Part C – Important information to help in developing a Local Biodiversity Strategy

Part C of the Guidelines provides important background information to assist Local Governments in the local biodiversity planning process. This includes important statistics, templates for natural area assessment, planning polices, natural area protection mechanisms and a simple guide to the planning system.

12. Natural Area Initial Assessment templates and supporting information

These Guidelines encourage using the standard templates developed by the Perth Biodiversity Project (PBP) when collecting information on natural areas for local biodiversity planning. These four templates use current field survey techniques for flora and vegetation surveys in the region. They are based on the bushland plant survey recording sheets developed by Keighery (1994) and on templates prepared for use in the Bush Links project run in the Cities of Wanneroo and Joondalup by Volunteer Coordinator Alice Stubber. They have been tested and refined through assessment of a number of Local Government natural areas and a User's Guide is currently being prepared for publication.

12.1. Initial desktop and field assessment methodology

The templates compile information on ecological values, current vegetation condition, threats (threatening processes and disturbance factors) and, where present, existing management infrastructure. They will provide a basis for building a database about the natural areas occurring within a Local Government area.

The four templates include:

- Natural Area Initial Desktop Assessment template
- Natural Area Initial Field Assessment A template
- Natural Area Initial Field Assessment B - Significant Species and Communities template
- Natural Area Initial Assessment Summary template.

Before conducting field assessments, a Natural Area Initial Desktop Assessment template (Section 12.2) should be completed for each Local Natural Area, to compile existing information for verification during the field assessment.

Two field assessment templates are provided. The first, the Natural Area Initial Field Assessment A template (Section 12.3), is for Local Governments, community groups and consultants (if appropriate) to document the basic ecological values of a given natural area.

The skills required to complete the Natural Area Initial Field Assessment A template include the ability to:

- differentiate between native versus weed species and upland versus wetland plant species for a given locality
- recognise and describe plant communities based on structural layers and dominant species
- assess vegetation condition using a standard scale
- identify threats
- document management infrastructure
- make initial recommendations for management.

Trials in the City of Wanneroo have found that for natural areas under 100 ha, three to four hours of field work is required to complete the Natural Area Initial Field Assessment A template. Another six to eight hours should be allocated per area to complete the Natural Area Initial Desktop Assessment template, undertake necessary information collection and record and assess all the information gathered from the desktop and field work. This equates to allocating about three days for every two natural areas. This time may be reduced where a large number of sites are to be studied, or the natural areas are small.

The second field assessment template, the Natural Area Initial Field Assessment B template (Section 12.4), requires a higher skill level to complete. It is designed to record the presence of significant species or communities such as Declared Rare Flora (DRF) or Priority Flora, Specially Protected or Priority Fauna, other significant species (for example, as listed in Government of Western Australia 2000b) and Threatened Ecological Communities (TECs). These skills may be available within the Local Government or local community but in many instances it will be necessary to contract a specialised ecological consultant to undertake this part of the assessment at the appropriate time of year to determine the presence of any expected significant species or communities.

Consultants will have their own templates for this type of work and could be contracted to assess all natural areas within a Local Government area for significant species and communities as a separate brief. The Natural Area Initial Field Assessment B template will guide Local Government in preparing such a brief as it shows the kind of data collection required to address the ecological criteria for local significance on the basis of rarity.

The ideal situation would be to use assessors with the required skill level to undertake both of the initial field assessment templates at the same time. Completing two templates at once does not take much more time than completing the Natural Area Initial Field Assessment A template alone. If both are completed by the same assessor, this ensures greater consistency in the information collected. Assessors with the required skill level could be contracted to undertake both templates on the understanding that Local Government staff work alongside them during the assessment process to build staff capacity to understand and use the information. However, the resources may not be available to use highly skilled assessors for both tasks. Even if the two templates are completed by different assessors it is a good opportunity to train and mentor Local Government staff during the field assessment process.

The Appendices to the assessment templates (Sections 12.6 – 12.10) contain useful reference material for completion of the templates. Section 12.6 provides more detail on the skill levels required to complete the field assessment work. Section 12.10 is an appendix to be prepared by each Local Government for its own local area to assist with completion of Natural Area Initial Field Assessment B template for significant species and communities.

The Natural Area Initial Assessment Summary template (Section 12.5) allows the recording of Local Significance Criteria met by a Local Natural Area. It should be completed after the desktop and field assessments have occurred.

Note that these initial assessment templates do not require the collection of comprehensive flora and fauna species lists (except where Threatened Ecological Communities are thought to exist). For the purposes of comprehensive management planning or determining whether regional significance diversity criteria are met, comprehensive flora and fauna lists will be required. These could easily be compiled during the initial assessment process.

For the purpose of making the plant communities information collected during the initial assessment process compatible with the National Vegetation Information System (NVIS), there are several places in the templates where additional information needs to be noted using NVIS methodology. This will allow structural plant communities to be described using the NVIS Level 5 description methodology for plant associations (Executive Steering Committee for Australian Vegetation Information 2003). NVIS is an Australian wide standardised methodology being introduced to allow State of the Environment reporting at national, state and regional scales. However, this is not the methodology that has been used to date in Western Australia, especially at the regional level. These templates use the methodology previously adopted for studies in the PMR based on Keighery (1994). In the future the NVIS methodology will become increasingly more important and will be required for contributing information to State managed GIS datasets of vegetation type and extent that are needed for monitoring biodiversity conservation objectives and targets.

Date of assessment _____ Name of area _____

12.2. Natural Area Initial Desktop Assessment

Native Vegetation Unique ID No. _____

Name of area _____

Other names used _____

Location (address/ street name incl. suburb, nearest street corner, Local Government)

_____

_____

Street Directory Page and Grid Ref. (Street Smart/ Gregorys/ UBD) _____

Prepare the following maps and label with the name of the area.

Map 1: Location of _____

Photocopy of street directory showing location of site _____

Map 2: Reference Sites/ Plots and Linkage for _____

A GIS print-out of general area showing vegetation complexes, reference sites, reference plots, mapped wetlands and their management category, areas of any previously recorded Declared Rare Flora, Specially Protected Fauna, Priority Flora or Fauna or Threatened Ecological Communities plus location of Regional and, if available, Local Ecological Linkages. If no Local Ecological Linkages have already been determined for the Local Government area, use this map to mark potential local ecological linkages to other natural areas.

Map 3: Aerial photograph of _____

Date of photography _____ Scale _____

GIS print-out of aerial photography (with topography, if available) at a scale that ensures site covers most of an A4 page. Easy-to-use scales are 1:2000 (1 cm = 20 m), 1:3000 (1 cm = 30 m), 1:4000 (1 cm = 40 m) or 1:5000 (1 cm = 50 m). For large sites, spread over several A4 pages at one of these scales if necessary.

Area (ha) _____ Perimeter (m) _____

Perimeter (m) to area (m2) ratio _____ Priority for Further Investigation _____

Lot/Location/Reserve Number/s _____

Ownership (Local Government Reserve / Other Govt (Agency?) / Private) _____

Vesting Purpose _____

Current Status/ Use of land _____

Long term plans? _____

MRS Reservation or Zoning _____

TPS Reservation or Zoning _____

Land Manager _____

Date of assessment _____ Name of area _____

Recognised International/ National/ State/ Regional Conservation Value yes/no

Specify _____

Part of a Regional Ecological Linkage yes/no

Specify (links which areas?): _____

Mapped Vegetation Complex/es _____

Mapped Soil Type/s (if mapping available) _____

Mapped wetland/s: yes/no Environmental Protection Policy (EPP) Lake: yes/no

Wetland Management Category (see PBP Mapping): CC/RE/MU

Is it a mapped floodplain area? yes/no

Reference Sites and Plots (e.g. Bush Forever Sites; CALM Reserves, see Map 2). For reference sites on the coastal plain, note name, floristic community type (FCT) and whether FCT actual or inferred.

Existing biological information for area or for reference sites (reports/ surveys/ species lists)

Conservation Management Plan yes/no Current or Review needed?

Title/Author/Year _____

Part of a Local Ecological Linkage yes/no

(if these have not already been determined by Local Government mark potential links on Map 2)

Time since isolation from other natural areas <5 years/ 5 - 20 years/ >20 years

(consult local community, historical aerial photography)

Date of assessment _____ Name of area _____

Does it contain any mapped Threatened Ecological Communities (see Map 2)? yes/no

Specify: _____

Does it contain any mapped Declared Rare Flora (see Map 2) or is it a known location for any Specially Protected Fauna or significant habitat for these fauna? Yes/no

Specify: _____

Does it contain any mapped Priority (see Map 2) or other significant flora (e.g. see Table 13, Bush Forever, Vol. 2, p. 51) or is it a known location for any Priority or other significant fauna (e.g. see Tables 14 and 15, Bush Forever, Vol. 2, pp. 59-63) or significant habitat for these fauna? yes/no

Specify

_____

_____

Riparian vegetation expected yes/no

Estuarine fringing vegetation expected yes/no

Coastal vegetation expected (foredunes or secondary dunes) yes/no

Fire History (consult with FESA/Volunteer Fire Brigades, local community, historical aerial photography)

_____

_____

_____

_____

Known to be of particular value to the local community for conservation yes/no

Active Friends/Environmental Group yes/no

Name of group and contact details

_____

_____

Surrounding land uses with potential for community interest and possibly assistance with management

- educational facility yes/no
- residential development yes/no
- other (specify) yes/no
- European or Indigenous Cultural or Historical Heritage Value yes/no

Notes

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Date of assessment _____ Name of area _____

12.3. Natural Area Initial Field Assessment A

Date of Site Visit _____ Native Vegetation Unique ID No. _____

Name of area _____

Location (address/ street name) _____

_____

Assessor _____ *Skill Level _____

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

**Important Note: Skill level 4 or above is required by the assessor to complete this template (see Section 6.1)*

Photographs

Indicate film roll no. and photograph no., location and direction of each photo on Map 4 during site visit. e.g. R1/ P4 (Roll 1/ Photo 4 looking in this direction)

Photographer's Name _____

Latitude And Longitude (Optional)

GPS used: yes/ no GPS datum: AGD66 AGD84 GDA94 WGS84 (circle one)

Location of reading/calculation (indicate on Map 4)	Reading/calculation

Prepare the following map during the field assessment and label with the name of the area.

Map 4: (transparent overlay on aerial photograph, Map 3): Uplands/Wetlands, Structural Plant Communities, Vegetation Condition, Spot Weed Occurrences, Areas of Disturbance and Management Infrastructure of

_____

Uplands, Wetlands And Structural Plant Communities – Description And Mapping

On Map 4 divide the site into upland versus wetland areas and then into broad sections based on structural plant communities. Allocate a number to each community and describe each community below using a representative sample point. Note the vegetation condition of each sample point as well as drawing a vegetation condition map for the whole site.

Each structural plant community is described by noting the dominant species in each growth form layer of the community (see section 1.8) . Collect specimens for identification if necessary provided you have a licence from CALM and land owner permission. Carefully label all specimens. DO NOT collect species suspected of being DECLARED RARE FLORA but take a good photo and accurately note location. Do not collect whole plants unless they are very small species and do not collect at all if only a few are present, take a good photo as an alternative.

Date of assessment _____ Name of area _____

Photocopy this page and complete for each Structural Plant Community identified

Structural Plant Community No. _____ Indicate location of point described on Map 4.
Upland or Wetland? (circle one)

Landform and Soils

SLOPE: flat/ gentle/ steep ASPECT: n/a or N/ NE/ E/ SE/ S/ SW/ W/ NW
SURFACE SOIL: Colour: _____ Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel
EXPOSED ROCK (type and % of surface) _____
SUB-SURFACE SOIL: Colour: _____ Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel
UNDERLYING ROCK (type and depth if known) _____
DRAINAGE: well/ moderate/ poor WET: all year/ winter and spring only OR n/a

Topographic Position Circle position of point described on a transect diagram of site below.

Growth Form Layer	**Dominant species** (list all obviously dominant species for each growth form layer, record species in order of dominance) (* record % cover and height for each spp. for NVIS) (** record % cover for each spp. and which spp. < 0.5m for NVIS)	**Crown Cover (Keighery 1994)** 2-10% / 10-30% / 30-70% / over 70%	**Crown Cover (NVIS)** Record % crown cover to nearest 5-10%
Trees over 30 m			
Trees 10–30 m			
Trees under 10 m			
Mallees over 8 m *			
Mallees under 8 m *			
Shrubs over 2 m			
Shrubs 1-2 m			
Shrubs under 1 m **			
Herbs **			
Sedges/ Rushes **			
Grasses **			
Other (e.g. climbers)			

Common Native Species Note species observed.

Icon Flora Species (Note if present)

Vegetation Condition (Note scale used) (see Section 12.7)

Description Of Structural Plant Community No. ____ (see Section 12.8)

Icon Community (tick if an icon community) ☐

Date of assessment _____ Name of area _____

Weed Species Note species observed, especially the occurrence of species in better condition areas, even if they only occur in small numbers or in small patches at present. Note the distribution of each species across the site, e.g. throughout the site, spot occurrences or disturbed areas only (edges/tracks/cleared areas). Mark spot occurrences and easily mapped distributions on Map 4. If a species is widespread, note whether it is restricted to specific plant communities or wetland areas.

Weed Species	**Distribution** e.g. throughout the site, spot occurrences or disturbed areas only (edges/tracks/cleared areas)

Feral Fauna Note species observed or evidence for presence of species (scats, tracks or traces)

	✓	**Comments**
Evidence of Foxes (burrows, wildlife kills)		
Evidence of Rabbits (burrows, dung piles, grazing)		
Evidence of Dogs (droppings, scratchings)		
Evidence of Cats (wildlife kills)		
European Honey Bees (hives in tree hollows)		
Evidence of Horses/ Cattle/ Sheep (foot prints, droppings)		
Evidence of Pigs (soil disturbance)		
Rainbow Lorikeets		
Other		

Date of assessment _____ Name of area _____

Native Fauna Note species observed or evidence of presence of species, indicate any that are icon species

Species	**Comments:** Observed directly, evidence of presence (scats, tracks and traces) or likely habitat?

Native Fauna Habitat	✓	**Comments**
Areas of dense understorey vegetation		
Tree hollows in old mature trees		
Dead branches as perches for hunting/ look outs		
Large fallen logs on the ground		
Granite or other natural rocky outcrops		
Wetlands or waterways		

Vegetation Health

Note dead or dying trees, shrubs, herbs and so on. Note the species concerned and the pattern of deaths/changes in the vegetation. Phytophthora Dieback moves in fronts and along drainage lines therefore noting patterns helps to determine whether Phytophthora spp. are present. Section 12.9 lists common indicator species that are affected by Phytophthora spp. Do not automatically assume dead of dying plants means that Phytophthora is present.

	✓	**Comments**
Numerous tree stumps (not from logging)		
Dead or dying species		
Heavy leaf/stem damage by insects (e.g. lerps, stem borers)		
Diseases/ pests suspected		
Drought/ lowering of groundwater table suspected		
Flooding/ rise in groundwater table suspected		

Date of assessment _____ Name of area _____

Miscellaneous Disturbance Factors and Threatening Processes

Determine the range and extent of disturbance factors and threatening processes occurring at the site. If appropriate, mark on Map 4 and photograph as required. If site is large it may be beneficial to divide into sections and evaluate each separately.

Factor/Process	✓	**Comments**
Evidence of salinisation (e.g. scalding, seeps)		
Erosion (e.g. gullies, bank collapse)		
Wetland eutrophication (e.g. algal blooms)		
Stormwater drains/sumps		
Service corridors (e.g. Water Corp, Telstra, Western Power, Alinta Gas)		
Mining/extraction		
Evidence of past logging (e.g. selective removal of large trees)		
Previous clearing (may be partially cleared areas or evidence of previous clearing and regrowth over much of site)		
Overgrazing (e.g. rabbits, stock, goats; over-population by kangaroos)		
Firewood collection (e.g. recent chainsaw/axe cuts, sawdust piles)		
Dope plants/ production equipment		
Soil movement (dumping or removal)		
Factor/Process	✓	**Comments**
Rubbish dumping (note type, e.g. construction, garden waste, weed source?)		
Proliferation of tracks (fire breaks, walk trails)		
Off road vehicle use (4WD / trail bikes/ BMX/ mountain bikes)		
Cubby construction		
Vandalism (damage to plants)		
"Enrichment Planting" (revegetation with species not found in that local plant community, are these becoming weeds?)		
Impacts of High Fire Frequency and/or Intensity		
Reduced range of tree ages Fire scars high up (due to a hot burn) Major trunk damage Trees suckering from trunk and branches Amount of leaf litter reduced Large fallen logs nearly burnt away Evidence of arson (burnt grass tree skirts, matches, cigarette lighters, exploded spray cans)		
Time since last fire (estimate)		<2 years/ < 5 years/ <10 years/ <20 years (circle one)

Date of assessment _____ Name of area _____

Vegetation Condition Map

For initial assessment, the overall vegetation condition of the site can be determined by familiarising yourself with the site. Then on Map 4, divide the site into broad sections based on condition. Using the map, estimate the % area each section occupies of the total site and score each section for condition in the boxes below, for example, 'Section 1: 75% of site, Very Good. Section 2: 25% of site, Degraded.' For most sites there will be very degraded areas along tracks, for example, where rubbish has been dumped. If not extensive these can be referred to by adding a statement such as 'areas of severe localised disturbance' in the comments (Government of WA 2000b).

Vegetation Condition Scales Use either the Keighery (1994) or Kaesehagen (1994) condition scale (see Section 12.7). Indicate which condition scale is used in table below. Indicate % area each section occupies of the total site (ensure adds up to 100%). Draw boundary of each section and note condition of each on Map 4.

Keighery (1994)	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded
% area						
Kaesehagen (1994)		Very Good to Excellent	Fair to Good		Poor	Very Poor
% area						

Comments

Existing Management Infrastructure

Describe type in box below and mark location on Map 4, photograph if required.

	✓	Comments
Fencing		
Fence condition		
Gates		
Paths		Soil; concrete; limestone; mulch
Path condition		
Path fencing		
Path fence condition		
Fire Access Tracks		Slashed; sprayed; ploughed
Signs		Name of area / other
Previous works		

Social Significance Values

	✓	Comments
EVIDENCE OF Community/ Education/ PASSIVE RECREATION Interest		
Landscape amenity (e.g. screen/ buffer between conflicting land uses)		
SCENIC FEATURES (e.g. high point in landscape)		
INDIGENOUS/ EUROPEAN Heritage (CULTURAL OR HISTORICAL)		
OTHER		

Date of assessment ________________ Name of area ________________

Surrounding Land Uses (mark on Map 4)

	✓	Comments
Surrounding Land Uses (note type/s and indicate likely impacts/benefits. (e.g. source of rubbish; weed seeds blowing into site; potential for community interest and volunteers to assist management)		

Recommendations for Management List potential management actions (for example, Phytophthora Dieback assessment by an accredited assessor; fencing; signage to identify as a conservation area; rubbish removal; weed survey and mapping; fire response plan)

Date of assessment _____ Name of area _____

Confirmation of GIS Mapped Boundaries

Prepare the following map if recommending changes to wetland or native vegetation mapping and label with the name of the area.

Map 5: (overlay on aerial photo): Recommended GIS Boundary Changes for _____

Forward a copy of recommended changes with Map 5 to Perth Biodiversity Project, WALGA, 15 Altona St, West Perth 6005 for distribution to relevant custodian of database.

GIS dataset		Changes recommended (yes/no) Prepare Map 5 if recommending changes to A or B only. Draw boundaries that correspond to your field assessment and assign accordingly 'A' and/or 'B'. Outline the rationale for each change against the relevant category (A or B)
A	**Mapped Native Vegetation** (DPI/Dept of Agriculture 2001)	Yes / No
Rationale: _____		
B	**Mapped Wetland/s and Management Category** CC, RE or MU (DoE current update)	Yes / No / NA For changes to the mapping of non-flowing wetlands on the Swan Coastal Plain complete and attach EPA Bulletin 686 (EPA 1993) to determine the new boundary and management category.
Rationale: _____		
C	**Mapped Vegetation Complex/es** (Heddle, Loneragan and Havel 1980 or Mattiske & Havel 1998)	Yes / No More likely to be _____
Rationale: (do not map) _____		

Date of assessment _____ Name of area _____

12.4. Natural Area Initial Field Assessment B – Significant Species and Communities

General Information

Native Vegetation Unique ID No. _____

Name of area _____

Location (address/ street name)

_____

_____

Assessor _____ Skill Level* _____

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

Date of Site Visit _____ Skill Level _____

**Important Note: Skill level 5 or above is required by the assessor to survey natural areas for significant species. Skill Level 6 is required to survey for threatened ecological communities (see Section 12.6)*

Assessed as NOT containing significant species or communities Tick the box and continue no further if significant flora, significant fauna and Threatened Ecological Communities have been recorded as NOT present during this assessment.	✓

Date of assessment _____ Name of area _____

Photographs

Indicate film roll no. and photograph no., location and direction of each photo on Map 4 during site visit. e.g. R1/P4 (Roll 1/Photo 4 looking in this direction)

Photographer's Name _____

Latitude And Longitude (Optional)

GPS used: yes/no GPS datum: AGD66 AGD84 GDA94 WGS84 (circle one)

Location of reading/calculation (indicate on Map 4)	Reading/calculation

Prepare the following map during the field assessment and label with the name of the area. Consult Map 4 prepared for Natural Area Initial Field Assessment A for the structural plant communities and vegetation condition mapping, update on Map 6 if necessary.

Map 6 (overlay on aerial photograph): Location of Threatened Ecological Communities, significant native flora or fauna or suitable habitat for these fauna of _____

_____

Threatened Ecological Communities (TECs)
List the Threatened Ecological Communities present or believed to be present on the site and the reasons why. For those TECs based on floristic community types, map the boundary of each TEC by cross referencing with the structural plant communities mapped during the Natural Area Initial Field Assessment A (Map 4). **During spring**, describe a standard 10 x 10 m quadrat and compile a species list for each structural plant community representing a TEC (see Threatened Ecological Communities – Description and Mapping).

Date of assessment _____ Name of area _____

Significant Native Flora

Note presence of Declared Rare, Priority or other significant flora. Note location of species on Map 6. Indicate which structural plant communities they occur in (refer to Map 4 of the Natural Area Initial Field Assessment A).

Species and Significance	Comments eg. Structural Plant Community, Population Size

Significant Native Fauna

Note presence or evidence for presence of Specially Protected, Priority or other significant fauna. Note location of species/ evidence on Map 6. Indicate which structural plant communities they occur in or utilise.

Species and Significance	Comments: Observed Directly, Evidence of Presence or Likely Habitat?

Date of assessment _____ Name of area _____

Photocopy this page and complete for each Structural Plant Community identified as a TEC

Threatened Ecological Communities – Description and Mapping

For TECs based on floristic community types, description and mapping needs to be undertaken during spring to provide the definitive floristic information needed to confirm the presence of a TEC. On Map 6, draw the boundary of each Threatened Ecological Community present and label with the TEC to which it belongs. These boundaries should be based on the structural plant communities identified on Map 4 of the Natural Area Initial Field Assessment A template. Allocate a number to each structural plant community representing a TEC and describe each below using a permanently located and representative 10 x 10 m quadrat. Note the vegetation condition of each quadrat. Compile a list of the plant species present within each quadrat.

Structural Plant Community No. _____ Indicate location of point described on Map 6.

Upland or Wetland? (circle one)

Landform and Soils

SLOPE: flat/ gentle/ steep ASPECT: n/a or N/ NE/ E/ SE/ S/ SW/ W/ NW

SURFACE SOIL: Colour: _____ Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel

EXPOSED ROCK (type and % of surface) _____

SUB-SURFACE SOIL: Colour: _____ Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known) _____

DRAINAGE: well/ moderate/ poor WET: all year/ winter and spring only OR n/a

Topographic Position Circle position of point described on a transect diagram of site below.

Growth Form Layer	**Dominant species** (list all obviously dominant species for each growth form layer, record species in order of dominance) (* record % cover and height for each spp. for NVIS) (** record % cover for each spp. and which spp. < 0.5m for NVIS)	**Crown Cover (Keighery 1994)** 2-10% / 10-30% / 30-70% / over 70%	**Crown Cover (NVIS)** Record % crown cover to nearest 5-10%
Trees over 30 m			
Trees 10–30 m			
Trees under 10 m			
Mallees over 8 m *			
Mallees under 8 m *			
Shrubs over 2 m			
Shrubs 1-2 m			
Shrubs under 1 m **			
Herbs **			
Sedges/ Rushes **			
Grasses **			
Other (e.g. climbers)			

Date of assessment _____ Name of area _____

Photocopy this page and complete for each Structural Plant Community identified as a Threatened Ecological Community

Plant Species Note native and weed species observed within a standard 10 x 10 m quadrat.		
Trees / Mallees	**Herbs**	
Shrubs		
		Sedges / Rushes
		Grasses
Vegetation Condition (Note scale used) (see Section 12.7)		
Description Of Structural Plant Community No. ____ (see Section 12.8)		

Date of assessment _____ Name of area _____

12.5. Natural Area Initial Assessment Summary

ECOLOGICAL CRITERIA	
1. Representation	
1a. Regional Representation	
i) recognised International, National, State or Regional conservation value but not already protected Specify:	yes/no
ii) of an ecological community with only 1500 ha or 30% or less (whichever is the greater) remaining in IBRA subregion Specify:	yes/no
iii) large (greater than 20 ha), viable natural areas in good or better condition of an ecological community with more than 30% remaining within the IBRA subregion	yes/no
iv) of an ecological community with only 1500 ha or 15% or less (whichever is the greater) protected for conservation in the Jarrah Forest IBRA subregion Specify:	yes/no
v) of an ecological community with only 400 ha or 10% or less (whichever is the greater) protected for conservation in the Bush Forever Study Area Specify:	yes/no
1b. Local Representation	
i) of an ecological community with 10% or less remaining of its pre-European extent within the Local Government Area Specify:	yes/no
ii) of an ecological community with 30% or less remaining of its pre-European extent within the Local Government Area Specify:	yes/no
iii) large (greater than 10 ha), viable natural areas in good or better condition of an ecological community with more than 30% remaining within the Local Government Area	yes/no
2. Diversity	
i) natural area in good or better condition that contains both upland and wetland structural plant communities	yes/no
3. Rarity	
i) of an ecological community with only 1500 ha or 10% or less (whichever is the greater) remaining in IBRA subregion Specify:	yes/no
ii) of an ecological community with only 400 ha or 10% or less (whichever is the greater) remaining in the Bush Forever Study Area Specify:	yes/no
iii) contains a Threatened Ecological Community Specify:	yes/no
iv) contains Declared Rare Flora, Specially Protected Fauna or significant habitat for these fauna Specify:	yes/no
v) contains Priority or other significant flora or fauna or significant habitat for these fauna Specify: _____ _____ _____	yes/no

Date of assessment _____ Name of area _____

4. Maintaining Ecological Processes or Natural Systems - Connectivity	
i) natural areas acting as stepping stones in a Regionally Significant Ecological Linkage Specify:	yes/ no
ii) natural areas acting as stepping stones in a locally significant ecological linkage Specify:	yes/ no
5. Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	
i) Conservation or Resource Enhancement category wetland plus buffer	yes/ no
ii) EPP Lake plus buffer	yes/ no
iii) riparian vegetation plus buffer	yes/ no
iv) floodplain area plus buffer	yes/ no
v) estuarine fringing vegetation plus buffer	yes/ no
vi) coastal vegetation on foredunes and secondary dunes	yes/ no

VIABILITY ESTIMATE

Viability Factor	**Category**	**Score**
Size	Greater than 20 ha	5
	Greater than 10 ha less than 20 ha	4
	Greater than 4 ha less than 10 ha	3
	Greater than 1 ha less than 4 ha	2
	Less than 1 ha	1
Shape	Circle, square or squat rectangle	3.5
	Oval, rectangle or symmetrical triangle	3
	Irregular shape with few indentations	2.5
	Irregular shape with many indentations	2
	Long thin shape with large proportion of area greater than 50 m wide	1.5
	Long thin shape with large proportion of area less than 50 m wide	1
Perimeter to area ratio	Less than 0.01	4
	Greater than 0.01 less than 0.02	3
	Greater than 0.02 less than 0.04	2
	Greater than 0.04	1
Vegetation condition NB: based on Keighery (1994) condition scale	Pristine 10	
	Excellent 8	
	Very good 6	
	Good 4	
	Degraded 2	
	Completely degraded 0	
	calculated score =	

Date of assessment _____ Name of area _____

Connectivity	Forms part of a Regional Ecological Linkage and is contiguous with another protected natural area greater than 4ha	5
	Not part of a Regional Ecological Linkage and is contiguous with another protected natural area greater than 4ha	4.5
	Forms part of a Regional Ecological Linkage and is within 500 m of more than 4 other protected natural areas having an area greater than 4 ha	4
	Not part of a Regional Ecological Linkage but is within 500 m of more than 4 other protected natural areas having an area greater than 4 ha	3.5
	Forms part of a Regional Ecological Linkage and is within 500 m of 3 or 4 other protected natural areas having an area greater than 4 ha	3
	Not part of a Regional Ecological Linkage but is within 500 m of 3 or 4 other protected natural areas having an area greater than 4 ha	2.5
	Forms part of a Regional Ecological Linkage and is within 500 m of 2 other protected natural areas having an area greater than 4 ha	2
	Not part of a Regional Ecological Linkage but is within 500 m of 2 other protected natural areas having an area greater than 4 ha	1.5
	Forms part of a Regional Ecological Linkage and is within 500 m of less than 2 other protected natural areas having an area greater than 4 ha	1
	Not part of a Regional Ecological Linkage but is within 500 m of less than 2 other protected natural areas having an area greater than 4 ha	0.5
	Forms part of a Regional Ecological Linkage and is not within 500 m of any other protected natural areas having an area greater than 4 ha	0.25
TOTAL SCORE		

12.6. Skill level matrix for natural area assessment

Skill Level	Description
1	No relevant environmental qualification, no training specific to bushland management and no previous experience in undertaking biological surveys
2	Basic introductory training in bushland management[1] but no previous experience in undertaking biological surveys
3a	Training specific to bushland management[2] but no previous experience in undertaking biological surveys
3b	Relevant environmental qualification[3] but no training specific to bushland management and no previous experience in undertaking biological surveys
3c	Relevant environmental qualification[3], and training specific to bushland management2 but no previous experience in undertaking biological surveys
4a	Training specific to bushland management[2] and some experience in undertaking biological surveys
4b	Relevant environmental qualification[3] but no training specific to bushland management and some experience in undertaking biological surveys
4c	Relevant environmental qualification[3] and training specific to bushland management and some experience in undertaking biological surveys
4d	Some experience in undertaking biological surveys
5a	Training specific to bushland management[2] and extensive experience in undertaking biological surveys
5b	Relevant environmental qualification[3] but no training specific to bushland management and extensive experience in undertaking biological surveys
5c	Relevant environmental qualification[3] and training specific to bushland management and extensive experience in undertaking biological surveys
5d	Extensive experience in undertaking biological surveys
6a	Training specific to bushland management[2] and extensive experience in undertaking biological surveys in the Perth Metropolitan Region
6b	Relevant environmental qualification[3] but no training specific to bushland management and extensive experience in undertaking biological surveys in the Perth Metropolitan Region
6c	Relevant environmental qualification[3] and training specific to bushland management and extensive experience in undertaking biological surveys in the Perth Metropolitan Region
6d	Extensive experience in undertaking biological surveys in the Perth Metropolitan Region

[1] for example, APACE Introduction to Bush Regeneration course (minimum of four days study)

[2] for example, a Certificate in Bush Regeneration (such as Certificate II or III in Conservation and Land Management) (minimum of six months study)

[3] for example, a Degree or Diploma in Environmental Science or Biology (minimum of three years study)

It is expected that people in each of the above skill levels would have the following capabilities:

- good observation skills
- familiarity with common plant and animal species of the local area
- map/aerial photo reading skills
- mathematical skills (for example, can read scales, draw to scale)
- basic map drawing skills, contours, latitude/longitude
- ability to use a GPS for determining coordinates for mapping where required.

for Skill Level 4 and above:

- ability to distinguish between wetland and upland areas; ability to distinguish between weed/feral species and species that are native to a given area; knowledge of steps required to identify plant and animal species, for example, ability to use identification keys.

for Skill Level 5 and above:

- ability to survey for Declared Rare Flora, Specially Protected Fauna, Priority and other significant species of flora and fauna

for Skill Level 6:

- ability to survey for threatened ecological communities in the Perth Metropolitan Region

12.7. Vegetation condition scales for natural area assessment

A comparison of the Keighery (1994) and Kaesehagen (1994) vegetation condition scales for natural area assessment

Keighery Condition Scale (Keighery 1994)	Kaesehagen Condition Scale (Kaesehagen 1994)
Pristine Pristine or nearly so, no obvious signs of disturbance	
Excellent Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive species	**Very good to excellent** ▪ 80% to 100% native flora composition ▪ Vegetation structure intact or nearly so ▪ Cover/abundance of weeds <5% ▪ No or minimal signs of disturbance
Very good Vegetation structure altered; obvious signs of disturbance For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging; grazing	**Fair to good** ▪ 50% to 80% native flora composition ▪ Vegetation structure modified or nearly so ▪ Cover/abundance of weeds 5% to 20%, any number of individuals ▪ Minor signs of disturbance
Good Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; grazing.	
Degraded Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires; the presence of very aggressive weeds; partial clearing; dieback; grazing	**Poor** ▪ 20% to 50% native flora composition ▪ Vegetation structure completely modified or nearly so ▪ Cover/abundance of weeds 20% to 60%, any number of individuals ▪ Disturbance incidence high
Completely Degraded The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.	**Very Poor** ▪ 0% to 20% Native flora composition ▪ Vegetation structure disappeared ▪ Cover/abundance of weeds 60% to 100%, any number of individuals ▪ Disturbance incidence very high

12.8. Growth Form Layers and Vegetation structure classification scheme for natural area assessment (for comparison to NVIS see User's Guide in prep.)

Growth Form Layers (Adapted from Keighery 1994, McDonald et al. 1990 and Executive Steering Committee for Australian Vegetation Information 2003)

Tree:	woody plant with a single trunk and canopy, the canopy is less than or equal to 2/3 of the height of the trunk, no lignotuber apparent
Mallee:	woody plant with many woody stems, canopy well above the base, lignotuber usually apparent, commonly of the genus Eucalyptus
Shrub:	woody plant with one or many woody stems, foliage all or part of the total height of the plant, includes grass trees (Xanthorrhoea spp.) and cycads (Macrozamia spp.)
Herb:	non-woody plant with stems, generally under 0.5 m tall and not a grass, sedge or rush
Grass:	non-woody plant that comes from the plant family Poaceae; all have inconspicuous individual flowers that are pollinated by wind; leaf sheath always split, ligule present, leaf usually flat, stem cross-section circular, evenly spaced internodes.
Sedge:	non-woody, tufted or spreading plant that comes from the plant family Cyperaceae; most have inconspicuous flowers that are pollinated by wind; leaf sheath never split, usually no ligule, leaf not always flat, extended internode below inflorescence
Rush:	same as sedge but comes from the plant families Juncaceae, Restionaceae, Typhaceae or Xyridaceae; leaf sheath may be split in Restionaceae
Climbers:	plants that climb or scramble over other plants for support.

Classification System Used to Describe Vegetation Structure (Keighery 1994), as adapted from Muir (1977) and Aplin (1979)

Growth Form/ Height Class	Canopy Cover			
	100% to 70 %	**70% to 30 %**	**30% to 10 %**	**10% to 2 %**
Trees over 30 m	Tall Closed Forest	Tall Open Forest	Tall Woodland	Tall Open Woodland
Trees 10-30 m	Closed Forest	Open Forest	Woodland	Open Woodland
Trees under 10 m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland
Mallee over 8 m (Tree Mallee)	Closed Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Mallee under 8 m (Shrub Mallee)	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub
Shrubs over 2 m	Closed Tall Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland
Shrubs 1-2 m	Closed Heath	Open Heath	Shrubland	Open Shrubland
Shrubs under 1 m	Closed Low Heath	Open Low Heath	Low Shrubland	Very Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

12.9. Common indicator species for the presence of disease caused by Phytophthora cinnamomi

Indicator Species

"An indicator species is a plant species, which is reliably susceptible to Phytophthora cinnamomi (i.e. that the disease usually kills that species). Common indicator species in the northern jarrah forest include Banksia grandis (bull banksia), Patersonia spp (purple flag and yellow flag), Persoonia longifolia (snottygobble), and Xanthorrhoea preissii (balga or grass tree). Indicator species distribution and composition will vary from place to place according to vegetation type" (Department of Conservation and Land Management 2003b). If plants of these species are selectively dead or dying amongst otherwise healthy bushland plants then it is safe to assume that this indicates the Phytophthora cinnamomi dieback disease process is operating until confirmed otherwise by experts.

Refer to the current table of dieback indicator species posted on CALM's Nature Base website (available at http://www.calm.wa.gov.au/projects/pdf_files/dieback_indicators.pdf) (Department of Conservation and Land Management 2003b).

12.10. Significant species and ecological communities known to occur or that may occur within Local Government Area.

Declared Rare Flora, Specially Protected Fauna, Priority or Other Significant Flora or Fauna that may Occur in the Area (To be filled out by the assessor for each Local Government Area based on information collected from reference sites/plots; Bush Forever Vol 2 for the coastal plain; reports/surveys; WA Herbarium & WA Museum databases and in consultation with CALM and WA Museum).

Species & significance	Distinguishing features	Expected habitat

Threatened Ecological Communities (based on information from CALM's TEC database, reference sites/plots, Bush Forever Vol 2 for SCP, reports/surveys)

Communities & significance	Description/key features