Department of Conservation and Land Management

Conserving the nature of WA

BACKGROUND DOCUMENTATION

FORTESCUE MARSH VISIT

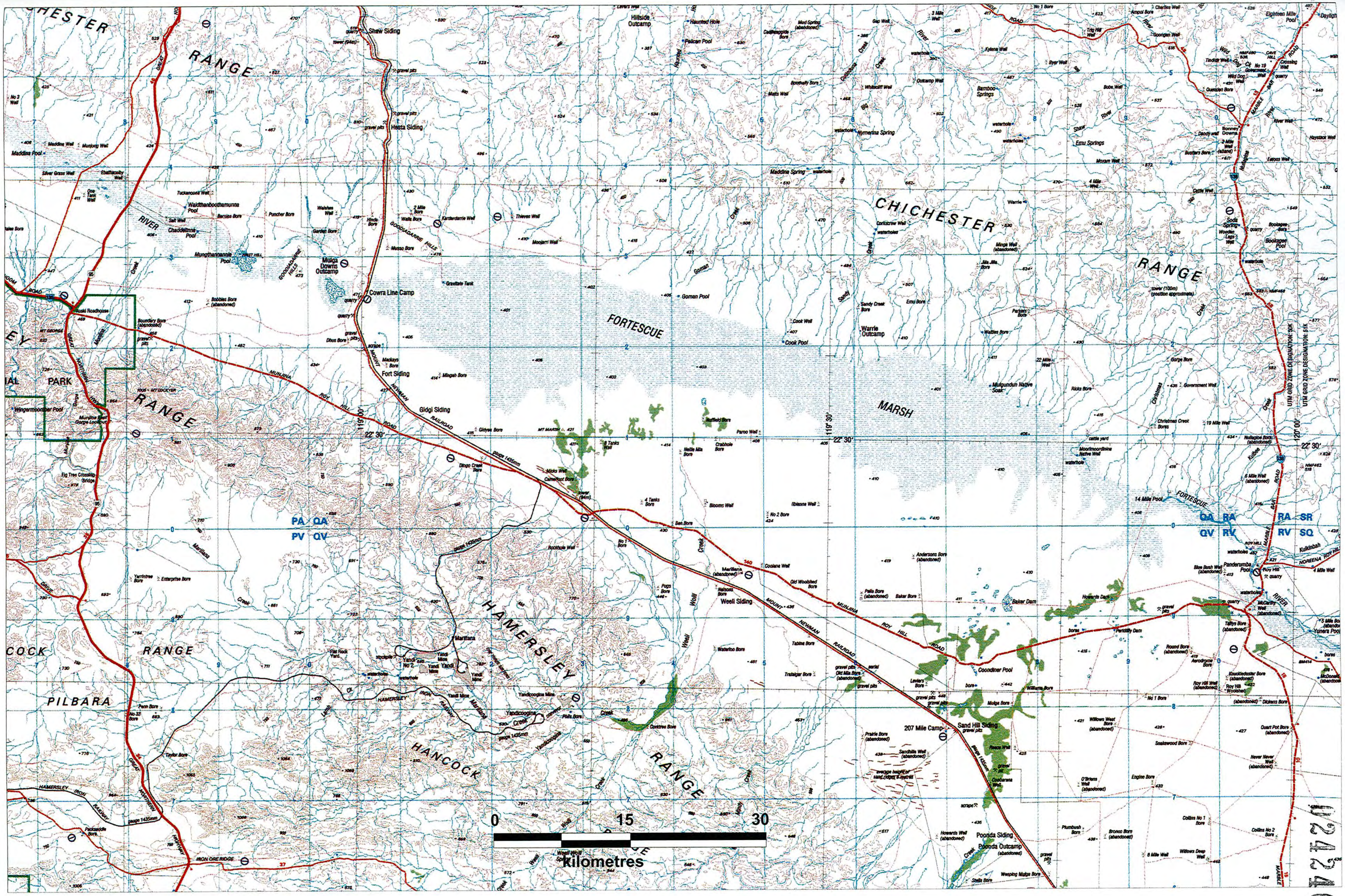
CONSERVATION COMMISSION

WESTERN AUSTRALIA

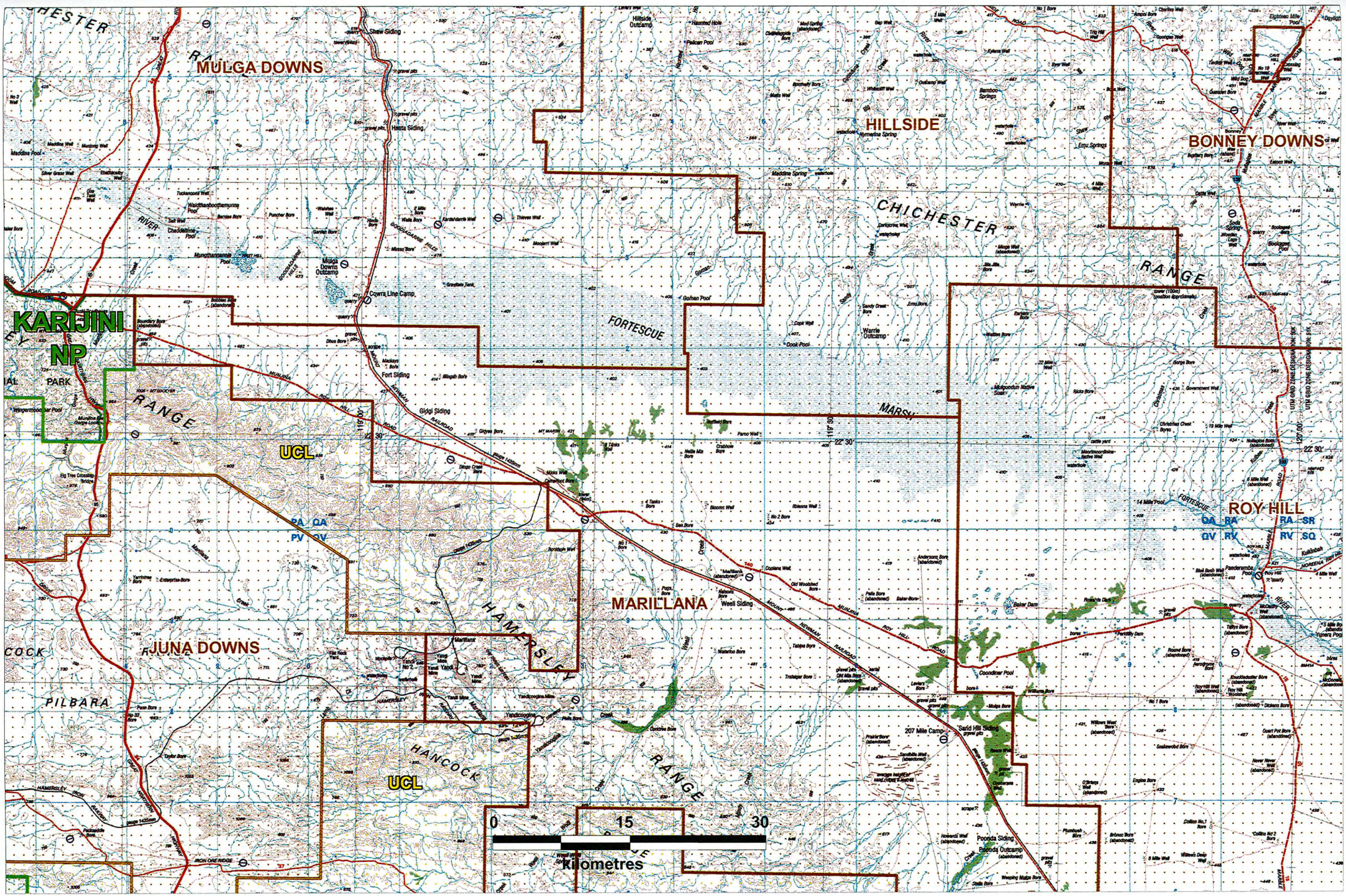
Friday 1 July 2005

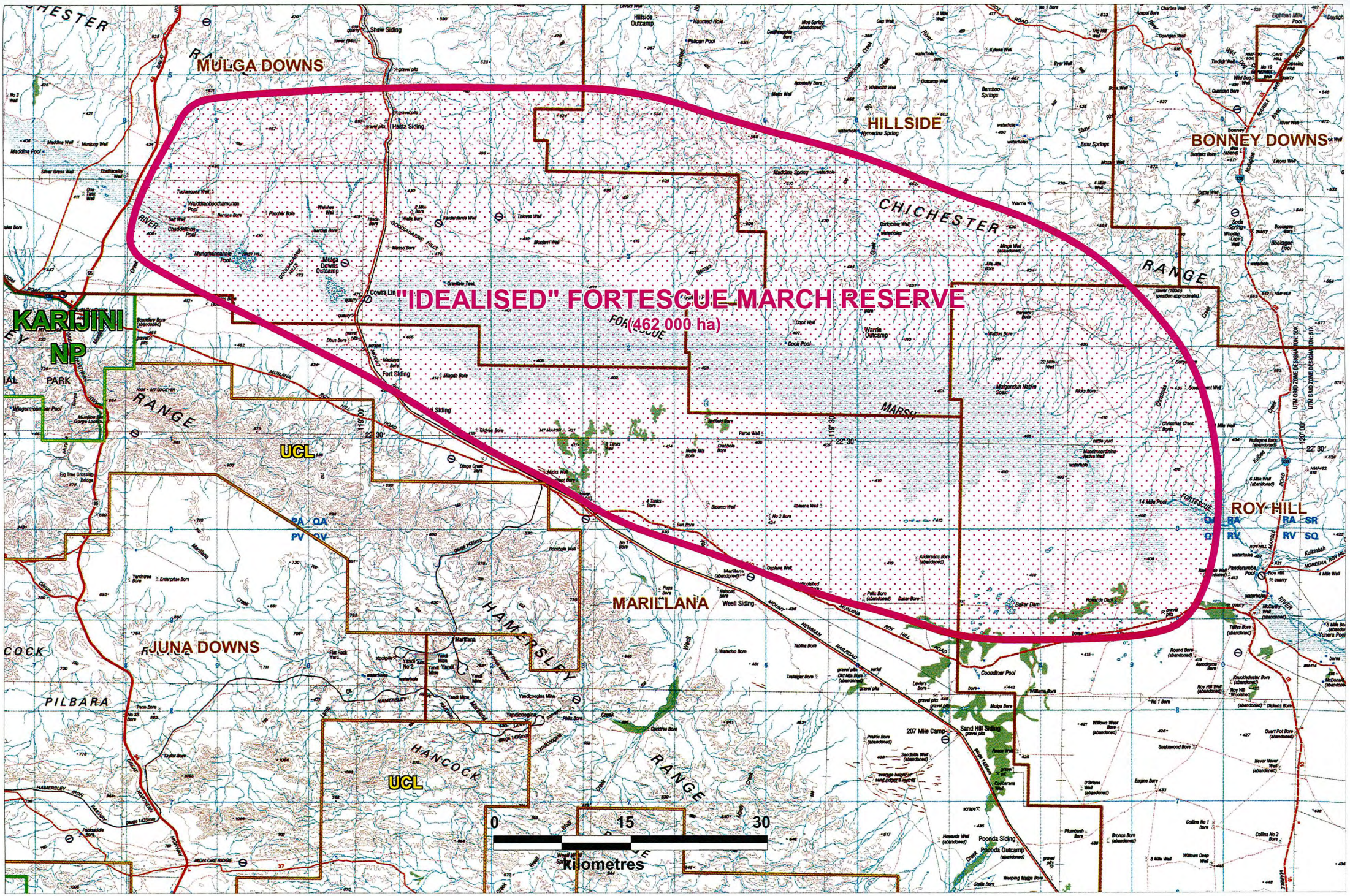
CALM

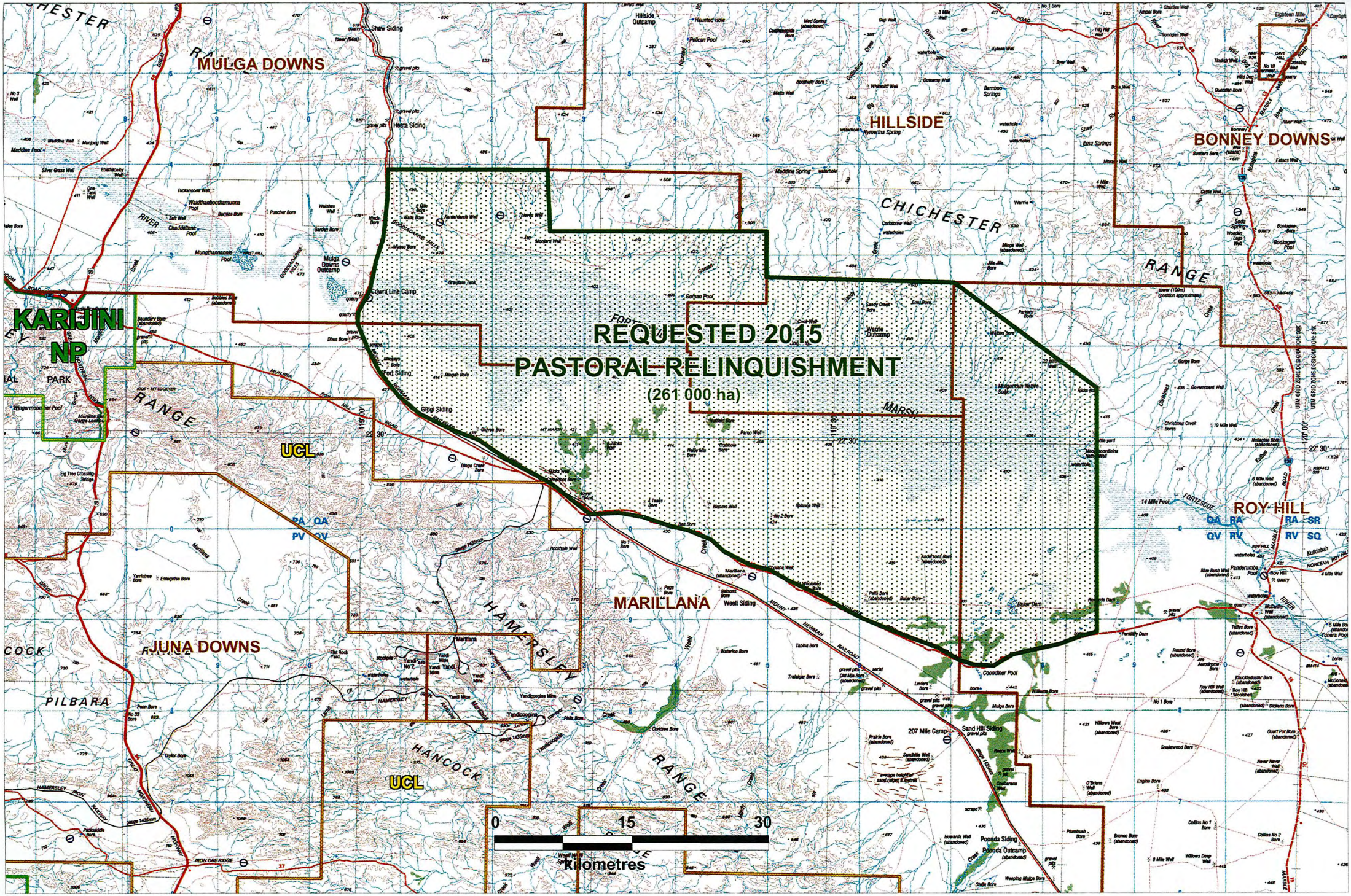
PILBARA REGION & SCIENCE DIVISION

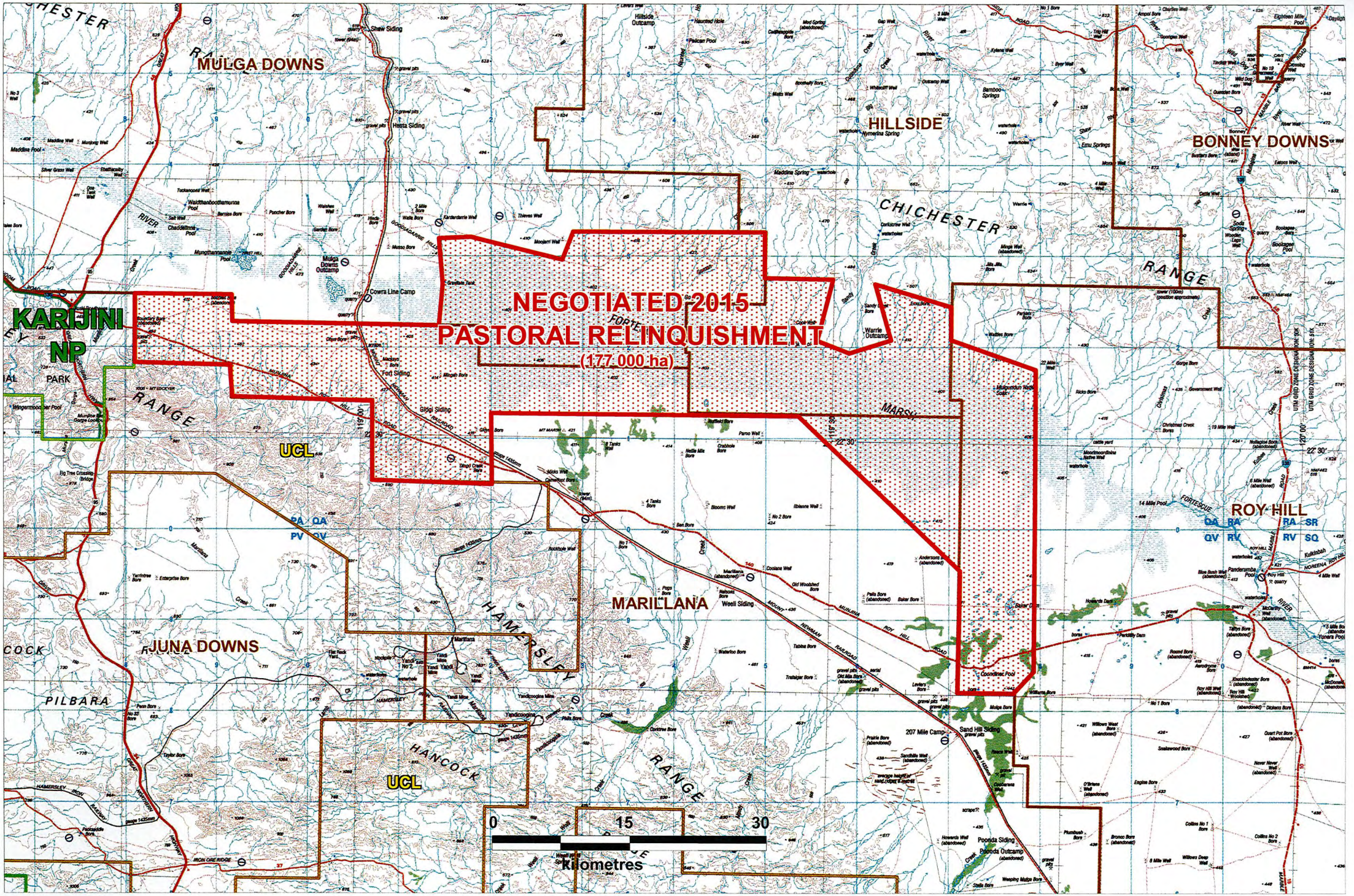


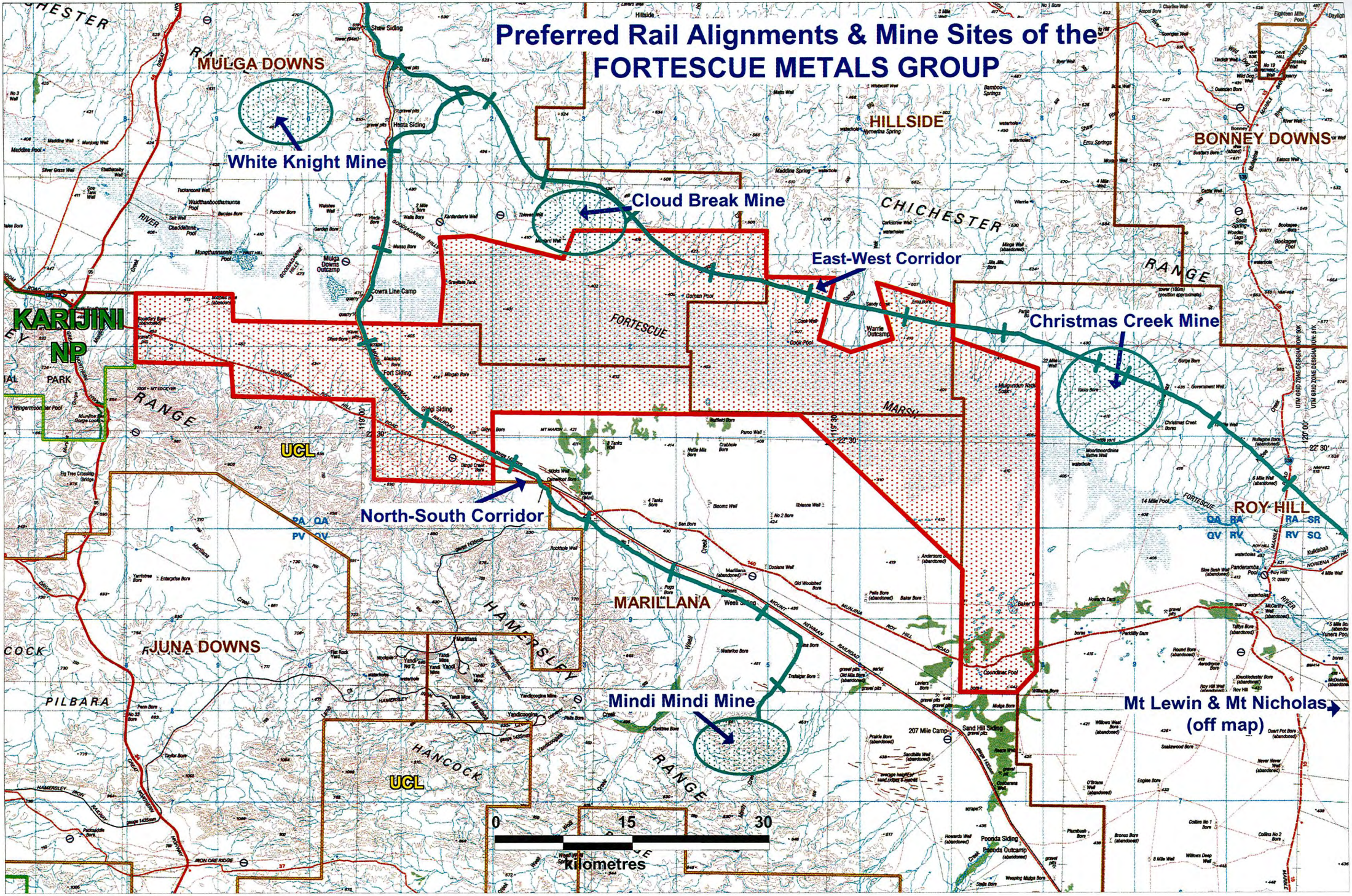
CHICHESTER
RANGE
FORTESCUE
MARSH
HAMERSLEY
RANGE
HANCOCK
RANGE
PILBARA
PARK
Shaw Siding
Hesta Siding
Cowra Line Camp
Fort Siding
Gidgi Siding
Weeli Siding
Sand Hill Siding
207 Mile Camp
Poonda Siding
Marillana
Yandi
Cook Pool
Goman Pool
Baker Dam
Coondiner Pool
Warrie Outcamp
Auski Roadhouse
Munjina Gorge Lookout
MUNJINA ROY HILL ROAD
MOUNT NEWMAN RAILROAD
PA QA
PV QV
QA RA
QV RV
RA SR
RV SQ
0
15
30
kilometres


MULGA DOWNS
HILLSIDE
BONNEY DOWNS
CHICHESTER RANGE
KARIJINI NP
FORTESCUE MARSH
ROY HILL
MARILLANA
JUNA DOWNS
HAMERSLEY RANGE
HANCOCK RANGE
UCL
UCL
PILBARA
Shaw Siding
Hesta Siding
Cowra Line Camp
Mulga Downs Outcamp
Fort Siding
Gidgi Siding
Hillside Outcamp
Warrie Outcamp
Weeli Siding
207 Mile Camp
Poonda Siding
Poonda Outcamp
0
15
30
Kilometres


"IDEALISED" FORTESCUE-MARCH RESERVE
(462 000 ha)
MULGA DOWNS
HILLSIDE
BONNEY DOWNS
CHICHESTER RANGE
KARIJINI NP
PARK
UCL
MARILLANA
ROY HILL
JUNA DOWNS
PILBARA
HANCOCK RANGE
MARSH
0
15
30
kilometres


REQUESTED 2015
PASTORAL RELINQUISHMENT
(261 000 ha)
KARIJINI NP
MULGA DOWNS
HILLSIDE
BONNEY DOWNS
CHICHESTER RANGE
MARILLANA
ROY HILL
JUNA DOWNS
HAMERSLEY RANGE
HANCOCK RANGE
UCL
UCL
PILBARA
0
15
30
Kilometres


NEGOTIATED 2015
PASTORAL RELINQUISHMENT
(177 000 ha)
MULGA DOWNS
HILLSIDE
BONNEY DOWNS
CHICHESTER RANGE
KARIJINI NP
MARILLANA
ROY HILL
JUNA DOWNS
HANCOCK RANGE
UCL
UCL
Shaw Siding
Hosta Siding
Cowra Line Camp
Ford Siding
Gilgi Siding
Weeli Siding
207 Mile Camp
Sand Hill Siding
Poonda Siding
Poonda Outcamp
Warrie Outcamp
Hillside Outcamp
Mulga Downs Outcamp
0
15
30
Kilometres


Preferred Rail Alignments & Mine Sites of the
FORTESCUE METALS GROUP
MULGA DOWNS
White Knight Mine
HILLSIDE
BONNEY DOWNS
Cloud Break Mine
CHICHESTER
RANGE
East-West Corridor
Christmas Creek Mine
KARIJINI
NP
PARK
FORTESCUE
MARSH
UCL
North-South Corridor
ROY HILL
QA RA RA SR
QV RV RV SQ
PA QA
PV QV
MARILLANA
JUNA DOWNS
HAMERSLEY
PILBARA
Mindi Mindi Mine
Mt Lewin & Mt Nicholas
(off map)
HANCOCK
UCL
RANGE
0 15 30
kilometres

ATTACHMENT 2

of

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT'S

SUBMISSION TO THE ENVIRONMENTAL PROTECTION AUTHORITY

on

EAST PILBARA IRON ORE AND INFRASTRUCTURE PROJECT: EAST-WEST RAILWAY AND MINE SITES (STAGE B) PILBARA FOR FORTESCUE METALS GROUP LIMITED - PUBLIC ENVIRONMENTAL REVIEW (PER) ASSESSMENT NO. 1520

March 2005

ENVIRONMENTAL VALUES OF THE FORTESCUE MARSH

NB: The comments below, except where stated, refer to values associated with the Fortescue Marsh (FM) as defined by the area bounded by the Chichester Range to the north, Newman-Nullagine Road to the east, Roy Hill-Munjina Road to the south and BHP's Port Hedland-Newman railway through the Goodiadarrie Hills to the west. The area comprises an extensive samphire shrubland (100 km by 10 km) and associated fringing mulga woodlands to the north and south.

This paper was formulated by CALM prior to the completion of flora and fauna surveys by Biota as presented in the Stage B PER document. The PER Stage B Appendices add to this knowledge.

BIOLOGICAL KNOWLEDGE

- No comprehensive biological surveys have been undertaken of the FM. Surveys to date include a localised, quadrat based flora survey by Ken Newbey in the mid-1980's; land system and rangeland mapping programs on pastoral stations (principally Marillana Station by the Mulga Research Centre in the 1980s and 1990s); and some area specific surveys associated with project developments and infrastructure corridors (Hope Downs) in the mid 1990s. Possibly the most comprehensive survey to encompass the FM was the Department of Agriculture's Pilbara Ranges Project (rangeland survey) conducted in the late 1990s. Consequently, the Department's current knowledge of the biological values of the areas is imperfect, being limited mainly to the flora and aquatic biota.

BIOGEOGRAPHICAL SIGNIFICANCE

- The samphire shrubland on the FM is the largest ephemeral wetland in the Pilbara and the only feature of this type in the Pilbara bioregion.

- The fringing mulga woodlands are at the limits of their distributional range. Those woodlands on the north side of the FM represent the most northern extent of this community type in Western Australia. Mulga as a species is also at the extreme limits of its range along the northern flanks of the FM. Bioclimatic considerations are purported to be the principal selective forces influencing the distribution of mulga at a continental scale.

- Phytogeographically the FM is at the northern limits or leading edge of the *Acacia-Triodia* transition zone. Further to the north, Triodia grasslands dominate the vegetation while to the south *Acacia* woodlands and shrublands dominate.

FAUNA

- Very limited knowledge is available with respect to terrestrial vertebrates other than birds, which is principally limited to wetland species.

- **Waterbirds**. The value of the FM as a waterbird habitat has been mostly grossly understated. Whenever the system floods (every 5-7 years on average) it contains very significant (nationally) numbers of birds and supports a lot of breeding activity (coots, swans and pelicans are obvious examples of species for which the area east of the railway line is important at least a State level). Counts in late winter 1999, 2000 and 2003 after flooding events from summer/autumn cyclones were about 270,000, 260,000 and 276,000 birds, respectively. Over the three counts 47 species were present. The value of FM as an arid wetland for waterbird populations of national importance must be emphasised.

- **Aquatic invertebrates (surface).** Four sites produced a list of more than 160 species for the Marsh. This is rich by published standards for arid/semi-arid Australian lakes but perhaps not as impressive in a Pilbara context as the published information suggests - Nyeetberry Pool on the Robe yielded 170 species from a single sample rather than four. Nevertheless, the Marsh has significant invertebrate biodiversity that will certainly increase when further samples have been sorted and identified. Of particular interest is that CALM has recorded a new species of giant ostracod in the Marsh (giant = about 4 mm) which has not been recorded anywhere else.

- **Stygofauna**. Published records suggest the stygofauna in the vicinity of the Marsh is relatively depauperate, despite the large amount of karst. This requires further investigation and may simply reflect the lack of bores under the Marsh itself. Published information lists 7 genera of stygofauna near the Marsh (5 ostracods, 1 widespread amphipod genus and the much more interesting inland record of speleogriphacids - genus *Mangkurtu*). CALM has identified samples from 6 additional bores in the general vicinity and they yielded very little - bathynellids (tiny primitive crustaceans), nematodes and oligochaetes. CALM has unsorted samples from an additional 8 bores and these findings may change. In summary, on current information the FM area seems to have relatively little stygofauna, especially in relation to the amount of karst in the area. This may reflect the saline shallow aquifer, inadequate sampling to date, or an unusual biogeographical phenomenon.

- Reputedly, Roy Teale and collegues from Biota observed a night parrot on the southern fringes of the FM last year (2003) while undertaking survey work for Hancock Prospecting. John Blyth (Western Australian Threatened Species and Communities Unit, CALM) confirms that there are no historical records of night parrots from the FM. The species is listed as Critically Endangered. (Mike Bamford has also recently reported sitting a night parrot on the Marsh, (Stephen van Leeuwen per comm. May 2005)).

- In the late 1980s, CALM was involved with the capture of a bilby on Marillana Station in sandplain country at the base of the Hamersley Range escarpment. A bilby population persisted on Roy Hill Station, near the homestead, until the early 1980s. An extant bilby population is allegedly known from Mulga Downs Station just west of the Goodiadarrie Hills. Bilbies are listed under the *Environment Protection and Biodiversity Conservation Act 1999* as Threatened (Vulnerable), the 2000 IUCN Red List of Threatened Species as Vulnerable and the *Wildlife Conservation Act 1950* as threatened.

FLORA

- The FM supports at least two endemic taxa (*Eremophila spongiocarpa and Halosarcia* sp. Roy Hill (H. Pringle 62)), both confined to the samphire shrublands.

- Taxa with disjunct distributions (*E. youngii* subsp. *lepidota, Muellerolimon salicorniaceum*) or at the limits of their geographical range (*E. pilosa, Acacia sibilans*) have also been recorded in the area. The occurrence of disjunct and range end taxa in the vicinity of the FM is indicative of the area's transitional nature in respect to bioclimatic and phytogeographic considerations (*Acacia-Triodia* line).

- Several Priority listed flora species occur on in the vicinity of the FM including *Goodenia omearana* (P1), *G. nuda* (P3), *E. spongiocarpa* (P1), *E. pilosa* (P1), *E. youngii* subsp. *lepidota* (P4), *Myriocephalus scalpellus* (P1) and *Sida* sp. Wittenoom (W.R. Barker 1962) (P3).

- *Eremophila spongiocarpa*, *E. pilosa*, *Myriocephalus scalpellus* and *Halosarcia* sp. Roy Hill (H. Pringle 62) are not known to occur on conservation reserves.

- The flora of the fringing northern mulga woodlands is not well documented. Inherently, given the biogeographical predisposition of these woodlands, it would be reasonable to assume that many species characteristic of mulga woodlands are at the northern limits of their distributions in this area. The flora of mulga woodlands to the south is akin to that in the Hamersley Range although tussock grasses are more conspicuous, especially the environmental weed Buffel grass (*Cenchrus ciliaris*).

VEGETATION COMMUNITIES

- The samphire shrubland community of the FM is unique principally because of the presence of endemics, which are not rare and may dominate some floristic community types.

- The northern fringing mulga woodlands are very different to those found in the Hamersley Range. They typically have an understorey in which hummock grasses are absent. They also often are comprised of extensive stands of snakewood (*Acacia xiphophylla*) or form a tight mosaic with tall snakewood shrublands. The presence of such communities is indicative of a low fire frequency regime.

- Extensive areas of grove-intergrove mulga woodland also occur on the northern fringes of the FM. These woodlands are indicative of very gentle slopes (run-on habitats) and are highly susceptible to changes in surface hydrological and nutrient cycling processes. The mulga types in such woodlands are also very susceptible to fire. Evidence from elsewhere in the Pilbara and Ashburton suggests that infrastructure corridors aligned parallel to the contour in these grove-intergrove woodlands has the potential to cause significant water ponding and drainage shadow effects. Similarly, disruptions in the ability of such woodlands to retain resources, which may simply be caused by livestock pads running perpendicular to the slope, are well known to have a major impact on ecosystem functioning.

- The southern fringing mulga woodlands tend to have an understorey dominated by tussock and hummock grasses. Consequently, and in conjunction with an increase in ignition sources, these woodlands have experienced a much higher frequency of fires, which is having a deleterious effect. Interspersed in these southern mulga woodlands are extensive areas of spinifex sandplain, calcareous shrublands with Spinifex, snakewood cracking clay flats and coolibah woodlands with *Acacia*/*Eremophila* subshrubs and tussock grasses.

- Mulga woodlands to the east of the FM (eastern side of the Newman-Nullagine Road) are regionally unique and unlike any known from elsewhere in the Pilbara. These eastern woodlands are similar in floristic richness to those recorded at West Angelas (ie. very specious) although floristically (species composition) they are markedly different.

LAND SYSTEMS (COARSE SURROGATE FOR VEGETATION)

- Twelve land systems, as mapped during the Pilbara Ranges Project, are known from the FM area.

- The dominant land system in the area is the Marsh system, which comprises the samphire shrublands.

- With the exception of two, the majority of land systems are restricted to the Fortescue Valley.

- Two of the twelve land systems (Marillana and Turee) are restricted to areas immediately fringing the FM.

- Only two of the 12 land systems in the vicinity of the FM are represented on conservation reserves.

- All but three of the 12 land systems are restricted to the Fortescue (PIL2) sub-region of the Pilbara bioregion.

DISTURBANCE HISTORY AND THREATS

- Samphire shrubland appears resilient to grazing and is generally free from environmental weeds.
- Fringing mulga woodlands to the south are somewhat degraded. This degradation has been caused by intensive grazing; frequent burning from fires that originate as a result of orographic effects from the Hamersley Range escarpment and as a consequence of rail maintenance activities; drainage shadows and ponding effects from the BHP railway line; and extensive infestations of environmental weeds, principally Buffel grass and Kapok, especially on sandy pediment, extensive alluvial fans (eg. Weeli Wolli creek and outwash) and calcareous substrates.
- Fringing mulga woodlands to the north are in extremely good condition. These woodlands are long unburnt (natural and anthropomorphic ignition sources are limited and a lack of hummock grasses promotes an open understorey that precludes the spread of fire) and have not been grazed as intensively as those to the south. Environmental weeds are also not as prevalent, being confined to the sand and alluvial pediments of drainage lines.
- The Biodiversity Audit identified the FM samphire scrubland community as an ecosystem at risk from grazing pressures and changes in hydrological processes. The Audit also noted that grove-intergrove mulga on the southern fringe of FM (northern apron of Hamersley Ranges at southern end) are threatened from grazing pressures, feral animals and changes in fire regime.
- The Department of Agriculture delimited seven areas totalling 2,397 ha of severely degraded land around the FM during the Pilbara Ranges Project. One of the degraded areas was on Mulga Downs Station (394 ha), three were on Marillana Station (1,124 ha) and the other three were on Roy Hill Station (776 ha).

TENURE

- Currently the FM is encompassed within the boundaries of four pastoral leases. These leases are Mulga Downs, Hillside, Roy Hill and Marillana Stations.
- As part of the 2015 pastoral lease renewal process, substantial areas of Mulga Downs, Roy Hill and Marillana Stations and a small portion of Hillside are proposed for relinquishment to the Crown to facilitate the creation of a conservation reserve.
- The seasonally inundated samphire shrublands of the FM are listed as a wetland of national significance.

RESERVATION STATUS

- The samphire shrubland and mulga woodland communities of the FM are not represented on any conservation reserve.
- At present the 2,041,914 ha Fortescue (PIL2) sub-region of the Pilbara bioregion is not adequately represented in conservation reserves with only 0.79% of the total sub-region under reservation. This reservation is extremely biased and is representative of only very small areas within the Millstream-Chichester and Karijini National Parks.
- A proposed FM conservation reserve created as a result of the 2015 pastoral lease renewal process would significantly redress deficiencies in the reserve system of the Fortescue (PIL2) sub-region.

2015 PROPOSAL AND NEGOTIATIONS

- Approximately 261,000 ha of land was identified from relinquishment from Mulga Downs, Roy Hill, Hillside and Marillana Stations as part of the 2015 pastoral lease renewal process. This land was centred on the FM and was designed to capture the samphire shrublands and fringing mulga woodlands.

- Subsequently during the negotiation process, the extent of proposed pastoral relinquishments was significantly redefined. For example, the Marillana relinquishment was redrawn to exclude areas with minimal conservation value. The southern boundary of the Marillana relinquishment was originally along the Roy Hill-Munjina Road however, this has now been moved north, thereby excluding broad stands of Bardie bush (*A. synchronicia*), an indicator of overgrazing, and sandy washes and alluvial fans supporting grasslands of Buffel grass.

- Capturing the mulga woodlands fringing the samphire shrublands of the FM was always integral to the Department's requirements in respect to the negotiation process and achieving a satisfactory outcome, particularly with regard to the northern fringing mulga woodlands.

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