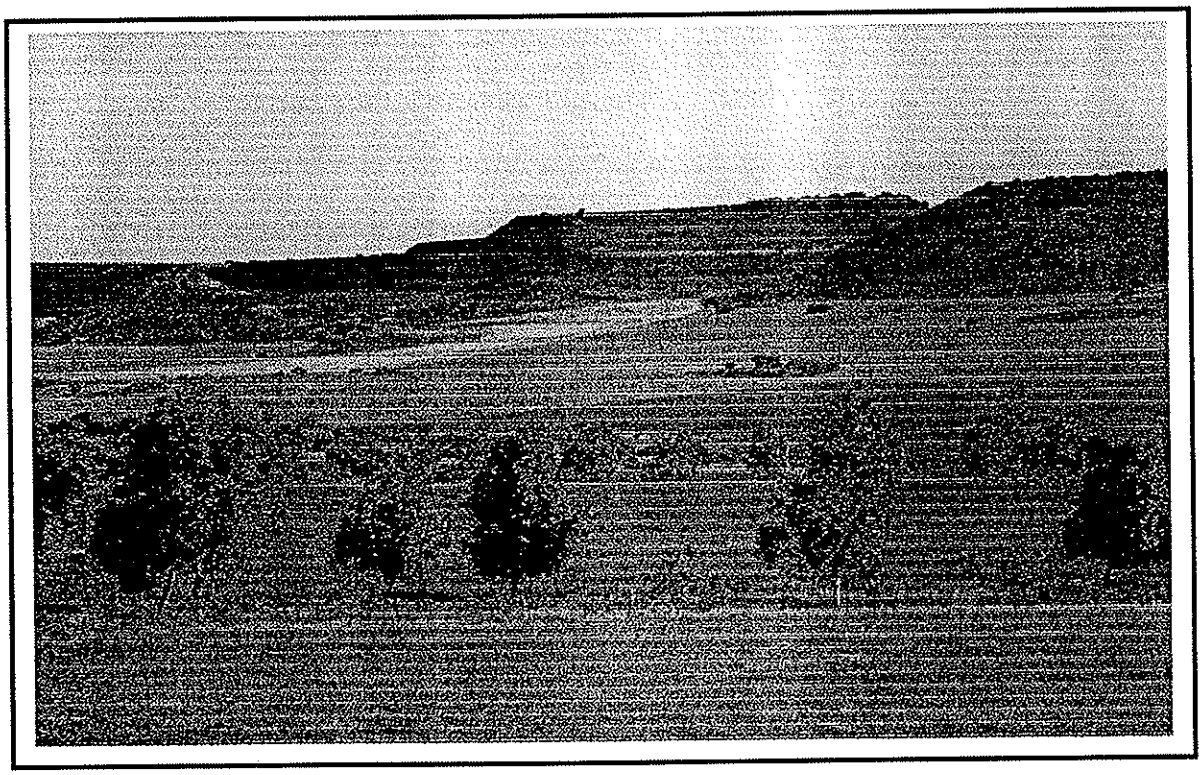
A Conservation Assessment of the Moresby Range.

WORKING PAPER

for the Moresby Range Management Strategy



Prepared on behalf of the Moresby Range Management Committee

By Midwest Region
epartment of Conservation and Land Management
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A Conservation Assessment of the Moresby Range

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1.0 Introduction

The Moresby Range lies primarily to the north and north east of Geraldton. The range, especially the southern section including Mount Fairfax, forms a significant landscape backdrop to Geraldton city. In addition, the range is a very significant landscape feature viewed from key regional roads, in particular through the Chapman Valley. The range rises over 200 metres in height and is characterised by several mesa tops. The Oakagee, Buller, and Chapman Rivers and Oakabella Creek drain the range system.

The regional importance of the Moresby Range was recognised in the draft Geraldton Region Plan (1989). The plan stated that the "*Ranges provide a vital backdrop to the Geraldton-Greenough area*" and that it was "*imperative that they be protected*". The plan made the following policy statements in regards to the range:

- The area be designated landscape protection in the Region Plan.
- The rural character of the area be protected by precluding non-rural uses.
- The area be designated for landscape protection in the respective local authority town planning schemes.
- The landscape management body (as defined on p107 of the Region Plan) develop and implement a management system for the area.
- Consideration be given to the purchase of the Moresby Range, reserving it as a Regional Park and provision of funds for its management by the Department of Conservation and Land Management.

The Geraldton Region Plan (1997) reiterated the conservation and landscape significance of the Moresby Range, and recommended that mechanisms to provide for appropriate protection and management of the special characteristics of the range need to be identified.

The Moresby Range Management Committee has been established to examine the land management requirements for the range. The committee is coordinating the preparation of a Moresby Range Management Strategy with the following aims:

- to determine the extent and regional significance of the Moresby Range;
- to define a system of land management for the range.

This report contributes to the Moresby Range Management Strategy. It aims to provide a desktop overview of the conservation values of the range, and assess the adequacy of the conservation reserve system in the study area (Map 1).

A spatial definition of the Moresby Range has been adopted by the Moresby Range Management Committee. This was based on landform and soil type mapping (Rogers, 1996). The three units of the Moresby soil-landscape system have been defined as the extent of the range.

2.0 Broad Conservation Values

The original vegetation of the range consisted of floristically diverse kwongan (open shrublands and woodlands) vegetation communities. Remnant vegetation on the Moresby Range is fragmented and confined to a number of small discrete locations. The majority of remnant vegetation occurs on private property. A number of conservation priority flora taxa occur within the range, with populations of each species generally ocurring at several locations, of which many locations are in habitats that are poorly represented in the reserve system.

The EPA System 5 Report identified the northern sandplains, which includes the Moresby Range, as floristically rich and recommended that representative areas needed to be protected with controlled access for people to enjoy the "*spectacular and diverse floral displays*". In respect to the Moresby Range, the System 5 report stated that it "*recognises the scarcity of conservation reserves in the Geraldton area and the scenic attraction of the Moresby Range*". Further, it recommended that land be acquired for the purpose of establishing National Parks.

The Moresby Range system is on the proposed list for inclusion on the Threatened Ecological Communities database that is being prepared by CALM. Currently, there is insufficient data available to enable an evaluation of the status of the system.

3.0 Geology and Land Types

The Moresby Range comprises the western remnants of the much dissected Victoria Plateau, whose mesas are dissected by deep gorges of old river systems. The parent material is Jurassic marine sediments comprising sandstones, fossiliferous limestone and shale. Summit surfaces were once a continuous undulating plain, part of the Victoria Plateau which underwent one or more periods of laterite development from early Tertiary times. The western margins of the plateau were dissected by local river systems in Pliocene times to form much of the present landscape. A weathered laterite profile exists on summit surfaces with steep shallow rocky sideslopes and recent colluvium on the footslopes. Gneiss and granite of Precambrian age outcrop along the lower flanks of the range.

There are no known features of significant geological importance that require special protection in the Moresby Range study area.

Soil types range from fine white and yellow sands to reddish loams and clays. The fine sands and sandy-gravels (laterite) carry distinctive vegetation communities, differing greatly in species composition from those ocurring on the heavier soils among the massive rocky outcrops.

The study area comprises the Moresby soil-landscape system (Rogers,1996), described as "*Flat topped ranges and isolated mesas. Flat to gently undulating summit surfaces, moderate to steep sideslopes and gently inclined footslopes. Sandy and gravelly soils on plateau surfaces, shallow rocky soils on sideslopes with sandy duplex soils on footslopes*". The system consists of three sub-systems: Mo1 - summits and slopes, Mo2 - footslopes of mainly soft brown sands over sandy clays, and Mo3 – footslopes of mainly firm reddish brown loamy sands grading to loam and clay at depth (Map 2).

There are six soil-landscape systems that abut the study area that complement the landscape of the Moreby Range (Map 2):

- Casuarina – level to undulating sandplains to the north-east of the study area.
- Northampton – Valleys of gently undulating to rolling rises and low hills with rock outcrop common on hillcrests associated with long gentle slopes and alluvial terraces of local rivers. Located to the west, north and east of the study area.
- Durawarra – rolling to steep low hills to the south-east of the study area.
- Sugarloaf – undulating to rolling rises with narrow valleys to the south-east of the study area.
- Greenough – alluvial plains of the Chapman River valley floor to the east of the primary range area.
- Tamala – coastal sandplains and dune systems to the south-west of the study area.

4.0 Flora and Vegetation Communities

The Moresby Range lies in the Irwin District of the South-West Botanical Province, and is comprised of the Northampton Vegetation System (Map 3). There is a well marked catenary sequence of vegetation character types associated with the range (Beard, 1976):

- x2SZc (Vegetation code no. 408). Scrubheath on the mesa summits. This unit consists of at least two types, one on laterite and the other on sand. The structure and density of the laterite assemblage varies from heath to thicket according to the time elapsed since the last fire. The sand assemblage is a true scrub heath in that it will grow taller and be more open.

  This unit has been mapped as being present over an area of 333 647 hectares at the time of European settlement (Interim Biogeographic Regionalisation for Australia, IBRA, in Hopkins *et al.*, 1996).

- mhSc (Vegetation code no.675). Mixed *Melaleuca-Hakea* thickets on the Jurassic sediments of the scarp slopes. This unit consists of at least two types. The most common is thickets on stony slopes in which *M. megacephala* and *H. pycnoneura* are abundant. The second appears to come in where there is some superficial laterite, and consists of dense thickets of *Allocasuarina campestris* and *M. uncinata* alternating with other mixed shrub species.

  This unit has been mapped as being present over an area of 390311 hectares at the time of European settlement (IBRA).

- e6Mra19Si (Vegetation code no. 35). Jam (*Acacia acuminata*) scrub with *Hakea* and scattered York gum (*Eucalyptus loxophleba*) on the lower undulating country. Much of this vegetation type has been cleared, with few remnants remaining.

  This unit has been mapped as being present over an area of 188 003 hectares at the time of European settlement (IBRA).

- Scattered River gum (*Eucalyptus camaldulensis*) with Swamp she-oak (*Casuarina obesa*) and Swamp paperbark (*Melaleuca rhaphiophylla*) on rivers and drainage lines.

For the majority of the remnant vegetation in the study area there is a dominance of open scrub (Kwongan) occuring on a wide range of soil types. The kwongan communities are prominent on mesa slopes, where they have been protected from clearing for agriculture as a result of their steepness and common occurrence of Champion Bay Poison (*Gastrolobium oxylobioides*). The sandy soils overlying laterite or sandstone have a vegetation cover ranging from low to high shrubland. The younger alluvial gorge soils support open low woodlands.

Flora of the Moresby Range is poorly recorded. Additional survey work is required, particularly for the upland areas of the range.

In the early 1970's significant flora collections were taken in the vicinity of Howatharra (McFarland, 1977). A broad flora survey was conducted for the Moresby Range in 1983 (Cranfield and Parker, 1995). This survey and other published records indicate that approximately 500 species occur in the range area. Twenty four species of environmental weeds have been reported from remnant vegetation in the range.

There are a number of priority flora species located throughout the Moresby Range. This includes 4 species of Declared Rare Flora (DRF) – Hoffman's Spider Orchid (*Caladenia hoffmanii*), Moresby Range Drummondita (*Drummondita ericoides*), Howatharra Mallee (*Eucalyptus blaxellii*), and Mallee Box (*E. cuprea*), 4 Priority One species, 5 Priority Two species, 2 Priority Three species and 3 Priority Four species. Three of these priority flora species are not found on conservation reserves in the area.

Flora Code:

DRF Declared Rare Flora. Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection.

Priority One	Poorly known taxa. Taxa which are known from one or a few (generally <5) populations which are under threat.
Priority Two	Poorly known taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat.
Priority Three	Poorly known taxa. Taxa which are known from several populations, at least some of which are not believed to be under immediate threat.
Priority Four	Rare taxa. Taxa which are considered to have been adequately surveyed and which whilst being rare, are not currently threatened by any identifiable factors.

5.0 Fauna

The fauna of the Moresby Range has not been documented. There are no fauna species of conservation importance known to occur in the range area. Fauna surveys are required to establish the faunal attributes of the range.

6.0 Description of Existing Conservation Reserves

The following eight nature reserves are either within the study area or are adjacent to it with vegetation communities that reflect the floristic conservation values of the Moresby Range (Map 1). All are vested in the National Parks and Nature Conservation Authority (NPNCA), for the purpose of "*conservation of flora and fauna*".

6.1 Wokatherra Nature Reserve

The Wokatherra Nature Reserve (A 39276, gazetted in 1985) is 112 hectares in size. It is located south of the White Peaks Road east of the North-west Coastal Highway. The reserve includes the Wokatherra Hill and Wokarena Peak mesas and adjacent footslope landforms. The reserve is entirely within the Moresby soil-landscape system with the majority in Mo1 sub-system except for the western end which comprises Mo2. It is characterised by the mixed thicket vegetation type.

Flora species of conservation significance located on the reserve are *Drummondita ericoides* (DRF), *Cryptandra gracilipes* (Priority 1), and *Vittadinea cervicularis* (Priority 1). *D. ericoides* is only known from this reserve, however, it may occur on suitable habitat in nearby remnant vegetation (surveys are required).

There are discrete areas of remnant kwongan communities in the vicinity of the reserve that occur in private property. Abutting the east and north-east of the Wokatherra Hill section of the reserve there is an area (approximately 50 hectares) of shrubland that is a continuation of this landform. Intact remnant vegetation persists on Mount Sommer and its adjacent footslopes, approximately 1.5 kilometres to the east of the reserve. There is an extensive area of remnant vegetation on a variety of landforms and soil types to the north of the reserve.

6.2 Oakajee Nature Reserve

The Oakajee Nature Reserve (A 331, gazetted in 1978) is 124 hectares in size. The reserve is located on Olsen Road east of the North-west Coastal Highway and west of the range. The reserve consists of kwongan communities on a uniform footslope landform of granite rocks with red loams and clay soils. It is comprised entirely of the Northampton soil-landscape system. The eastern half of the reserve is characterised by the mixed thicket vegetation type, and the western half by the Jam scrub vegetation type.

Flora species of conservation significance located on the reserve are *Caladenia hoffmanii* (DRF), *Eucalyptus diminuta* (Priority 2), *Grevillea triloba* (Priority 2), and *Diuris recurva* (Priority 4).

The reserve is bordered by an area (approximately 50 hectares) of intact remnant vegetation to the east and south-east, and there is overstorey species on low hills to the north of the reserve.

6.3 Howatharra Nature Reserve

The Howatharra Nature Reserve (A 40002 gazetted in 1987 and 40587 gazetted in 1988) is 71.4 hectares in size. It is located on the Nanson-Howatharra road. The reserve has a diversity of vegetation habitats over hill top, slope and valley floor landforms. Approximately half of the reserve is south of the road and consists entirely of Mo1 soil-landscape sub-system, and the section north of the road consists entirely of Mo2 sub-system. The reserve is characterised by the mixed thicket vegetation type.

Historically, this area has not been grazed by stock due to the abundance of poisonous *Gastrolobium* species. The reserve was a private ecological research area for a number of years prior to its gazettal. During this period much of the reserve's flora and fauna attributes were documented (McFarland, 1977). This included 300 plant species, 3 mammal species, 55 bird species, and approximately 17 reptile and amphibian species. Flora species of conservation significance located on the reserve are *Caladenia hoffmanii* (DRF), *Verticordia cervicularis* (Priority 1), *Grevillea bracteosa* (Priority 2), *Schoenus* sp. (Priority 2), *Verticordia densiflora* (Priority 3), and *Diuris recurva* (Priority 4).

There are large areas of remnant vegetation immediately to the south and northwest of the reserve.

6.4 Bella Vista Nature Reserve

The Bella Vista Nature Reserve (A 40001, gazetted in 1987) is 69 hectares in size. It is located in close proximity to Howatharra Nature Reserve, approximately one kilometre north of the Nanson-Howatharra Road. The reserve is entirely within the Mo2 soil-landscape sub-system, and is characterised by the mixed thicket vegetaion type.

The reserve comprises of tall, dense woodlands along a drainage line with heath shrublands on the lateritic slopes on the eastern side of the reserve. The reserve is floristically diverse. *Acacia guinetii* (Priority 4) is the one flora species of particular conservation significance located on the reserve. For the most part the reserve is surrounded by cleared agricultural land.

6.5 Nilligarri Nature Reserve

The small Nilligarri Nature Reserve (A 12017, gazetted in 1980) is 6.6 hectares in size. It is located on Starling Road west of the North-west Coastal Highway. The reserve is outside of the study area. It is entirely within the Northampton soil-landscape system. The reserve consists of the Jam and York gum scrub vegetation type.

The reserve comprises a tall, dense woodland on loam soils dissected by a small creek system. The reserve has been protected as a public reserve since 1909. *Grevillea triloba* (Priority 2) is the one flora species of particular conservation significance located on the reserve.

Small areas of remnant vegetation abut the reserve. Road corridor vegetation links this reserve to Oakabella Nature Reserve.

6.6 Oakabella Nature Reserve

The Oakabella Nature Reserve (A 8937, gazetted in 1983) is 33 hectares in size. It is located adjacent to the North-west Coastal Highway where the highway passes through the northern extent of the Moresby Range. It is entirely within the Mo1 soil-landscape sub-system, comprising a heath shrubland on a hill landform. The reserve is characterised by the mixed thicket vegetation type.

Flora species of conservation significance located on the reserve are *Caladenia hoffmanii* (DRF), *Eucalyptus blaxellii* (DRF), *Leucopogon oblongus* (Priority 1), and *Grevillea triloba* (Priority 2). *L. oblongus* has only been documented at one other location, on private property to the south of the reserve.

The reserve is surrounded by areas of remnant vegetation on private property, and which extends to the eastern side of the North-west Coastal Highway.

6.7 Protheroe Nature Reserve

The Protheroe Nature Reserve (C 27349, gazetted in 1978) is 70 hectares in size. It is located north of the Nabawa-Yetna Road, on the edge of the study area. The majority of the reserve is within the Casuarina soil-landscape system, consisting of a thick kwongan community on an undulating sandplain system. A small area of Mo2 sub-system occurs in the south-east corner of the reserve. This is reflected in the vegetation character types, with a predominance of the scrub heath on sandplain unit except for the Jam scrub with Hakea and scattered York gum unit in the south-east corner There are no flora species of particular conservation significance known on the reserve.

There is an area of remnant vegetation on crown land immediately to the south of the reserve.

6.8 Cutubury Nature Reserve

The small Cutubury Nature Reserve (A893, gazetted in 1989) is 15 hectares in size. It is located on the Chapman River, and is divided by the Moonyoonooka road. It is the only nature reserve on the Chapman River, and it is located at the end of a vegetated corridor that extends from the proposed Chapman River Regional Park upstream to the reserve. The eastern half of the reserve is within the Greenough soil-landscape system, and the western half within the Northampton system.

The reserve consists of a low forest vegetation type. Closer to the river overstorey species comprise of River gum (*Eucalyptus camaldulensis*), Swamp paperbark (*Melaleuca rhaphiophylla*), and Swamp she-oak (*Casuarina obesa*). Away from the river the dominant overstorey species are Jam (*Acacia acuminata*) and *Hakea.* The vegetation of the reserve is significantly degraded with few understorey species and a high level of weed infestation.

Thryptomene stenophylla (Priority 2) is the one flora species of particular conservation significance located on the reserve.

7.0 Adequacy of the Reserve System in the Moresby Range

7.1 Representation of Vegetation Communities

The Moresby Range occurs in the Geraldton Sandplain Biogeographic Region of Western Australia (IBRA). Fifty-five of the 85 vegetation units which occur in this Region are inadequately represented in the conservation reserve system: 19 do not occur in reserves at all and a further 36 occur but at a very low level of representation (<10% of their original areal extent). The following table illustrates the representativeness within the reserve system of the three primary vegetation types associated with the Moresby Range:

Beard Code	Vegetation Code No.	Vegetation Description	Total area of original vegetation (ha)	Total area in conservation reserves (ha)	% of unit in conservation reserves
mhSc	675	Shrublands; mixed thicket (melaleuca and hakea)	390311	371	0.095
e6Mra19Si	35	Shrublands with scattered trees; jam scrub with scattered York Gum	188003	607	0.32
x2SZc	408	Shrublands; scrubheath on laterite and yellow sandplain	333647	92760	27.8

It is considered that 10% of the original areal extent of a vegetation unit ocurring within the conservation reserve system is reasonable representation of this vegetation type (Hopkins *et al.*, 1996). On this basis the x2SZc (code no. 408) vegetation type is adequately represented in the conservation system.

The table demonstrates that the mhSc (code no. 675) and e6Mra19Si (code no. 35) vegetation types are significantly under-represented in the reserve system. This reflects the historical high suitability of these land types for clearing for agricultural purposes. The mhSc (code no. 675) vegetation type is the predominant vegetation type that is represented in reserves in the study area. The existence of areas of remnant vegetation of these significantly diminished vegetation types in the Moresby Range further illustrates the conservation importance of this area.

7.2 Adequacy of existing conservation reserves

The nature reserves in the Moresby Range study area are all small (less than 125 hectares in size), with only Wokatherra and Oakajee being greater than 100 hectares. In addition, the reserves contain primarily only one uniform landform and vegetation community type. Five of the reserves, covering the majority of reserved land in the study area, are comprised predominantly of the mhSc (code no. 675) vegetation type. The e6Mra19Si (code no. 35) vegetation type is the predominant community in Protheroe Nature Reserve and the very small Nilgarri Nature Reserve. The x2SZc (code no. 408) vegetation type is only found in the reserve system in the north-west corner of Protheroe Nature Reserve. The current situation is unsatisfactory from a reserve system perspective given that for ecological sustainability it is desirable to have reserves with a diversity of landforms and vegetation types, and to be of sufficient size to have a high degree of integrity.

The five nature reserves in, or adjacent to, the Moresby Range are located at the extremities of the range system, and as result do not reflect the typical landscape and geological features of the range. Four of the five nature reserves are at the northern extent of the range system. Only Wokatherra Nature Reserve occurs in the core area that provides the landscape backdrop for Geraldton. However, Wokatherra Nature Reserve does not reflect the typical mesa formations or western range escarpment landscapes. To achieve representation, there would be merit in having both a discrete vegetated mesa and western scarp with intact remnant vegetation in the reserve system.

The areas of the Moresby soil-landsccape system east of the Chapman River is not represented in the conservation reserve system.

As a result of their small size, location, and environmental features, the existing nature reserves under-represent the distinct ecological communities of the Moresby Range study area. Therefore, to meet conservation objectives the expansion of the reserve system in the study area is a priority. This could be achieved by the acquisition of lands neighbouring existing reserves to expand their size, and/or the acquisition of discrete areas of intact remnant vegetation larger than 150 hectares (very few of these exist in the study area).

8.0 Areas of Remnant Vegetation in the Moresby Range

As a result of historic clearing for agricultural pursuits there is less than 10% remnant vegetation remaining in the Moresby Range study area (Map 4). There are numerous patches of remnants remaining throughout the range, however, these are generally small (less than 20 hectares), narrow, linear and discontinuous. Further, some of the remnant vegetation is degraded (categorised as "scattered") with most under-storey plants removed as a result of stock grazing and selective clearing. Areas of remnant vegetation that fit these descriptions do not have high conservation value given their lack of ecological integrity. However, from a land conservation perspective these areas should be a target for revegetation activities.

There are, however, a number of intact areas of remnant vegetation in the Moresby Range study area, and some of these are significant in size,. Remnant vegetation on the western and northern section of the study area provides a near intact link from the south Wokatherra Nature Reserve northwards through Oakagee Nature Reserve, to Howatharra Nature Reserve, to Bella Vista Nature Reserve, and to Protheroe Nature Reserve in the northeast of the study area. These corridors are important as

wildlife habitats (Map 4). Further, the remnants neighbouring the nature reserves effectively double the size of the vegetated area from a wildlife perspective and are, thus, significant in enhancing ecological integrity. The protection of these corridors and remnants adjacent to existing reserves is a priority, with the future management (including tenure) of these areas requiring attention.

In terms of size, the most significant area of semi-continuous remnant vegetation in the study area occurs between the Wokatherra Nature Reserve and Oakagee Nature Reserve, and east to the Chapman River. This area is representative of the typical landforms of the system including a significant section of the western escarpment and vegetated discrete mesas. Superficical assessments completed by CALM suggest that the vegetation communities in this area have a high floral species diversity.

A second large continuous block of remnant vegetation occurs outside, but adjacent, to the south-west section of the study, north-west of Bringo in the vicinity of Appa Hill.

East of the Chapman River there are a number of areas of remnant vegetation ocurring within the Moresby soil-landscape system within the study area, however, these areas are generally linear and discontinuous. In many instances this is a result of the vegetation being restricted to the escarpments.

9.0 Potential Candidate Areas of Remnant Vegetation for Conservation Management

On the basis of the information provided in this report an assessment has been completed to determine which areas of remnant vegetation in the study area are a priority for protection and management for conservation purposes. The criteria utilised in making this determination are:

- the size and intactness of the area of remnant vegetation;
- whether the vegetation types present are under-represented in the existing conservation reserve system in Western Australia;
- whether the landforms present are representative of the unique landscape features of the Moresby Range;
- whether the area is significant as a wildlife corridor, linking existing reserves;
- whether the area is adjacent to, and enhances the ecological integrity, of existing nature reserves;

On the basis of this criteria the following six candidate remnant vegetation areas have been identified (Map 5). The candidate areas are not listed in priority order.

Land south of Protheroe Nature Reserve.

There is a large "battle-axe" shaped area of remnant vegetation south of Protheroe Nature Reserve, that extends south of the Nabawa - Yetna road. A significant portion of the area is vacant crown land (VCL), however, the south-eastern third of the remnant vegetation occurs on private property. The entire area comprises primarily of e6Mra19Si (code no. 35) vegetation type. The VCL corridor south of the reserve consists of the Casuarina soil-landscape system, with the area immediately north and south of the road (including the private property) consisting of the Mo2 soil-landscape sub-system.

There are current considerations by State government agencies and the local authority in regards to the vesting of the VCL as a nature reserve for the purposes of "conservation of flora and fauna". If VCL was incorporated into the reserve this would approximately double the size of the reserve and significantly enhance its ecological integrity.

Land adjacent to the Howatharra Nature Reserve

There is a significant extension of remnant vegetation on private property to the north-west and south of the Howatharra Nature Reserve.

The area of remnant to the north-west is approximately 5 times the size of the nature reserve. It consists predominantly of an Mo1 soil-landscape sub-system escarpment with some Mo2 footslopes. The area consists primarily of mhSc (code no. 675) vegetation type. This escarpment area has landscape value from the Northwest Coastal Highway at the northern end of the range.

The area to the south (approximately twice the size of the reserve) provides a wildlife corridor to the Oakajee Nature Reserve, and contains a population of a DRF species. It consists of Mo1 soil-landscape sub-system, and mhSc (code no. 675) vegetation type.

Land Central in the Moresby Range study area

The largest sector of remnant vegetation in the Moresby Range occurs in a block east of a north/south line from Wokatherra to Oakajee Nature Reserves, extending eastwards to the Chapman River. All the landform features of the range system occur within this block. This area encompasses several freehold titles, and a small area of crown land. Given the location and size of this area it is a significant vegetated corridor in the Moresby Range system.

The remnant vegetation in this block occurs nearly all within the Mo1 soil-landscape sub-system, with small areas of Mo2 sub-system edges. The mesa and range summits comprise of x2SZc (code no. 408) vegetation type, with extensive mhSc (code no. 675) vegetation type on the slopes and footslopes.

Mount Sommer

Mount Sommer is an outstanding example of a vegetated discrete mesa landform, and as a result it is a scenic feature on the Chapman Valley road. It appears that the mesa formation has not historically been grazed and, thus, the vegetation communities are likely to be intact and have a high degree of integrity. Mount Sommer is immediately east of the Wokatherra Nature Reserve, and there is a corridor of remnant vegetation linking these two features. Mt Sommer occurs within the the Mo1 soil-landscape sub-system with Mo2 footslopes, and consists of mhSc (code no. 675) vegetation type.

Mount Sommer and adjacent remnant vegetation occurs on private property.

Moresby system east of the Chapman River

There are two areas of reasonably sized (150 – 200 hectares) blocks of remnant vegetation in the Moresby Range east of the Chapman River. There is minimal information available on these areas and, thus, their conservation value requires further assessment.

The first site is south of Murphy road and north of Urch road, in the vicinity of Gnows Nest Hill. It falls predominantly within the Mo1 soil-landscape sub-system, and consists primarily of mhSc (code no. 675), with some e6Mra19Si (code no. 35), vegetation types.

The second (and smaller) site is south of Norris road and east of Scott road. It falls within mixed Moresby and Northampton soil-landscape systems, and consists predominantly of mhSc (code no. 675) vegetation type.

Land in the vicinity of Appa Hill

There is a large block of remnant vegetation outside, but within the vicinity of, the study area that has landform and vegetation charcteristics very similar to the features of the range system. The site is located north-west of Bringo, in an area centrally located north of the Geraldton-Mullewa road, east of the Narra Tarra - Moonyoonooka road, and south of the Chapman East road. There is minimal information available on this area and, thus, the conservation value requires further assessment. The area forms a middle distance landscape backdrop to views from roads in the southern portion of the Chapman Valley.

The area contains a mix of both Sugarloaf and Durlacher soil-landscape systems. It also has a mix of mhSc (code no.675) and e6Mra19Si (code no. 35) vegetation types.

9.1 Management Options for Remnant Vegetation of High Conservation Value

This report has provided a desktop overview of the conservation value of the remnant vegetation of the Moresby Range study area. It is important to recognise that the assessment of potential high conservation value areas requires groundtruthing to verify the flora and fauna attributes, the integrity of the vegetation communities, and the accuracy of the assessment for each candidate area. Without this exercise being completed, the recommended suite of candidate areas can only be considered as an indicative model of the type of remnant vegetation that should be focussed on as a high priority for conservation management.

A key to successful protection of remnant vegetation in the Moresby Range study area will be effective consultation and collaboration with landowners. It is important that landowners are advised of the significance of the remnant vegetation on their properties. Further, the intentions and desires of landowners need to be understood, as to whether there is mutual interest in improving protection and management of the remnant vegetation.

The management options that should be considered for areas of remnant vegetation of high conservation value include:

- provision of support and encouragement to landowners with the management and protection of remnant vegetation. This could include assistance with seeking funds for fencing and other activities, and the provision of management advice.

- formal recognition of the value of the remnant vegetation, and the efforts being undertaken by the landowner. Registration under the "Land for Wildlife" scheme would be appropriate in this instance. A voluntary covenant over the area of remnant vegetation could be considered.

- development of a formal management agreement, or Memoranda of Understanding, between the landowner and a management agency (ie. CALM or the local authority). These agreements can be specifically tailored to the requirements of the landowner and the management needs of the area of remnant vegetation on the property. In these arrangements a more formal covenant over the area of remnant vegetation could be considered.

- acquisition of the remnant vegetation for inclusion into the conservation reserve system. This option should be considered for those areas in the range that have the highest conservation value based on thorough biological surveys.

- inclusion of the remnant vegetation in a crown reserve that accomodates the protection of flora and fauna values. This option enables the involvement of a range of agencies (ie. local authorities), and provides for a greater diversity of uses (ie. tourism and recreation).

The next phase in the process to enhance the protection and management of the remnant vegetation in the Moresby Range study area is to establish a planning mechanism that provides for consultation and involvement of the landowners. The significance of the remnant vegetation, and the management options, requires further consideration and discussion. The manner in which this can be achieved requires direction from the Moresby Range Management Committee. The outcome of this process will lead to the inclusion of objectives and actions for conservation management in the Moresby Range Management Strategy.

10.0 References

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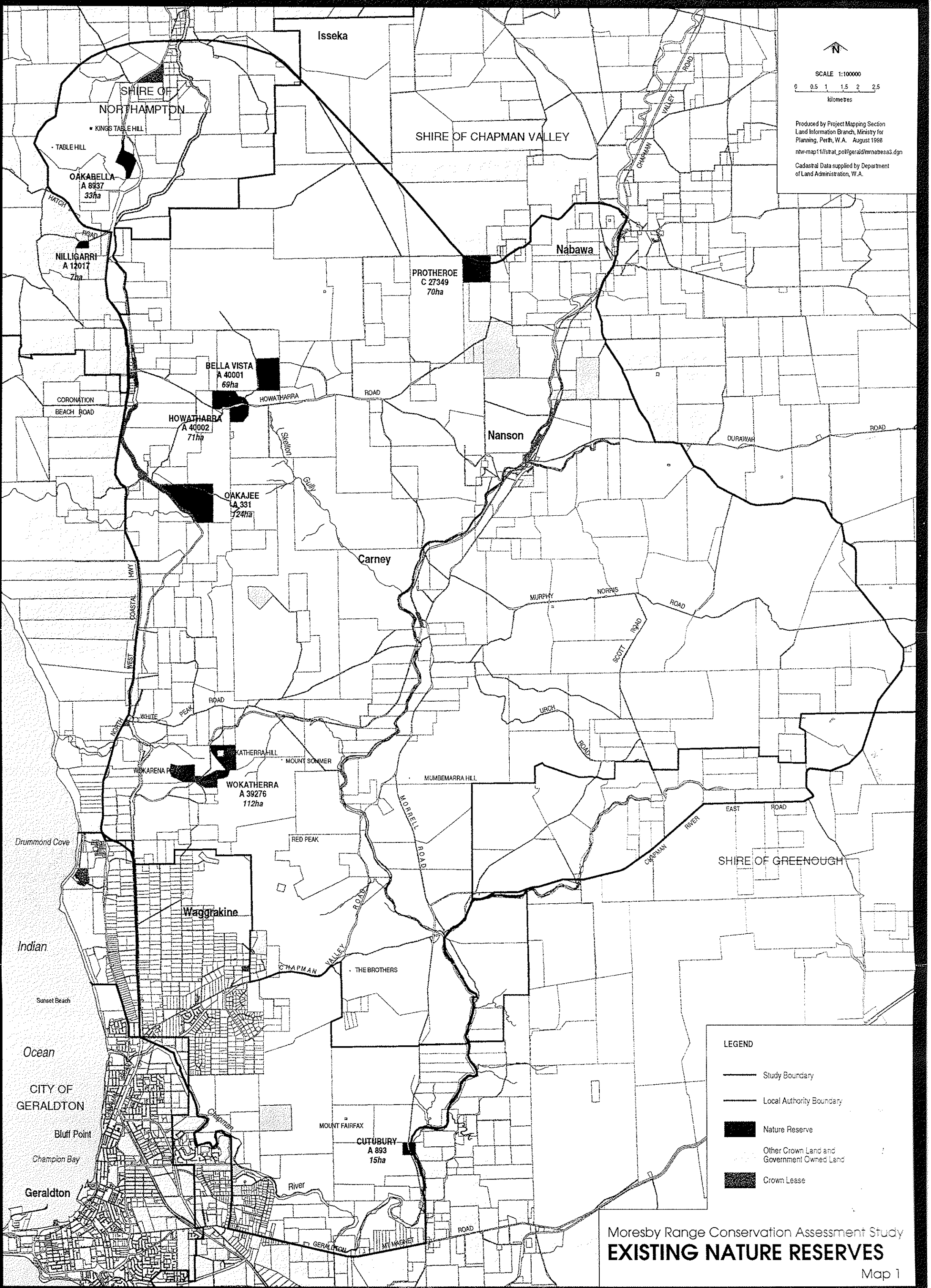
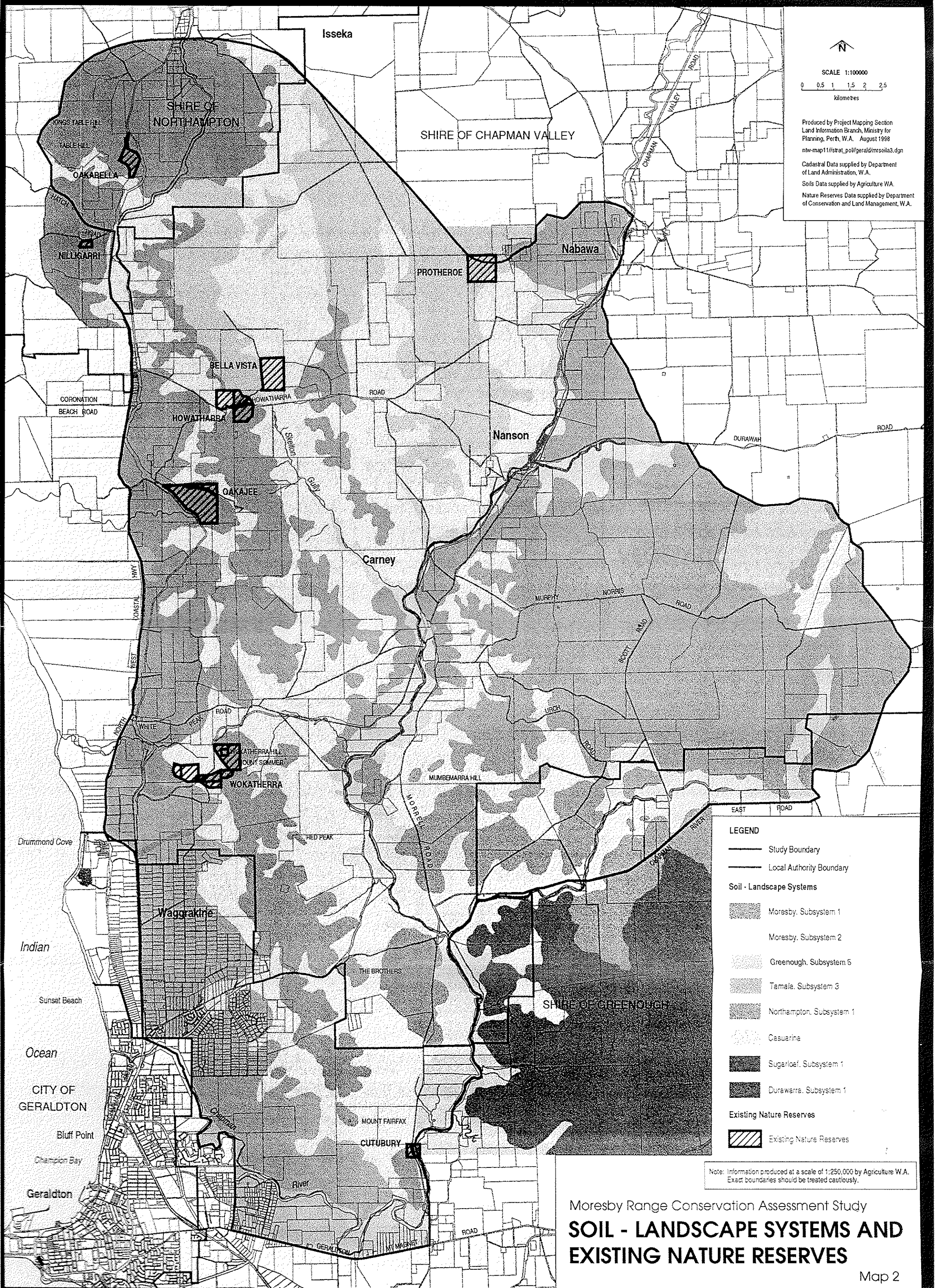

Isseka
SHIRE OF NORTHAMPTON
KINGS TABLE HILL
TABLE HILL
OAKABELLA
A 8937
33ha
HATCH ROAD
NILLIGARRI
A 12017
7ha
SHIRE OF CHAPMAN VALLEY
CHAPMAN VALLEY ROAD
Nabawa
PROTHEROE
C 27349
70ha
BELLA VISTA
A 40001
69ha
HOWATHARRA ROAD
HOWATHARRA
A 40002
71ha
Skelton Gully
Nanson
DURAWAH ROAD
OAKAJEE
A 331
124ha
Carney
MURPHY NORRIS ROAD
SCOTT ROAD
CORONATION BEACH ROAD
COASTAL HWY
WEST
NORTH WHITE PEAK ROAD
WOKATHERRA HILL
MOUNT SOMMER
WOKARENA PEAK
WOKATHERRA
A 39276
112ha
MUMBEMARRA HILL
MORRELL ROAD
URCH ROAD
EAST ROAD
CHAPMAN RIVER
SHIRE OF GREENOUGH
Drummond Cove
RED PEAK
Waggrakine
CHAPMAN VALLEY ROAD
THE BROTHERS
Indian
Ocean
Sunset Beach
CITY OF GERALDTON
Bluff Point
Champion Bay
Geraldton
Chapman River
MOUNT FAIRFAX
CUTUBURY
A 893
15ha
GERALDTON MT MAGNET ROAD
N
SCALE 1:100000
0 0.5 1 1.5 2 2.5
kilometres
Produced by Project Mapping Section
Land Information Branch, Ministry for
Planning, Perth, W.A. August 1998
ntw-map11//strat_pol/gerald/mrnatresa3.dgn
Cadastral Data supplied by Department
of Land Administration, W.A.
LEGEND
Study Boundary
Local Authority Boundary
Nature Reserve
Other Crown Land and
Government Owned Land
Crown Lease
Moresby Range Conservation Assessment Study
EXISTING NATURE RESERVES
Map 1


Isseka
SHIRE OF NORTHAMPTON
SHIRE OF CHAPMAN VALLEY
KINGS TABLE HILL
TABLE HILL
OAKABELLA
WATCH
ROAD
NILLIGARRI
PROTHEROE
Nabawa
BELLA VISTA
CORONATION
BEACH ROAD
HOWATHARRA
ROAD
Skeiton
Gully
Nanson
DURAWAH
ROAD
OAKAJEE
Carney
COASTAL
HWY
MURPHY
NORRIS
ROAD
BOOTT
ROAD
WEST
NORTH
WHITE
REAY
ROAD
URCH
ROAD
WOKATHERRA HILL
MOUNT SOMMERS
WOKATHERRA
MUMBEMARRA HILL
MORRELL
ROAD
EAST
ROAD
RIVER
CHAPMAN
RED PEAK
Drummond Cove
Waggrakine
Indian
THE BROTHERS
Sunset Beach
SHIRE OF GREENOUGH
Ocean
CITY OF GERALDTON
Chapman
MOUNT FAIRFAX
Bluff Point
CUTUBURY
Champion Bay
River
Geraldton
GERALDTON
MT MAGNET
ROAD
N
SCALE 1:100000
0 0.5 1 1.5 2 2.5
kilometres
Produced by Project Mapping Section
Land Information Branch, Ministry for
Planning, Perth, W.A. August 1998
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Cadastral Data supplied by Department
of Land Administration, W.A.
Soils Data supplied by Agriculture WA.
Nature Reserves Data supplied by Department
of Conservation and Land Management, W.A.
LEGEND
Study Boundary
Local Authority Boundary
Soil - Landscape Systems
Moresby. Subsystem 1
Moresby. Subsystem 2
Greenough. Subsystem 5
Tamala. Subsystem 3
Northampton. Subsystem 1
Casuarina
Sugarloaf. Subsystem 1
Durawarra. Subsystem 1
Existing Nature Reserves
Existing Nature Reserves
Note: Information produced at a scale of 1:250,000 by Agriculture W.A.
Exact boundaries should be treated cautiously.
Moresby Range Conservation Assessment Study
SOIL - LANDSCAPE SYSTEMS AND EXISTING NATURE RESERVES
Map 2

SCALE 1:100000

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kilometres

Produced by Project Mapping Section
Land Information Branch, Ministry for
Planning, Perth, W.A. August 1998

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Cadastral Data supplied by Department
of Land Administration, W.A.

Vegetation Types Data supplied by
Agriculture W.A.

Nature Reserves Data supplied by Department
of Conservation and Land Management, W.A.

SHIRE OF NORTHAMPTON

SHIRE OF CHAPMAN VALLEY

SHIRE OF GREENOUGH

CITY OF GERALDTON

KINGS TABLE HILL

TABLE HILL

OAKABELLA

HATCH ROAD

NILLIGARRI

PROTHEROE

Nabawa

BELLA VISTA

HOWATHARRA

CORONATION BEACH ROAD

OAKAJEE

Shelton Gully

Carney

Nanson

DURAWAH ROAD

CHAPMAN VALLEY ROAD

MURPHY NORRIS ROAD

SCOTT ROAD

URCH ROAD

EAST CHAPMAN ROAD

MORRELL ROAD

COASTAL HWY WEST

NORTH WHITE PEAK ROAD

WOKATHERRA HILL

MOUNT SOMMER

WOKARENA PEAK

WOKATHERRA

MUMBEMARRA HILL

RED PEAK

Drummond Cove

Waggrakine

Indian Ocean

Sunset Beach

CHAPMAN VALLEY ROAD

THE BROTHERS

MOUNT FAIRFAX

CUTUBURY

Chapman River

Bluff Point

Champion Bay

Geraldton

TO GERALDTON

MT MAGNET ROAD

408 675 35 413 359 371

LEGEND

Study Boundary

Local Authority Boundary

Existing Nature Reserve

Vegetation Types

675 Shrublands; mixed thicket

35 Shrublands: jam scrub

408 Scrub-heath: yellow sandplain

413 Shrublands; *Acacia neurophylla*

359 Shrublands; acacia/banksia scrub

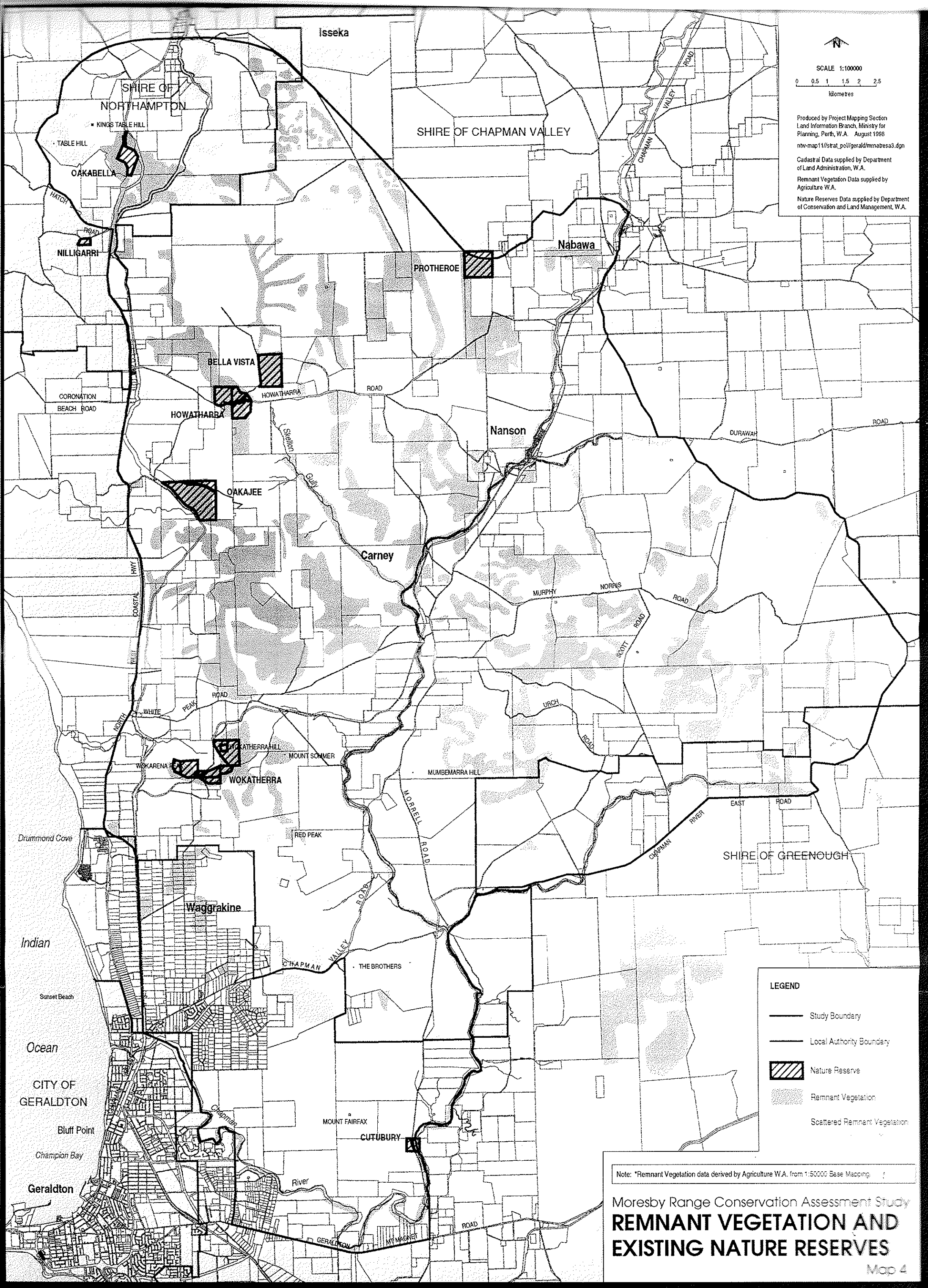
371 Low Forest; *Acacia rostellifera*

Note: * Vegetation types from J.S. Beard and A.C. Burns (1976) "The vegetation of the Geraldton Area". Original mapping at 1:250,000, therefore exact boundaries should be treated with caution.
* Much of the area's original vegetation has been cleared.

Moresby Range Conservation Assessment Study

VEGETATION TYPES AND EXISTING NATURE RESERVES

Map 3


Isseka
SHIRE OF NORTHAMPTON
KINGS TABLE HILL
TABLE HILL
OAKABELLA
HATCH ROAD
NILLIGARRI
SHIRE OF CHAPMAN VALLEY
CHAPMAN VALLEY ROAD
Nabawa
PROTHEROE
BELLA VISTA
HOWATHARRA ROAD
HOWATHARRA
CORONATION BEACH ROAD
Skelton Gully
OAKAJEE
Nanson
DURAWAH ROAD
Carney
COASTAL HWY
MURPHY NORRIS ROAD
SCOTT ROAD
NORTH WHITE PEAK ROAD
URCH ROAD
WOKATHERRA HILL
MOUNT SOMMER
WOKARENA R
WOKATHERRA
MUMBEMARRA HILL
MORRELL ROAD
EAST ROAD
CHAPMAN RIVER
Drummond Cove
RED PEAK
SHIRE OF GREENOUGH
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Chapman
MOUNT FAIRFAX
CUTUBURY
River
GERALDTON MT MAGNET ROAD
N
SCALE 1:100000
0 0.5 1 1.5 2 2.5
kilometres
Produced by Project Mapping Section
Land Information Branch, Ministry for
Planning, Perth, W.A. August 1998
ntw-map11//strat_pol//gerald/mrnatresa3.dgn
Cadastral Data supplied by Department
of Land Administration, W.A.
Remnant Vegetation Data supplied by
Agriculture W.A.
Nature Reserves Data supplied by Department
of Conservation and Land Management, W.A.
LEGEND
Study Boundary
Local Authority Boundary
Nature Reserve
Remnant Vegetation
Scattered Remnant Vegetation
Note: *Remnant Vegetation data derived by Agriculture W.A. from 1:50000 Base Mapping.
Moresby Range Conservation Assessment Study
REMNANT VEGETATION AND EXISTING NATURE RESERVES
Map 4

N

SCALE 1:100000

0 0.5 1 1.5 2 2.5

kilometres

Produced by Project Mapping Section
Land Information Branch, Ministry for
Planning, Perth, W.A. August 1998

ntw-map11//strat_pol/gerald/mrnatresa3.dgn

Cadastral Data supplied by Department of Land Administration, W.A.

Remnant Vegetation Data supplied by Agriculture W.A.

Nature Reserves Data supplied by Department of Conservation and Land Management, W.A.

Isseka

SHIRE OF NORTHAMPTON

SHIRE OF CHAPMAN VALLEY

KINGS TABLE HILL

TABLE HILL

OAKABELLA

HATCH ROAD

NILLIGARRI

PROTHEROE

Nabawa

BELLA VISTA

HOWATHARRA

CORONATION BEACH ROAD

ROAD

Skelton Gully

OAKAJEE

Nanson

DURAWAH ROAD

CHAPMAN VALLEY ROAD

Carney

COASTAL HWY

WEST

MURPHY

NORRIS ROAD

SCOTT ROAD

NORTH WHITE PEAK ROAD

URCH ROAD

WOKARENA HILL

MOUNT SOMMER

WOKATHERRA

MUMBEMARRA HILL

MORRELL ROAD

EAST ROAD

RIVER

CHAPMAN

Drummond Cove

RED PEAK

SHIRE OF GREENOUGH

Waggrakine

CHAPMAN VALLEY

THE BROTHERS

Indian

Sunset Beach

Ocean

CITY OF GERALDTON

Bluff Point

Champion Bay

Geraldton

MOUNT FAIRFAX

CUTUBURY

Chapman River

GERALDTON MT MAGNET

LEGEND

- Study Boundary
- Local Authority Boundary
- Potential Candidate Areas of Remnant Vegetation for Conservation Management
- Nature Reserve
- Remnant Vegetation
- Scattered Remnant Vegetation

Note: *Remnant Vegetation data derived by Agriculture W.A. from 1:50000 Base Mapping.

Moresby Range Conservation Assessment Study

POTENTIAL CANDIDATE AREAS OF REMNANT VEGETATION FOR CONSERVATION MANAGEMENT

Map 5