were assessed to indicate their potential to intercept turbines. This assessment is shown in Table 3. Primary foraging strata and primary foraging modes were taken from Richards (2001), Churchill (1998) and other publications.

Species in the *above canopy – prey intercept* category would be those most likely to fly in the rotor swept area of turbines. Four species were placed in this category: the White-striped and Eastern Freetail Bats, the Yellow-bellied Sheathtail Bat, and the Large Bentwing Bat. The latter two species are listed

in the NSW TSC Act. The Chocolate Wattled Bat has been occasionally recorded in carcass searches at wind farms in Victoria[3].

Potential Impacts from Construction and Operation of the Wind farm

Two primary impacts are likely to occur during the construction and operation of the wind farm. These include:

- loss of roost sites via tree clearance during the construction phase, and
- bat collision with turbines during the operation phase, relevant to species in the *above canopy – prey intercept* category (Table 3).

Table 3: Foraging characteristics of insectivorous bat species that were determined from database searches as being expected in the project area. The species list is separated into two categories of potential presence. Threatened species are shown in bold.

Primary foraging stratum	Primary foraging mode	Species potentially present	Species doubtfully present
Above canopy	Prey intercept	**Yellow-bellied Sheathtail Bat**	
		Large Bentwing Bat	
		White-striped Freetail Bat	
		Eastern Freetail Bat	
Around canopy	Prey pursuit	**Large-eared Pied Bat**	**Little Bentwing Bat**
		Gould's Wattled Bat	**Greater Broadnosed Bat**
		Chocolate Wattled Bat	
		Eastern Falsistrelle	
		Eastern Broadnosed Bat	
		Large Forest Bat	
		Eastern Forest Bat	
		Southern Forest Bat	
		Little Forest Bat	
Below canopy	Prey gleaning	Lesser Longeared Bat	**Golden-tipped Bat**
		Gould's Longeared Bat	**Greater Longeared Bat**
	Prey ambush	Eastern Horseshoe Bat	

CONCLUSIONS

It was concluded that:

- There is the potential to have up to 21 species present on the project area, though in reality 16 species is most likely species count.

- There is the potential for nine threatened species to occur in the area. Four of these have edges of their distribution 50-70 km to the east of the project area, and another, the Grey-headed Flying Fox may only be an occasional visitor to the area under special circumstances.

[3] *pers. comm*. Brett Lane and Associates Pty Ltd, Victoria

Therefore, in reality, four threatened species are expected to be present.

The number of species would be dependent upon the quality and complexity of habitats in the project area.

It would be essential to conduct a field survey to determine the structure of the bat community in the project area, and the distribution of species within the various habitats on the site. A field survey is recommended for summer of 2007-2008.

REFERENCES

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APPENDIX 1:
Map of Project Layout and Turbine sites used for the assessment

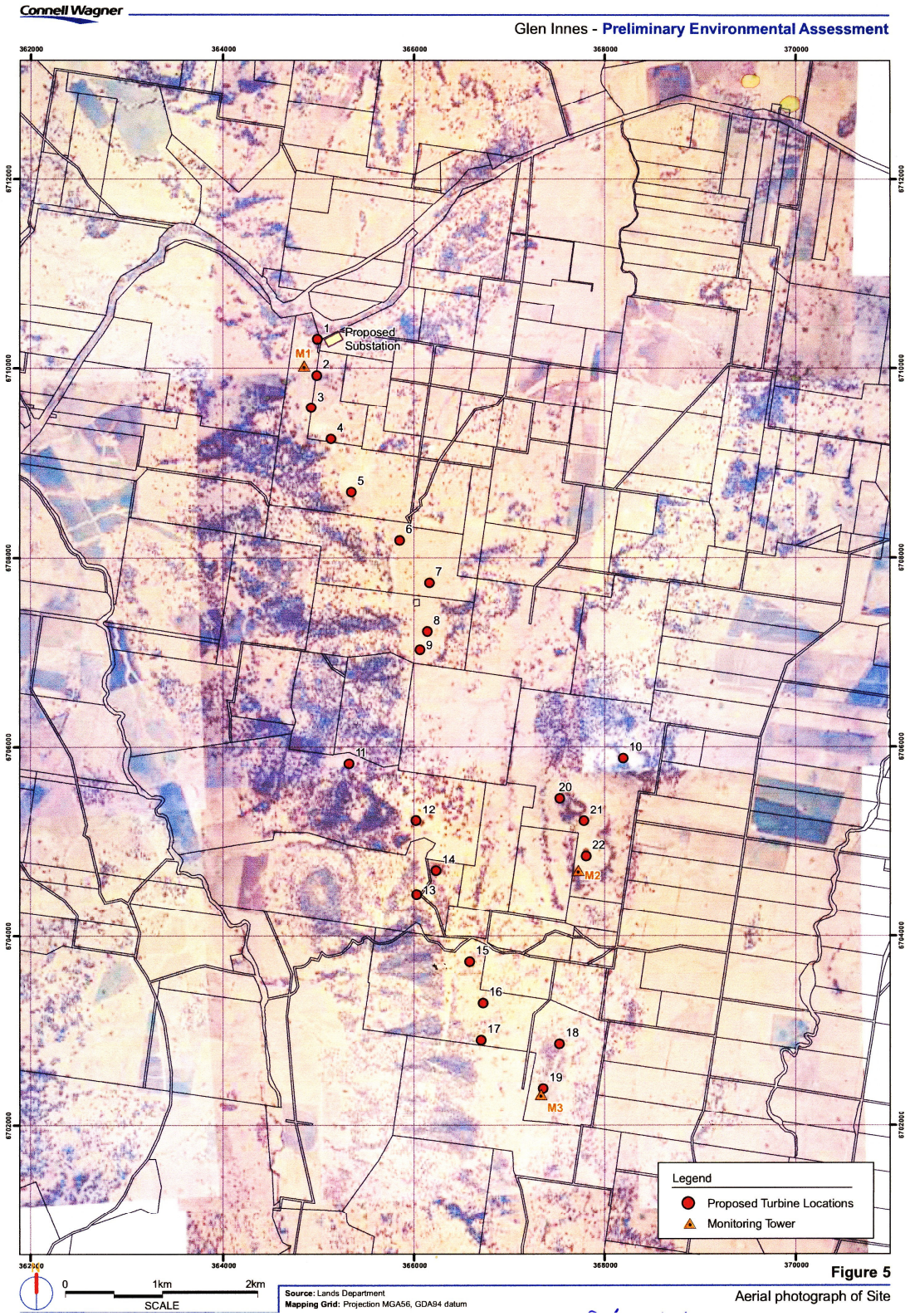


Figure 5
Aerial photograph of Site

APPENDIX 2: List of site photographs referenced by the Assessment


An existing 66kV line at nth end of WF 12 July 07


T1 distance & Substn foreground


T1 to north of photo point 12 July 07


T1 to T2 View to M1 12 July 07


T2 in near distance T7 on hill 12 July 07


T2 looking South along ridge 12 July 07


T3 to T4 12 July 07


T4 on hill in distance looking nth 12 July 07


T4 on ridge in distance 12 July 07


T5 View toward T6 & T7 12 July 07


T6 12 July 07


T6 View North 12 July 07


T6 View to T7 & Ross Trig 12 July 07


T7 on hill top T8 in foreground


T7 View north to T6 T5 and T4


T8 & T9 from T7


T9 on top of ridge from 10B 11th July 07


T10 on Top ridge 10 July 07


T10B foreground 11th July 07


T10B LHS-T9&T8 on Ridgeline from east10 July...

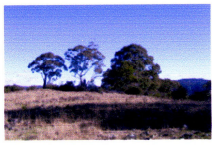

T11 in foreground 11th July 07


T11 mid distance RHS from 10B 11 July 07 Sony


T11B foreground T12B in distance 11th July 07


T12B near Mast M4 11th July 07


T12C toward 14 11th July 07


T13B 11 July 07


T14B 11 July 07


T15 & T16 ih distance from T16 11 July 07


T16 10 July 07


T16 from 13B 1 July 07 Sony


T17 in clearing - mid distance 10 July 07


T18 & T19 on ridge in distance


T18 in distance from T16 DSCF2091


T18_T19 in distance_DSCF2092


T19 in distance from T16_DSCF2093


T20 in distance from T21 10 July 07


T21 looking north T10 distance 10 July 07


T21 View Sth 10 July 07


T22 View to M2 10 July 07