



SOUTH WEST GROUP

DRAFT AREAS OF PRIORITY CONSERVATION ACTION

CASE STUDY OF THE SOUTH WEST METROPOLITAN REGION

OVERVIEW

The South West Group, a Voluntary Regional Organisation of Councils, is progressing toward establishing a natural resource management (NRM) framework for the six member Local Governments to work together, and with other stakeholders, towards a common vision for natural resource management in the region.

The South West Group comprises the Cities of Fremantle, Melville, Cockburn, Kwinana and Rockingham and the Town of East Fremantle. Their NRM framework is outlined in the South West Group Regional Natural Resource Management Strategy (NRM Strategy) which provides a key mechanism to achieve a 'landscape vision for healthy communities'.

The NRM Strategy has been developed in four key themes:

- Green Network
- Water
- Climate Change and
- Sustainable Development.

In the Green Network Theme, one of the NRM Strategy objectives is to:

“Identify the regional values of natural areas and work actively with member Councils and other stakeholders to conserve and manage important natural areas as part of a whole of landscape and collaborative approach.”

To identify regionally and locally significant natural areas, the South West Group adopted a local natural area prioritisation methodology developed by the Perth Biodiversity Project, which has been used to undertake local biodiversity conservation planning in the South West of Western Australia (Del Marco *et al* 2004, Zelinova *et al*, 2012).

Local biodiversity conservation planning provides for strategic assessment of ecological values of 'Local Natural Areas' and assessment of opportunities and constraints to their conservation. Local Natural Areas are defined as natural areas that are outside the Department of Parks and Wildlife (DPaW) managed lands and Bush Forever areas.

The importance of retaining and protecting local natural areas is recognised as one of the mechanisms to support the long term viability of natural areas in the current formal and informal reserve system, those managed by the DPaW, Bush Forever Sites and those in Regional Parks (State Planning Policy 2.8; Environmental Protection Guidance Statement No 33).

To meet the 'Green Network' objective, there were three main areas of assessments undertaken for the South West Group by the Local Biodiversity Program:

- **Identification of priority areas for local biodiversity conservation**, considering the ecological values and assessment of opportunities and constraints to their retention and protection;
- Identification of priority areas where **local conservation action** will contribute to maintaining or improving **regional connectivity** or '**Areas of priority conservation action for cross boundary initiatives**' (APCA);
- **Identification of potential local linkages** which contribute to the long term sustainability of significant local natural areas.

For each of these listed areas, spatial layers were generated and made available through WALGA's Local Biodiversity Program on-line mapping viewer, the Environmental Planning Tool, with a login specific to the South West Group.

IDENTIFICATION OF PRIORITY BIODIVERSITY CONSERVATION AREAS

When identifying priority areas for biodiversity conservation locally, principles adopted through the Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel (Zelinova *et al*, 2012) were adopted.

Level 1 Prioritisation assesses remnant vegetation against 32 criteria, with areas meeting larger number of criteria being considered relatively higher priority for consideration for conservation. It is critical to view the results of this prioritisation with an overlay which identifies parts of remnant vegetation with features protected by Federal or State legislation.

Level 2 Prioritisation combines the Level 1 Prioritisation with land use categorisation based on provisions for natural area retention or protection. Level 2 Prioritisation allows identifying remnant vegetation within lands where land use provisions could facilitate long term protection or provide good opportunities for natural area protection and retention.

These areas should be high priority for conservation action. It also identifies natural areas within land uses that provide limited opportunities for natural area retention yet being of high indicative conservation values. These areas should be a high priority for adequate investigation of conservation values before further development is considered.

Level 3 Prioritisation has been undertaken for the Perth and Peel regions, and this identified potentially threatened vegetation complexes for the region. The Level 3 Prioritisation was based on an assessment of the portion of regional geographic extent of vegetation complexes represented in Perth and Peel and an hypothetical assumed loss of these vegetation complexes based on their distribution within land uses of the Metropolitan Region Scheme and the Peel Region Scheme.

Some of the most potentially threatened vegetation complexes occur in the South West Group region, including Cottesloe Central and South and Herdsman vegetation complex that are potentially restricted to the Perth and Peel region and their extent could be reduced to less than 30% of their pre-European extent.

Vegetation complexes such as Bassendean Central and South, Guildford, Karrakatta Central and South, Serpentine River and Southern River are also represented and considered threatened as more than 60% of their pre-European extent was mapped within Perth and Peel and potentially less than 10% of their pre-European extent might remain. Other significant vegetation complex in the South West Group area is Quindalup vegetation complex.

AREAS REQUIRING LOCAL BIODIVERSITY CONSERVATION ACTION

The second type of assessment was to identify priority areas where local conservation action will contribute to maintaining or improving regional connectivity.

These areas were called 'Areas of priority conservation action for cross boundary initiatives' (APCA).

The proposed draft 'APCAs identify areas where cross boundary cooperation would provide opportunities to access external funding, prioritise actions at local level and will contribute to biodiversity conservation actions at regional level.

In the Cities of Kwinana and Rockingham, specific actions in most of these areas will also contribute to meeting local biodiversity conservation objectives adopted or proposed in their Local Biodiversity Strategies.

Management of threatening processes, restoration of habitat or securing long term security of land tenure in any of the proposed draft APCAs would improve the conservation status of a full range of biodiversity features in the wider region, on the Swan Coastal Plain. For example, a number of APCAs in the Cities of Kwinana and Rockingham include extensive areas of high conservation value remnant vegetation on private lands or in Local Government reserves whose retention is critical to maintaining linkage between protected areas to the east, west toward the coast and north-south.

The eastern part of the South West Metropolitan Region area includes several Bush Forever Areas that are relatively isolated when compared with Bush Forever Areas within the string of Regional Parks running through the centre of the region, including the Beeliar Regional Park and the Rockingham Lakes Regional Park. Improvement of connectivity in this area will ensure the long term viability of the recognised high conservation value natural areas.

It is important to note that there are numerous natural areas that are considered of high conservation value but are not included in the draft APCAs in this analysis. Conservation planning and management of those areas will contribute to the improved status of biodiversity at the regional level through appropriate local action. These actions should be identified through updates to Local Biodiversity Strategies in the Cities of Kwinana and Rockingham and further conservation planning in the City of Cockburn.

IDENTIFICATION OF POTENTIAL LOCAL LINKAGES

The third area of assessment led to the identification of local ecological linkages. They are designed to link regionally significant natural areas not connected through the Perth Regional Ecological Linkages and to connect a network of local reserves with regionally significant natural areas to support their functions as stepping stones.

Some local linkages follow roads and run through Public Open Space areas with no remnant vegetation. This is recognising the highly fragmented character of urbanised landscapes and the opportunities Public Open Spaces provide for planting local species as part of landscaping and restoration work.

While the primary objective of the analysis was to inform priority actions of the South West Group Regional NRM Strategy, the results can be used to inform other regional assessments such as the Strategic Assessment for Perth and Peel being undertaken under the EPBC Act provisions.

Even though the APCAs do not identify all regionally significant natural areas in the South West Group region, they do provide some level of site specific information that might be helpful when identifying opportunities for offsets as many APCAs provide future restoration opportunities or opportunities to improve protection status of natural areas providing habitat to matters of national environmental significance.

PROPOSED OUTCOMES OF ASSESSMENT

- Gain an understanding and appreciation of regional biodiversity conservation values and assets
- Facilitate collaboration across Local Governments, State Government agencies and community groups for regional scale, cross boundary projects/initiatives that have the potential to achieve landscape scale outcomes

- Identify ecological links (existing, potential, future) that could form wildlife corridors and refuge for flora and fauna
- Improve local decision making by member Councils through having access to regional scale information/data
- Identify biodiversity under threat of clearing and opportunities to improve conservation outcomes
- Gain a “post development” scenario to determine critical conservation risks
- Identify practical actions on a parcel by parcel basis to improve biodiversity conservation and management activities

METHODOLOGY IN DETAIL

Local Natural Area Conservation Priorities

Level 1 Prioritisation

Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel *Level 1 Prioritisation*

This dataset represents an extent of remnant vegetation by a number of conservation significance criteria being met within any portion of remnant vegetation. Thirty two conservation significance criteria were used that were based on the State Government endorsed local significance criteria developed through the Perth Biodiversity Project (Del Marco *et al.*, 2004). The local significance criteria can be grouped into several categories:

1. Representation of vegetation types at the regional scale (regional retention and protection status of vegetation types)
2. Rarity – presence of threatened ecological communities, flora, fauna and their habitat
3. Features important to maintaining ecological functions – connectivity, wetlands, estuarine, riparian and coastal vegetation
4. Local representation of vegetation types.

A detailed list of Priority Fields and source of spatial data can be provided on request.

Level 2 Prioritisation

Level 2 Prioritisation divides remnant vegetation by Level 1 Prioritisation into additional four categories according to opportunities and constraints to retention or protection. The opportunities and constraints are assessed on land use planning provisions at the regional scheme and local planning scheme levels.

Land use categories (zones and reserves) of the Metropolitan Region Scheme (MRS) and the Peel Region Scheme (PRS) were classified into four categories, according to provisions for natural area retention or protection. The same classification was applied to land use categories in 33 Local Planning Schemes that overlap with the study area:

1. Those providing **protection** for natural areas, such as conservation zone;
2. Those with **good opportunities** for natural areas, such as Parks and Recreation, Recreation, Rural Landscape Protection, State Forest, and other.
3. Those with **varied opportunities** for natural areas, such as Public Purposes, Special Use, Rural Small Holdings, and other;
4. Those with **limited opportunities** to natural area retention, such as Urban, Urban Deferred, Industrial, Road reserves and other.

The land use categorisation was then intersected with Level 1 prioritisation. The greater the number of criteria being met within a patch of remnant vegetation within each of the four land use opportunity categories, the higher priority for further investigation is assumed. However, different land use planning mechanisms would need to be used to achieve conservation of these areas.

There are limitations to this assessment of opportunities and constraints as there are numerous other considerations that will influence the final land use decision that were not considered. For example, the assessment:

- Does not differentiate between urban zoned lands prior to 1996 where schemes were not referred to the EPA native vegetation and other environmental issues were not considered and therefore might be subject to formal environmental impact assessment prior development approvals;
- Does not consider Basic raw materials;
- Does not consider Aboriginal Heritage;
- Does not consider 'vegetation protection areas' identified through structure plans for rural subdivisions approved under Local Planning Schemes;
- Does not consider areas that will be retained as conditions of development approvals or as offsets.

Table 1 below identifies the biodiversity conservation categories associated with zoning used for the assessment.

Table 1: Categorisation of land use categories in the Metropolitan Region Scheme and the Peel Region Scheme according to opportunities and constraints provided for biodiversity retention/protection

RFLBCP land use categorisation	Land uses (zones and reserves)
Protected	Parks & Recreation (Restricted) & Bush Forever/DEC
With good opportunities for natural area retention/protection	Parks & Recreation Regional Open Space Rural – water protection State Forest Waterways
With varied opportunities for natural area retention/protection	Private Recreation Public Purposes (for varied uses) Rural
Constrained or limited opportunities for natural area retention/protection	Central City Area Highways and Regional Roads Industrial Port Installation Railways Special Industrial Urban Urban Deferred Regional Centre

Level 3 Prioritisation

A potential level of native vegetation retention by vegetation complexes was estimated based on assumed cumulative impacts of existing land use provisions for the Perth Metropolitan and the Peel Region Scheme areas. The following assumptions were used:

- No vegetation was retained within zones or reserves such as Urban, Urban Deferred, Industrial, Roads and Railways; except where these were also Bush Forever Areas where 30% retention is assumed;
- 70% of remaining vegetation within rural zoned land and land reserved for public purposes was retained, except where these were also Bush Forever Areas, as then 90% retention on rural zoned lands and 80% retention on public purposes reserved lands is assumed;
- All vegetation reserved for Parks and Recreation and State Forest was retained.

These are only hypothetical considerations as native vegetation is being retained within zones that provide limited opportunities, for example through Public Open Space or as part of environmental conditions, but these are generally limited to less than 10% of the total development area. At the same time, some clearing of native vegetation occurs within lands reserved for Parks and Recreation and the State Forest is primarily managed for timber production.

Vegetation complexes are divided into six categories based on the assumed level of retention when comparing to their pre-European extent, with those endemic or geographically restricted to the Perth and Peel Region Scheme areas (the study area) being at the highest risk:

- Vegetation complexes with >90% regional extent within the study area and assumed <10% retention in the study area;
- Vegetation complexes with >90% regional extent in the study area and assumed <30% retention in the study area;
- Vegetation complexes with >60% regional extent in the study area and assumed <10% retention in the study area;
- Vegetation complexes with >60% regional extent in the study area and assumed <30% retention in the study area
- Vegetation complexes with <10% assumed retention in the study area;
- Vegetation complexes with <30% assumed retention in the study area.

Retention and protection of local natural areas representative of any of the above listed vegetation complexes should be a priority in the Perth and Peel Regions.

Connectivity analysis

To further assist with the assessment of how individual patches of remnant vegetation contribute to connectivity locally and regionally, three new vegetation remnant classification measures were developed through the Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel (Oh 2012). Results of this analysis were considered when identifying APCAs.

These measures have the properties of being dimensionless and scaleless. Dimensionless means the measures have no units and are purely relative numbers (low is poor, high is good). Scaleless means the measures are not calibrated to a particular "size" and they work with any configuration of input remnant vegetation.

The measures provide a visual indication of the role that a remnant patch plays in connecting the landscape and how vulnerable that connection is. For the purpose of this discussion a "patch" is defined as a physically isolated piece of remnant vegetation or a conservation category wetland.

The development of the new remnant vegetation connectivity classification was based on the following assumptions:

- Small, isolated patches tend to require higher intensity management to maintain their ecological values than large patches;
- Large patches can support larger populations of particular species and a greater diversity of species as there is more land area;
- The distance between patches affects the ability of animals to move between them and for plant propagules to be dispersed.

Remnant patch shape is important as thin, linear patches are subject to greater 'edge' effects (e.g. weed infestation, disturbances) than compact patches (Del Marco et al, 2004).

Measure 1: Regional Connectivity (connectivity quality)

Connectivity quality is a measure of the amount of vegetation that a patch contributes to connecting. Small or poorly shaped remnants that are isolated do not contribute much to connectivity quality and have a low score. On the other hand, small or poorly shaped remnants that connect large patches of

vegetation (e.g. river corridors) can have a high score. Large intact patches (e.g. hills forests) can have a high score in their own right because there is a large amount of "self-connection" due to their size.

Measure 2: Fragmentation (Local connectivity quality)

Fragmentation is a measure of the density of vegetation around a patch. Patches which are small or have a linear shape tend to have low fragmentation scores.

Measure 3: Connectivity Reach

To give a sense of scale to an area being assessed for 'Regional connectivity', a logarithm is taken. Considered across a landscape, higher reach values indicate patches which are part of larger connected networks than patches with smaller reach values.

Measure 4: High Regional, Low Local Density

Selecting patches which have a high connectivity quality even though have low viability highlights areas that may be contributing greatly to connecting the landscape but are fragile and vulnerable to further clearing. Alternatively, these areas could be viewed in terms of revegetation potential.

The methodologies are based on general biodiversity management principles and do not recognise the specific requirements of all taxa occupying the landscape. It cannot be used as a substitute for focused species or communities management planning.

Identification of Areas of Priority Conservation Action

The primary objective when identifying the APCAs was to identify areas which contribute to connectivity at regional and local level and thus provide good opportunities for cross Local Government boundary cooperation. Key considerations included:

- Location of natural areas with recognised values of regional significance (Bush Forever Areas, DPAW Conservation lands, Regional Parks)
- Natural areas within Perth Regional Ecological Linkages
- Feasibility of long term support for vegetation retention and/or protection (opportunities and constraints assessment of local land use provisions)
- Location of Local Natural Areas (areas outside Bush Forever Areas, DPaW Conservation lands, Regional Parks) of high conservation value and contributing to meeting local biodiversity conservation objectives adopted through Local Biodiversity Strategies.

Conservation values of Local Natural Areas were assessed using the prioritisation methodology developed for the Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel (Regional Framework) (Zelinova *et al*, 2012).

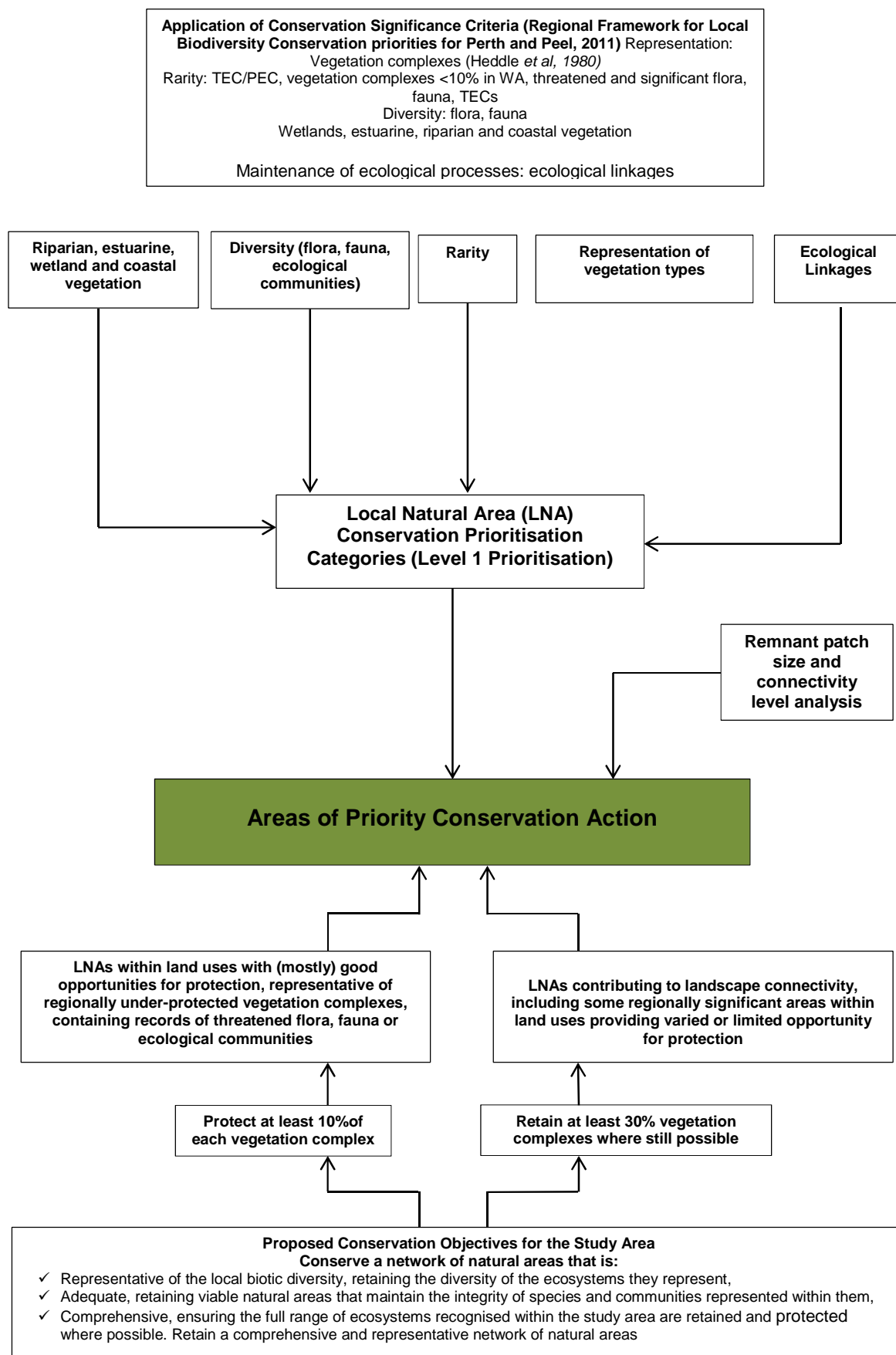
In general, higher the number of criteria being met the higher the priority for further consideration for conservation. However, all remnant vegetation potentially providing habitat for flora, fauna and ecological communities listed under legislation are high priority for further consideration.

Figure 1 overleaf provides an overview of the criteria used to select the APCAs in general.

Other consideration when selecting Local Natural Areas to be included within an APCA included natural area size, proximity to other natural areas and whether they are considered contributing to maintaining a large network of natural areas (Connectivity reach).

Connectivity analysis measures developed through the Regional Framework consider remnant patch size, shape and its position in relation to other remnant patches locally and in the broader landscape. However, this was only a secondary consideration and therefore it is not detailed further.

Figure 1: Summary of considerations to identify the Areas of Priority Conservation Action in the South West Group Study Area



The draft proposed APCAs were not designed to identify all natural areas of high conservation value in the study area. There are Local Natural Areas outside the proposed draft APCAs, in particular on private lands, with potentially high conservation values but are outside the Perth Regional Ecological Linkages. Conservation actions for these areas should be identified through Local Biodiversity Strategies developed by Local Government. Examples of such significant natural areas were included in APCAs R27 to R33 (refer to Appendix A), all in the City of Rockingham. Many similar areas exist in the City of Kwinana and City of Cockburn.

Each of the 145 APCAs that form a preliminary list developed for the City of Rockingham (refer to Appendix A) can be identified by a name and specific recommendations for actions. It is important to note that these recommendations are preliminary and subject to further consultation with the City of Rockingham and other stakeholders.

The following datasets were used to guide the identification of the APCAs:

- Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel Level 1 Prioritisation (2012)
- 2010 remnant vegetation mapping by vegetation complex mapping
- 2011 land use mapping to assess the opportunities and constraints to remnant vegetation retention and protection
- *Approved* structure plans (February 2012)
- Local Reserves
- Perth Regional Ecological Linkages (2004)
- Proposed local linkages (City of Cockburn, City of Fremantle).

2010 remnant vegetation mapping by vegetation complex mapping

This dataset was created by the Perth Biodiversity Project and categorises remnant vegetation extent according to vegetation complexes, as mapped in the Jarrah Forest by Mattiske and Havel (2000) and on the Swan Coastal Plain by Heddle *et al.* (1980). This dataset was derived by intersecting the 2010 remnant vegetation extent dataset provided by the Department of Agriculture and Food with pre-1750 vegetation complexes mapping.

2011 land use mapping to assess the opportunities and constraints for remnant vegetation retention and protection

Land use categories in the Metropolitan Region Scheme (MRS) and Local Planning Schemes (as in 2011) for all Local Governments in the study area were provided by the Department of Planning. These land uses were categorised according to level of opportunities provided by land use provisions to retain and protect natural areas. This land use provisions categorisation is based on the methodology developed by the Perth Biodiversity Project for the Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel (Level 2 Prioritisation).

An example of land uses that provide good opportunities for natural area retention and protection are lands reserved for Parks and Recreation in the MRS and local planning schemes. However, lands reserved for Recreation in local planning schemes are considered providing varied opportunities as they are often limited to small parcels of land and provision for active recreation might be a higher priority than providing for passive recreation which can facilitate vegetation retention. Other examples of lands providing varied opportunities for natural area retention include Rural zoned lands in the MRS, Rural lands with larger lot sizes in local planning schemes and lands reserved for various Public and Special Purposes.

Lands zoned Urban, Residential, Industrial or reserved for Roads and Railways are examples of land uses considered providing limited opportunities for vegetation retention or protection, mostly limited to meeting legislative requirements for species protection. For the full list of land use categorisation see Appendix C.

Approved structure plans and development plans

Lands zoned Urban or Residential in local planning schemes are at various degrees of development. To identify where opportunities to establish local linkages or strengthen connectivity within the Perth Regional Ecological Linkages exist, designs of approved structure plans were sourced from Local Governments. The degree of detail varied, ranging from a spatial dataset outlining the exact location of approved subdivision layout available for the City of Rockingham (status in February 2012) to shape files identifying an approved structure plan area boundary available for example for the City of Fremantle and the City of Cockburn.

Where vegetation or wetlands remained within structure plan area boundaries, documents providing detail on approved land uses for these structure plans were sourced through Local Government websites. For example, for the Hope Valley Wattleup Redevelopment Project area the APCA recommendations and some local linkages were informed by the Biodiversity Strategy prepared for this redevelopment area. Jandakot Airport Master Plan provides another example of an approved plan which affected the feasibility of a Perth Regional Ecological Linkage and led to identification of an alternative connectivity opportunity in the surrounds of the airport.

The information provided by the structure plans was primarily used to inform the location of local ecological linkages and in the City of Rockingham also to assess the feasibility of proposed representational conservation targets for vegetation complexes.

Local Reserves

Local Governments provided shape files identifying locations of reserves within their boundaries, some with information identifying reserves already managed for conservation. Local reserves provide good opportunities to strengthen connectivity through management of existing vegetation or providing opportunities for restoration. Their location was a key consideration in identifying opportunities for establishing local linkages or strengthening connectivity within regional linkages in urbanised landscapes.

Perth Regional Ecological Linkages (2004)

Regional Ecological Linkages link protected Regionally Significant Natural Areas by retaining the best condition Local Natural Areas available between them that can act as stepping stones for flora and fauna. This increases the long-term viability of the Regionally Significant Natural Areas as well as the Local Natural Areas in the link. The regional linkages also need to connect to Regionally Significant Natural Areas that are protected outside the study area. To be effective the linkages should incorporate the major variation in plant communities and fauna habitat typical of the region so that the widest range of flora and fauna possible can use the links.

Regional Ecological Linkages for the Perth Metropolitan Region have been identified by the Perth Biodiversity Project with input from Department of Environment, Department of Conservation and Land Management, and Department for Planning and Infrastructure in 2004.

A GIS dataset is available titled PMR – Regional Ecological Linkages. Linkage lines were drawn to be broadly reflective of the intended direction of the ecological link. A distance of 250 m either side of the linkage lines was created, resulting in a 500 m wide ecological linkage. A 500 m wide linkage was considered to be the minimum required to promote the inclusion of more viable Local Natural Areas within the ecological linkage.

The ecological linkage represents the first step in the process of identifying those Local Natural Areas that can act as stepping stones to form the Regional Ecological Linkages. These Regional Ecological Linkages provide the framework within which each Local Government can identify local ecological linkages that aim to link their Locally Significant Natural Areas to each other, to regionally significant natural areas and to the Regional Ecological Linkages.

Local linkages provided by Local Governments (City of Cockburn, City of Fremantle).

A number of Local Governments in the Perth Metropolitan Region have identified local linkages which have the potential to contribute toward conservation outcomes, albeit to a limited extent. For example, the City of Cockburn provided a dataset identifying 'local ecological corridors'. While no

metadata was provided with the dataset, local linkages follow major roads and power line easements. The City of Fremantle also provided a spatial datasets that identified 'Local Preliminary Linkages' and 'Greening opportunities'. No metadata was provided.

The Local Preliminary Linkages follow major streets and the Greening Opportunities overlap some Public Open Space areas and some Structure Plan areas within the Perth Regional Linkages through the City.

Some of these local linkages have merit from a conservation perspective, however, in most instances it is not considered viable in the long term to rely on vegetation in road reserves to act as linkage or ecological corridor. With intensified urbanisation, road widening will significantly affect any opportunity to maintain such linkages.

2.4 Identification of potential Local Ecological Linkages

Local ecological linkages are designed to link regionally significant natural areas not connected through the Regional Ecological Linkages. They are also connecting a network of local reserves with regionally significant natural areas to support their functions as stepping stones.

Some local linkages follow roads and run through Public Open Space areas with no remnant vegetation. This is recognising the highly fragmented character of urbanised landscapes and the potential of Public Open Spaces for planting local species as part of landscaping.

Finally, when identifying a route for a local linkage, suitable areas within 500m of each other were selected as a priority.

References

- Del Marco, A., Taylor, R., Clarke, K. Savage, K. Cullity, J. and Miles, C. (2004) *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*. Western Australian Local Government Association, West Perth.
- Oh, T (2012) *A Morphological classifier for remnant vegetation*. In: Zelinova et al (2012) *Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel*. Unpublished report, Perth Biodiversity Project, Western Australian Local Government Association
- Zelinova, R., Oh, T., Deeley, J. and Guthrie, N. (2012) *Regional Framework for Local Biodiversity Conservation Priorities for Perth and Peel*. Unpublished report, Perth Biodiversity Project, Western Australian Local Government Association.

APPENDIX A

Table 1: Summary of conservation values and examples of actions to maintain these values in the proposed draft Areas of Priority Conservation Action for cross boundary initiatives within the City of Rockingham.

ID Number City of Rockingham	Conservation values	Recommended actions
R1, R11, R24, R25	Coastal foreshore	<ul style="list-style-type: none"> • Rehabilitation of degraded areas within the coastal reserve • create local connection to BFS 356
R2	BFS355, BFS358, EPP Lake, coastal, regional ecological linkage	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration
R3	Regional linkage, representative of regionally significant vegetation	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation • Improve connectivity through restoration
R4	BFS 356, regional ecological linkage, EPP wetlands	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration
R5	BFS 377 & BFS356, intersection of two regional ecological linkages, Conservation category wetlands, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration • Retain vegetation on Rural zoned lands (support to private landholders)
R6	Stakehill Swamp, Outridge Swamp – EPP lakes and Conservation Category Wetlands, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages, adjoining BFSs	<ul style="list-style-type: none"> • Support private landholders to retain and manage remnant vegetation within rural zoned land • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration within lands reserved for Parks and recreation
R7	BFS 278, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Support private landholders to retain and manage remnant vegetation within rural zoned land • Retain as much as possible of remnant vegetation within BFS 278.
R8	BFS 379, EPP Lakes, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration within lands reserved for Parks and recreation.
R9	Regional ecological linkage, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos,	<ul style="list-style-type: none"> • Consider improving protection status of remnant vegetation within POS • Improve habitat value of remnant vegetation through threat control and restoration within POS areas

ID Number	Conservation values	Recommended actions
R10	Chain of EPP lakes, representative of regionally significant vegetation, adjoining BFSs	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation through threat control and restoration within POS areas • Support private landholders to retain and manage remnant vegetation within the adjoining rural zoned land
R12 R14	BFS394, BFS 277, EPP Lakes, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Support private landholders to retain and manage remnant vegetation within the rural zoned land
R13	BFS 375, BFS 376, EPP Lakes, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Support private landholders to retain and manage remnant vegetation within the rural zoned land
R15	BFS 376, regional ecological linkage	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration within lands reserved for Parks and recreation
R16	Representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Retain remnant vegetation within future subdivision
R17	Representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages – the best opportunity for a continuous corridor	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration within this old railway reserve (good opportunities for offset planting)
R18	Representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation through threat control and restoration within POS areas • Retain remnant vegetation within future subdivision
R19	Representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Support private landholders to retain and manage remnant vegetation within the rural zoned land
R20	BFS 356, BFS495, EPP lakes, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration within lands reserved for Parks and Recreation • Support private landholders to retain and manage remnant vegetation within the adjoining Rural and Special Residential zoned land

ID Number	Conservation values	Recommended actions
R21	BFS 418, BFS 419, EPP lakes, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation within these regionally significant areas through threat control and restoration within lands reserved for Parks and Recreation • Support private landholders to retain and manage remnant vegetation within the adjoining rural zoned land • Consider opportunities for revegetation to strengthen the connectivity along the regional linkage
R22	BFS 369, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos, regional ecological linkages	<ul style="list-style-type: none"> • Support private landholders to retain and manage remnant vegetation within the rural zoned land • Consider opportunities for revegetation to strengthen the connectivity along the regional linkage
R23	Adjoins BFS, representative of regionally significant vegetation,	<ul style="list-style-type: none"> • Improve habitat value of remnant vegetation through threat control and restoration within POS areas • Retain remnant vegetation within future subdivision • Support private landholders to retain and manage remnant vegetation within the rural zoned land
R26	Adjoins BFS, representative of regionally significant vegetation, potential habitat for Carnaby's black cockatoos	<ul style="list-style-type: none"> • Retain remnant vegetation within future subdivision
R27	Adjoins BFS, representative of regionally significant vegetation and landforms, Conservation Category wetlands,	<ul style="list-style-type: none"> • Support land managers to retain and manage remnant vegetation within the golf course
R28	Representative of regionally significant vegetation for which specific local conservation target is proposed, potential habitat for Carnaby's black cockatoos, Tuarts	<ul style="list-style-type: none"> • Support land managers to retain and manage remnant vegetation • In any future subdivision, maximise retention to maintain connectivity between BFS 379 and BFS 394 and provide for protection (e.g. via Local Conservation reserve of adequate size)
R29	Representative of regionally significant vegetation for which specific local conservation target is proposed, potential habitat for Carnaby's black cockatoos,	<ul style="list-style-type: none"> • Support land managers to retain and manage remnant vegetation with particular focus on maintaining connectivity along creecklines (protecting riparian vegetation)
R30	Representative of regionally significant vegetation for which specific local conservation target is proposed, potential habitat for Carnaby's black cockatoos	<ul style="list-style-type: none"> • Support land managers to retain and manage remnant vegetation with particular focus on providing adequate buffers to BFS 394 from any future potential development

ID Number	Conservation values	Recommended actions
R31	Representative of regionally significant vegetation for which specific local conservation target is proposed (Guildford vegetation complex)	<ul style="list-style-type: none"> Proposed target is set at 2ha or 3 ha out of total extent in the City of 4.97ha which represents 0.77% of the original extent. So portion within R22 and R31 are the last remaining examples of this vegetation type in the City. Due to their size, it could be feasible to retain them in their entirety within any future development. Their long term viability will depend on the level of retention of the same vegetation type within the City of Kwinana.
R32	Representative of regionally significant vegetation for which specific local conservation target is proposed, potential habitat for Carnaby's black cockatoos, Tuarts	<ul style="list-style-type: none"> Support land managers to retain and manage remnant vegetation In any future subdivision, maximise retention to maintain connectivity between BFS 356 and the regional ecological linkage; and provide for protection (e.g. via Local Conservation reserve of adequate size)
R33	Representative of regionally significant vegetation for which specific local conservation target is proposed, potential habitat for Carnaby's black cockatoos, Tuarts	<ul style="list-style-type: none"> Support land managers to retain and manage remnant vegetation In any future subdivision, maximise retention via POS