



# LOCAL BIODIVERSITY STRATEGY

Adopted by Council –22 October 2013



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## Abbreviations

ABBREVIATION	DESCRIPTION
ACV	Area of Conservation Value
BVA	Beard Vegetation Association
CV#	Numbering of Areas of Conservation Values in the Shire of Chapman Valley
CGG	City of Greater Geraldton
GG#	Numbering of Areas of Conservation Values in the City of Greater Geraldton
DEC	Department of Conservation
EPA	Environmental Protection Authority
EPBC	<i>Environmental and Biodiversity Conservation Act 1999</i>
GCR	Geraldton Conservation Report
GRFVS	Geraldton Regional Flora and Vegetation Study
IBRA	Interim Bioregionalisation of Australia
LBS	Local Biodiversity Strategy
LGA	Local Government Authority
LPS	Local Planning Scheme
NRM	Natural Resource Management
PC	Plant Community
SCV	Shire of Chapman Valley
TPS	Town Planning Scheme
WALGA	Western Australia Local Government Association
WAPC	Western Australia Planning Commission
WWF	World Wildlife Fund for Nature

## Glossary

**Biodiversity** - The variety of life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form part. Biodiversity is usually considered at three levels: genetic diversity; species diversity; and ecosystem diversity.

**Degradation** – Any activity which reduces the quality, nature or usefulness of land. Degradation can be caused by salinity, soil acidification, soil compaction, waterlogging, siltation, soil erosion, eutrophication, flooding, and/or the removal or deterioration of natural or introduced vegetation.

**Flora** - Plants considered as a group, especially the plants of a particular country, region, or time.

**Local Natural Areas** - all natural areas within a Local Government boundary that are outside of the State Government's conservation estate.

**Native Vegetation** – Any local indigenous plant community containing throughout its growth the complement of native species and habitats normally associated with that vegetation type or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance following disturbance. It excludes plantations and vegetation that has been established for commercial purposes.

**Natural Area** - an area that contains native species or ecological communities in a relatively natural state and hence contains biodiversity. Natural areas can be areas of native vegetation, vegetated or open water bodies (lakes, swamps), or waterways (rivers, streams, creeks – often referred to as channel wetlands, estuaries), springs, rock outcrops, bare ground (generally sand or mud), caves, coastal dunes or cliffs (adapted from Environmental Protection Authority 2003). Note that natural areas exclude parkland cleared areas, isolated trees in cleared settings, ovals and turfed areas.

**Protection** - The highest level of conservation available meaning vesting lands in land tenure conducive to long-term protection in perpetuity, accompanied by an appropriately coordinated and funded management regime.

**Retention** - Any process of ensuring a natural area is retained but not necessarily afforded protection to ensure its continued existence and viability.

**Taxa** (singular taxon) – The named classification unit to which individuals or sets of species are assigned, such as species, genus and order.

## Executive Summary

Geographically, the Local Biodiversity Strategy (LBS) covers 32,410 ha including the coastal portion of the City of Greater Geraldton, the Shire of Chapman Valley and small portion of the Shire of Northampton. The area is approximately bounded by Coronation Beach Rd to the North, Devlin Pool Rd to the South and Moresby Range to the East.

Scientifically, the scope of the 'biodiversity' included in the LBS mainly focuses on vegetation communities (as opposed to taxa) in natural areas, with inclusion of some consideration of particularly rare or threatened species.

The Geraldton area is included in one of only 34 global biodiversity hotspots, being both very high biodiversity value, yet also under significant threat. The City of Greater Geraldton (CGG) and the Shire of Chapman Valley's (SCV) policies and strategies show a commitment to environmental values, and to halting and reversing the observed trends towards collapse of local ecosystems. Recent surveys and forums have also shown community support for strong commitments to conservation to preserve social, economic, cultural and intrinsic values and ecosystem services provided by natural areas.

The starting position for achieving the community vision for biodiversity conservation is that in area covered by this LBS 6041 ha of vegetation remain, representing only 18% of pre-European extent of native vegetation, and well under the 30% threshold recognised at which species loss appears to accelerate exponentially at an ecosystem level (Del Marco *et al*, 2004, EPA, 2008). More than 30% of that remaining is land identified for future development and an additional 20% is land where potential future development could result in further vegetation clearing (Zelinova *et al*, 2012). Less than 1.8% of the original extent of vegetation in the study area has some level of protection.

Despite the high level of clearing, remaining vegetation shows high levels of diversity. An analysis of the state, regional and local vegetation types shows that more than 17 distinct Plant Communities, with 83% of remaining vegetation being regionally significant. While not all this vegetation can practically be conserved, more than 10% of natural areas within Geraldton area have good opportunities to achieve protection or retention of native vegetation. Action now to protect this vegetation is more financially prudent

than subsequent restoration or regeneration, and will likely yield measurable and popular social, economic and environmental benefits.

Achieving the vision will require stronger action from government in policy, planning and compliance, and business in natural area assessment, urban design, and use of offsets. Action towards the vision must also provide stronger support for: local community groups working on the coast, in the Moresby Range and in the Chapman River, planners working to implement innovative policies in areas such as Waggrakine, and for private landholders wanting to conserve their bushland.

The LBS takes all these trends and aspirations into account and, using detailed spatial and policy analysis, suggests a prioritised list natural areas for conservation action and a comprehensive set of recommendations for mechanisms to achieve the vision for local natural areas.

The recommendations contribute towards 5 Goals:

Goal 1: **Retention** - Retain natural areas. Aim to retain at least 3334ha of the remaining 6041ha of natural areas remaining.

Goal 2: **Protection** - Protect natural areas and specific biodiversity features, targeting at least 5% of the original extent of natural areas, leading to the protection of an additional 1058ha of areas of conservation value.

Goal 3: **Management** - Manage protected natural areas for conservation. Active management of 100% of LGA natural areas of conservation value.

Goal 4: **Engagement** – Increased community contributions to biodiversity conservation. Decrease in behaviours identified as threats to biodiversity values.

Goal 5: **Regeneration** - Ensure the rate of regeneration exceeds the rate of degradation. E.g. restore more than 1500 ha of natural areas in CGG.

## Guide for Readers

Specific sections of the LBS, Appendices and Technical Reports are likely to be of more or less interest to different readers. Below is a short guide to the most relevant sections.

### **Policy-makers and planners**

- Map of Areas of Conservation Value and Ecological Linkages. Appendix A & C
- Recommended changes to local planning scheme and policy. Appendix D & E
- Biodiversity values and the prioritisation criteria. LBS Section 7
- Biodiversity features with legislative support for conservation. LBS Section 2.5

### **Land managers and conservationists**

- Biodiversity Conservation Management recommendations. Section 8.2, LBS Action Plan.
- Map of Areas of Conservation Value. Appendix A
- Specific Areas of Conservation Value and recommendations. Appendix B.

### **Landholders and developers**

- Biodiversity features with legislative support for conservation. LBS Section 2.5
- Map of Areas of Conservation Value. Appendix A
- Specific Areas of Conservation Value and recommendations. Appendix B.
- Incentives for conservation. Section 8.1
- Ecological linkages for development design. Appendix C

# 1 Introduction

The City of Greater Geraldton (CGG) and the Shire of Chapman Valley's (SCV) have jointly prepared a Local Biodiversity Strategy (LBS) covering 32,410ha within an area bounded by Coronation Beach Rd to the North, Devlin Pool Rd to the South and Moresby Range to the East ( See Figure 1).

The City of Greater Geraldton (CGG) and the Shire of Chapman Valley's (SCV) policies, strategies and results of community engagement show the natural environment is highly valued. These organisations and communities' have proposed strong commitments to biodiversity conservation of natural areas. The reality is that less than 18% of pre-European extent of native vegetation remains in the study area, and nearly half of that may be lost through planned developments.

Achieving community and Local Government's environmental aspirations requires a strategic approach. This LBS defines the most practical and effective actions to achieve biodiversity goals, derived from rigorous analysis of the ecological data, social values, implementation mechanisms and planning constraints.

## 1.1 DEFINING AND VALUING BIODIVERSITY

An accepted definition of biodiversity is: *"The variety of life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form part. Biodiversity is usually considered at three levels: genetic diversity; species diversity; and ecosystem diversity."* (Department of the Environment, Sport and Territories (1996).

The global and local communities' wellbeing is dependent on the services provided by nature: our sustenance, health, cultural identity and economy are all dependent on biological systems and processes. The *2010 Living Planet Report* (WWF, 2010), identifies four ways in which we benefit from the services provided by biodiversity:

1. *Provisioning Services*: Examples include food, medicine, timber, fibre, biofuel.
2. *Regulating Services*: Examples include water filtration, waste decomposition, regulation of climate, crop pollination.
3. *Supporting Services*: Examples include nutrient cycling, photosynthesis, soil formation.

4. *Cultural Services*: Examples include enrichment of recreational, aesthetic and spiritual experience.

Many examples of all these services and their critical importance to local culture and economy are evident in Geraldton: rock lobster fishing, broadacre agriculture, wildflower tourism, bushfoods and medicines, 'leaning tree' symbols and the popularity of nature-based recreational activities such as fishing, diving, and bushwalking.

The intrinsic, implicit, qualitative values associated with biodiversity have historically been difficult to quantify. More recently, concepts such as 'ecosystem services', 'triple bottom line', 'sustainability indicators', 'carbon offsets', 'natural asset management' and 'carbon price' have enabled quantification of the value of biodiversity.

The LBS acknowledges a high risk that the ecological, cultural and economic values of Geraldton's biodiversity will be lost. Some driving threats and pressures are obvious and direct (such as weed infestation) can be addressed through improved resourcing of management. Other pressures are indirect (e.g. population increase), and addressing them may be perceived to be in conflict with goals regional economic development. This LBS aims to create a framework where biodiversity (ecosystems, species and genes) flourishes at the same time as our economy, with both contributing to the Geraldton communities' wellbeing.

## 1.2 LGAS' ENVIRONMENTAL GOALS

The CGG and SCV have identified the importance of our environment, biodiversity and local natural areas in their plans and strategies. Preparation of the LBS is consistent with the values and goals in the following documents.

CGG's *Strategic Community Plan 2011-2021* (City of Greater Geraldton, 2011) outlines the 'City-Region Vision': *"A creative city-region which has a prosperous, diverse and sustainable community within an attractive Western Australian setting"* (p11, CGG, 2011).

'Environmental' is 1 of 5 elements of the sustainability framework, stating the aspiration for *"The rate of regeneration exceeds the rate of degradation in our natural and built environment"* (p13, CGG, 2011)

Strategies to achieve environmental sustainability include: *Strategy 4.3.3 Protect biodiversity and provide landscape management through effective conservation and rehabilitation* (p27, CGG, 2011).

The Plan also cites linkages with CGGs 2029 and Beyond project and 'Directions' such as: '*becoming carbon neutral*', and '*moving from an environmentally conscious community to an environmentally active community...that protects our precious beaches and other natural assets*' (p33, CGG, 2011).

CGG's *Towards Sustainability Policy Framework* (City of Geraldton-Greenough, 2010) includes Goals and Guiding Questions to be applied to decision-making. They include:

*Environmental Goal: The rate of regeneration exceeds the rate of degradation in our natural and built environment.*

*Environmental Guiding Questions (include):*

2. *Ensure environmental systems and services are not systematically degraded (through over-extraction, pollution or physical degradation), and are actually enhanced?*
4. *Encourage our community to act as stewards for the environment locally, and globally?*

SCV's *Local Planning Strategy* (Shire of Chapman Valley, 2008) describes how land use planning decision-making can consider environmental issues, including biodiversity:

- 1.2 *Ensure natural and cultural heritage is protected*
- 3.2 *Ensure that land, soil and biodiversity is safeguarded and degradation does not occur*
- 3.3 *Minimise clearing of vegetation and maximise retention and replanting of native vegetation to link areas of remnant bushland with roadside vegetation and nature reserves*
- 3.4 *Ensure significant environmental features are protected, conserved and/or nature enhanced*
- 3.5 *Recognise, maintain and promote natural beauty, landscape values and recreational opportunities of the Shire*
- 3.6 *Continue to encourage activities in relevant Precincts that protect the 'clean and green' status of agricultural produce derived from this Shire.*

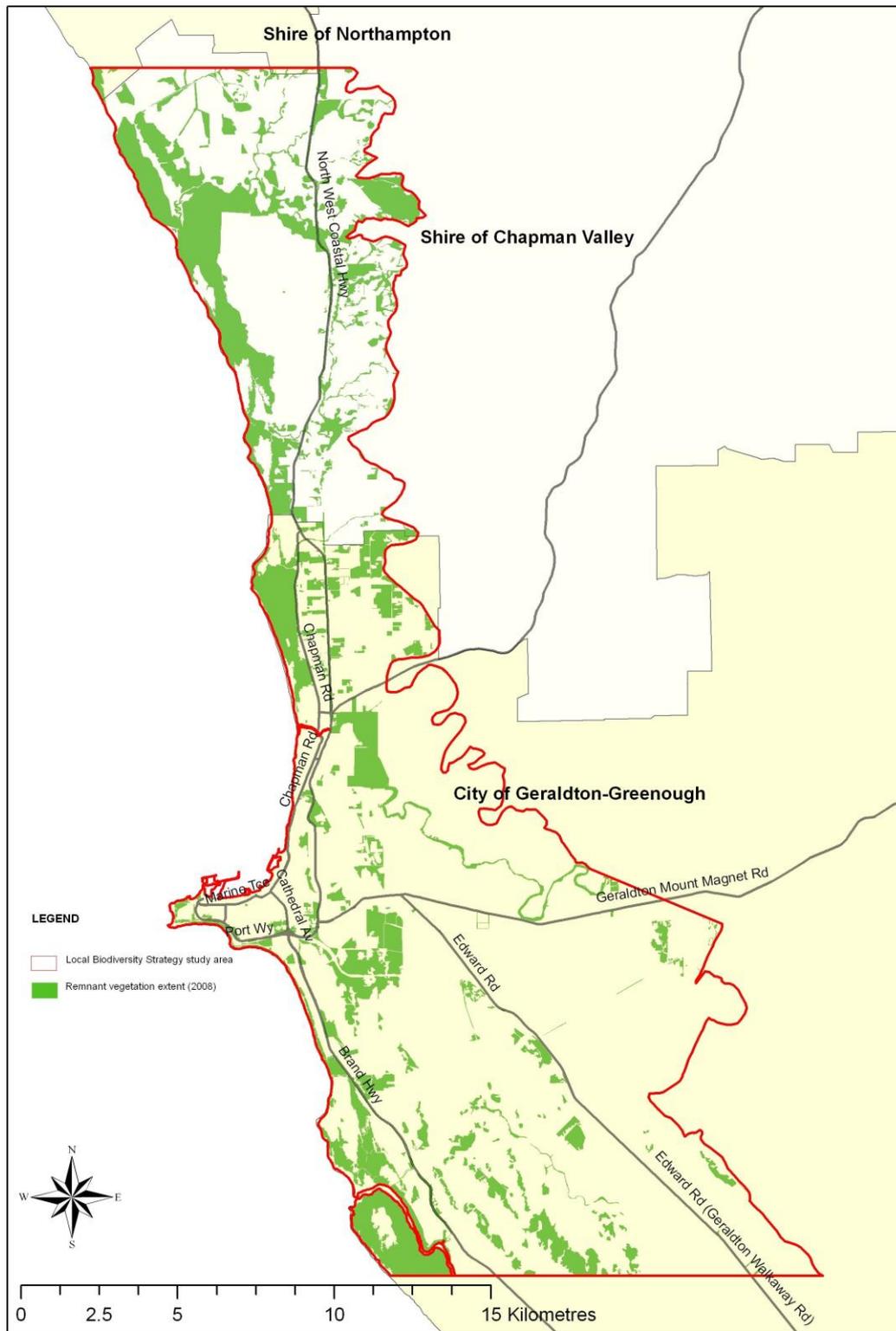


Figure 1 Geraldton Local Biodiversity Study Area

### 1.3 AREA AND SCOPE

The definitions of the LBS area and descriptions of vegetation communities are based on the *Geraldton Regional Flora and Vegetation Survey* (GRFVS) (Western Australian Planning Commission, 2010), cover 32,410 hectares and was chosen through consideration of:

- Areas experiencing the highest growth, development pressures and management effort,
- Areas identified by the EPA as requiring further consideration for retention and conservation of remnant vegetation,
- Availability of information from the GRFVS.

The geographic scope for the LBS includes the coastal portion of the City of Greater Geraldton, the Shire of Chapman Valley and small portion of the Shire of Northampton (Figure 1). The area is approximately bounded by Coronation Beach Rd to the North, Devlin Pool Rd to the South and Moresby Range to the East. Implementation of LBS recommendations (e.g. policy changes) may impact other locations within the City of Greater Geraldton and the Shire of Chapman Valley.

The scope of the 'biodiversity' included in the LBS mainly focuses on vegetation communities (not individual taxa) in natural areas, with inclusion of some consideration of particularly rare or threatened species.

'Natural area' is used to describe an area that contains native species or communities in a relatively natural state and hence contains biodiversity. Natural areas can be areas of native vegetation, vegetated or open water bodies (lakes, swamps), or waterways (rivers, streams, creeks – often referred to as channel wetlands, estuaries), springs, rock outcrops, bare ground (generally sand or mud), caves, coastal dunes or cliffs (note that natural areas exclude parkland cleared areas, isolated trees in cleared settings, ovals and turfed areas) (del Marco, 2004).

Most spatial analyses in the LBS are based on vegetation communities and 'Local Natural Areas'. Local Natural Areas (LNA) are all natural areas within a Local Government boundary that are outside of the State Government's conservation estate (del Marco *et al*, 2004, Molloy *et al*, 2007). LNA's include all freehold and other government land including vegetated natural areas, wetlands

and waterways as well as bare sand or rock outcrops that provide habitat to native animals.

Of the 6041 ha of native vegetation remaining in the study area, only 124.5 ha is part of the Department of Environment and Conservation (DEC) conservation estate. The remaining 5915 ha qualify as LNAs and includes privately owned land, land owned or vested in Local Government or other State Government agency.

### 1.4 THE NEED FOR A LOCAL BIODIVERSITY STRATEGY

Achieving LGAs' values and goals requires stronger action to protect and conserve environmental values and assets. The local trends are towards decreasing quality and extent of vegetation. 18% (6041 ha) of the original (pre-European) extent of vegetation remains in the study area. Analysis of each vegetation types confirms the current extent is below 30% of the original extent of each vegetation type. Below 30% species loss appears to accelerate exponentially at an ecosystem level (Del Marco *et al*, 2004, EPA, 2008).

The threats to the remaining native vegetation are increasing: clearing for urban development, invading weeds and pests, under-resourcing of management, incompatible recreational use, and accelerated climate change. Of the 6041 ha, more than one third is within land identified for potential future high intensity development and an additional 20% is within land where potential future development could result in further vegetation clearing (Perth Biodiversity Project, 2011).

Implementation of the LBS can contribute to LGA's environmental goals and mitigate threats by increasing retention, protection and conservation of LNAs. Implementation can build on positive initiatives such as:

- Community-lead conservation projects including tree-planting days in Wonthella, Sunset Beach, Pt Moore, Mahomets, Glenfields, Drummonds Cove,
- Arboretums such as Byne Park and the Regional Herbarium maintaining knowledge,
- A Community Nursery growing local provenance species for revegetation,
- Integration of conservation into urban planning in Waggrakine and Glenfields,
- Implementation of management and conservation plans for areas including Chapman River Wildlife Corridor, Greenough River, and Moresby Range,

- Educational public talks organised by Northern Agricultural Catchments Council and the WA Museum,
- Promoting the use of local native plants for gardens and public open spaces.

## 1.5 PRINCIPLES OF BIODIVERSITY CONSERVATION

The principles used in the LBS are supported by research, policy and legislation, as identified in the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (Del Marco *et al*, 2004). These principles include:

- I. **Retention of at least 30% of the original extent of each vegetation type to avoid exponential acceleration of species loss at an ecosystem-level.**
- II. **Where only 10% or less of original extent remains, a vegetation community is considered endangered.**
- III. **Protection of regionally and locally significant areas.**
- IV. **Retention and regeneration are higher priority than revegetation.**
- V. **High conservation value natural areas are highest priority for protection and management.**
- VI. **Community involvement critical to positive on-ground outcomes.**
- VII. **Site specific field surveys are essential to fully understand biodiversity values.**
- VIII. **Natural area conservation is a legitimate land-use.**

## 1.6 PREVIOUS BIODIVERSITY CONSERVATION REPORTS

In 1998, the Environmental Protection Authority (EPA) released Bulletin 891 on the Geraldton Region Plan highlighting the need for identification, retention and conservation of remnant vegetation and retention and extension of conservation areas in regional parks and open space. The EPA supported the proposal in the Geraldton Region Plan to compile an inventory of, and to conserve, regionally significant remnant vegetation in both private and government ownership.

As a result, the GRFVS was initiated in 2007 to provide a regional context for decisions on proposals affecting native vegetation. The GRFVS was planned as a 3-phase project that includes

initial vegetation mapping, conservation and regional planning and further regional flora and vegetation surveys.

Phase 1 commenced in 2008 and was recently completed for the area between Coronation Beach Road (north), Devlin Pool Road (south) and the foothills of the Moresby Range. This final GRFVS was endorsed by the EPA in 2010. A technical report providing information on the conservation significance of vegetation associations and plant communities in the GRFVS project area was produced.

Based on this technical report, the Geraldton Regional Conservation Report (GRCR) was also produced (PBP, 2012). The GRCR provides a framework for prioritising LNAs in the study area, and identifies criteria and mechanisms for the protection and retention of biodiversity within the GRFVS study area.

The LBS is based upon both the GRFVS and GRCR, which provide detailed information and a sound basis for LGAs to achieve their goals for biodiversity conservation. The LBS provides a framework for, complements, references and reinforces the recommendations of existing local coastal, natural area or river management plans e.g. Geraldton-Greenough Coastal Strategy and Management Plan, Chapman River Wildlife Corridor Management Plan, and Greenough River Management Plan.

## 1.7 ADDITIONAL RELEVANT FEDERAL AND STATE LEGISLATION AND POLICY

There are numerous international agreements as well as federal and state laws and statutory and non-statutory bodies that provide for biodiversity conservation within Australia and Western Australia.

One of the key national policy documents that will guide how plants, animals and ecosystems are managed over the next 20 years is the *Australia's Biodiversity Conservation Strategy 2010-2030*, released by the National Management Ministerial Council in October, 2010.

Other main federal and state legislation and policies governing biodiversity in the Geraldton region include:

- *Environmental Protection and Biodiversity Conservation Act 1999* (Cmwth),
- *Wildlife Conservation Act 1950*,

- *Environmental Protection Act 1986,*
- *Conservation and Land Management Act 1984,*
- *Planning and Development Act 2005,*
- *EPA Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia,*
- *EPA Guidance Statement No 33: Environmental Guidance for Planning and Development,*
- *Environmental Protection Bulletin No 10: Geraldton Regional Flora and Vegetation Survey (GRFVS),*
- *State Planning Policy 2: Environment and Natural Resources,*
- *State Planning Policy 2.5: Land Use Planning in Rural Areas,*
- *State Planning Policy 2.6: State Coastal Planning Policy,*
- *Development Control Policy 3.4: Subdivision of Rural Land,*
- *Development Control Policy 6.1: Country Coastal Planning Policy,*
- *Planning Bulletin 69: Proposed Bush Forever Protection Areas,*

## 1.8 LOCAL BIODIVERSITY STRATEGY PLANNING PROCESS

The LBS process is based on established conservation planning methodology and principles used by local governments in the Perth Metropolitan Region, as outlined in *Local Government Biodiversity Planning Guidelines for Local Government* (Del Marco *et al*, 2004). The LBS has been prepared by the Perth Biodiversity Project team at WALGA with Eco Logical consultants and subsequently with We Are Arising, under guidance from a working group and steering committee.

The steps in the LBS process are described in Figure and are in accordance with Local Government Biodiversity Planning Guidelines:

- Ecological assessment of local natural areas and prioritisation for conservation,

- Assessment of opportunities and constraints to natural area retention and protection,
- Adoption of measurable and feasible biodiversity conservation objectives and targets,
- Identification of land use planning, management and enabling mechanisms to achieve the conservation objectives.

The GRFVS, GRCR and conservation significance criteria were used in prioritising LNAs. These criteria are based on the current EPA criteria of conservation significance (EPA, 2008 and EPA, 2000). The criteria were used to formulate priorities, and map Areas of Conservation Value (ACVs).

These maps, priorities and further analysis of opportunities and constraints within the current planning framework were used to create targets for ACVs. Stakeholder engagement was combined with existing policies and science-based targets to create quantifiable 'Goals' for protection, retention and conservation.

Mechanisms have been recommended to achieve the overall Goals as well as achieving outcomes for each ACV. Mechanisms include changes to policy, planning, management, stakeholder engagement, incentive schemes and discrete projects, as described in Figure 3.

## 1.9 DEFINING PROTECTION AND RETENTION

'Protection' and 'retention' have specific meaning in the LBS.

### Protection

Protection is the highest level of conservation available meaning vesting lands in land tenure conducive to long-term protection in perpetuity, accompanied by an appropriately coordinated and funded management regime. Typically, protection is afforded via:

- Department of Environment and Conservation (DEC) Estate: Land is vested in DEC and is managed as a conservation reserve.
- Appropriate Regional and Local Planning Scheme land use planning category provisions: Zones and reservations such as Landscape and Coastal Protection, Dune Preservation, Conservation or Parks and Recreation reserves including native vegetation vested for conservation.

- Conservation Covenants: Covenant on the title of the land tied to an agreement to conserve the lands and apply appropriate management regimes. Usually supported by well-defined and legally binding performance measures and reporting requirements.

### Retention

Retention is any process of ensuring a natural area is retained but not necessarily afforded protection to ensure its continued existence and viability. Management of this land is focused on preventing degradation. Typically retention is facilitated via development design and construction limiting clearing to infrastructure footprint, retention of natural area in public open space with shared use, voluntary programs which support native vegetation retention on private land such as Land for Wildlife, a program administered by DEC.

#### 1.10 LIMITATIONS OF THE STUDY

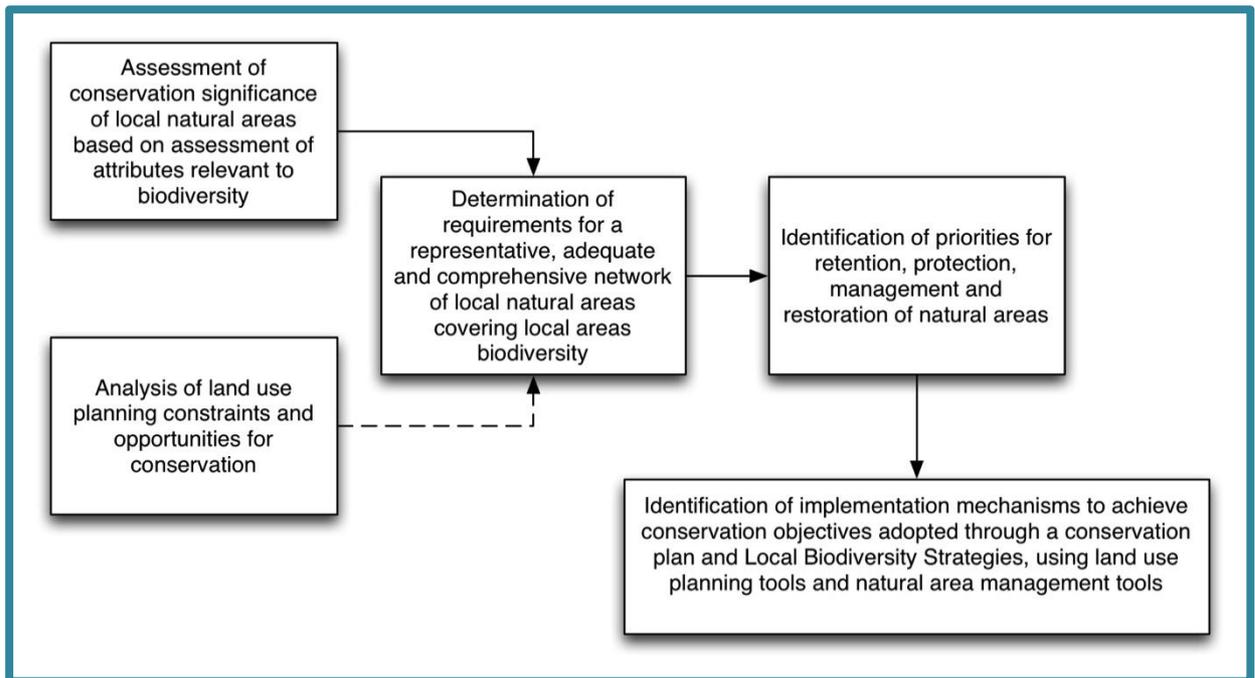
This LBS was developed using the GRCR (PBP, 2012) and the GRFVS report (WAPC, 2010), datasets of environmental values and information from policy documents. Conservation significance criteria were developed taking into account limitations wherever possible, but certain assumptions have been made, as described below.

In the GRFVS report (WAPC, 2010) the Plant Communities (PCs) provide more accurate descriptions of the vegetation types than Beard Vegetation Associations (BVAs) which are mapped at a broad scale (1:250 000). Whilst some GRFVS PCs closely correspond with BVAs, the descriptions of BVAs and scale of mapping does not adequately describe some of the vegetation types, represent the range of vegetation types within the area, or provide accurate delineation of vegetation boundaries. The GRFVS report recommends conservation significance should be considered both in terms of BVAs and PCs (WAPC, 2010).

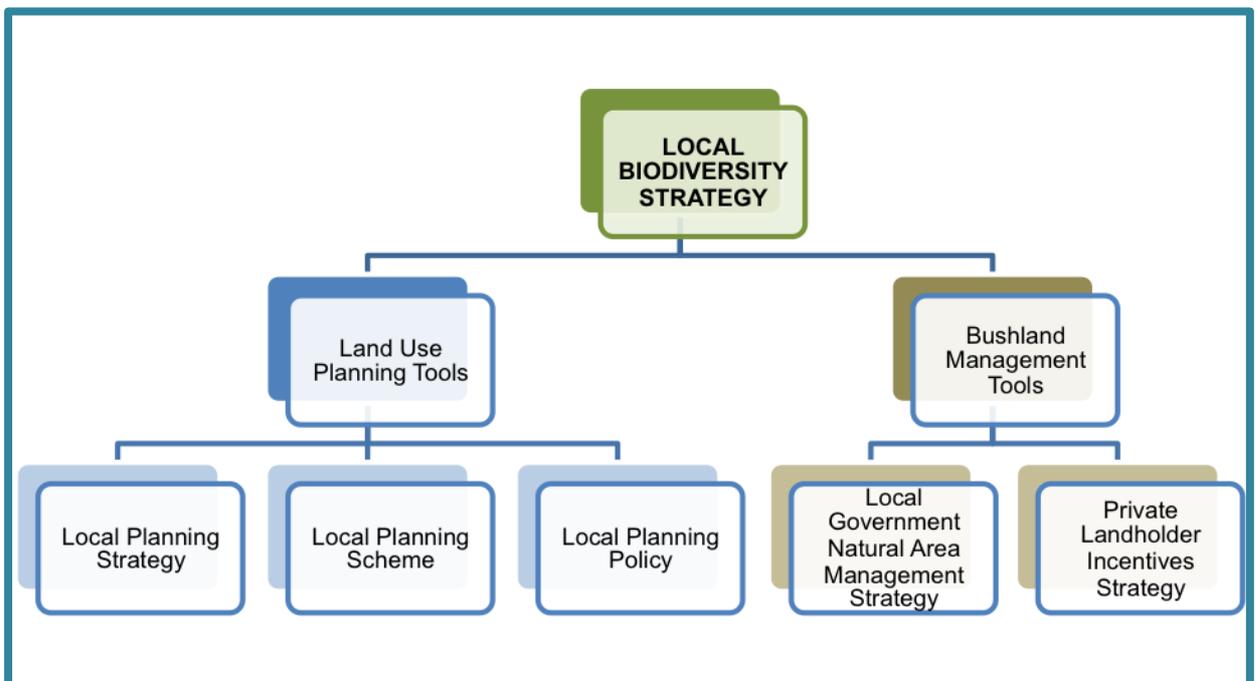
The conservation significance prioritisation process developed for the GRCR and the LBS was based on information available within the GRFVS study area. The nature and extent of PCs outside the study area were unknown at completion of the GRCR. Review of conservation priorities will be needed when new information becomes available on extent of PCs outside the study area.

Records of Declared Rare Flora (DRF), Significant Priority Flora (SPF) and Threatened Ecological Communities (TECs) were correct at the time of mapping (October 2010). Site-specific surveys might identify new locations of these biodiversity features. Appropriate mechanisms for their protection will need to be identified.

Although fauna records and fauna habitat distribution are important considerations in biodiversity conservation planning, however information on the fauna of the region is not the focus of this report. Spot information on fauna within the LBS area is inconsistent and limited and therefore not included in the spatial model of the conservation significance of LNAs. There is a need to consider fauna habitat requirements in future studies, planning and decision-making.



**Figure 2 Local Biodiversity Strategy planning process.** As described in Local Government Biodiversity Planning Guidelines for Local Government (Del Marco et al, 2004).



**Figure 3 Areas of recommended action to implement a Local Biodiversity Strategy.**

## 2 Biodiversity Status

This section provides a snapshot of the status of terrestrial floral biodiversity in the study area and background information on the components of the conservation significance criteria.

### 2.1 GLOBAL CONTEXT

2010 was the International Year of Biodiversity, yet various reports paint a very grim picture the state of global biodiversity. Butchart et al (2010) published a report based on 31 indicators of progress toward targets set in 2002 to reduce the rate of global biodiversity loss through the Convention on Biological Diversity. Their conclusion was: *“Most indicators of the state of biodiversity showed declines, with no significant recent reductions in rate, whereas indicators of pressures on biodiversity showed increases. Despite some local successes and increasing responses (including extent and biodiversity coverage of protected areas, sustainable forest management, policy responses to invasive alien species, and biodiversity-related aid), the rate of biodiversity loss does not appear to be slowing”*.

Australia is one of only 17 countries described as being 'megadiverse' (Department of Sustainability, Environment, Water, Population and Communities, 2011). These countries have less than 10% of the earth's area, but support more than 70% of the biological diversity. So Butchart et al (2010) indicators highlight that conservation of Australia's biodiversity has global importance.

### 2.2 NATIONAL CONTEXT

Geraldton is located within in one of only 15 national biodiversity hotspots, and one of only 34 global biodiversity hotspots. Hotspots for biodiversity conservation are areas with many endemic species that are experiencing high levels of stress or future threats. The national hotspots were recognised by the Australian Government in 2003 to increase public awareness of the cost-effectiveness of strategic and timely action to conserve biodiversity (Department of Sustainability, Environment, Water, Population and Communities, 2011).

### 2.3 REGIONAL CONTEXT

The Geraldton flora represents the northern extent of a transition zone between two Botanical Provinces: the mesic South West and arid Eremaean (Hopper 1979; Gibson *et. al.* 2004). The Geraldton area falls with the South West Botanical Province, which has been recognised as a biodiversity hotspot primarily because of the highly endemic flora (Department of the Environment, Sport and Territories, 1994; Myers *et. al.*, 2000). Large areas of this botanical province have been extensively cleared to form the Western Australian Wheatbelt, with some areas as much as 90% converted to annual crops and pasture (Shepherd *et. al.*, 2002; Gibson *et. al.*, 2004). Initially the productive soils in the valleys were cleared but it has also extended to the sandy soils on upland areas.

The remaining remnant vegetation present in the Wheatbelt consists of variously sized fragments surrounded by agricultural farmland. Generally, the smaller and more dispersed the fragments, the less resilient the ecosystem. The median size of nature reserves managed DEC within the Wheatbelt is 116 ha, whereas other government reserves have a median size of less than 4ha (Gibson *et. al.*, 2004). In the Geraldton area, out of 638 patches of remnant vegetation mapped, 59% are less than 2 ha (Perth Biodiversity Project, 2011).

Within the South West Botanical Province the Geraldton area falls within the IBRA 6.1 (Department of the Environment, Water, Heritage and the Arts, 2010) subregion, Geraldton Sandplains otherwise known as the 'Geraldton Hills IBRA sub-region'. The sub-regional area totals 1,968,332 ha. Because of their position on the coast, the Geraldton Hills subregion experiences major climatic changes in relatively short distances between Mediterranean and Arid. This rapid environmental change over from a cooler, wetter Mediterranean (coastal ameliorated) to warmer drier Eremaean further inland, is unique to the Geraldton subregions with the result that the PCs are also unique to the region (Perth Biodiversity Project, 2011).

A total of 54% of the native vegetation within the Geraldton Hills subregion has been cleared (Government of Western Australia, 2010a; Perth Biodiversity Project, 2011), leaving the remaining vegetation (46%) highly fragmented, degraded and susceptible to dryland salinity. Only 18% of the subregional land is within the conservation reserve system; of this, 66.5% is contained in 1 Park and 1 Nature Reserve (Kalbarri National Park in the north-

western periphery and Wandana Nature Reserve in the north-eastern periphery; Government of Western Australia, 2010b). A further 28% (nearly 72,000ha) situated on the northern boundary of the Geraldton Hills subregion, historically formed parts of pastoral leases and are now being managed for conservation purposes.

This means approximately 98% of the conservation estate is now held in nine reserves of 1,500ha or larger (Government of Western Australia, 2010b). The remaining 36 reserves are generally small in size, on agriculturally unproductive land and form just over 1.6% of the conservation estate (Government of Western Australia, 2010b).

In summary, the Geraldton subregions are a unique transitional zone between southern ecosystems and the semi-arid ecosystems of northern and central Western Australia. Current climate and weather patterns in combination with diverse and complex soil distributions have allowed unique communities of plants and animals to develop in this region. These communities have the potential to extend or retract their distributions or mix and alter structures in response to the effects of acidification and climate change. However their resilience and capacity to regenerate is significantly constrained by clearing, fragmentation, degradation and other threats.

The remainder of this section of the LBS describes the vegetation in more detail.

## 2.4 VEGETATION COMMUNITIES IN THE STUDY AREA

The GRFVS Study (WAPC, 2010) described the vegetation communities in terms of a more established system of description known as 'Beard Vegetation Associations' (BVAs) and a more recent system of description known as 'Plant Communities' (PCs). Both systems are useful, but one or the other is more or less appropriate depending on the purpose of the description and analysis.

BVA mapping is a broad scale (1:250000) mapping dataset that allows for calculations of clearing against historical extent of vegetation. Being a WA-wide dataset, BVA places vegetation remaining in the LBS area in a wider context. The PCs are considered to represent vegetation types mapped and described at the sub-regional to local scale, between the level of BVAs and site-specific ecological assessments (WAPC, 2010).

Use of BVAs and PCs enables more accurate and effective assessment, comparison and management of different natural areas. Representative numbers e.g. PC1 or BVA413 will be used throughout the rest of the report. Appendix 4 provides an easy reference guide linking numbers for each PC or BVA to photos and species lists.

### 2.4.1 Beard Vegetation Associations

There are 9 BVAs within the study area. Historically most common vegetation types were both shrublands representative of BVA359 and BVA371. BVA440 occupied just over 30% of the study area and remains represented at a similar level now, with more than 50% of the original extent remaining. The rarest BVA in the study area was and is BVA387 represented in a 1.6ha patch. Other BVAs represented in the study area include BVA35, BVA129, BVA371, BVA 431 and BVA 675. The original extent, current extent, proportions of the study area and proportions of their extent across WA are provided for each BVA in Section 5.

The GRFVS recommended categorising BVAs into 3 categories to determine conservation priorities:

- **Regionally significant-endangered.** BVAs with less than 10% of their original extent remaining in Western Australia e.g. BVA 35 and BVA 371
- **Regionally significant-vulnerable.** BVAs with less than 30% of their original extent remaining in Western Australia e.g. BVA359 and BVA 675
- **Locally significant.** BVAs with more than 30% of their pre-European extent remaining in Western Australia e.g. BVA 129, BVA 387, BVA 413, BVA 431 and BVA 440.

The GRFVS acknowledged that except BVA 129 none of the representative BVAs are adequately represented in the State's conservation reserve system.

### 2.4.2 Plant Communities

The GRFVS PCs represent vegetation types mapped and described at the sub-regional to local scale, between the level of BVAs and site-specific ecological assessments (WAPC, 2010). 15 PCs were mapped with full descriptions of each PC in the Appendices of the GRFVS (WAPC, 2010).

Conservation significance of these PCs has been determined through the GRCR (Zelinova *et al.*,

2012) and is discussed further in Section 5.2 'regionally and Locally Significant Vegetation'.

## 2.5 NATIVE VEGETATION EXTENT AND PROTECTION

Analysis was undertaken to understand the extent and resilience of the vegetation, show the relative proportions of vegetation remaining and reserved, and to show differences for BVAs, PCs and each local government.

The LBS covers 32,410 ha, with 17 PCs represented in the remaining 6041 ha of native vegetation. This area represents 18.6% of the original extent, of which only 124.5 ha are managed for conservation by the DEC (Zelinova *et al*, 2012). An additional 449 ha are reserved for dune and landscape preservation in Local Town Planning Schemes (Zelinova *et al*, 2012).

In total these areas represent just less than 1.8% of the original extent of vegetation having some level of protection. Despite the high level of clearing, remaining vegetation shows high levels of diversity.

Across the study area, 9 BVAs were identified. Of these, BVA 371, BVA 387 and BVA 675 have less than 10% of their original extent remaining in the study area and BVA 35, BVA 359, and BVA 413 have less than 30% of their original extent remaining in the study area (Zelinova *et al*, 2012). In addition, BVA 35 and 371 are considered endangered, with 10% of the original extent remaining in Western Australia (approximately 9%, and, 5.7% respectively (WAPC, 2010).

Figure 4 and Figure 5 show less than 5% of the pre-European vegetation extent is protected within reserves in the two Local Government areas. There is little native vegetation remaining in the LBS area, and the target of at least 30% of original extent for various vegetation types (BVAs) can rarely be met. This means all remaining vegetation is 'Regionally Significant' (whether described by BVA or PC) with important implications for policy and management.

In addition to the existing clearing, the coastal areas of the CGG and the SCV have been placed under increasing pressure from urban and industrial expansion and development. The national and regional context described in Section 2.3 and the small percentage of vegetation remaining presents a compelling case for increased protection, retention and conservation to maintain the values of the unique biodiversity.

One way to protect, retain and conserve is through strategic planning that may accommodate growing demand for industrial and residential development in the coastal area with minimal loss to biodiversity. Strategic planning processes require more site-specific and detailed information than has previously been available to date. Hence the reasons for the GRFVS study of the remaining native vegetation to identify specific vegetation communities and place their value in a regional and national context.

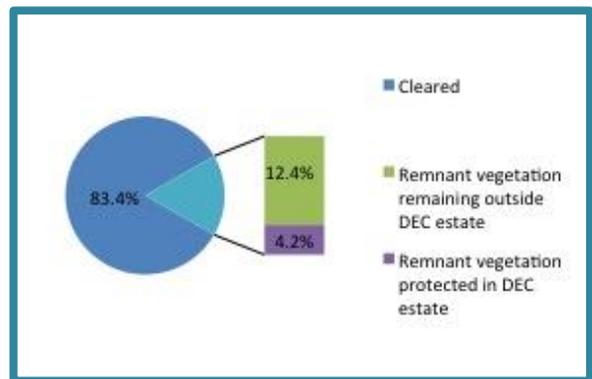


Figure 4 Remnant vegetation retention status within the City of Greater Geraldton (based on 2006 data).

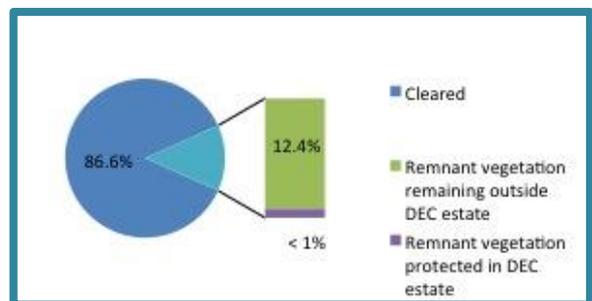


Figure 5 Remnant vegetation retention status within the Shire of Chapman Valley (based on 2006 data).

### 2.5.1 Protection levels of natural areas

For the LBS, adequate levels of protection are based on widely accepted thresholds relating to original, pre-European extent of vegetation remaining (30% and 10% - see Section 1.5). From a traditional conservation planning perspective, these threshold values are most meaningful on land tenure that can provide certainty for protection in perpetuity e.g. land owned and managed for conservation by DEC.

The GRFVS report (WAPC, 2010) shows that nearly all BVA's represented in the study area are not adequately protected in Western Australia. Only

BVA 129 could be potentially considered protected as 29.8% of its original extent in Western Australia is currently in DEC managed estate. There is 4.8% of the original extent of BVA 440 and 2.6% of BVA 387 within DEC estate across the State and all other BVAs within the study area have less than 1% protected, leaving them all under-protected at the State level.

Of the GRFVS PCs mapped in the study area, only PC 15 and PC17 have over 20% of known extent in DEC Estate (WAPC, 2010). Portions of some PCs are represented within land reserved for dune preservation, landscape protection in the current LPS covering the study area. Plant Communities PC4, PC5, PC9, PC10, PC11, PC12 and PC16 are not included in areas reserved for conservation or landscape protection in the study area or only inadequate portions are included. For further details on the protection levels for BVAs and PCs see Tables in the LBS Technical Reports.

### 2.5.2 Threatened Ecological Communities

The GRFVS report states that there are no DEC-listed or Commonwealth-listed (*Environment Protection and Biodiversity Conservation Act 1999*) threatened ecological communities in the GRFVS area. However, it does identify 'Plant assemblages of the Moresby Range system' as a Priority 1 ecological community. This Moresby Range systems is synonymous with BVA 675, which occurs within the GRFVS area (WAPC, 2010): 'Plant assemblages of the Moresby Range system' Priority ecological community includes the *Melaleuca megacephala* and *Hakea pycnoneura* thicket on stony slopes, *Verticordia* dominated low heath, and *Allocasuarina campestris* and *Melaleuca uncinata* thicket on superficial laterite, on Moresby Range.'

### 2.6 THREATENED FLORA SPECIES

In addition to the rarity or significance of entire communities comprised of many species of vegetation, individual taxa can also be highly significant and/or threatened. Identification of species as Threatened can afford them an additional level of protection through conservation legislation and planning processes.

Through the fieldwork for the GRFVS, 9 flora species of conservation significance, including 2 Declared Rare Flora (DRF) taxa, were identified. Subsequently, 1 (*Eucalyptus blaxellii*) of them has been re-classified as Priority 4. They are listed below, with their relative conservation status in brackets

- *Caladenia hoffmanii* (DRF),
- *Thryptomene stenophylla* (Priority 2),
- *Anthocercis intricata* (Priority 3),
- *Grevillea triloba* (Priority 3),
- *Hibbertia glomerosa* var. *bistrata* (Priority 3),
- *Leucopogon* sp. Moresby Range (Priority 3),
- *Thryptomene* sp. Moresby Range (Priority 3),
- *Diuris recurva* (Priority 4),
- *Eucalyptus blaxellii* (Priority 4).

3 species, *Hibbertia glomerosa* var. *bistrata*, *Linum marginale*, and *Drosera porrecta* were recorded at the extreme range of their known extent or were range extensions (PBP, 2012). A search of the WA Herbarium database shows 2 DRF were recorded in the study area *Caladenia hoffmanii* and *Eucalyptus cuprea*, as well as 20 Priority Flora as defined under the *Wildlife Conservation Act 1950*.

The results of DEC's NatureMap search identifying status of state-listed flora in the study area and the results of a Federal EPBC Act Protected Matters Search identifying status of federally-listed flora are documented in the LBS Technical Reports.

### 2.7 ECOLOGICAL LINKAGES

Ecological linkages are defined as a series of both contiguous and non-contiguous patches that, by virtue of their proximity to each other; act as stepping stones of habitat which facilitating the maintenance of ecological processes and the movement of organisms within, and across a landscape. Identification and management of ecological linkages should not be regarded in isolation of other biodiversity values, but rather in the context of other regional and local biodiversity conservation values. Regional and ecological linkages should be considered when comparing areas of the same priority level to inform planning and decision making (Geraldton Regional Conservation Report, 2012).

Ecological linkages are natural areas that:

- Connect larger natural areas by forming stepping stones,
- Allow movement over time of organisms between larger areas,
- Maintain some ecological functions of natural areas, and
- Counter the effects of habitat fragmentation (EPA, 2008; Del Marco, 2004).

Identification and management of ecological linkages should not be regarded in isolation of other biodiversity values, but rather in consideration of other regional and local biodiversity conservation values.

Past studies identified important wildlife corridors within the study area. One of them is the Chapman River Wildlife Corridor that includes 664 ha along 17km of the Chapman River, extending from the mouth of the Chapman River to east to Cutubury Nature Reserve. This corridor runs through the Chapman River Reserve, its significance considered at least as important as Bold Park in Perth (Desmond, A.J and Heriot, S.M, 2002).

Regional and local ecological linkages have been identified for the study area by the Perth Biodiversity Project (Guthrie, 2012) and are provided in the Ecological Linkages Report included in Appendix F. The ecological linkages were identified through GIS analysis using the following set of criteria:

- Facilitate connectivity between areas secured for conservation and other remnant vegetation of high conservation value by identifying natural areas connecting these to each other,
- Aim for the maximum distance between natural areas of between 100-500 metres,
- Include a wide range of habitats,
- Priority should be given to natural areas with vegetation in good or better condition.

Opportunities and constraints for vegetation retention in the study area were also considered. Priority was given to natural areas within parts of the landscape where native vegetation retention will be possible while accommodating future development needs.

Mapping of the resulting linkages is provided in Appendix C. The ecological linkages are represented as 500 m wide schematic lines, showing the general direction of the linkage and identifying natural areas that are already acting as stepping stones within the landscape. In many areas the distance between patches of vegetation is greater than 500 metres due to past clearing, or natural areas in poor condition might have been included as part of the linkage.

Any patch of native vegetation within the schematic linkage or touching a linkage can act as a stepping stone. Mapping in Appendix C also shows the results of a spatial analysis that considers distances between remnants of native vegetation and groups

of remnants to identify those that are well connected to each other and thus facilitate movement.

To improve the connectivity across those parts of the landscape, the distances between patches would need to be reduced. The identified regional and ecological linkages can be used:

- To identify priority areas for rehabilitation or restoration, especially along the numerous creeklines that cross the eastern side of the study area,
- As further reason for encouraging use of locally indigenous plants in streetscaping, private gardens and industrial areas to facilitate movement of fauna between protected areas,
- As another factor to be considered in planning and decision-making e.g. additional criteria that may distinguish between areas of the same conservation priority, and
- When identifying sites for restoration works to meet any future development mitigation offset requirements. **THREATENED AND SIGNIFICANT Fauna**

Although the GRFVS and LBS process did not include any specific on-ground research or analysis of existing flora, previous studies of the local area have identified conservation-significant fauna. These fauna depend on the plant communities as habitat, and so are additional considerations in any planning for retention, protection and conservation of local natural areas. While consideration of fauna issues have not directly formed part of this LBS, detailed studies of fauna assemblages should be incorporated into future planning.

The fauna of the Geraldton subregions show a similar tradition as the flora: from assemblages occurring in wetter cooler areas in the south to more arid adapted faunas in the north and east. In many cases, this region is at the limits of, or close to, their natural range of either southern or northern distributions. Many vertebrates with otherwise southern distributions are present along the coast into the Geraldton subregions due to the cooler wetter coastal ameliorated climate (Guthrie, 2011). And, because of their close associations with plants, many terrestrial invertebrates groups will most likely show similar transitional patterns of distribution as the Plant communities (Guthrie, 2011).

In general, limited data is available on fauna of the Midwest region of Western Australia. WA Museum Records show the vertebrate fauna previously

recorded in the Geraldton subregions is rich, with approximately 26 mammals, 113 reptiles and 17 frog species. The most comprehensive information has been collected through the Chapman River Wildlife Corridor project which recorded 10 species of native mammals, 39 species of reptile and 6 species of frogs within the 664 hectares of the study area (Desmond, A.J and Heriot, S.M, 2002).

More recent localised fauna surveys by Ecologia Environmental Consultants (Oakajee Port & Rail Pty Ltd, 2010) within the proposed Oakajee Industrial Estate recorded 10 native mammal species, 76 native birds, 35 reptile species and two amphibians. The survey results highlighted the importance of riparian vegetation in arid areas for the persistence of the Common Brushtail Possum (*Trichosurus vullpecula*) in this region. The most widespread species were Little Long-tailed Dunnart (*Sminthopsis dolichura*), Euro (*Marcopus robustus*) and Short-beaked Echidna (*Tachyglossus aculeatus*).

Of the native bird species recorded at the proposed Oakajee Industrial Estate, four are EPBC Act listed migratory bird species: White-bellied Sea-eagle (*Haliaeetus leucogaster*), Fork-tailed Swift (*Apus pacificus*), Rainbow Bee-eater (*Merops ornatus*) and Eastern Osprey (*Pandion cristatus*); and one DEC Priority 4 sub-species, the White-browed Babbler (*Pomatostomus superciliosus*) that was also recorded during fauna surveys conducted in the adjoining Buller locality (GHD, 2010).

Of the 35 reptile species recorded by Ecologia Environmental Consultants (Oakajee Port & Rail Pty Ltd, 2010), collection of an undescribed worm-lizard *Aprasia* sp, a potentially endemic species to the Geraldton Hills subregion and a collection of two forms of the skink *Lerista lineopunctulata* are locally significant findings. *Aprasia* sp. has also been recorded by GHD (2010) in the Buller location.

Other studies have recorded:

- 15 dragonfly and 11 caddis fly species as being at the northern limit of their distributions in the Geraldton region (Sutcliffe, 2003),
- Nine bat species, with one species appearing to be at its northern limits three at their southern limits and four with wide spread distributions (Guthrie, 2010).

## 2.8 OTHER IMPORTANT BIODIVERSITY FEATURES

While this LBS primarily uses native vegetation as a surrogate for identifying natural areas of conservation significance; protection of significant water features such as rivers, estuaries, and creeklines is critical to having an adequate network of natural areas supporting biodiversity.

There are several important rivers that flow through the study area from east to the coast. The northern section of the study area is within the catchment of Oakajee River and Buller River and their tributaries. Despite historical clearing in its catchment and lower reaches, the Chapman River retains its conservation value as a refuge for wildlife. In the southern section of the study area, Greenough River cuts through dunes before entering the ocean, forming a narrow inter-barrier estuary. Estuarine conditions are extending for about 7km upstream (Brearley, 2005). There are no other wetlands mapped in the study area.

Another prominent feature within the study area is a series of mobile dunes, including the large dunes south and north of Greenough River. Understanding of Southgate Dunes contribution to the coastal processes in this region has been limited in the past (EPA, 2009), however recent research suggests it contributes sediment to the beaches north of Southgate Dunes (Collins, L & Tecchiato, S. 2010).

### 3 Threats

To set meaningful, achievable goals and direct resources to where they will be most effective in achieving those goals, we must properly understand the future threats and current activities that contribute to degradation. This analysis of threats and activities with negative biodiversity impacts is based on community engagement and analysis of previous local, national and global studies.

In 2010 the *Global Biodiversity Outlook 3* (Secretariat of the Convention on Biological Diversity, 2010), analysed the reasons for failure to achieve the global biodiversity targets set in 2002, and suggested changes to strategy for the future. This analysis is just as relevant to understanding the threats in the Geraldton study area as it is globally: *"...the failure to meet the 2010 Biodiversity Target at the global level is that actions tended to focus on measures that mainly responded to changes in the state of biodiversity, such as protected areas and programmes targeted at particular species, or which focused on the direct pressures of biodiversity loss, such as pollution control measures. For the most part, the underlying causes of biodiversity have not been addressed in a meaningful manner; nor have actions been directed ensuring we continue to receive the benefits from ecosystem services over the long term. Moreover, actions have rarely matched the scale or the magnitude of the challenges they were attempting to address."*

In the Geraldton context, and heeding the advice of the *Global Biodiversity Outlook 3* authors, both the indirect and direct threats to achieving biodiversity conservation need to be considered.

Underlying, indirect causes of biodiversity loss include:

- Cultural values that see humans as separate from nature, nature as infinite in its capacity, or degradation of nature as being of little consequence,
- Increasing consumption of goods and services that directly degrade or pollute ecosystems,
- Population increase linked to increasing consumption, and more direct pressures,

- Individual lifestyle choices or cultural norms such as preferring large lots on the coast, preferring non-native gardens,
- Economic policies measures that neglect the cost of biodiversity loss, or dis-incentivise conservation,
- Planning policy or frameworks that place the burden of proof for impacts of development on the government or community, rather than developers,
- Planning policy that doesn't account for cumulative impacts of individual developments,
- Climate change manifesting as altered rainfall patterns, temperature increases and species migration,
- Disconnect or lags between: actual loss of biodiversity, community concerns about the loss, political action to address concerns, and on-ground action,

Direct causes of biodiversity loss include:

- Clearing for residential housing, industrial development, and agriculture,
- Direct degradation: off-road vehicle use, dumping rubbish, inappropriate clearing intended as a fire prevention,
- Noxious weeds and introduced pests that compete with native flora and fauna,
- Lack of formal protection, active management or regular enforcement to protect natural areas,
- There being too little vegetation, or it being too fragmented to be viable ecosystems,
- Lack of resources to respond to or support community demand for action.

While many of the indirect threats to biodiversity are outside the scope of this LBS, they are within the scope of influence of the local government and other stakeholders and strategies and actions can be identified to address them.

## 4 Goals

So far this document has addressed the need for a strategy and current status of biodiversity. The following section outlines the process and outcomes of developing measurable goals aligned with the community vision.

### 4.1 STAKEHOLDER ENGAGEMENT PROCESS

The LBS Goals were developed in consultation with the officers of the SCV and CGG, representatives from state agencies, and citizens who participated in surveys and workshops. The following is a summary of this engagement and consultation. The consultation was as per a Stakeholder Engagement Plan designed by CGG to identify, educate, and involve stakeholders in the biodiversity planning process through 3 phases.

- 1) Collating Survey Results. The LBS Steering Group (comprising staff and consultants) conducted a review of previous community consultation and surveys, (e.g. NACC Coastal Communities Study, 2029 and Beyond Deliberative Survey, existing management plans), and conducted a new survey of community values, issues and visions for biodiversity. 25 responses were received through the online and hard-copy forms, and these responses directly informed the content of the strategy, as well as guided the structure and focus of the subsequent workshops. One aim of the community consultation was to identify meaningful and practical actions that could be implemented as 'early wins'.
- 2) Information Session and Background Briefing. In May 2010, a LBS information session involved: introducing the timeline and process for strategy development, feeding back values, visions, and concerns identified from previous surveys, and identifying additional information required for meaningful stakeholder participation. Attendees were also involved in small-group conversations on the same topics as the survey: values, issues, solutions, and useful additional information. Subsequently a 'background briefing' document was created, summarising the results of engagement and research.
- 3) Setting goals and prioritising actions. In July 2010, more than 30 people attended a 'goal-setting' and 'action-planning' workshop in

Geraldton. Participants were presented with a background briefing and engaged in discussions about goals for biodiversity conservation. Steering group members facilitated small group conversations to develop goals for the strategy, and brainstorm actions to achieve those goals. The end result was a set of goals and list of prioritised actions.

### 4.2 COMMUNITY ENGAGEMENT OUTPUTS

The stakeholder engagement outputs included the following values, issues, goals and priorities.

Values: Previous surveys associated with the City of Greater Geraldton's '2029 and Beyond' project and other work indicated strong support for biodiversity conservation in the area. In response to the specific LBS survey questions about values, verbatim responses included:

- *Chapman River Regional Park, Greenough River, Oakajee and the Moresby Ranges,*
- *The wild flowers, wattles, Hakeas and Grevilleas,*
- *The echidna that came into our yard!,*
- *Linkages between remnants, green space in urban settings (natural not landscaped),*
- *Roadside areas, primary and secondary dunes, and corridors.*

Aspirations: Some of the aspirations for 10 years time included (in respondent's own words):

- *Large areas of native healthy bushland with a focus on protecting and preserving the bushland that is left from future development and investment in rehabilitation and tree planting activities',*
- *Improved linkages and corridors that are celebrated in urban areas e.g. Chapman River interpretive trail,*
- *Valuing local natural areas as important public spaces to be actively managed for biodiversity outcomes and enjoyed as such by residents,*
- *Education and facilities to encourage people to use and value these places as a chance to get back to nature,*
- *Protecting areas and valuing them for their ecosystem services, even if no-one is actively using them,*
- *Prioritising conservation of natural habitats and Indigenous sites, including for Aboriginal Cultural tourism,*

- *Retaining a greenbelt and limiting development within cleared area,*
- *That there are still 17 vegetation communities intact & healthy in the study area!*

**Threats:** Respondents were asked about both the threats to biodiversity, and some of the projects they thought were contributing positively. Positive projects have already been described in Section 1.4, and the threats included:

- *Box Thorn & other noxious weeds; Introduced pests (fox, feral cats & rabbits); 4WD / trailbikers,*
- *Clearing vegetation for urban development including coastal development - fragments already largely cleared areas contributes to loss of topsoil and erosion and reduction in land productivity, directly contributes to species loss via loss of habitat.*
- *Climate change - in the sense that small fragments of remnant vegetation do not have the resilience of large expanses to withstand the impacts of changes in temperature and rainfall leading to localised and regional reductions in species diversity. Stop land clearing!*
- *Off-road vehicle use, such as motorbikes & quadbikes and weeds. Other threats include erosion, vehicles spreading weeds and the access tracks created introduce more means for weeds & fragmentation of remnant vegetation.*
- *Unplanned development & development that does not adequately take into account the natural values of the area.*
- *Traditional community behaviour - farming practice, urban recreational practices (e.g. 4wd, quad bikes & destructive behaviour) and inflated expectation by landowners with ability to subdivide.*
- *I do not see any threats if developers are supported to achieve sustainable outcomes*
- *Land use and clearing, management of already set out reserves.*
- *Urban sprawl, pollution and climate change*

**Priorities:** The goal-setting and action-planning workshop generated actions, which were then prioritised and organised under goals. Overall goals were:

- Legal mechanisms to protect all existing remnant vegetation,
- Change culture and take responsibility for management and education in perpetuity,

- Set targets at maximum levels, not the minimum requirements to increase chance of success,
- Use trade-offs or offsets as a means to achieve net gains.

The following specific recommendations were made for inclusion in the strategy. These recommendations are reflected in the LBS Goals and Action Plan.

**Through education, increase the number of residents and LGA members who have knowledge of and value biodiversity.** *Suggested actions:*

- Collect and disseminate stories of success
- Target communities of interest
- Use popular media to share information

**Revegetate priority areas to reconnect highly fragmented sections along the regional and local ecological linkage.** *Suggested actions:*

- Ensure local provenance species are used as a priority
- Educate specific communities about the value and location of ecological linkages
- Promote existing programs

**Increase the existing level of protection and allow reserves to grow in size.** *Suggested actions:*

- Improve the management of reserves by having a presence and contact person, especially for reserves that are large, high-value and close to town,
- Increase and improve community awareness and involvement
- Get rid of threats e.g. weeds, feral animals, incompatible use by people

**Encourage biodiversity retention and linkages through sub-division design.** *Suggested actions:*

- All future POS areas in priority areas to contain 75% biodiversity
- Encourage linkages through subdivision design (e.g. POS, schools, road reserves)
- Use 50% of cash-in-lieu funds for biodiversity
- Recognise GRFVS through LPS.

**Use legal mechanisms to protect all remaining vegetation.** *Suggested actions:*

- Offer incentives for conservation covenants that are legally binding
- Management of current land needs to be guided by an adaptive management plan
- Investigate differential rating for protection, preservation and rehab of natural areas.

#### 4.3 GOALS

Goals for local biodiversity conservation were decided through careful consideration of the biodiversity assets, their regional and local significance within the context of opportunities, constraints and community aspirations. These goals contribute to the LGAs 'vision' as described in documents such as the *Towards Sustainability Policy Framework* (2010), and *Strategic Community Plan* (2011).

5 goals were identified, each focusing on retention, protection, management, engagement and regeneration. The logic supporting these goals is that:

- Protection and ongoing management is the highest order of conservation available,
- Opportunities still exist to protect natural areas on public and private land,
- Development can be directed towards already cleared areas, and retention of natural areas can be incorporated into designs of new land developments,
- Un-protected areas such as vegetation retained in parks, streets, schools, gardens or transport corridors are important for connecting protected areas,
- Maintenance of biodiversity conservation values is very dependent on active, adaptive management to reduce threatening processes,
- Climate change resilience requires retention of well-connected networks of natural areas representative of a full range of ecosystems (Commonwealth of Australia, 2009),
- LBS implementation is heavily dependent on the community and institutional support, which can increase through communication and education,
- Citizens that have are engaged and have learned about biodiversity values are more likely to act in ways that support biodiversity conservation.

The 5 Goals are:

#### **Goal 1: Retention - Retain natural areas**

Given current constraints to natural area retention, this goal translates into over 10% of the original extent of native vegetation in the study area, as a minimum:

- Retention of at least 3334<sup>1</sup> ha of the remaining 6041 ha of natural areas remaining,
- Retention of a representative and well-connected network of natural areas,
- Requirement to offset and re-vegetate as compensation where losses are unavoidable.

#### **Goal 2: Protection - Protect natural areas and specific biodiversity features**

This goal translates into:

- Protection of at least 5% of the original extent of natural areas,
- Protection of an additional 1058<sup>2</sup> ha of areas of conservation value,
- Protection of Threatened Ecological Communities, Declared Rare Flora, Priority flora and fauna, and riparian and coastal vegetation

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<sup>1</sup> 3334ha is equal to high conservation value areas (Priority 1A and 1B) in land use categories providing good and varied opportunities for retention provided for in the Local Planning Schemes (July 2011). See Figure 9.

<sup>2</sup> Calculated as 5% of study area = 1620.5ha – 124.5ha (DEC managed lands) – 438ha (lands reserved Dune and Landscape Protection in Local Planning Schemes = 1058ha needed to achieve 5% protection locally.

**Goal 3: Management - Manage protected natural areas for conservation**

This goal translates into:

- Active management of 100% of Local Government natural areas of conservation value,
- Active management of 50% of all other retained natural areas (1659 ha), through provision of incentives for private land conservation and restoration,
- Valuation of biodiversity assets and implementation of asset management plans.

**Goal 4: Engagement – Increased community contributions to biodiversity conservation**

This goal translates into:

- Observable change in public and institutional language, values and priorities,
- Measured decrease in behaviours identified as threats,
- Measured increase in the time, money or resources contributed to biodiversity conservation,
- Observable increase in the biodiversity 'proofing' of policies.
- Increase in evidence that the community are 'acting as stewards for the environment'.

**Goal 5: Regeneration - Ensure the rate of regeneration exceeds the rate of degradation**

This goal translates into:

- Restoration of more than 1500 ha of natural areas in CGG,
- Measurable improvement in connectivity between natural areas and along ecological linkages,
- Use of local offsets to over-compensate any future clearing of native vegetation.

## 5 Conservation Significance of Vegetation

### 5.1 LEGISLATIVE AND POLICY FRAMEWORK AND CONSERVATION SIGNIFICANCE CRITERIA

Provisions of existing laws and policies already support some of the LBS goals. The most relevant legislation is:

- Environmental Protection (Clearing of Native Vegetation) Regulations 2004, set out under the Environmental Protection Act 1986,
- Environmental Protection and Biodiversity Conservation Act 1999,
- Wildlife Conservation Act 1950.

Since 2004 it has been an offence to clear native vegetation under the *Environmental Protection Act 1986* unless it is for an exempt purpose. All other clearing of native vegetation requires a permit to be obtained from DEC.

Several flora and fauna species recorded within the study area or in close proximity are protected by the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*. Any development that can potentially impact on species and communities listed under this Act, requires referral to the Department of Sustainability, Environment, Water, Population and Communities to determine a level of assessment. Additional flora and fauna species known to be rare or under threat which occur in the Shire are given a level of protection under the State's *Wildlife Conservation Act 1950*.

Some level of guidance is provided on the significance of biodiversity values and the appropriate levels and methods of assessment through the following EPA policies and guidance statements:

- Environmental Protection Bulletin No 10 – Geraldton Regional Flora and Vegetation Study (2010)
- EPA Position Statement No 2 (EPA, 2000): Environmental protection of Native Vegetation in Western Australia, Clearing of native vegetation with particular reference to the agricultural area
- EPA Guidance Statement No 33: Guidance for the Assessment of Environmental factors –

Environmental Guidance for Planning and Development (2008)

- EPA Guidance Statement No. 51
- EPA Guidance Statement No. 56.

In particular, the EPA methodology for identifying regionally significant natural areas was applied using the following main criteria:

- Representation of ecological communities,
- Rarity,
- Diversity,
- Maintaining ecological processes or natural systems,
- Protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation.

Further considerations included:

- PBP's Local Government Biodiversity Planning Guidelines (Del Marco *et al* 2004) regarding Local Significance criteria. The guidelines describe the principle that at least 30% of the pre-European extent of each ecological community is needed to maintain species diversity and where only 10% or less of pre European extent remains, a vegetation community is considered endangered. These thresholds are applied not only at regional scale, such as Western Australia or a biogeographic region, but also at local scale.
- International Union for the Conservation of Nature (1991) Guidelines: The target for protection of at least 10% or 400ha, whichever was the larger, of each vegetation complex in at least 5 separate areas is recommended.

### 5.2 REGIONALLY AND LOCALLY SIGNIFICANT VEGETATION

The GRFVS Report (WAPC, 2010) describes conservation significance of vegetation in the study area at two levels – BVAs at the 10% and 30% thresholds at WA and study area levels and PCs in terms of EPA conservation significance criteria.

The Geraldton Regional Conservation Report (Zelinova *et al.*, 2012) extended the evaluation of conservation significance of native vegetation in the study area by including additional considerations such as proportionate distribution of BVAs at regional and local level, conservation values of PCs, presence of DRF and other conservation significant flora, presence of coastal, riparian or estuarine vegetation as well as known opportunities and

constraints to native vegetation retention, represented by either BVAs or as PCs. The opportunities and constraints analysis informed the prioritisation of BVAs in the study area (Table 1) and resulted in identification of 'Plant Communities with Constrained Opportunities for Protection' as their current known extent is limited to areas where zoning provisions do not support native vegetation retention.

Although fauna and fauna habitat are important considerations when assessing conservation significance of natural areas, fauna records available for the study area were not consistent and therefore were not included in the analysis. Any future land use planning decisions that would result in loss of fauna habitat should incorporate results of detailed fauna studies.

Conservation Significance Categories inform the LBS by providing a means of identifying regionally and locally significant vegetation. Prior to application of significance criteria, regional context for the native vegetation by BVAs was established. The following section describes the prioritisation criteria for BVAs and PCs and how the overall prioritisation of natural areas for conservation priority was determined.

### 5.2.1 Regionally Significant Vegetation Types

BVAs provide regional context for the remnant native vegetation in the study area. Representativeness within the study area and across WA based on pre-European and current extent, proportionate distribution and protection levels was assessed and the results are summarised in Table 1. The last column in Table 1 shows the portions of current extent of each BVA within areas planned to facilitate development with no or limited provisions for native vegetation retention (more information on how this was determined is provided in Section 8).

The information in Table 1 was considered when listing the representative BVAs in order of conservation priority for the study area. For example, BVA 440, BVA 129 and BVA 431 are all retained at more than 30% in Western Australia and in the study area. BVA 440 and BVA 129 are at risk of being reduced to less than 30% of their pre-European extent as significant portions of their current extent are within land use planning categories that do not provide for native vegetation retention and protection. Therefore BVA 440 and BVA 129 are a higher priority for conservation in the study area than BVA 431. BVAs in the GRFVS area

have been assigned a Conservation Significance category from 1A, 1B, 1C through 2A and 2B to 3. The prioritisation of BVAs presented in Table 1 will support decision-making to retain and protect a representative range of vegetation types within the area.

PCs identified through the GRFVS can be divided into several main categories in accordance to whether they meet EPA criteria of regional significance for conservation as defined in the EPA Guidance Statement No 33 (2008). Table 2 summarises the information published in the GRFVS (WAPC, 2010) that was then used to determine the conservation significance categories for PCs. Further detail on PC conservation significance is provided in the LBS Technical Reports. Spatial distribution of PCs by conservation significance categories is presented in Appendix A.

This analysis of PCs also identifies 'Plant Communities with Constrained Opportunities for Protection', highlighting those that have more than 85% of their known extent within the Greater Geraldton Structure Plan Update 2010 land use categories that do not provide for vegetation retention and protection and/or zero (0%) or less than 5% within zones or reserves that provide good opportunities for vegetation retention and protection. PCs that meet this criterion and so have Constrained Opportunities for Protection are PC4, PC5, PC9, PC11 and PC12.

Currently, it is not possible to determine the regional representation of the mapped PCs in the absence of information outside of the study area. Results of flora and vegetation surveys currently being undertaken south and north of the study area will provide further information and guidance.

### 5.2.2 Locally Significant Vegetation Types

All natural areas representative of BVAs or PCs that do not meet the 1A and 1B conservation significance criteria can be classed as 'Locally Significant'. Within this group several are of higher priority for conservation due to various reasons. For example, the relative rarity or presence of flora of conservation significance and comparatively higher number of flora species within some Plant communities that increases their importance for conservation e.g. PC7, PC12, PC13, PC14, PC15, PC16 and PC17.

PC 10 is classed as 'other locally significant plant community' as it is most common and does not meet any of the other criteria mentioned above. In addition, the GRFVS report does not identify PC 10 as either a priority plant community for conservation or priority for further investigation to confirm its conservation status.

### **5.3 CONSERVATION SIGNIFICANCE CATEGORIES**

Final prioritisation of natural areas for conservation combines the prioritisation of vegetation types by BVAs and PCs and considers additional information on the presence of other records such as Threatened and Priority Ecological Communities (TECs and PECs) and Declared Rare (DRF) and Priority flora. Table 3 lists the conservation significance criteria and categories. It also shows which natural area attributes correspond with each criterion.

Where a patch of remnant vegetation meets several criteria, the final conservation significance category assigned to that patch corresponds to the highest conservation value. For example, if a patch of remnant vegetation BVA 129, locally significant vegetation type, but is also representative of PC 3, the conservation significance category for such a patch will be 1A, because that patch is representative of estuarine ecosystems.

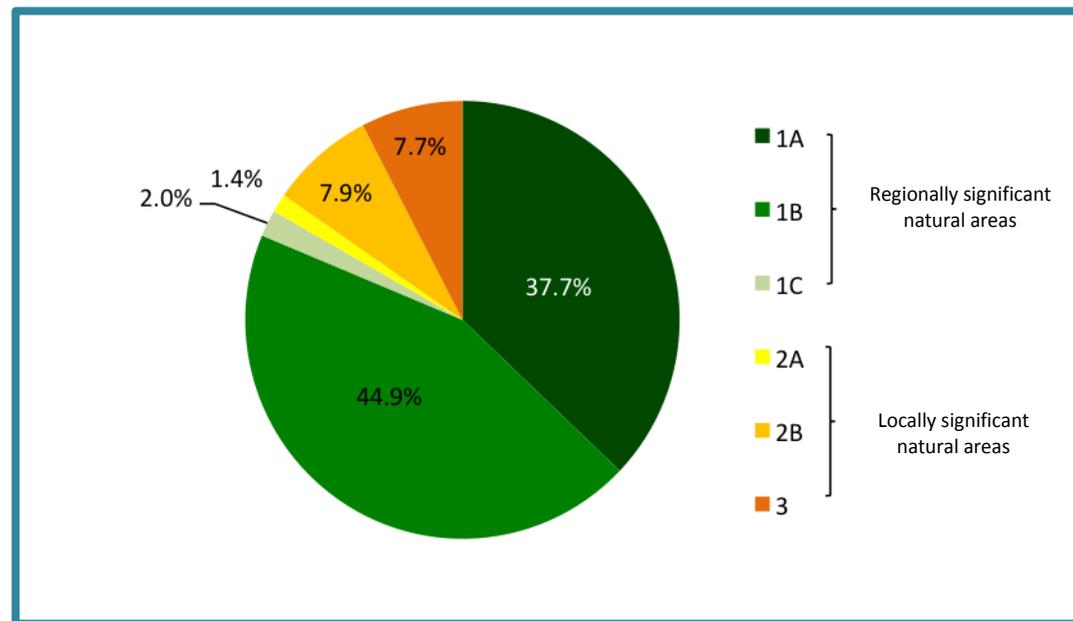
Figure 6 shows that most of natural areas in the study area meet the regional significance criteria (1A-1C), representing 83% of the current native vegetation extent. Figure 7 shows the spatial distribution of conservation significance categories.

**Table 1 Prioritisation of Beard vegetation associations in the study area.** Table 1 was compiled using information published in the GRFVS report (WAPC, 2010) and calculations by the Perth Biodiversity Project (Zelinova *et al*, 2012).

BVAs	% of WA original extent remaining	% of Geraldton extent remaining	Original % of WA extent in Geraldton Hills IBRA	Current % of WA extent in Geraldton Hills IBRA	% of Geraldton area original extent in DEC estate	% of current extent in highly constrained LPS land use categories	Conservation Significance	Explanatory notes
371	<10%	<10%	85%	9.8%	1.57%	17.5%	1A	Not readily recognisable in the study area. Over-cleared regionally, locally. Previously common (29%), now only 5.7%.
35	<10%	<30%	99%	17%	0	4.6%	1A	Limited opportunities to protect BVA 35 outside Geraldton. Retention in WA less than 10%. All natural areas representative of BVA 35 to be retained.
359	<30%	<30%	100%	27%	(1.41ha)	35.1%	1B	<b>Used to occupy nearly half of the study area. While it represents half of the remaining vegetation in the study area more than 60% of the current extent is marked for development. As a result, it might not be possible to retain even 10% of its pre-European extent in the study area.</b>
675	<30%	>30%	99%	25%	14%	3.2%	1B	Equivalent to P1 priority ecological community (PEC) 'Plant assemblages of the Moresby Range system'.
413	>30%	<30%	50%	21%	0	5.2%	1C	Over-cleared locally and regionally. Conserving 30% regionally would require 509 ha in Geraldton, but only 316 ha remains. No other occurrences of BVA 413 in adjoining IBRA regions.
387	~90%	<30%	55%	84%	0	0%	2A	No areas protected locally. Was always rare in Geraldton. Opportunities for protection exist outside study area, but local conservation important for regional targets.
440	>30%	>30%	89%	70%	0	63.6%	2B	Risk of reduction to less than 30% of original extent in Geraldton. Over 70% of current extent within LPS zones with limited opportunities for retention: current extent of 53.6% of the original could be reduced to 19%. Therefore, natural areas representative of BVA 440 are a high priority for conservation.
129	>30%	>30%	4.8%	42%	0	27.9%	3	Risk of reduction to less than 30% of local original extent if all areas are developed within "highly constrained" LPS zones. Current portion of 40% of local original extent could be reduced to 29%.
431	>30%	>30%	98%	82%	0	14.5%	3	Locally, occupies 3 times larger proportion of the area than originally, when it covered 1.71% of the study area and now the proportion of area covered by BVA 431 is 6%. Given clearing in the study area, retention of BVA 431 locally is significant for maintaining native vegetation cover above minimum 10% of original extent.

**Table 2 Plant Communities meeting the Conservation Significance criteria.** More detailed analyses of Plant Communities are provided in the LBS Technical Reports.

PC's meeting the criteria	Descriptions	Category
PC15, PC16, PC17	PCs floristically related to regionally significant BVAs	1A & 1B
PC4, PC5, PC9, PC11, PC14	PCs potentially restricted to the Study area	
PC15	PCs associated with listed ecological communities	
PC15, PC16	PCs with high diversity of flora species, including protected flora	
PC3, PC4, PC5, PC6, PC8, PC9	Coastal vegetation	
PC1	Estuarine vegetation	
PC2	Riparian vegetation	
PC7, PC14, PC16, PC17	PCs with <400ha remaining or within 10% of the 400 ha threshold	2A
PC11, PC12, PC13	PCs floristically related to locally significant BVAs	3
PC12, PC13, PC14	PCs with high diversity of flora species	
PC10	All other not meeting any of above significance criteria	



**Figure 6 Remnant native vegetation distribution by Conservation Significance categories.** Shown as a percentage of current vegetation in the study area. 83% of the natural areas meeting the criteria for being 'regionally significant'. For the description of the categories see Table 3.

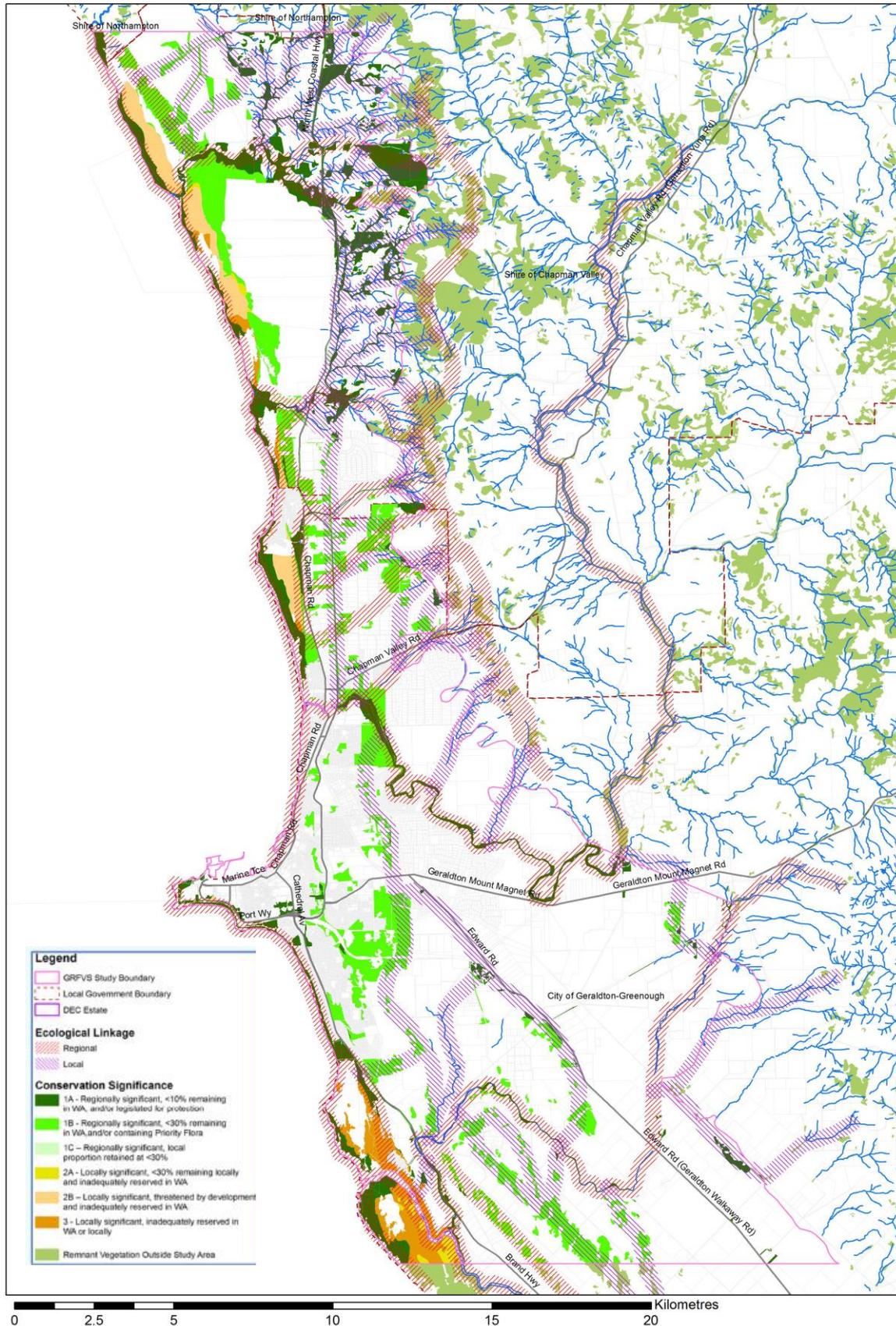


Figure 7 Remnant vegetation categorised by conservation significance and ecological linkages.

**Table 3 Conservation Significance Criteria for the Geraldton.** This shows reasoning for assigning significance categories, combining the criteria used for PCs, BVAs and additional information.

Cons. Sig.	Description of reason for significance	Vegetation descriptors	Additional information
<b>Regionally significant natural areas</b>			
1A	Vegetation within BVAs with <10% of Pre European extent remaining in WA	BVA 35 & BVA 371 and PCs floristically associated with BVA 35 (PC16 & PC17)	Highly restricted vegetation associations, priority for inclusion into the NAR system by both the Federal and State Government. BVA 371 is the highest priority for conservation in the study area as it used to be a common and now its extent only represents 5.7% of the total area (from 29%)
1A	GRFVS PCs potentially restricted to study area	PC4,PC5, PC9, PC11, PC14	Descriptions of these PCs include characteristics not identified in similar studies outside the study area. Additional detailed surveys are required to confirm this status.
1A	Contains (records) of DRF	DEC database	In patches > 20 ha, a 50 m buffer is applied to a spot location, otherwise the whole patch is selected.
1A	Contains Threatened and Protected Ecological Communities (TEC, PEC)	PC15	Priority 1 EC recorded
1A	Natural areas with high diversity of flora species	PC15, PC16	Include records of several listed flora and recorded the highest species diversity in the study area
1A	Coastal vegetation on foredunes and secondary dunes	PC 3, PC4, PC5, PC6, PC 8, PC9	
1A	Estuarine fringing vegetation	PC1	
1A	Floodplain area	Mapped for Chapman River, otherwise Soil Landscape Units are used to identify	Floodplains are generally no-development zones due to risk of damage to infrastructure. Any native vegetation occurring on or buffering floodplains is important for soil stability and the health of the river system. Regularly inundated floodplains can also support a wide range of fauna.
1A	Riparian vegetation	PC2	
1A	Significant wetland	No significant wetlands have been mapped in study area	
1B	Vegetation within BVAs with <30% Pre European Extent remaining in WA	BVA 675 and BVA 359 and PCs associated with BVAs (PC13 & PC15)	The portion of BVA 359 within the GRFVS area declined from its original extent
1B	Contains (records) of Priority or other significant flora	DEC database	In patches >20 ha, a 50 m buffer is applied to a spot location, otherwise the whole patch is selected.
1C	Vegetation within Beard Vegetation Association with >30% Pre-European extend remaining in WA but with local proportion of the original extent declining below the 30% threshold	BVA 413 and PCs floristically associated with BVA 413 (PC15)	To conserve BVA 413 regionally, > 509 ha should be retained and protected within GRFVS area. 509ha would represent 30% of the original extent. However, only 316 ha remain locally, which means that the GRFVS portion declined from 41.86% to 19%. No other occurrences of BVA 413 are in adjoining IBRA sub-regions so it's assumed that they would be different in floristic composition on finer scale.
<b>Locally significant natural areas</b>			
2A	Vegetation within BVAs with >30% Pre European Extent remaining in WA but <30% remaining in GRFVS Area and inadequately reserved in WA	BVA 387 and PCs floristically associated with BVA 387 (PC11 and PC12)	
2A	PCs with <400ha remaining or PCs within 10% of the 400ha threshold	PC7,PC14, PC16, PC17	
2A	Natural areas with high diversity of flora species	PC12, PC13, PC14	Recorded high species diversity in the study area
2B	BVAs with >30% Pre European Extent remaining in WA and >30% remaining in GRFVS Area but threatened by future development and inadequately reserved in WA	BVA 440	Over 70% of extent within zoning with limited opportunities for vegetation retention and protection
3	BVAs with >30% Pre European Extent in WA and >30% in GRFVS Area but inadequately reserved in WA or locally	BVA 431 BVA 129	

## 6 Planning Framework

Planning approaches and legislation are increasingly integrating environmental and natural resource management objectives, as described in the *Directions Paper on the Integration of NRM into Land Use Planning* (WAPC, 2011). While LBS prepared by Local Governments are not being formally endorsed by any State Government agency, local biodiversity conservation objectives can be endorsed through their integration into the local planning framework. For example, relevant components of the LBS can be incorporated into a local planning strategy to be endorsed by the WAPC. In addition, if effective biodiversity conservation outcomes are to be achieved, appropriate provisions need to be incorporated into local planning schemes (WAPC, 2011). Therefore analysis of the local planning framework forms an essential part of the local biodiversity conservation planning.

The Western Australian planning system is hierarchical, which generally requires consideration of issues at decreasing scales before planning decisions are made. At each level there is a combination of statutory, policy and strategic documents used to aid decision-making. There is significant interplay between the different levels of planning both in the statutory and non-statutory documents. While biodiversity conservation needs to be considered at every level of decision-making in land use planning, opportunities to provide for biodiversity protection vary amongst the levels. 8 shows the different levels of opportunity for integrating biodiversity conservation objectives into land use planning.

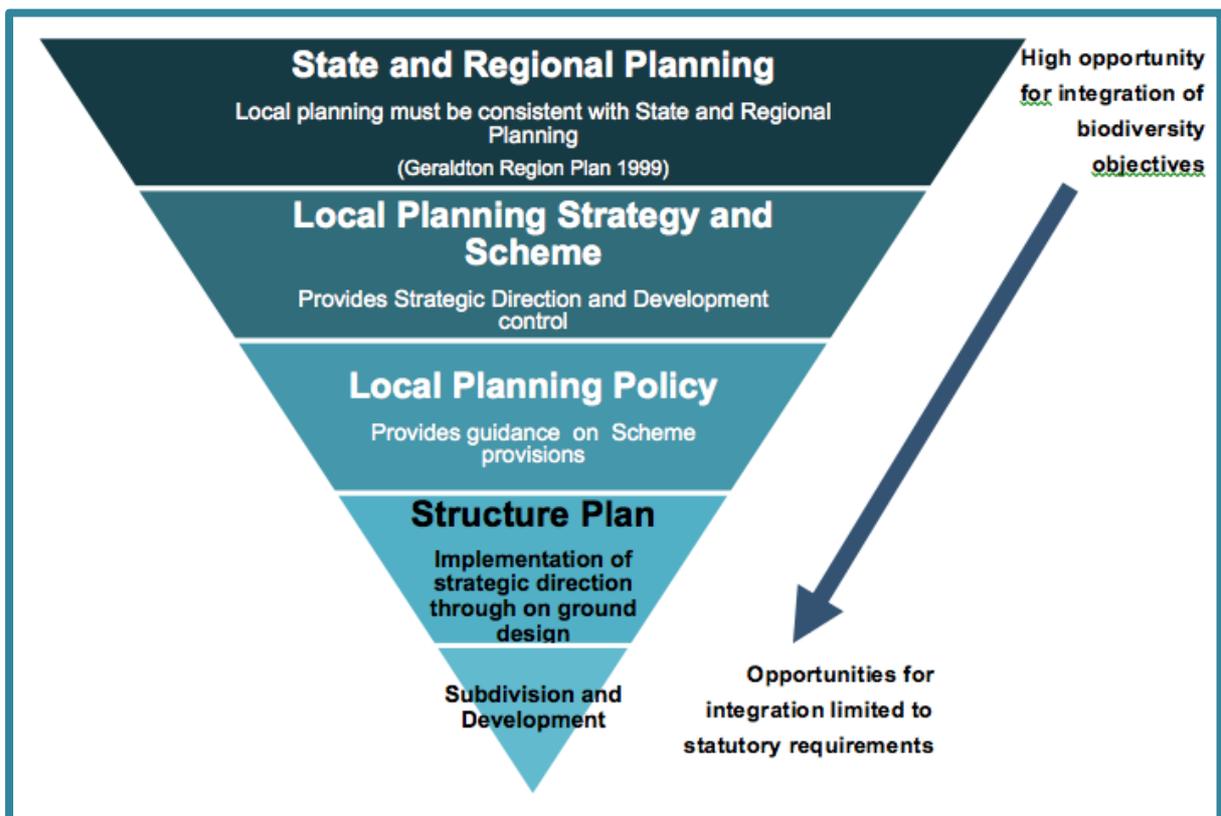


Figure 8 Hierarchy of opportunity for addressing biodiversity conservation objectives. Described at different stages of land use planning in Western Australia (WAPC, 2011).

## 6.1 REGIONAL AND LOCAL STRATEGIES

A number of high-level strategies have been prepared for the study area that provided the basis for identification of biodiversity conservation mechanisms relevant to achieving on ground outcomes in the study area. These include:

### Greater Geraldton Structure Plan 2011

The plan seeks to provide a framework for the future coordination of regional planning and forms a principal part of the Geraldton Region Plan 1999. The purpose of the Region Plan is to identify planning objectives and actions necessary to achieve those objectives. The Greater Geraldton Structure Plan 2011 has been prepared as an interim measure until new local planning strategies and /or district structure plans are prepared by Local Governments.

The Region Plan recommends inclusion of ecologically significant areas in the conservation estate, protection of areas of agricultural significance and the establishment of landscape committees to protect areas of landscape value. The Greater Geraldton Structure Plan 2011 introduces a new 'regional parks, recreation and conservation' land use category and includes 'foreshore and river systems' category for areas currently protected under the local planning schemes, providing better opportunities for protection of natural areas. The 2011 Structure Plan also acknowledges the EPA's Environmental Protection bulletin No 10 outlining EPA's expectation on regional flora and vegetation information to be considered in future land use planning.

### Shire of Chapman Valley Local Planning Strategy (2008)

The SCV Local Planning Strategy serves to address the future planning needs and direction for the whole of the Shire over the next 10 – 15 years. It considers a number of planning matters including biodiversity, flora and fauna and opportunities to preserve natural features.

### City of Greater Geraldton Local Planning Strategy (Greenough)

The CGG Local Planning Strategy purpose is to identify the likely land uses that will be established in the former Shire area (Greenough) in the next 15 years, and to indicate the preferred location for

these land uses. The Strategy includes the Greenough and Chapman River foreshores into areas with significant environmental value. The promotion of foreshore reserves, foreshore management plans, and re-vegetation along these rivers will provide a basis for linking other environmentally significant areas to these rivers. The strategy states that foreshore reserves, foreshore management plans and/or re-vegetation along these rivers are required as conditions of subdivision to create lots for more intensive use and, where possible, efforts should be made to provide links between these river corridors and other environmentally significant areas (e.g. Moresby Range).

### City of Greater Geraldton Local Rural Strategy

The Local Rural Strategy articulates a more detailed planning strategy for the rural areas of the CGG. It includes objectives to retain native vegetation, create vegetation corridors as well as specific management directives for vegetation management.

## 6.2 LOCAL PLANNING SCHEMES

The Local Planning Schemes (LPS) for CGG and SCV set out the legal framework for managing development and assessing development proposals.

The City of Greater Geraldton has 5 Local Planning Schemes in operation:

- Town Planning Scheme No. 1A (Cape Burney)
- Town Planning Scheme No. 3 (Geraldton)
- Local Planning Scheme No. 5 (Greenough)
- Town Planning Scheme No. 1 (Mullewa Townsite)
- Local Interim Development Order No. 11 (Mullewa)

The Shire of Chapman Valley's current LPS (No.1) is currently in force and will be replaced by LPS No.2, once finalised.

Local Planning Schemes zone and reserve land for a primary purpose (e.g. residential, rural, parks and recreation) and establish requirements for structure plans to be prepared before land can be subdivided for its planned purpose. The scheme provisions have a large bearing on opportunities to protect natural areas. Table 4 shows the classification of LPS zones and reserves in the study area by opportunities for protection and retention

of native vegetation based on assumptions on what is possible under that zoning or purpose of reserved land. They serve as the basis for analysis of opportunities and constraints and target setting for this strategy.

Appendices D and E provide specific guidance as to how LPS and specific planning policies can align with and contribute to biodiversity conservation Goals. Further analyses in the LBS Technical Reports show distribution of native vegetation by BVAs, PCs and land use categories of the current LPSs covering and by land use categories of the Greater Geraldton Structure Plan Update 2010.

**Table 4 Opportunities and constraints to natural area retention provided by the Local Planning Schemes and the Draft Greater Geraldton Structure Plan Update 2010 zone and reserve's provisions.**

Opportunity/Constraint level	Local Planning Scheme zones and reserves	GGSP Update 2010 Zones & Reserves
Land use planning categories with highly <b>CONSTRAINED</b> opportunities for natural area <b>RETENTION</b>	4 : Commercial	Central Geraldton
	1 : Central Geraldton	
	7 : Development	Future Urban
	8 : District Distributor Road	
	19 : Industry - General	Industrial
	20 : Industry - Light	
	38 : Industry - Port	Port Industry and Installation
	25 : Local Centre	
	44 : Railway	
	39 : Primary Distributor Road	Primary Distributor Road
	50 : Road	Railway Reserve
	68 : West End	West End
	3 : Civic and cultural	
	15 : Important Regional Road	Regional Distributor Road
	47 : Residential	Public Utility
	48 : Residential Development	Urban
49 : Resort Development/Tourist		
17 : Industrial Investigation	Future industrial	
Land use planning categories with varying degrees of opportunities for <b>RETENTION</b> and <b>PROTECTION</b> of natural areas	62 : Special Rural	Rural
	64 & 42 : Special & Public Use	Community Purpose
	54 : Rural Smallholdings	
	6 : Community & Public Purposes	
	52 : Rural Residential	Rural Living
	37 : Parks & Recreation	
Land use planning categories with <b>GOOD</b> opportunities to achieve <b>PROTECTION</b> and <b>RETENTION</b> of natural areas	67 & 36 Waterway/Ocean	Regional Park, recreation & conservation
	23 : Landscape and Coastal Protection	
	9 : Dune Preservation	Foreshore protection
	11 & 51 : General Farming/Rural	Future Rural Living

## 7 Identifying Priority Areas of Conservation Value

'Areas of Conservation Value' (ACVs) have been identified across the study area to spatially highlight areas where consideration of native vegetation retention and protection should be a high priority in decision-making. Identification of these areas is designed assist with implementation of biodiversity conservation objectives and LBS Goals adopted through the LBS by showing where the highest value biodiversity can be most effectively conserved while working with limited resources. All vegetation in the area is of conservation value, the ACVs are the priorities for action as part of this strategy.

Following the identification of Conservation Significance of BVAs and PCs, ACVs were identified following three steps:

1. Adoption of a conservation objective that provides for a representative, adequate and comprehensive network of local natural areas covering the study area's biodiversity. See Section 8.1.
2. Assessment of opportunities and potential constraints to native vegetation retention/protection through current provisions of LPS land use categories and reserves. See Section 8.2.
3. Identification of natural areas that need to be considered as a priority for biodiversity conservation if the LBS goals to be achieved. ACVs represent those areas. See Section 8.3

The following sections describe the three steps towards identification of ACVs in more detail.

### 7.1 REQUIREMENTS TO ACHIEVE A REPRESENTATIVE, ADEQUATE AND COMPREHENSIVE NETWORK OF LOCAL NATURAL AREAS

Three objectives have guided the analysis of the opportunities for protection and retention towards achieving the LBS Goals. These objectives are to create a network of Local Natural Areas that are:

- Representative of the local biotic diversity, retaining the diversity of the ecosystems they represent,
- Adequate, retaining viable natural areas that maintain the integrity of species and communities represented within them,

- Comprehensive, ensuring the full range of ecosystems recognised within the study area are retained and protected where possible.

Analysis shows that only 18.6% of the original extent of native vegetation remains in the study area. This means achieving a representative network of the original, pre-European ecosystems might not be possible. However, it is still possible to secure the known range of ecosystems represented by various BVAs and PCs and ensure that the retained and protected areas are viable. Action to protect these representative areas is critical to prevent further loss of native vegetation to below the 10% of threshold.

To meet these objectives and the LBS Goals, the network of retained and protected natural areas needs to:

- Include areas representative of each BVA and PC found in the study area,
- Include adequate areas to ensure the future extent for none of the BVAs is allowed to fall below the 10% threshold or the 30% threshold where feasible,
- Retain and protect where possible all known locations of DRF, significant flora, threatened fauna and priority ecological communities,
- Retain and protect where possible coastal, estuarine and riparian vegetation
- Protected natural areas are retained in viable patches interconnected with other natural areas.

The following analysis of how to achieve the goals does not intend to account for all of social, economic, legislative and environmental considerations inherent to any planning and implementation process. However this analysis does provide a sound basis for quantifying LBS Goals and specifying actions and locations critical to achieving those Goals.

### 7.2 OPPORTUNITIES AND CONSTRAINTS FOR NATIVE VEGETATION RETENTION

An assessment of opportunities and constraints to natural area retention (based on provisions of the current planning framework) has been completed to test the feasibility of LBS Goals. This assessment also identifies threatened biodiversity conservation features that are a priority for conservation. The process of identifying opportunities and constraints is as follows:

### 1. Identify zonings:

Local Planning Scheme land use categories from both the City of Greater Geraldton (TPS No 1A, TPS No 3 and LPS No 5) and the Shire of Chapman Valley (TPS No 1) were examined to identify opportunities and constraints to native vegetation retention through zoning and reserves. The same process was applied to the land use categories in the draft Greater Geraldton Structure Plan 2010 update.

### 2. Categorise LPS land use categories and reserves according to opportunities and constraints to native vegetation retention and protection:

Three levels of opportunity / constraint for conservation have been derived based on provisions of current LPS zoning, as outlined in Table 4. 'Constrained' describes areas where there is a reasonable expectation that development will proceed. For example, urban or residential, urban deferred or industrial zoned land, or land with existing development approval. While opportunities still might exist, they can be limited to small areas, for example through Public Open Space allocation.

Areas with 'Good' opportunities are those areas where zoning of the land contains objectives for protection, retention or scope for integrating areas of vegetation with future development.

Using these criteria, areas in the study area were classified as providing:

- 'Constrained' opportunities,
- 'Variable' opportunities, or
- 'Good' opportunities

to achieve protection and retention of natural areas.

Mapping in Appendix C shows remnant vegetation extent by LPS land use categories and reserves and their categorisation according to opportunities and constraints for natural area retention.

### 3. Correlate remnant vegetation with identified zonings and quantify opportunities and constraints by land area and vegetation type.

The results of the analysis using LPS land use categories and reserves show the potential conservation outcomes for the study area. Table 5 shows the results of the analysis for natural areas summarised from the GRCR.

More than 11%<sup>3</sup> of natural areas within Geraldton area have some opportunity to achieve protection or retention of native vegetation. Figure 9 illustrates how that more than 86%<sup>4</sup> of this 11% portion is of highest conservation value. The conclusion to be drawn is that maximising those opportunities could make a significant contribution to achieving LBS Goals.

### 4. Specifically identify Plant Communities at risk of local extinction.

Analysis shows that some PCs might become extinct within the study area if major development proposals were to go ahead without any consideration given to biodiversity conservation issues i.e. Oakajee Industrial Development, future residential development at Buller, Sunset Beach or Cape Burney.

Statistical analysis of a potential impact of the proposed Greater Geraldton Structure Plan Update 2010 shows that future land use changes might even further reduce the retention levels of native vegetation in the study area (see LBS Technical Reports for more detail).

The PCs most at threat are those considered as being highly geographically restricted and therefore a single proposal could potentially clear the entire PC. PCs most affected are PC4 and PC5 (100%) and PC9 (~90%). More than one third of PC8, PC10, PC11 and PC12 are within 'Constrained' zoning under the current LPS provisions and proposed future residential or industrial development (Greater Geraldton Structure Plan, 2011).

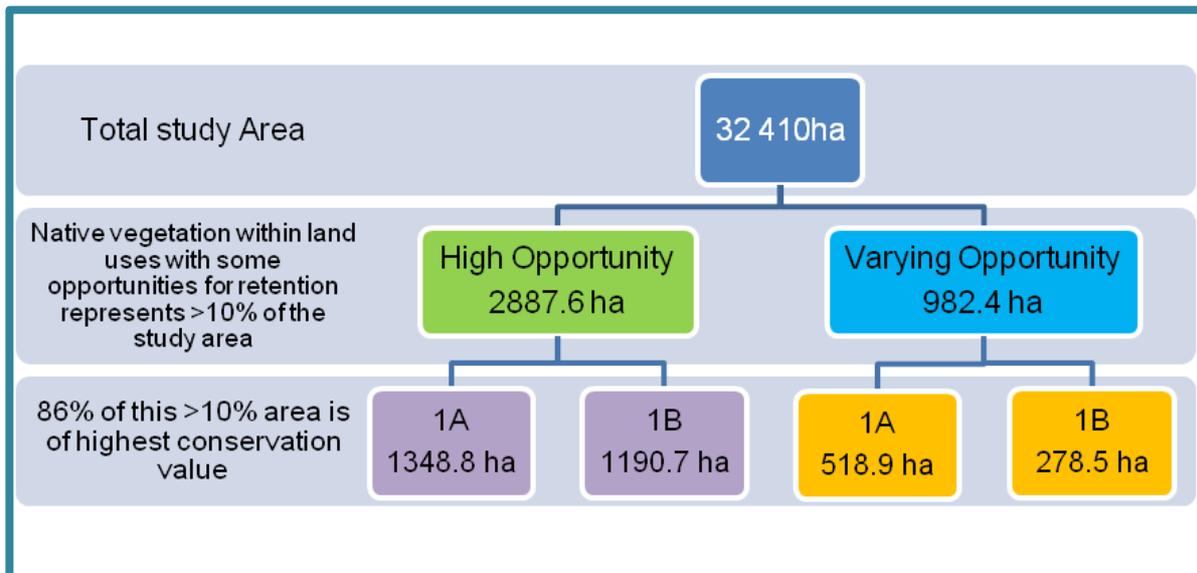
<sup>3</sup> Calculation based on: (High Opportunity = 2887.6Ha) + (Variable Opportunity = 982.4Ha) / (Total = 32410 Ha) = 11.9%

<sup>4</sup> Calculation based on: ((High Conservation Value = 11348.8Ha+1190.7Ha+518.9Ha+278.5Ha) / (Total Opportunities = 2887.6Ha +982.4Ha)) = 86%

Therefore, before any proposals affecting these PCs and in particular PC 4, 5, 9 and 11, are approved, this LBS will recommend that surveys should be conducted in areas outside the study area to better understand the conservation status of these PCs in the region.

**Table 5 Native vegetation distribution within Local Planning Schemes' (July 2011) land use categories in accordance to opportunities and constraints to its protection and retention (in hectares).**

Level of opportunity for native vegetation retention/protection	ha
Land use categories with limited opportunity/ Highly constrained land uses	2887.6
Land uses with varied opportunities for retention	982.4
Land uses with good opportunities for retention	2068.0
<b>Total native vegetation within the CGG and SCV:</b>	<b>5958.0*</b>



**Figure 9 Portions of remnant vegetation within zones and reserves providing good opportunities for vegetation retention and protection**

### 7.3 IDENTIFICATION OF AREAS OF CONSERVATION VALUE

The next step in the analysis of how to best achieve LBS goals was to identify Areas of Conservation Value (ACVs) across the study area. ACVs are natural areas where consideration of native vegetation retention and protection should be a priority consideration in decision-making.

#### 7.3.1 Criteria for ACVs

ACVs were identified using the following criteria:

- Adequate examples of both Regionally and Locally Significant Natural Areas as defined by the Conservation Significance Categories to ensure at least 10% or 30% of each BVA is retained where still feasible,
- Retain and protect all known locations of significant flora in the study area,
- Retain and protect PCs being considered as priority for conservation or further research in the GRFVS report,
- Areas identified for protection of wetlands, riparian, coastal and estuarine vegetation as defined by the Conservation Significance Categories,
- When deciding between 2 areas with similar values, natural areas that form an ecological linkage are a priority,
- Natural areas with zoning that provide opportunities for natural area retention and protection were a priority. Land use categories of the Greater Geraldton Structure Plan 1999 were considered for the spatial analysis.

A schematic representation of the factors considered during the selection of Areas of Conservation Value is provided in Figure 10.

Where ACVs have certain characteristics, they were prioritised more highly, and for protection and/or retention. For example:

- Natural areas larger than 20ha or groups of patches where their total area is larger than 20ha and they are less than 100 m apart were included as a priority for Protection. This includes natural areas where it is possible for at least 50% of the natural area to be retained and protected.
- Natural areas containing known examples of conservation significance flora and priority ecological communities were included as high priorities for Protection.
- Regionally significant natural areas that form ecological linkages were also a priority for

Protection, and where formal protection of all native vegetation or selected portions of native vegetation could be pursued.

- Where areas contained more than 4ha of vegetation (but less than 20ha) in patches less than 100m apart, the natural areas become a priority for Retention. Smaller patches within that area may be suitable for formal Protection.

#### 7.3.2 Prioritising ACVs

There are 44 ACVs in the City of Greater Geraldton and 32 ACVs in the Shire of Chapman Valley.

Within these ACVs, adequate areas of native vegetation representative of the full range of vegetation types should be included to achieve the minimal target of at least 10% or 30% of pre-European extent of each vegetation type is retained.

The total identified areas of the ACVs includes more than the minimum to achieve the 10% or 30%, anticipating the actual level of retention will vary from site to site. To ensure that adequate numbers of ACVs are identified, further statistical analysis was done to document the area of each vegetation type represented in the 76 ACVs (See LBS Technical Reports).

The ACVs are divided into three main groups:

- **Protection** – ACV with good opportunities for natural area protection of biodiversity,
- **Retention** - ACV with good opportunities for natural area retention of biodiversity,
- **Constrained** – ACV that have constraints for protection or retention of natural areas but contain natural areas of high conservation that need to be considered in decision-making.

Figure shows the spatial distribution of ACV. Summaries of selected conservation values within each ACV are presented in Appendix B.

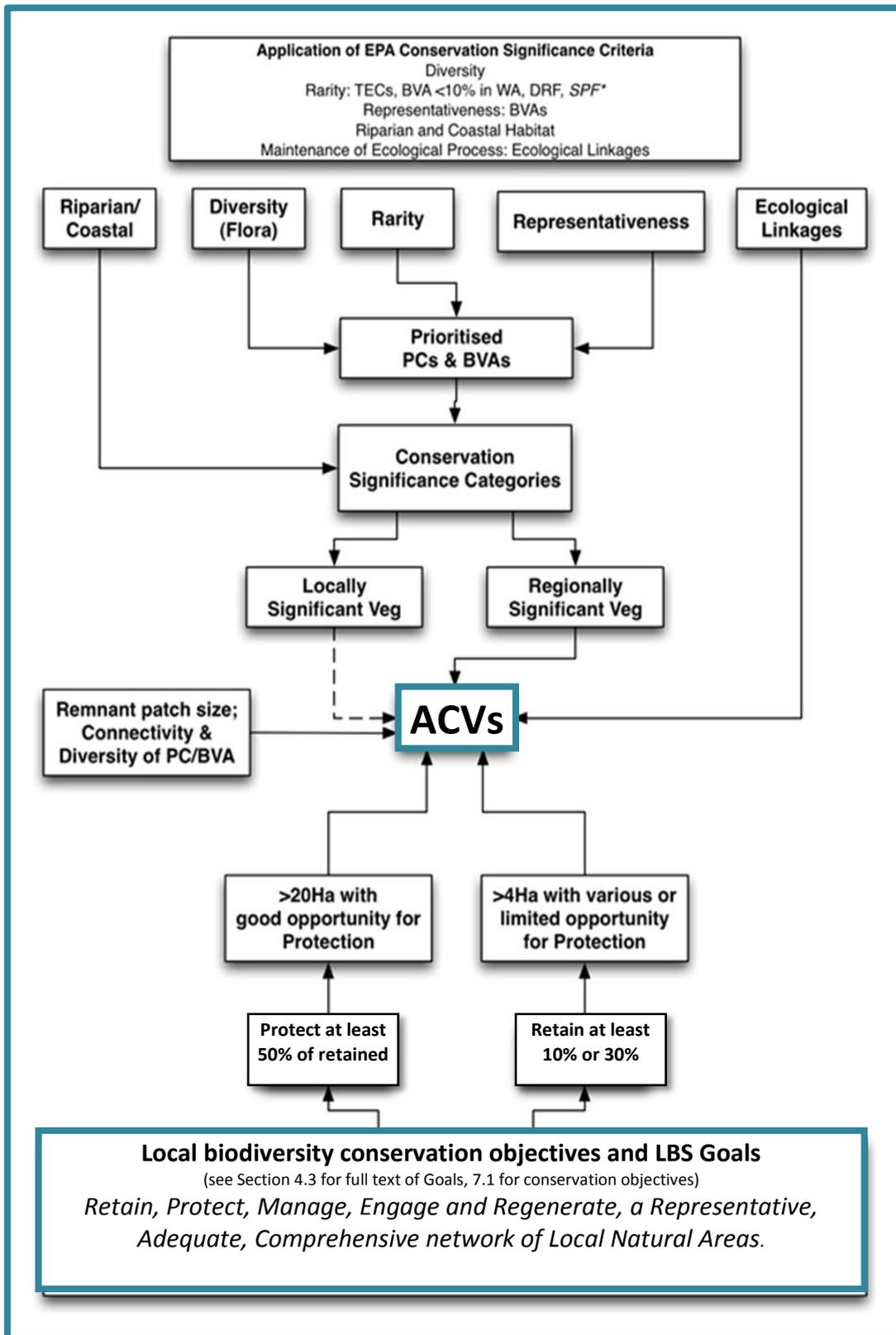


Figure 10 Summary of the process undertaken to identify the 'Areas of Conservation Value' (ACVs).

### 7.3.3 Contribution of ACVs to LBS Goals

Final analysis included determination of the minimal area of targeted vegetation type required from each ACV to contribute to the achievement of the LBS Goals for the study area. Opportunities and constraints to native vegetation retention provided by the current LPS land use categories were used. The ACV Action Table shows the minimal area required from each ACV to achieve the conservation objective for the study area.

Importantly, the ACVs boundaries are designed to be indicative only and include already cleared areas or even portions of areas where development has been approved. ACVs are not to be interpreted as areas where development is prohibited. They should be used to identify areas where any remaining vegetation is of conservation significance and its retention and protection should be a priority when deciding on future land use planning.

Further, it is critical that ALL native vegetation in the area has conservation value: areas NOT included in an ACV should NOT be deemed as not having conservation value. ACVs are just those areas where analysis, based on current knowledge, shows that conservation efforts should be best directed. Considering the extent of clearing, the primary objective should be to use every opportunity to retain ALL native vegetation remaining.

### 7.3.4 Recommended actions for ACVs with different opportunities

The detailed recommendations for each area of conservation value are detailed in Appendix B and can be summarised for each level of opportunity.

For ACVs with good opportunities for protection of biodiversity, and to achieve the targets for protection the summary recommendations are:

1. Review and implement existing management plans and policies where they apply
2. Change zoning, vesting and reserve status to protection biodiversity values, where and when opportunities arise
3. Maximise the width of buffers and setbacks when re-zoning or planning for development
4. Strengthen regional and local linkages through protection, retention and revegetation
5. Design developments and apply conditions to development that achieve biodiversity conservation and management goals

6. Retain native vegetation in Public Open Space, streetscapes and transport corridors if development occurs
7. Direct recreational activities or facilities into cleared or severely degraded areas of Recreational reserves and fence and protect remnant vegetation
8. Develop and implement management plans for conservation area
9. Continue or develop partnerships with community, private landholders and grant funders to implement conservation and regeneration
10. Develop support and incentive programs for private landholder conservation

For ACVs with good opportunities for retention of biodiversity, and to achieve the targets for retention the summary recommendations are:

1. Maximise the width of buffer, setbacks and area of vegetation retained when re-zoning or planning for development
2. Design developments and apply conditions to development that achieve biodiversity conservation and management goals
3. Retain native vegetation in Public Open Space, streetscapes and transport corridors when development occurs
4. Develop support and incentive programs for private landholder conservation
5. Develop management plans and apply conservation policies where possible
6. Strengthen regional local linkages through protection, retention and revegetation

For ACVs that have constraints for protection or retention of natural areas but they contain natural areas of high conservation value that need to be considered on decision making:

1. Maximise the width of buffer, setbacks and area of vegetation retained when re-zoning or planning for development
2. Retain native vegetation in Public Open Space, streetscapes and transport corridors.
3. Develop support and incentive programs for private landholder conservation

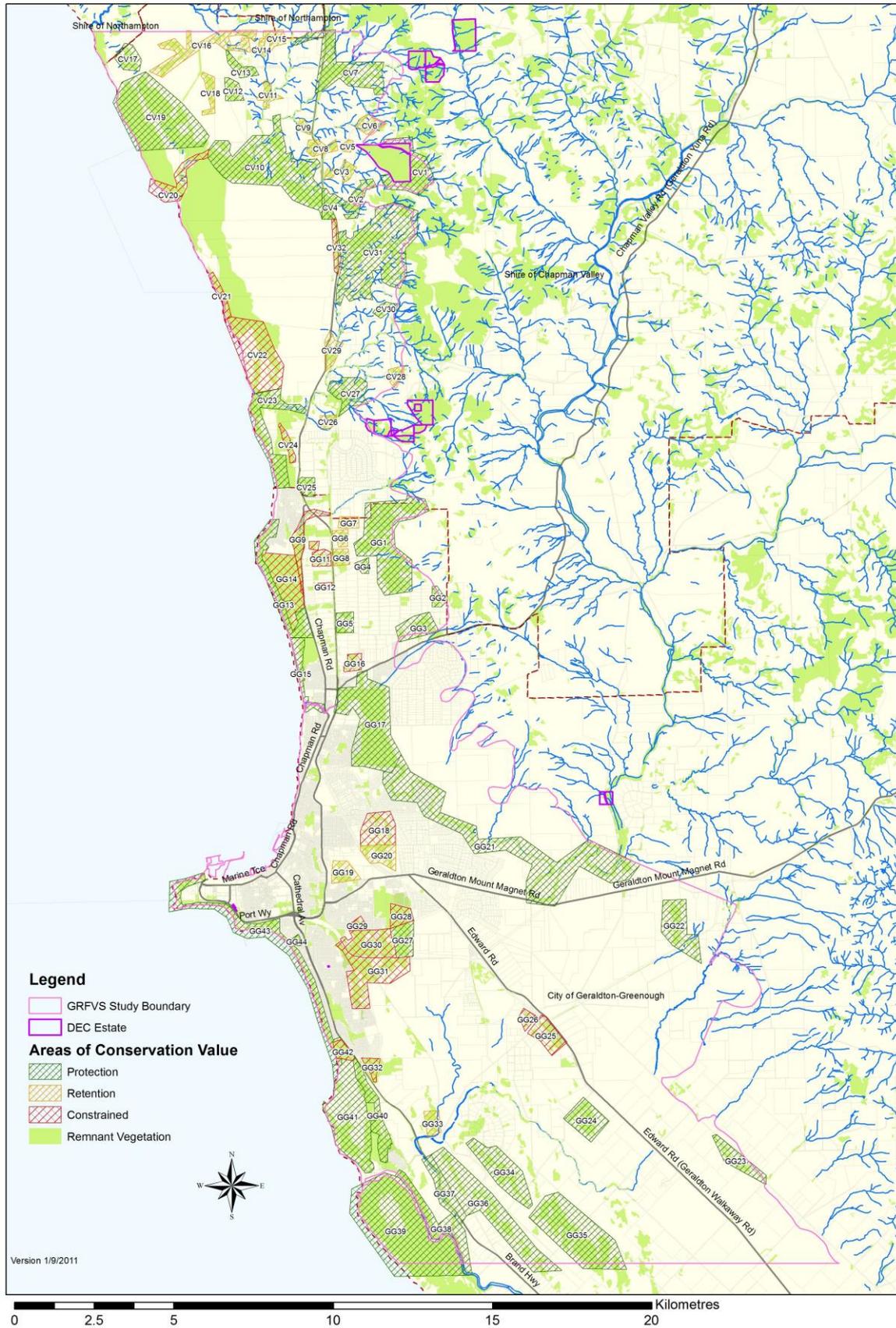


Figure 11 Areas of Conservation Value in City of Greater Geraldton and Shire of Chapman Valley.

## 8 Achieving the Goals

Achieving the LBS Goals and conservation objectives will require political commitment and additional resources. The current condition of LNAs is mixed, and many of the threats are increasing.

The challenges are global, not just local and indirect not just direct. As 'Global Biodiversity Outlook 3' (Secretariat of the Convention on Biological Diversity, 2010) suggests "...direct pressures on biodiversity must continue to be addressed, and actions to improve the state of biodiversity maintained, although on a much larger scale...".

Despite the challenges, the LBS Goals can be achieved using a range of existing and proposed plans, policies, projects, funding sources and community engagement tools. Many of the most effective mechanisms are within the local planning system e.g. maximising opportunities on publicly held lands, from regional and public open space, maintaining buffers to waterways, and also via offsetting loss of vegetation into priority areas for conservation and retention.

This section of the LBS outlines the existing and potential new mechanisms for achieving the vision.

### 8.1 MECHANISMS FOR BIODIVERSITY CONSERVATION

Planning policies, strategic planning documents, management plans and conservation programs are already available for use to achieve the Goals. Provisions in the current statutory and strategic planning framework have been described in Section 0 and a summary of different land use categories' provisions for natural area retention or protection are described in Table 4.

Additional mechanisms are in three broad categories:

- Policy and planning tools
- Management tools
- Engagement and education tools

#### 8.1.1 Policy and planning tools

##### **Local planning framework provisions**

Local planning strategies are strategic documents adopted by LGAs and WAPC, setting out the general aims and intentions for future long-term growth for

the local government area. Local planning strategies link to the local government's corporate plan by including the social, environmental and economic aspirations of the community.

Because of these characteristics, local planning strategies can help achieve any LBS Goals and recommendations (WAPC, 2011). Specifically, local planning strategies can:

- Incorporate a spatial plan identifying priority biodiversity conservation assets,
- Provide rationale for conservation reservation, zoning and provisions of the LPS,
- Describe means for achieving win-win outcomes for conservation and development.

Local Planning Schemes (LPS) are the primary statutory planning tools of local government. There are many options of how to integrate biodiversity consideration into the local planning scheme, but primarily through the use of reserves, land use categories, and special control areas.

In the study area, the LBS Technical Reports list reserves where (following an assessment of vegetation condition) changing of vesting purpose to conservation or recreation/conservation would contribute to the protection status of vegetation types represented within those reserves. The LBS Technical Reports show that nearly twice as many hectares of native vegetation exist in reserved land for purposes other than conservation.

LPS may also include general development requirements relevant to biodiversity conservation, such as subdivision plans, guidelines for development of building envelopes, setbacks, management plans, clearing controls, stock and weed management and requirements for rehabilitation or revegetation of degraded land.

Appendix D provides a guide and specific recommendations of how LPS can help achieve LBS Goals.

##### **Policies for biodiversity conservation**

Local Planning Policies (LPP) provides additional guidance on LPS provisions. A Local Planning Policy for Biodiversity Conservation, prepared under the Town Planning Scheme (TPS), can guide how local priority ACVs are identified and protected. The LPP for biodiversity conservation can also identify the level of information required for adequate assessment of the impact of proposed developments on natural areas. The LPP assists local government to establish appropriate

responses to protect the natural area (or part thereof) either through the mechanisms available in the land use planning and development process and/or any incentives strategy prepared by the LGA.

Appendix E provides an overview and detailed recommendations of how LPP can help achieve LBS Goals.

### ***Proofing other policies***

Additional policy actions include 'proofing' other policies for their contribution towards LBS Goals. The CGG 'Towards Sustainability Policy Framework' (City of Greater Geraldton, 2010), Climate Change Adaptation Action Plan (BROC, 2010) and this LBS can be used to test other LGA policies, plans or strategies and recommend changes if they will contribute to degradation or regeneration of biodiversity assets. For example, a primarily economic and culturally-driven strategic plan may propose policies designed to aggressively grow the population of Geraldton. A 'proofing' of strategy for its unintended, indirect, yet real negative impacts on biodiversity may result in revisions to the rate or size of the population growth.

### ***Incentives for private land conservation***

Policies and strategies that incentivise conservation by private landholders can assist in achieving LBS Goals. An incentive for private land conservation is defined as a "*financial or non-financial inducement to landowners to conserve natural areas on their properties*". Normally, landowners enter into arrangements voluntarily; however they can be encouraged through policy and planning provisions. Scope for incentivising landowners already exists in the Waggrakine Rural-Residential Structure Plan where a reserve of monies paid in lieu of revegetation by some landowners could be used on other landowner's property.

As 82% or over 5100 ha of the remaining vegetation in Geraldton is in private ownership, mechanisms to increase private landholders' and managers' contribution are very important. An incentives strategy makes it much more likely that detailed, on-ground assessment of the biodiversity assets will occur on privately owned lands.

Incentive programs are best enabled through formal landholder commitment to protect and maintain the assets at a certain condition for a specific amount of time i.e. covenants. There are three types of programs that exist in Western

Australia encouraging biodiversity conservation on privately owned land:

- Programs administered by state agencies,
- Voluntary management arrangements through DEC's *Land for Wildlife* program, and
- Individual local governments can adopt their own Private Landholder Incentives Strategy that can offer a range of incentives.

The LBS Technical Reports include comparison of the 3 covenanting programs available in Western Australia. Below are a range of other mechanisms that could encourage private landholders to contribute to LBS Goals.

Rate Rebates or Differential Rating Rate rebates (or discounts) provide ongoing financial recognition of the conservation efforts of landholders on behalf of the wider community. In return for a reduction in rates the landholder agrees to maintain the land, conserve remnant vegetation or take other agreed conservation measures. A differential rate can also be used to achieve similar objectives for vegetation conservation, based on use and zoning of the land (Bateson, 2001)

Grants Grant programs provide direct financial support for materials or labour for conservation works to individual landholders or groups of landholders providing on the ground works or stewardship. These grant programs may be 'devolved' funding from other government or private sources (e.g. NRM funding), or may be a redistribution of contributions from other landholders in lieu of conservation on their own land.

Markets for Environmental Services In some existing market-based schemes landholders providing biodiversity conservation management or carbon sequestration can compete for funding through local auctions to get these actions paid for by an appropriate funding body. In others the funding is sought through accredited offsets via national or international trading schemes e.g. carbon credits. Another market-based mechanism is certification and labelling, with the Green Building Council's GreenStar system already being applied to 'communities' and developments with biodiversity conservation measures one of the criteria.

Tax Relief There are two main types of tax relief available for conservation. The first is tax deduction incentives available to land owners who enter a conservation covenant, where the covenant may decrease future prospects for development on the

land. The second is relief from land tax for private land with valuable native vegetation under a conservation covenant.

**Environmental Levies** Levies involve a flat charge on households applied by LGAs and used to support environmental programs (such as the incentive programs above, or management programs outlined later). The levy also communicates to the community that biodiversity is of real value (Bateson, 2001).

**Developer Contributions** or levies required by local government authorities can provide the community with funding for environmental programs or purchase of open space/bushland.

### 8.1.2 Management Tools

#### **Support for private landholders**

Lack of incentives are not the only barrier to conservation on private land. Other barriers can include lack of a community of support, lack of appropriate tools or equipment, or lack of practical or specialist knowledge. These barriers could be addressed through offering the following types of support as part of an incentives or education program:

**Training** Informal and formal, free or low cost workshops can help engage private landholders. This training is usually targeted at practical weed and pest management and regeneration skills, but can also involve training residents in self-assessment and monitoring techniques (Bateson, 2001).

**Technical Support** This may include technical support with plan identification, mapping, management planning, funding applications or other specialist skills that assist in the development and implementation of management and property plans.

**Networks and community groups** Support and promotion of progress associations, Landcare groups, private landholder networks or other community groups can be valuable. In these groups people can come together and discuss biodiversity issues, learn from each other about solutions, and create a sense of pride, identity and confidence in their individual and collective conservation efforts.

**Equipment & Labour Subsidies** Local governments may provide preferential or exclusive access to seedlings and equipment as well as access to supplied labour/volunteers.

#### **Management of Local Government reserves**

Active, adaptive management of natural areas to control threats and prevent degradation is critical to maintaining the ecological values of LNAs. This is critical in Geraldton's highly fragmented landscape with increasing levels of human use. There are a range of threats and issues that require active management beyond what planning or policies can control e.g. uncontrolled access by vehicles (esp. motor bikes), weed infestation, feral animals, rubbish dumping, dieback, and erosion.

Local government reserves that contain LNAs present an excellent opportunity to protect and retain vegetation. Tables presented in the LBS Technical Reports identify 266.7ha of natural areas that are held by the LGAs in reserves vested for conservation and foreshore/landscape protection. It is far more cost-effective (ecologically and financially) to protect and manage these areas before trying to re-vegetate or create new areas. A further 17 reserves have been identified where changing of vesting to included conservation would increase the area of protection natural areas by up to 459ha.

#### **City of Greater Geraldton existing management plans**

The City of Greater Geraldton has a range of management plans and 10 are listed below. A complete list of the existing plans and technical documents is included in Appendix M and all are available upon request from CGG.

**Moresby Ranges Management Plan** (2010). Adopted by the WAPC with recommendations for erosion control, pest and weed management and revegetation. Currently being implemented by SCV and CGG in partnership with private landholders through State and Federal grants.

**Chapman River Estuary Management Plan** (2010). A draft plan has been used as the basis for successful funding applications and on-ground works to protect and regenerate the natural areas seaward of the main traffic bridge.

**Dongara to Cape Burney Coastal Vegetation Survey** (2010), Completed as part of a broader strategic and statutory planning exercise with. Complementary visual landscape assessment report and geomorphological reports are a sound basis for conservation in the area.

**Pt Moore to Tarcoola Foreshore Master Plan** (2010). Adopted by CGG in 2010, this Master Plan builds on the technical information and

recommendations of the 2005 Coastal Strategy to provide an action plan for the coastal strip.

Roadside Vegetation and Conservation Values in the City of Geraldton-Greenough (2009). A report presented to CGG by the Roadside Conservation Committee based on work done to systematically survey the condition, threats and actions to protect areas of biodiversity value on roadsides.

Greenough River Foreshore Management Plan (2007). Completed as part of a proposed development this includes detailed plans for upgrading facilities and conservation along a short section of the northern bank of the Greenough River.

North Sunset Foreshore Management Plan (2007). A detailed management plan being implemented as part of a land development. Implementation has involved significant earthworks, fencing, revegetation and weed management and has many lessons for other stakeholders and parts of the coast.

Geraldton-Greenough Coastal Strategy & Foreshore Management Plan (2005). A detailed report for the whole coastline. The actions have subsequently been transferred into a database used to prioritise and monitor implementation.

Greenough River Estuary Management Plan 2005 Update (2005). The third revision of the Shire of Greenough's plan for managing the estuary, and still contains useful information and actions.

Foreshore Assessment Chapman River (2002). Detailed survey of the natural values, threats and recommendations for protection along the length of the Chapman River.

Greenough River Foreshore Assessment (2001). Detailed survey of the natural values, threats and recommendations for protection along the length of the Chapman River.

Chapman Regional Wildlife Corridor Project Report (2001). Contains detailed recommendations for access control, fire management, weed control and recreation.

#### ***Shire of Chapman Valley existing management plans***

Coastal Management Strategy (2007). The Shire of Chapman Valley Coastal Management Strategy guides coastal use between Drummond Cove and Woolawar Gully (approx. 18.5km). The objective is to ensure retention of the range of recreational

opportunities, environmental values and sense of isolation unique to this near-city coastal resource.

Upper Chapman River Catchment Action Plan (2008) The aim of the project was to increase the capacity of farmers to address environmental issues affecting their properties. 93% of the catchment lacks perennial vegetation cover which increases vulnerability to soil conservation issues. Recommended actions included fencing, planting of shelterbelts, revegetation, perennial pastures, field days and education programs.

Nanson Foreshore Management Plan (2002) This document provides an assessment of the small section of the Chapman River and Durawah Gully and offers recommendations to assist the community with actively managing the riparian system for conservation and recreation purposes.

Moresby NRM Operations Plan (2011a) This plan pulls together all of the proposed revegetation, fencing, feral animal management projects for the section of the Moresby Ranges between Mt Fairfax and Wokatherra Gap. It is intended to improve the environmental condition and reduce degradation while planning for the Moresby Range Regional Park progresses.

Declared Species Management Plan (2011b) This document guides on-ground management of foxes, rabbits and pigs in the south-west portion of the Shire.

#### **8.1.3 Engagement and Education tools**

Successful biodiversity conservation requires an increase in the perceived value of biodiversity. While many organisations and individuals are affected by the state of biodiversity, few would be aware that they had a role to play in its conservation. Fewer still would understand the different values, vegetation types, current status, future vision or mechanisms for conservation and regeneration. Engagement with different stakeholders and providing education opportunities will therefore be essential to achieving LBS Goals.

There are already a large number of government and community-led efforts at increasing the awareness, knowledge, skills and motivation to conserve biodiversity in Geraldton. However, (paraphrasing the Secretariat of the Convention on Biological Diversity (2010) report), *"the urgency of a change of direction must be conveyed to decision-makers beyond the constituency so far involved in the biodiversity conservation"*.

Land developers, Main Roads WA, Western Power and businesses all make decisions involving large amounts of land and resources, and often affecting biodiversity values. Similarly, rural-residential and urban landholders are not the target audience of the NRM groups.

However, given the value of biodiversity, risk of loss and increasing threats, engagement and education must reach these non-traditional audiences. Existing engagement and education activities include:

Employed environmental staff. Northern Agricultural Catchment Council's (NACC) NRM officers, CGG Sustainability officers, SCV Landcare officers and DEC staff all play an important role as a regular contact point for new inquiries, coordinating conservation activities and attracting additional funding to conservation efforts. They play a key role in organising many of the education and engagement activities listed below.

Community planting days. Annual events such as National Tree Day, coastal planting and clean-up days attract a core group of volunteers. Larger numbers and sometimes whole organisations attend the more well-publicised events, and these remain popular opportunities for people to 'do something' whilst also learning more about more regular or different opportunities to contribute.

Grant-funded community conservation. Community groups have capacity to bring external funding into a local area through various grant schemes. Wonthella Progress Association successfully received funding and completed a project to fence and protect local bushland, as have Coastcare groups at Pt. Moore, Sunset Beach, Bluff Pt., Cape Burney, Drummond Cove, Chapman River and others. However, many community groups are vulnerable to burn out after couple of years. These projects are usually completed in partnership with the local government to achieve multiple biodiversity and community development goals. Practical support from Local Government to these groups can significantly extend their lifespan.

Community Nursery and Regional Herbarium. CGG has maintained support for a community nursery sited in its depot and largely managed by volunteers. The nursery propagates and sells local, native species to CGG, community groups and individuals. Many species are unavailable at other nurseries, and the volunteers have detailed and valuable practical knowledge. The Regional Herbarium is also volunteer-run and is an important

source of expertise on local species and their distribution.

Formal education and training. Durack Institute of Technology offers courses in Environmental Management, Land Conservation and Sustainability that are popular. The students often do practical work in creating management plans, monitoring and go on to work in the local community after their studies. Other irregular formal training opportunities are offered through NACC, such as seed collection or coastal regeneration workshops.

Conferences, events and guest speakers. Series such as the Coastal Conversations series, 2010 State NRM conference, regular talks at the Western Australia Museum and CGG '2029 and Beyond' forums attract large audiences to talks of relevance biodiversity conservation. These events and associated networking have been important development opportunities for professionals and catalysts for formation of new community groups and projects.

Community engagement. CGG has recently conducted a series of dialogues, surveys and forums focused on '2029 and Beyond' with 'sustainability' as a framework and the 'environment' being a dominant theme. NACC and CGG have also conducted professional social studies that revealing strong environmental values in the population. The dissemination of the results has been critical to the formation of major projects and new policies. Specific meetings for planning purposes, such as about Pages Beach, Pt. Moore to Tarcoola Foreshore Management Plan, this strategy and others generally attract 30-50 people. Online tools for engaging the community and enabling them to engage with each other are also increasingly popular e.g. NACC's Banjar and CGG's Civic Evolution.

Media. The local paper previously contained a popular regular supplement called the 'Greener Times' that promoted biodiversity conservation. Greener Times has been discontinued but gardening columnists in the local papers, radio segments and online media continue to focus on biodiversity issues in backyards and beyond.

## 8.2 PRIORITIES TO ACHIEVE THE GOALS

### 8.2.1 Goal 1: Retention - Retain natural areas

Retention of natural areas means:

- Retention of at least 3334 ha of the remaining 6041 ha of natural areas,
- Requirement to offset and revegetate as compensation where retention is not possible.

Achieving Goal 1 requires policy and planning decisions through the LGA that result in:

- Avoiding clearing,
- Ensuring the minimum retention targets for each ACV are met or exceeded,
- Restoration of 1500h of native vegetation in CGG to compensate for vegetation likely to be lost due to future development,
- Designing future development (structure plans, sub-divisions, transport corridors) to retain ecological linkages (identified by the Regional Ecological Linkages Report – see LBS Technical Reports).
- Outside ACV retaining large, well-connected patches of remnant vegetation and vegetation along waterways,
- Maintaining existing linkages between remnant vegetation and across landscape features.

#### **Recommendations to achieve Goal 1**

- **Update the CGG and SCV LPS to achieve LBS Goals.** Appendix D describes the recommended changes.
- **Develop a Local Planning Policy for Biodiversity Conservation.** Appendix E includes recommended structure and content.
- **Systemically implement the prioritised recommendations for ACVs.** As per Appendix B.
- **Consider new policies and design guidelines that encourage biodiversity outcomes in urban design and built form e.g. GreenStar communities.**
- **Consider changes to the sub-division and approvals process to consider LBS Goals and offer concessions and incentives. See Appendix C for recommended changes.**

### 8.2.2 Goal 2: Protection - Protect natural areas and biodiversity features

Protecting natural areas means:

- Protection of at least 5 % of the pre-European extent of natural areas,
- Protection of an additional 1058 ha of ACVs,
- Protection of TECs, DRF, Priority flora and fauna, and riparian and coastal vegetation.

Analysis in the LBS Technical reports demonstrates that if most natural areas within the ACVs were retained, it would be possible to protect at least 10% of each BVA and PC in the study area.

Achieving Goal 2 requires actions that result in:

- Ecological surveys to identify TECs, DRF, SPF and Priority 1 and 2 flora are carried out at the earliest appropriate stage of the planning process,
- Use of LPS zoning and vesting to achieve biodiversity conservation outcomes, including changing vesting of high conservation value land in public ownership to 'Conservation' or vesting with the Conservation Commission and managed by DEC,
- Promotion of existing programs that administer conservation covenants or investigate feasibility of establishing a local government based support program,
- Protection and enhancement of ecological linkages.

#### Recommendations to achieve Goal 2

- **Develop a private landholder incentives strategy to facilitate reservation through private management and conservation agreements.**
- **Consider changing zoning, vesting or reservation purpose of LGA-owned, natural areas ACVs owned by the LGA to 'conservation' e.g. 17 reserves, representing 459ha, have been identified for possible rezoning.**
- **Require that, at the earliest appropriate stage of the planning process, any development affecting PCs 4, 5, 8, 9, 10, 11, and 12, complete surveys outside the study area to better understand the conservation status of these Plant Communities in the region.**
- **Develop guidelines for development proponents to complete assessments of affected natural areas in a standard format e.g. PBP's Natural Area Initial Assessment templates (del Marco, 2004).**

### 8.2.3 Goal 3: Management - Manage protected natural areas for conservation

Managing natural areas means:

- Including areas not traditionally considered a nature reserve, e.g. parklands and road reserves.
- Active management of 100% of LGA natural areas,
- Active management of 50% of all other retained natural areas (1659 ha), through private land conservation and restoration,
- Valuation of biodiversity assets and implementation of asset management plans.

Achieving Goal 3 requires actions that will result in:

- Use of an 'asset management' approach to prioritise ACVs for management and annual allocation of resources for implementation.
- Coordination of activities across Departments and teams within the LGA,
- Investment in the knowledge, skills and resources of the LGA staff and community,
- Application of best-practice in restoration works e.g. use of local provenance seeds.
- Implementing an incentives strategy for conservation on private land.

#### **Recommendations to achieve Goal 3**

- **Incorporate specific, measurable targets for biodiversity conservation into LGA strategic plans and annual reporting.**
- **Investigate opportunities to jointly fund and implement actions that achieve LBS and Climate Change Adaptation Action Plan goals.**
- **Use an 'asset management' approach and system for prioritising recording condition assessments, forward planning, funding applications and budgeting for natural area management.**
- **Develop plans for management of existing and new public reserves that contain significant vegetation.**

#### 8.2.4 Goal 4: Engagement - Increase contributions to biodiversity conservation

Increasing contributions means:

- Observable change in public and institutional language, values and priorities regarding biodiversity,
- Measured decrease in behaviours that contribute to biodiversity loss,
- Measured increase in the resources committed to biodiversity conservation,
- Increase in evidence that the community are acting as 'stewards for the environment'.

Achieving Goal 4 could involve:

- Aligning strategies and increasing cooperation across agencies e.g. with LGAs, NACC, Main Roads and DEC,
- Providing existing initiatives with additional resources or support e.g. Regional Herbarium, Community Nursery.
- Achieving measurable behaviour change through social marketing, community engagement and behaviour change campaigns,
- Focusing on a select number of high-impact events or programs for community engagement e.g. National Tree Day, Million Trees project.

#### Recommendations to achieve Goal 4

- **Support ongoing forums such as working groups that enable collaboration and communication between agencies, LGAs and community groups to achieve LBS Goals.**
- **Continue to support the role of a nominated councillor as a 'Biodiversity Champion' in the LGA (CGG).**
- **Consider undertaking a study to value the of ecosystem services of natural areas as an aid to policy-making and community engagement.**
- **Update each local government's website to ensure all the biodiversity-related plans and information is accessible.**
- **Consider implementing an education and engagement program to encourage biodiversity conservation.** The strategy could include: support for existing groups, programs and events for citizens, social marketing campaigns, demonstration gardens etc.

### 8.2.5 Goal 5: Regeneration - Ensure the rate of regeneration exceeds the rate of degradation

This goal focused on regeneration, meaning:

- Restoration of more than 1500 ha of natural areas in CGG,
- Measurable improvement in connectivity between natural areas and along ecological linkages,
- Use of local offsets to over-compensate for any clearing of native vegetation.

Regeneration, restoration and revegetation are all relatively expensive, and are therefore lower priority than protection, retention and management of existing natural areas. However the extent of degradation and fragmentation in Geraldton means that achieving the overall Vision and goals will not be possible without some level of regeneration.

Achieving Goal 5 could involve:

- Introduction of levies or market-based mechanisms that generate revenue to be used for regeneration,
- Offset ratios higher than 1:1 e.g. for each ha lost, require 7ha be restored,
- Encouraging location of offset or carbon plantings within the Geraldton area,
- Pursue projects and funding that could generate additional private and government investment,
- Monitoring and reporting on the net change in natural areas and vegetation.

#### Recommendations to achieve Goal 5

- Continue to support programs like 'Million Trees' that set ambitious targets, and require participation from a range of stakeholders.
- Consider creating trust fund or reserves that can finance land acquisition for conservation and regeneration projects.
- Consider changes to policies to increase the range of situations in which offset are applicable, and increasing the ratio of offsets to losses.
- LGAs to consider leading the way by committing to becoming 'carbon neutral', including through use of local offset plantings.

## 9 Evaluation and Reporting

Successfully achieving the biodiversity goals and achieving the vision will require ongoing monitoring, evaluation and reporting on the activities and outcomes achieved through implementation of the strategy. The strategy and its implementation also need to respond to new information, changes in best practice, technology, legislation and more. A review of the strategy should be undertaken when any of the following occur:

- Changes to relevant State legislation
- Introduction of new legislation relating to the role of local government or natural resource management
- Introduction of new State or local government policies
- Beginning of a new Corporate Plan for the LGAs.

With respect to the monitoring and review of identified actions for the strategy, the LBS Action Plan identifies priorities, responsibilities and performance measures. The recommended approach to monitoring is based on a two-tiered structure that a dedicated Council officer(s) will need to be responsible for. These two tiers are monitoring of process and monitoring of outcome:

- The first tier of assessment (process) involves ensuring that each of the actions identified in this strategy are undertaken and implemented by the nominated responsible entity. This is generally evaluated by recording what action was completed, who completed it and when it was completed.

The second tier of assessment (outcome) involves identifying the measure of success for the actions in the strategy, and then reviewing and evaluating progress against these measures and how well they have been achieved by the nominated actions to address them. Typically this should be done by examining progress against targets in this strategy. Evaluation should include adequacy of resourcing, timing and any constraints or opportunities identified in trying to achieve the action.

## 10 Action Plan

The Action Plan has been developed to meet the vision and goals set by this strategy. Because Biodiversity strategies are not statutory documents and the majority of threats are dependent on land use planning and development decisions, the focus of the actions is on incorporating changes into new Local Planning Scheme.

It is anticipated that the SCV and CGG would have the primary responsibility for implementing these actions, with the support of relevant State government agencies, community and other stakeholders.

The implementation timeframe for this strategy is 5 years, with a periodic review at 3 years, after which it should be subject to a comprehensive review. Action Plan implementation will be subject to the availability of funding and resources.

The LBS recommendations have been prioritised based on the following scale:

- 1 – to be completed within 1-3 years of the endorsement of the final LBS by the LGA
- 2 – to be completed within 3-5 years of the endorsement of the final LBS by the LGA
- 3 - to be completed within 5-10 years of the endorsement of the final LBS by the LGA.

**Table 6 LBS Goals presented in tabular format.**

No.	Goal	Meaning and measurement
1	<b>Retention -Retain natural areas</b>	<p>Given current constraints to natural area retention, this goal translates into 10% of the original extent of native vegetation in Geraldton, as a minimum:</p> <ul style="list-style-type: none"> <li>• Retention of at least 3334 ha of the remaining 6041 ha of natural areas remaining,</li> <li>• Requirement to offset and re-vegetate as compensation where losses are unavoidable.</li> </ul>
2	<b>Protection - Protect natural areas and specific biodiversity features</b>	<p>This goal translates into:</p> <ul style="list-style-type: none"> <li>• Protection of at least 5% of the original extent of natural areas,</li> <li>• Protection of an additional 1058ha of areas of conservation value,</li> <li>• Protection of Threatened Ecological Communities, Declared Rare Flora, Priority flora and fauna, and riparian and coastal vegetation.</li> </ul>
3	<b>Management - Manage protected natural areas for conservation</b>	<p>This goal translates into:</p> <ul style="list-style-type: none"> <li>• Active management of 100% of Local Government natural areas of conservation value,</li> <li>• Active management of 50% of all other retained natural areas (1659 ha), through provision of incentives for private land conservation and restoration,</li> <li>• Valuation of biodiversity assets and implementation of asset management plans.</li> </ul>
4	<b>Engagement – Increased community contributions to biodiversity conservation</b>	<p>This goal translates into:</p> <ul style="list-style-type: none"> <li>• Observable change in public and institutional language, values and priorities,</li> <li>• Measured decrease in behaviours identified as threats,</li> <li>• Measured increase in the time, money or resources contributed to biodiversity conservation,</li> <li>• Observable increase in the biodiversity ‘proofing’ of policies.</li> <li>• Increase in evidence that the community are ‘acting as stewards for the environment’.</li> </ul>
5	<b>Regeneration - Ensure the rate of regeneration exceeds the rate of degradation</b>	<p>This goal translates into:</p> <ul style="list-style-type: none"> <li>• Restoration of more than 1500 ha of natural areas in CGG,</li> <li>• Measurable improvement in connectivity between natural areas and along ecological linkages,</li> <li>• Use of local offsets to over-compensate any future clearing of native vegetation.</li> </ul>

Table 7 Recommendations from the LBS summarised as an Action Plan, including indications of priorities and LBS Goals towards which the actions would contribute.

Retention	Protection	Management	Engagement	Regeneration	Recommendation	Action ID	Priority
○	○	○	○	○	Consider new policies and design guidelines that encourage biodiversity outcomes in urban design and built form e.g. GreenStar communities.	2	1
○	○	○	○	○	Incorporate specific, measurable targets for biodiversity conservation into LGA corporate strategic plans and annual reporting.	3	1
○	○	○	○		Investigate opportunities to jointly fund and implement actions that achieve LBS and and Climate Change Adaptation Action Plan goals.	6	1
○	○	○		○	Systematically implement the prioritised recommendations for ACVs. As per Appendix B	7	1
○	○	○		○	Consider changes to the sub-division and approvals process to consider LBS Goals and offer concessions and incentives. See Appendix C for recommended changes.	8	1
○	○	○			Update the CGG and SCV LPS to achieve LBS Goals. Appendix D describes the recommended changes.	11	1
○	○	○			Develop a Local Planning Policy for Biodiversity Conservation. Appendix E includes recommended structure and content.	12	1
○	○	○			Consider changing zoning, vesting or reservation purpose of LGA-owned, natural areas ACVs owned by the LGA to 'conservation' e.g. 17 reserves, representing 459ha, have been identified for possible rezoning.	13	1
○	○		○		Update the SCV LPS to recognise the Local Biodiversity Strategy (LBS) and incorporate provisions for Biodiversity protection and retention as identified in this strategy.	14	1

Retention	Protection	Management	Engagement	Regeneration	Recommendation	Action ID	Priority
○	○				Revise relevant land use planning categories in the LPS to create a conservation zoning, and amend other zonings to better reflect the importance of biodiversity conservation e.g. in 'recreation' zones. As per Appendix D.	17	1
	○	○	○	○	Implement the priority recommendations of existing LNA management plans e.g. Chapman River Wildlife Corridor, and allocated adequate resources for ongoing management.	24	1
		○	○		Through education, increase the number of residents and council members who have knowledge of and value biodiversity.	28	1
		○	○		Consider naming each reserve, area of remnant bushland and ecological linkages to aid identification and increase 'ownership'. Develop and install standard fact sheets signage that will enable easy recognition of conservation reserves, showing their name and status.	29	1
		○	○		Complete condition assessments and develop management plans for management of existing and new public reserves that contain significant vegetation.	30	1
		○	○		Support ongoing forums such as working groups that enable collaboration and communication between agencies, LGAs and community groups to achieve LBS Goals.	31	1
			○	○	LGAs to consider leading the way by committing to becoming 'carbon neutral', including through use of local offset plantings.	36	1
			○	○	Continue to support programs like 'Million Trees' that set ambitious targets, and require participation from a range of stakeholders.	37	1
			○		Update each local government's website to ensure all the biodiversity-related plans and information are accessible.	41	1
○	○	○	○	○	Seek funding and partnership opportunities to extend the GRFVS methodology and LBS strategy to other parts of the sub-region.	1	2

Retention	Protection	Management	Engagement	Regeneration	Recommendation	Action ID	Priority
0	0	0	0	0	Consider creating trust fund or reserves that can finance land acquisition for conservation and regeneration projects.	5	2
0	0	0		0	Consider changes to policies to increase the range of situations in which offset are applicable, and increasing the ratio of offsets to losses.	9	2
0	0		0		Develop guidelines or a procedure for development proponents who disagree with the survey results, mapping or prioritisation of ACVs: to check, validate and apply for an amendment to the mapping, if required.	15	2
0	0				Consider introducing Development Control Areas (e.g. Moresby Range Landscape Special Control Area in Greenough TPS) for the purpose of preventing clearing of threatened plant communities (as per ACVs) and areas identified as Ecological Linkages.	18	2
0	0				Identify opportunities to replicate successful biodiversity conservation measures incorporated in the Waggrakine structure plan, into future structure plans around Geraldton	19	2
0	0				Develop guidelines for development proponents to complete assessments of affected natural areas in a standard format e.g. PBP's Natural Area Initial Assessment templates (del Marco, 2004), and consider specifying additional information required for each priority class.	21	2
0					Consider setting quantitative targets and guidelines for achieving biodiversity conservation outcomes through subdivision design, POS location and design, use of cash-in-lieu.	23	2
	0	0	0	0	Develop a private landholder incentives strategy to facilitate reservation through private management and conservation agreements.	25	2
		0		0	Use an 'asset management' approach and system for prioritising recording condition assessments, forward planning, funding applications and budgeting for natural area management.	32	2

Retention	Protection	Management	Engagement	Regeneration	Recommendation	Action ID	Priority
		○			Consider directing recreational activities or facilities into already-degraded areas of reserves and fence and protect remnant vegetation	33	2
			○	○	Consider implementing an education and engagement program to encourage biodiversity conservation. The strategy could include: support for existing groups, programs and events for citizens, social marketing campaigns, demonstration gardens etc.	35	2
			○		Consider updating each local government's website to ensure all the biodiversity-related plans and technical reports are accessible to stakeholders.	38	2
			○		Consider holding LGA decision-making meetings in the Local Natural Areas that are the subject of the decisions, so that the biodiversity values and condition are given due consideration.	39	2
			○		Continue to support the role of a nominated councillor as a 'Biodiversity Champion' in the LGA (CGG).	40	2
				○	When determining locations for regeneration or offset projects, use ecological linkages maps to identify priority areas, especially along creeklines in the eastern part of the area.	42	2
				○	Identify barriers and consider additional incentives to encourage land developers and residents to use locally indigenous plants in streetscaping, private gardens and industrial landscapes.	43	2
○	○	○	○	○	Consider undertaking a study to value the of ecosystem services of natural areas as an aid to policy-making and community engagement.	4	3
○	○	○			Use the results of any new surveys to the north and south of the study area to re-evaluate the status of PC4, PC5, PC9, PC11 and PC14 (all are currently considered restricted to the study area).	10	3
○	○				Identify actions to retain, protect and conserve priority Plant Communities that have Limited Opportunities for Protection,	16	3

Retention	Protection	Management	Engagement	Regeneration	Recommendation	Action ID	Priority
					specifically PC4, PC5, PC9, PC11 and PC12.		
O	O				Require that, at the earliest appropriate stage of the planning process, any development affecting PC4, PC5, PC8, PC9, PC10, PC11, PC12 and PC14, complete surveys outside the study area to better understand the conservation status of these Plant Communities in the region.	20	3
O		O	O		Within the LGAs, consider introduce systematic proofing of other policies for their impact on LBS Goals.	22	3
	O	O		O	Review and implement new systems of trade-offs or offsets as a means to achieve net gains in extent and quality of biodiversity.	26	3
	O				When opportunities arise, extend the scope of the LBS to include fauna	27	3
		O			Consider review of Council street tree and streetscaping guidelines to maximise use of species from nearby plant communities and to improve local and regional ecological linkages	34	3

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