

# **LODDON SITES**

## Site 11 Lexton North Water Reserve

This site is at possible risk from groundwater discharge and is located within the Bet Bet Targeted Salinity Project Sub-Catchment.

### Site Description

The site is surrounded by sedimentary hills and is at an elevation of 300 metres. The remnant vegetation is significant, as much of the Ben More Range located closeby has been cleared of its original Box-Ironbark vegetation. Previous activities at the reserve have been grazing (a grazing licence was removed approximately 15 years ago) and timber harvesting activities. Parks Victoria now manages the site as a Conservation Reserve. Saline discharge is occurring along a drainage line within the reserve and visible salt scalds are present. Therefore the vegetation is highly threatened by dryland salinity (Keleher 1997).

### Vegetation Description and Composition

The EVC represented at this site is grassy dry forest and the vegetation community is dominated by *E. leucoxylon* (Yellow Gum) and *E. goniocalyx* (Long-leaf Box) with a minimal shrub layer (DSE 2003). The herbaceous layer consists of *Austrodanthonia* sp. (Wallaby Grass), *Tricoryne elatior* (Yellow Rush-lily) and *Lomandra* sp. (Mat Rush).

The most significant introduced species are *Briza maxima* (Quaking Grass) and *Briza minor* (Lesser Quaking Grass). Many introduced grasses have reduced in cover abundance due to dry seasonal conditions and probable grazing pressures from hares, rabbits and wallabies.

Two salt indicator species are present being *Lolium* sp. (Rye Grass) and *Polygomon monspeliensis* (Annual Beard Grass). Their further spread remains of concern due to salt discharge occurring nearby, but may still be a response to dry seasonal conditions. Further information is needed through soil salinity testing (appendices 8.2 & 8.3) (Davies 2003).

### Tree Health

Most trees have not changed in health since monitoring commenced in 1997, however scores are quite low for some trees with reduced canopy densities and high level of epicormic growth. Prolonged dry conditions and isolation from other stands of remnant vegetation are placing large amounts of stress upon these trees.

Only two *E. goniocalyx* (Long Leaf Box) trees could be reached with the pole pruners for leaf analysis which showed slight damage from insect attack and leaf chloride concentrations ranging from 0.11-0.15 percent. These low scores are due to the dry seasonal conditions and subsequent drop in the water table (Collopy 2003). Slight to moderate regeneration of the understorey layer was recorded within the vegetation quadrats (appendix 8.4).

### Birds

Bird species present at the time of the vegetation and tree health surveys were :- Corella, Galah, Kookaburra, Magpie, Red-rumped Parrot, Striated Pardalote, Welcome Swallow, Willie Wagtail, Noisy Miner, Superb Fairy Wren and Eastern Rosella. Most of these species are commonly found in wooded farmland habitat.

### **Groundwater and Salinity**

Two bores are located close to the reserve and the water table was approximately four metres below natural surface in 2002-2003. These levels are concerning given that the last few seasons have recorded below average rainfall and yet groundwater levels are still quite close to the surface. One bore had risen slightly in 2003, reflecting the wetter conditions received thus far (appendix 8.5).

### **Water Quality and Macroinvertebrates**

These tests do not apply to this remnant vegetation site.

### **Site Threats**

- Kangaroo grazing
- Vehicle tracks and compaction of site
- Possible discharge site
- Continued weed invasion from adjacent farmland
- Possible risk of fire

(Davies 2003).

### **Surrounding Land use**

Land use is sheep grazing and most paddocks did not contain enough pasture cover to feed stock. The impact that the drought has had on the area was evident from the hand feeding that has been occurring. This was indicated by the behaviour of sheep running toward the vehicle each month during the groundwater bore monitoring.



**Figure 17.** Lexton North Water Reserve contains a good shrub layer and is important habitat for many bird species

## Site 12 Merin Merin Swamp

The site appears to be in a stable environmental condition

### Site Description

Merin Merin Swamp at an altitude of 300 metres together with Middle Swamp nearby, form the southern end of a wetlands complex that extends north onto the Riverine Plain. The swamps receive water via localised runoff from surrounding volcanic cones that have been mapped as high recharge (Mt Glasgow, Mt Cameron and Merin Hill). Both swamps are locally important due to their high wildlife value and connection with Clunes State Forest. Previous land use had been grazing (grazing licence was removed in the early 1990s) and timber harvesting during the Gold rush era and beyond. The area is now a State Game Reserve managed by Parks Victoria (Keleher 1997).

### Vegetation Description and Composition

Note: there are three vegetation quadrats surveyed at both wetlands monitored in the Loddon catchment. Parks Victoria assists with funding the additional vegetation surveys.

This shallow freshwater marsh contains a combination of woodland dominated by *E. camaldulensis* (Red Gum) and open-sedgeland dominated by *Juncus* sp. (rushes) *Carex* sp. (sedges), and *Eleocharis* sp. (spike rushes). The swamp contains high habitat values due to the mixed age classes of Red Gums present and connection to the west with State forest. EVCs surrounding the swamp are plains grassy woodland on the eastern side and grassy woodland on the western side (DSE 2003).

There is a very high proportion of introduced species in the herbaceous layer, particularly *Phalaris* (Canary Grass) and species from the Asteraceae family. Weediness does vary across the site with no introduced species recorded within quadrat A in 2002. It is located at the northern end of the Swamp and is the area most regularly inundated. The seven native species that were observed reflected this and were mainly aquatic sedge and rush species.

Quadrat B and C both contained very high percentages of introduced species. They do not become inundated very often (and have remained dry for a very long time), are located on very fertile soils and have had a long grazing history. Dry seasonal conditions have assisted in temporarily reducing the cover abundance of some weed species but are expected to return when adequate rainfall is received.

Two salt indicator species were present being *Critesion marinum* (Sea Barley Grass) and *Lolium rigidum* (Wimmera Rye Grass). Although these are common agricultural weeds, their appearance and any further spread should be closely monitored because the northern end of the swamp and the drainage line running to the swamp from the north western corner have been mapped as potentially at high risk from salinisation.

Merin Merin Swamp has remained dry since January 2001. Some aquatic species, *Marsilea* sp. (Nardoo) and *Glyceria australis* (Australian Sweet-grass) were still present in spring 2002 but their level of abundance has been greatly reduced by dry seasonal conditions (appendices 8.2 & 8.3) (Davies 2003).

### **Tree Health**

Twelve *Eucalyptus camaldulensis* (Red Gum) trees instead of the standard eight are monitored at Merin Merin Swamp (four near each quadrat) because of the additional vegetation quadrat. Most trees are healthy and their scores have not altered very much since monitoring commenced in 1997. Some have experienced decline whereas three trees have recorded a large improvement in health. Three trees located on the eastern side of the swamp, where it does not flood very often were experiencing large amounts of insect attack and displaying some epicormic growth in 2002. They are young trees that are naturally vulnerable to insect attack, however could also be indicating drought stress.

Eight trees could be sampled for leaf analysis and contained fairly large amounts of insect attack by lerps and leaf skeletoniser caterpillars. Leaf chloride concentrations ranged from 0.10-0.32 percent. These low scores are a probable reflection of the dry seasonal conditions and drop in water tables (Collopy 2003). No regeneration of the tree or understorey layer was recorded within any of the vegetation quadrats (appendix 10.4).

### **Birds**

Bird species seen at the time of vegetation and tree health surveys were:- Black Faced Cuckoo Shrike, Corella, Galah, Kookaburra, Magpie, Musk Lorikeet, Noisy Miner, Red-rumped Parrot, Red Wattlebird, Richardson's Pipit, Starling, Striated Pardalote, Sulphur-crested Cockatoo, Welcome Swallow, White-browed Woodswallow and Willie Wagtail.

The number of birds recorded in years when Merin Merin Swamp has contained water has been much greater. The wetland is important habitat for Japanese Snipe, protected under the Japanese and Australian Migratory Bird Agreement (JAMBA), Brolga and Freckled Duck, both rare in Victoria; Peregrine Falcon and Blue-Billed Duck, both in decline. Brolga have been recorded as breeding at the site (Keleher 1997).

### **Groundwater and Salinity**

Two bores are monitored at this site, one is shallow and located on the eastern side in the newer volcanic land system, the other drilled into a deeper aquifer layer and is located on the sedimentary hills land system. The shallower bore is very responsive to seasonal weather variation and has fluctuated from 1.5 to 4.0 metres since 1997. In 2003, the water table had risen almost one metre in response to wetter seasonal conditions. The other bore has remained at around 15 metres below natural surface and has shown a slight downward trend in response to dry seasonal conditions (appendix 8.5).

### **Water quality**

Merin Merin Swamp has been inundated and sampled four times since 1997 and has remained dry since January 2001. Some general observations recorded so far were the water quality was generally very good in relation to dissolved oxygen, pH and conductivity levels, but nutrient concentrations often exceeded maximum limits for the prevention of eutrophication (nutrient enrichment). The swamp often contains only a few centimetres of water and this would be an important factor behind the high nutrient and turbidity readings. Merin Merin swamp receives localised runoff and the high phosphorus and nitrogen readings are a reflection of the effects of surrounding land use from fertilisers, plant/animal runoff and nitrogen fixing pastures (clover and lucerne).

Macroinvertebrate surveys are not conducted at this site as it rarely contains enough water (>30cm in late spring) for regular surveys to occur. The reason for this is due to the geology of the swamp bed being basalt, which drains rapidly (appendix 8.6).

### **Site Threats**

- Possible stock grazing
- Grazing by rabbits and hares
- Continued weed invasion in particular *Phalaris* (now present in Quadrat B and C.)
- Possible incorrect water regime

(Davies 2003).

### **Surrounding Land use**

Land use around Merin Merin Swamp was a mixture of cropping, sheep and cattle grazing and conservation (State Forest) adjoining the western side of the Swamp.



**Figure 18.** Merin Merin Swamp contains many large old Red Gum trees forming important wildlife

## Site 13 Jennings Bushland Reserve

This site appears to be in an environmentally stable condition at present but could decline if weed species continue to increase in cover abundance. The site is also located within the Timor West Targeted Salinity Project Sub-Catchment.

### Description

Jennings Reserve is located at the break of slope on the northern side of the Black Range and could therefore be at future risk from salinity. Groundwater discharge has been mapped occurring one kilometre west from the reserve. The land units are comprised of northern granites and metamorphic ridges and the site is at an altitude of 235 metres. The reserve did have a bee farm and range licence in the past and the Central Goldfields Shire has used the area to store gravel for road works. The site is now a conservation reserve managed by Parks Victoria (Keleher 1997).

### Vegetation Description and Composition

The site contains Box Ironbark forest EVC, listed as depleted in the Goldfields Bioregion (DSE 2003). The remnant vegetation community is relatively intact and a good representation of the original vegetation for the area, although the tree densities have been modified by previous clearing activities. The presence of *Allocasuarina luehmannii* (Buloke), depleted in Victoria is significant.

The site is dominated by *E. leucoxylon* (Yellow Gum) and *E. microcarpa* (Grey Box) with a shrub layer of *Dillwynia cinerascens* (Grey Parrot-pea), *Pultenaea largiflorens* (Twiggy Bush-pea) and *Acacia acinacea* (Gold-dust Wattle). The understorey layer contains *Austrodanthonia* sp. (Wallaby Grass) and *Lomandra* sp. (Mat Rush).

The most significant introduced species in this almost intact vegetation community continues to be *Briza maxima* (Quaking Grass) and the recent appearance of *Lolium* sp. (Rye Grass) and *Avena fatua* (Wild Oats).

Grazing pressures by kangaroos, wallabies, hares and rabbits have continued to increase due to the prolonged dry seasonal conditions. This has resulted in a particularly noticeable decline in the level of abundance of *Pultenaea largiflorens* (Twiggy Bush-pea). Many Wattle and *Cassinia arcuata* (Drooping Cassinia) seedlings that germinated after the wetter spring of 2000 have been removed by grazing. There has also been an increase in leaf litter levels and a reduction in the level of abundance of most plant species.

There were no salt indicator species present in 1997 or 1998. The recent appearance of Rye Grass is more likely a reflection of the surrounding landuse because it is a common agricultural weed and is most likely present due to dry seasonal conditions

(appendices 8.2 & 8.3) (Davies 2003).

### Tree Health

Most trees have experienced declining health since 1997 with reduced canopy sizes and densities. Drought is one reason for the decline, however the high

density of trees per hectare induced by previous clearing activities and subsequent coppice regrowth is also responsible for the reduction in canopy size and densities.

Only one *E. microcarpa* (Grey Box) tree could be reached with pole pruners for leaf analysis and showed fairly large amounts of damage by insects. The leaf chloride concentration was 0.43 percent. Only slight regeneration of *Cassinia arcuata* (Drooping Cassinia) was recorded at the site (appendix 8.4).

### **Birds**

Bird species present at the time of the vegetation and tree health surveys were :- Brown Treecreeper, Magpie, Rainbow Bee-eater, Red-rumped Parrot, Red Wattlebird, Welcome Swallow, White-plumed Honeyeater, White-browed Woodswallow, Willie Wagtail, White winged Chough, Eastern Rosella and Striated Pardalote. All are commonly found in Box Ironbark forest habitat.

### **Groundwater and Salinity**

The one bore recorded a large groundwater drop of one metre during the monitoring year and fell to 14.2 metres below natural surface in 2002-2003. Previous groundwater electrical conductivity readings indicated highly saline water (>10,000 EC) (appendix 8.5).

### **Water Quality and Macroinvertebrates**

These tests do not apply to this remnant vegetation site.

### **Site Threats**

- Weed invasion
- Disturbance through gully erosion and surface scouring
- Rabbit, hare and kangaroo grazing pressures have still continued to increase

(Davies 2003).

### **Surrounding Land use**

Land use around the reserve was a mixture of sheep grazing and remnant native vegetation.



**Figure 19.** Jennings Bushland Reserve contains Box Ironbark vegetation which is in good condition



## Site 14 Woodstock Bushland Reserve

The site appears to be in a stable environmental condition. Flood debris deposited during 2000 remains across some of the site.

### Site Description

Woodstock at an altitude of 192 metres is a small bushland reserve now managed by Parks Victoria. It had previously been classified as a camping and water reserve. Soil disturbance indicates that the area once had some mining and extraction activities. The vegetation at the site is listed at both the State and Federal levels by the Flora & Fauna Guarantee (FFG 1988) and the Environment Protection & Biodiversity Conservation (EPBC 1999) Acts as endangered and could be at risk from salinity, due to its location near a drainage line and relatively low setting in the landscape (Keleher 1997).

### Vegetation Description and Composition

Two endangered EVCs are represented at the site. On the higher ground grassy woodland occurs and is dominated by *E. albens* (White Box) and *E. microcarpa* (Grey Box) (DSE 2003). On the lower area near the ephemeral watercourse the EVC is creekline grassy woodland and the overstorey contains *E. camaldulensis* (Red Gum). The shrub layer is minimal with the occasional *Cassinia arcuata* (Drooping Cassinia), *Bursaria spinosa* (Sweet Bursaria) and *Acacia acinacea* (Gold-dust Wattle).

The site continues to have a high proportion of introduced species in the herbaceous layer (now greater than 40 percent of species present) including many pasture weeds. The salt indicator species *Lolium* sp. (Rye Grass), also a common agricultural weed is at the site and in the absence of other salt indicator species is more likely a reflection of the surrounding agricultural land use.

There have been minimal changes in vegetation survey results since monitoring commenced, except for the flood event in spring 2000 that deposited flood debris across some of the site. A reduction in cover abundance of many species can be attributed to the continued dry conditions (appendices 8.2 & 8.3) (Davies 2003).

### Tree Health

Tree health is generally quite high at the site with most trees recording an improvement in health since 1997. Only two trees, one White Box and a Red Gum could be reached for leaf analysis. The Red Gum tree had suffered extensive leaf insect damage exacerbated by drought stress. Leaf chloride concentrations ranged from 0.10-0.51 percent. The higher reading was recorded in the Box tree due to their tendency to accumulate salts (Collopy 2003). No regeneration of the tree or understorey layer was recorded at the site appendix 8.4).

### Birds

Bird species seen at the time of vegetation and tree health surveys were:-

Australian Raven, Black-faced Cuckoo-shrike, Galah, Grey Butcherbird, Kookaburra, Magpie, Noisy Miner, Red Wattlebird, Striated Pardalote, Weebill, Corella, Superb Fairy Wren, Eastern Rosella, Rufous Whistler, and Little Raven.

### **Groundwater and Salinity**

Two bores located near the site have remained dry since 1997. Therefore that water table must be at least 17m below natural surface (drilling depth). Although the regional water table is very deep, the drainage line running through the reserve could possibly be a source of saline discharge although there has never been any evidence to suggest that this has previously occurred (appendix 8.5).

### **Water Quality and Macroinvertebrates**

These tests do not apply to this remnant vegetation site.

### **Site Threats**

- Weed invasion but in particular, previously recorded on site, *Genista monspessulana* (Cape Broom) and *Oxalis pes-caprae* (Soursob)
  - Possible grazing
  - Road drainage is now directed across the site
- (Davies 2003).

### **Surrounding Land use**

Land use was a mixture of grazing, cropping and remnant vegetation.



**Figure 20.** Woodstock Bushland Reserve contains two endangered ecological vegetation classes (EVCs)

## Site 15 Tang Tang Swamp

The site is in environmental decline due to the spread of weed species and declining tree health.

### Site Description

Tang Tang Swamp at an altitude of 105 metres, is one of only four such areas in the Loddon River dryland catchment and is at the northern most extremity of a chain of wetlands extending from Merin Merin and Middle Swamps at Clunes. Tang Tang Swamp is listed as Nationally significant, contains many Aboriginal archaeological sites and provides important habitat for rare, threatened and migratory bird species. Rare and vulnerable flora species are also present. A grazing licence was held at the swamp until 1998. The area is now managed by Parks Victoria and is carefully crash grazed in autumn and spring to control weeds in the grassland areas (Keleher 1997).

### Vegetation Description and Composition

Note: there are three vegetation quadrats surveyed at both wetlands monitored in the Loddon catchment. Parks Victoria assists with funding the additional vegetation surveys.

Tang Tang Swamp is dominated by *E. camaldulensis* (Red Gum), *Carex* sp. (sedge) and *Eleocharis* sp. (spike rush). The area outside the inundation zone is the endangered plains grassland EVC dominated by a mixture of native grasses including: *Austrodanthonia* sp. (Wallaby Grass) and *Austrostipa* sp. (Spear grass) (DSE 2003).

The swamp in its entirety has remained dry since spring 2001. A very small puddle near the depth gauge was recorded in winter 2002. Inundation of the vegetation quadrats during spring 1997 and 1998 caused a huge reduction in annual weed species and an increase in native aquatic species. However prolonged dry conditions has seen the re-establishment of introduced species from the Poaceae (grass) and Asteraceae Families.

The rare *Maireana humillima* (Dwarf Bluebush) was recorded in 2002, as were the salt indicator species being *Lolium* sp. (Rye grass) and *Critesion marinum* (Sea Barley grass). Soil tests need to be performed to determine whether salinity levels are increasing across the site (appendices 8.2 & 8.3) (Davies 2003).

### Tree Health

Tree health at the swamp is declining with many containing reduced canopy densities, extensive epicormic growth and insect attack. Two of the monitored trees are now almost dead. Prolonged dry conditions are causing severe drought stress in these trees, however it is almost certain that saline water tables are also affecting Tang Tang Swamp. Tandarra Pondage less than two kilometres south from the swamp is a huge water storage held for irrigation purposes, and the pressure of this water is pushing the surrounding water table closer to the surface. Tree dieback is clearly evident along the Bendigo/Piccaninny Creek, due west from the pondage and it appears to be slowly creeping northward toward Tang Tang Swamp. All eight trees could be reached for leaf

analysis and displayed varying amounts of insect attack and all leaf samples collected were epicormic growth. Leaf chloride concentrations ranged from 0.10-0.53 percent. These low readings were most likely a response to dry seasonal conditions (Collopy 2003). No regeneration of the tree or understorey layer was recorded at the site (appendix 8.4).

### **Birds**

Bird species seen at the time of vegetation and tree health surveys were:- Brown Falcon, Galah, Magpie, Masked Woodswallow, Red-rumped Parrot White-browed Woodswallow (hundreds), Superb Fairy Wren, Willie Wagtail, Crested Pigeon, Corella, Magpie, Kookaburra, Little Raven, Welcome Swallow, Yellow Tufted Honeyeater, Striated Pardalote and Magpie Lark. When the Swamp has contained water, many thousands of birds and a large range of species (some migratory and rare) have flocked to the area.

### **Groundwater and salinity**

There are seven bores monitored in the vicinity of Tang Tang Swamp and all have displayed a slight falling groundwater trend in response to dry seasonal conditions. Depths to groundwater in 2002-2003 ranged from 4.1-5.8 metres and previous electrical conductivity readings have recorded highly saline groundwater. The water table is reasonably close to the surface given the dry conditions; therefore the swamp could be at risk from dryland salinity if levels were to rise further (appendix 8.5).

### **Water Quality**

Tang Tang Swamp has remained dry since spring 2001 (except for a tiny puddle recorded in winter 2002) and has been sampled 26 times (two years of data) since 1997. Tang Tang Swamp has often only contained a few centimetres of water when sampled which has had a large impact on the physico-chemical and nutrient concentration results.

Some general observations recorded so far were the water quality was generally very good in relation to dissolved oxygen, pH and conductivity levels, but nutrient concentrations often exceeded maximum limits for the prevention of eutrophication (nutrient enrichment). Depth and seasonal variations have an important influence on these high nutrient and turbidity readings. However high concentrations may also be a reflection of the quality of the Bendigo Creek waters that flow into the swamp and from the effects of surrounding land use (fertiliser application and nitrogen fixing pastures such as lucerne) (appendix 10.6).

Three macroinvertebrate surveys have been conducted at the swamp in 1996, 1997 and 2000 and found that there was relatively large taxon richness when compared to other wetlands across the state. Several pollution and salinity sensitive families were recorded, suggesting a relatively high level of biological health (O'Brien et al 1996; Lieschke et al 1997; Crowther et al 2001) (appendix 8.7).

### Site Threats

- Continued weed invasion with floodwaters eg. *Juncus acutus* Spiny Rush
- Possible return of stock grazing for “fire risk management”
- Increased nutrient levels
- Possible incorrect water regime

(Davies 2003).

### Surrounding Land use

Land use in the paddocks surrounding the swamp were a mixture of dryland cropping, grazing and lucerne pastures.



**Figure 21.** Many Red Gum trees are suffering from declining health at Tang Tang Swamp



**Figure 22.** Grassland quadrat with Tang Tang Swamp in the background

## Site 16 Elmore-Mitiamo Roadside Reserve

The site is in environmental decline due to the spread of weed species and from rising groundwater from the adjacent irrigation area.

### Site Description

This road reserve is located on the northern riverine plain at an altitude of 99 metres. The area is treeless and is periodically grazed as evidence of stock pugging and droppings have been observed. It is possible that this site is at risk from rising water tables caused by sub-lateral flow from the adjacent Pyramid Hill Irrigation area (Keleher 1997).

### Vegetation Description and Composition

The vegetation type at this site is the endangered plains grassland EVC, which has an indicative place listing on the Register of the National Estate and is therefore recognised as Nationally significant (DSE 2003). The Loddon Shire completed a roadside survey and erected significant roadside vegetation signs some years ago (Keleher 1997).

The area is dominated by a mixture of native tussock grasses including: *Austrodanthonia* sp. (Wallaby Grass), *Enteropogon acicularis* (Curly Windmill Grass), *Austrostipa* sp. (Spear grass) and *Chloris truncata* (Windmill Grass) with *Calocephalus citreus* (Lemon Beauty-heads), *Pycnosorus globosus* (Drumsticks), and *Maireana* sp. (Bluebush). The rare *Eryngium plantagineum* (Long Eryngium) was also recorded.

Continued dry conditions have reduced the number of introduced species by more than 20 percent, particularly from the Asteraceae, Fabaceae and Poaceae (grass) Families. There are now five salt indicator species being *Chloris truncata* (Windmill grass), *Critesion marinum* (Sea Barley Grass), *Lolium* sp. (Rye Grass), *Atriplex semibaccata* (Berry Saltbush) and *Plantago coronopus* (Bucks Horn Plantain). This is an increase from three salt indicator species that were first recorded in 1997. Continued dry conditions are the most likely reason for the recent inclusion of Berry saltbush as this plant is a good indicator of arid conditions and possibly filled the niche left by the reduction in introduced species. Soil tests would be the only way of determining whether salinity levels have increased at the site.

The continued dry seasons have maintained native grass growth, in particular Curly Windmill Grass. The wetter season of 2000 promoted the growth of Nardoo and it was still present in 2002 but was less abundant (appendices 8.2 & 8.3) (Davies 2003).

### **Tree Health**

The area is treeless Northern Plains Grassland and the test is not applicable at this site.

### **Birds**

Bird species present at the time of the vegetation and tree health surveys were :- Galah, Magpie, Australian Raven, Sparrow and Welcome Swallow. Few birds were recorded because the site is very open with little cover. The time of day (midday) and windy conditions would have also reduced bird numbers.

### **Groundwater and Salinity**

The one bore near the site has shown a relatively flat groundwater trend with little to no response to seasonal rainfall events. Its average depth below natural surface in 2002-2003 was 4.5 metres. Previous measurements have recorded extremely saline groundwater (>20,000EC) (appendix 8.5).

### **Water Quality and Macroinvertebrates**

These tests do not apply to this remnant vegetation site.

### **Site Threats**

- Deliberate roadside grazing
- Pugging from stock
- Continued roadside weed invasion

(Davies 2003).

### **Surrounding Land use**

Surrounding land use is dryland cropping and sheep grazing. There was evidence that the site had been grazed recently as the native grasses were much shorter and the vegetation quadrat pegs were easy to find. The drought is having an impact on the area and is probably why the roadside has been used to feed stock. Dry seasonal conditions had also stopped these grasses from flowering.



**Figure 23.** Elmore-Mitiamo Roadside in spring 2002. Terrick Terrick National Park (hills) are in the far background