# Recording sheets

Sharp S. and Gould L., 2014. *ACT Region Vegwatch Manual: Vegetation and habitat condition assessment and monitoring for Community*. Molonglo Catchment Group Inc., Canberra.

## Instructions

Copy the relevant recording sheets and associated instructions.

The recording sheets are available electronically via the Vegwatch website. You may either fill out hard copies and then enter the data onto the database, or enter the data electronically in the field. However, as entering the data electronically from recording sheets may have errors or omissions, it is important to review them for accuracy and completeness, soon after the field work. If entering it directly onto the database, ensure you check the data carefully to pick up any errors or data omissions.

Store the hard copies together with photos in a single location, such as a ring binder. Ensure that at least one additional copy of the data is stored elsewhere and provide copies of the data to the coordinator of the Vegwatch program

The data base has in-built functions for summarising the data and provision of graphs of the results of monitoring. (http://www.act-vegwatch.com.au).

**Recording Sheets**

Study Plan

Activity Diary

Field Equipment and Checklist

Plot Establishment and Location

Plot Description

Photopoint Monitoring

Indicator 1. Plant Species Diversity

Indicator 2. Structural Diversity of Native and Introduced Plants

Indicator 3. Condition of Native Trees and Shrubs

Indicator 4. Species Cover

Indicator 5. Terrestrial Habitat Condition

Indicator 6. Revegetation Success

Indicator 7. Distribution and Abundance of a Species

Indicator 8. Waterbody Habitat Condition

Unknown Species Identification

## Study Plan

Fill out this table for each monitoring or assessment program or study, and keep a record of it for future reference. See Section 4 Step 1 for more instructions. You will be recording the reasons why you are undertaking the study, and ensuring you have the resources to do it.

|  |  |  |
| --- | --- | --- |
| **Name of project** |  | |
| **Site location** |  | |
| **Names and contact details of planners** |  | |
| **Date** |  | |
| **1) Why am I carrying out this study?** | List two or more reasons for undertaking the study. This may relate to your site management objectives. |  |
| List corresponding proposed outcomes from the assessment and/or monitoring. |  |
| **2) What am I going to study?** | What are the questions I want to answer? (see Table 4.1) |  |
| List the indicators you are going to measure, based on the questions you are asking. |  |
| **3) Where and when am I going to measure the indicators?** | List the vegetation zones where the study will be undertaken (as determined through the mapping and from existing site information). |  |
| List how many replicate plots will be established and if control plots are to be established and where. |  |
| Identify whether the placement of the plots will be random or representative. |  |
| Note down the study time frame |  |
| **4) Who is going to be involved in the study?** | List the people and organisations who will be involved with the monitoring and their time availability. List their contact details. |  |
| List the people or agencies that need to be contacted for permission to undertake the study or to provide advice. |  |
| **5) How am I going to store and interpret the data?** | Note down what you intend to do with the data. |  |
| **6) Is my study design robust?** | Identify at least one person with experience in survey and monitoring to assess whether the design of the study is realistic and will provide desired results. |  |

Examples of questions to identify what can be measured and what methods (indicators) can be used to answer those questions through monitoring are in Table 3.2.

## Activity Diary

**Instructions**

Fill out details of any events, observations and management that you believe will assist with interpretation of the data. Try to keep it up to date so that it is as accurate and detailed as possible. If relevant attach photographs.

|  |  |
| --- | --- |
| **Name of project** |  |
| **Site Location** |  |
| **Vegetation Zone** |  |
| **Monitoring Sites** |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Recorded by** | **Observation, event or action** | **Follow up required** | **Completed** |
|  |  |  |  |  |
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## Field Equipment and Checklist

**Instructions**

Before going out into the field:

1. Collect together required equipment: refer to Chapter 2 to source or make equipment required.

|  |  |  |  |
| --- | --- | --- | --- |
| **Field equipment** | **To plan for the study** | **To establish temporary or permanent plots** | **Monitoring or Assessment** |
| Map of the site with vegetation zones identified | Yes | Yes | Yes |
| Camera |  | Yes | Yes |
| Pens, pencils, rubbers, clipboard |  | Yes | Yes |
| 2 x 50 m tapes and 2 x 20 m tapes or ropes marked at 20 m and 50 m |  | Yes | Yes |
| 4 tent pegs and 6 flags |  | Yes | Yes |
| Permanent markers (star pickets or surveyor pegs) |  | Yes (for monitoring) |  |
| Hammer |  | Yes (for putting in permanent markers) |  |
| Compass, GPS |  | Yes | Yes |
| Sighter post 1.5 m tall and bricklayer nail |  | Yes | Yes |
| Polypipe 8 mm wide and about 5 cm long (for viewing overhead cover); or cover app\* |  |  | Yes |
| Sign for identification of plot |  | Yes | Yes |
| Plastic bags and ID tags for specimens |  |  | Yes |
| Point wire (less than 3 mm thick) |  |  | Yes (Indicator 4) |
| Field guides |  |  | Yes |
| Recording sheets | Map of the vegetation and physical features  Study Plan  Activity Diary | Plot Location  Plot Description  Photopoint Monitoring | Plot Description, Plot Location and Photopoint Monitoring sheets for finding plots.  Indicators 1, 2, 3, 4, 5  Indicator 6 if revegetation success is being monitored |

\* <https://play.google.com/store/apps/details?id=com.scrufster.habitapp>

1. Contact the landholder to tell them when you will be on the site, who will be there and for how long. Ensure you have provided them with the details of the study and a map showing the location.
2. Ensure everyone involved is informed and prepared.
3. If you are going to collect plants ensure you have a licence (you will need at least a month to prepare for this).
4. Wear adequate protective clothing and shoes and take water.

## Plot Establishment and Location

**Instructions**

1. Assessment sites should be at least 10 metres away from the area boundary, as this zone is likely to be more disturbed. This may not always be possible. For monitoring programs choose sites that can be easily re-located.
2. In an area that contains woody vegetation over 2 m tall the convention followed is to undertake the measurements within a 0.1 ha plot, generally 20 m x 50 m plot. In an area that contains grassland, sedgeland or low shrubland the convention is to undertake the measurements within a 0.04 ha plot, usually 20 m x 20 m. Where plots of these dimensions do not fit, for example, in a long and narrow area such as a roadside, another shape plot may be used (e.g. 10 m x 100 m or 10 m x 40 m).
3. Establish the plots. The number of plots will depend on what is being measured. If you are undertaking this study as part of the Vegwatch program then you are probably only establishing one plot. If you wish to know more about whether changes can be attributed across the whole area being managed you will need to establish multiple plots. See Chapter 3.2 for a guide to how many plots and transects should be established according to the size of the vegetation zone.
4. For the Vegwatch program you will be monitoring areas that are representative. Find patches within the vegetation zone that are typical of the area you wish to assess. The plots are likely to be placed where change is expected to occur, so the location of these may differ from the plots established for baseline condition assessment.
5. If you are monitoring randomly across the vegetation zone, use a set of rules or a numbers table to locate the patches where you will be monitoring. You are recommended to establish random plots if you are establishing multiple plots to measure changes in your management area.
6. Work out which direction your plot or transect will follow. Generally, unless there is good reason not to, the long side of the plot runs along the contour, to minimise internal differences due to slope.
7. Mark out the sites:
8. *Plot based assessments:* For different shape plots (or different size, modify the lengths of the tape accordingly).
9. Starting at one corner, pull the tape out 50 m to mark the first side of the plot.
10. Put a peg in at 50 m and then pull a tape out to 20 m at right angles.
11. Put a peg in at 20 m and then pull a tape out to 50 m at right angles.
12. Put a peg in at 50 m and then pull a tape out to 20 m at right angles. You will need to adjust the tape to make the corners as close to right angled as possible.
13. *Transect based assessment:*
14. Identify the start and end points of the transect (e.g. at 0 m along the long side of the rectangular plot).
15. For permanent plots: Mark the location of the permanent monitoring plot or transect on your map and take GPS readings for each plot (starting at the SW corner). Put in permanent pegs, such as surveyor pegs.
16. There are unfortunately different measures of location on GPS and maps. Refer to your GPS or map details to determine which datum is used. In some GPS units you have a choice of which datum to use. The preferred datum is GDA94.
17. Even if you are putting in permanent pegs don’t assume it is straightforward to find them again. Therefore, as well as getting GPS readings, take photos to identify where each corner is. By convention the SW corner is identified as point 1.
18. For each plot or transect that you establish, fill out the Plot Location recording sheet. Provide enough detail so that someone else can find the plot without assistance.

#### Plot Location

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Site Location** |  | | **Monitoring Plot No.** |  |
| **Date established** |  | | **Surveyors** |  |
| **Assessment Site Set-up by** | |  | | |
| **Directions to get to plot** | |  | | |
| **Description of the location of the plot in the vegetation zone** | |  | | |
| **Plot dimensions, orientation** | |  | | |
| **Transect dimensions, orientation, location** | |  | | |
| **Map or GPS reference of permanent stakes or pegs at each corner** | | SW: Easting: …………………….......... Northing:………………………..  NW: Easting: ……………………......... Northing:………………………..  NE: Easting: ……………………........... Northing:………………………..  SE: Easting: ……………………............ Northing:……………………….. | | |
| **GPS Datum**: if known, circle appropriate | | WGS84 AGD66 AGD84 GDA94 | | |
| **Map type** (circle): | | Air Photo Google Earth Topographical map | | |
| **Map reference used** (if applicable) - normally printed on bottom left or top right corner of map. | | Scale: 1:50,000 1:25,000 1:10,000  Sheet: | | |
| **Sketch** **of area** showing location of assessment site and location of corner pegs | | | | |

Attach photos

## Plot Description

**Instructions**

1. For each plot or transect that you establish, fill out the Plot Description recording sheet.
2. Explanations: give an estimate or what you think answers the question best.

* Landuse: may include urban park, roadside, railway easement, reserve, rural land, etc.
* Landform element: where does the site occur in the landscape?
* Structural formation: see Indicator 2 for more information on structural formation
* Dominant tree and shrub species: list up to five species
* Dominant herbaceous species: list up to five species
* Height of the groundlayer: give an approximate height to the nearest 10 cm of the vegetation, not including flower or seed stems
* Regeneration present: see Indicator 3 (Condition of Native Trees and Shrubs) for descriptions
* Tree health: circle one or more for the most common description of tree health
* Planting: if it is clear that there has been planting, indicate whether native or introduced, growth form
* Significant weeds: list the weeds of most concern in the site
* Plot disturbance: indicate if you can see any disturbance, past or present, affecting the condition of the site
* Erosion: indicate if you can see any erosion, past or present, affecting the condition of the site and whether it shows indications of still actively eroding, whether it is stabilised and not currently active.
* Plot management: indicate what management is occurring.
* Grazers: may be deliberately introduced, native grazers or pests
* Description: provide a description that puts in words what you can see.

#### Plot Description

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | | **Veg Zone and Plot #** | |  | |
| **Surveyor** |  | **Recorder** |  | | **Photos** | |  | |
| **Land use** | |  | | | | | | |
| **Slope** (%, or flat, gentle, steep) | | | **Elevation** (from map) |  | | **Aspect:** N; NE; E; SE; S; SW; W; NW; 0 | |  |
| **Landform element** | | Ridge or crest; Hilltop; Upper slope; Lower slope; Flat; Valley Floor;  Drainage Line; Riparian zone | | | | | | |
|  | |
| **Structural formation** | | ***Natural grassland***: Isolated or no trees ***Secondary grassland*** Trees cleared  ***Sedgeland***: Isolated or no trees ***Shrubland***: Isolated or no trees  ***Woodland*** Trees canopies separated ***Open Forest***: tree canopy touching  ***Closed Forest***: tree canopy overlapping  ***Waterbody***: Isolated or no trees, permanently or occasionally containing water | | | | | | |
|  | |
|  | |
|  | |
| **Dominant tree and shrub species (list)** | | |  | | | | | |
| **Dominant herbaceous species (list)** | | |  | | | | | |
| **Height of the groundlayer not including flower or seedheads** (use the sighter post) | | |  | | | | | |
| **Regeneration present (see Indicator 3 for descriptions)** | | | Seedlings; Saplings; Immature trees; Mature trees; Very old mature trees; Senescent trees | | | | | |
| **Tree health (circle):**  1.Very good  2. Good  3. Moderate  4. Poor  5. Very poor | |  | | | | | | |
| **Planting: Yes/No** | | Local Native ( ); Non Local Native ( ); Exotic ( ); Don’t know ( )  Trees ( ); Shrubs ( ); Grasses ( ); Forbs (wildflowers) ( ) | | | | | | |
| **Significant weeds** (circle and indicateAbundant, Common, Occasional, Rare\*) | | Serrated Tussock ( ); African Lovegrass ( ); Chilean Needlegrass ( ); St John’s Wort ( ) Blackberry ( ); Woody weeds ( ); Other .............................................................. | | | | | | |
|
| **Plot disturbance** (indicate Low, Medium, High) | | Soil disturbance ( ); Recent clearing ( ); Dumping ( ); Artificial drainage ( );  Salinity ( ) | | | | | | |
| **Erosion** (indicate Active or Stabilised) | | Sheet ( ); Rill ( ); Gully ( ); Streambank ( ) | | | | | | |
| **Plot management** (circle) | | Weed control; Ploughing; Mowing; Recent fire; Grazing; No active management | | | | | | |
| **Grazers** (circle) | | Cattle; Sheep; Horses; Kangaroos; Rabbits; Other | | | | | | |
| **Description** **of plot** in your own words: condition, particular habitat features, weediness, disturbance etc | | | | | | | | |

\*Abundant - species occurs in an almost continuous manner or over more than approximately 75% of the area;

Common - species encountered commonly i.e. without having to search for it, but not distributed continuously.

Occasional - more than four plants but not encountered frequently.

Rare – isolated, very infrequent, one to four plants.

## Photopoint Monitoring

Instructions

1. Take photographs at set locations at the same time of the year and day on a regular basis.
2. At a defined point in front of the point at which the photo is to be taken, hammer in a “sighter” post (see Chapter 2 on how to make an easily transportable temporary sighter post). Attach a card to the sighter post with the date and name of the plot. This will help with record keeping. Write down the distance of the sighter post from the point from which the photo is taken. Try to minimise the amount of trampling between the camera post and the sighter post.
3. For a plot, the stake should be along the direct line of sight to the centre of the assessment site (along the diagonal). For a transect, put the stake in along the transect line. The post should be 1 to 1.5 m tall.
4. Record the location of the photopoint, and the distance and compass bearing of the sighter post from the camera post. Take two steps back and line-up both stakes before taking the bearing. Use this information to find the exact point in future monitoring. There are smartphone apps that contain compasses.
5. In some situations the best ‘sightline’ for the photopoint is not towards the centre of the monitoring site, e.g. a large bush is 2m away and blocks the camera view in that direction. If this is the case, choose a line of sight that is more appropriate.
6. Record the height of the camera above ground on the data sheet and ensure you use the same height each time you take a photograph in the future, e.g., “taken at eye level, 1.5 m high”.
7. Take the photo with the middle of the frame focussing on the top of the sighter post and take the photo in normal mode. Ensure the sign indicating the date and site number is visible before setting up the sighter post for the first time. Take a photo each time in the same way: landscape or portrait, and focus on the same point, so that each time the same details are in the photo.
8. Complete the Photopoint Monitoringrecording sheet.
9. Take a photograph from your photopoint each time you monitor, or, at the least, once a year. Each time, fill out the subsequent monitoring description sheet. Take the previous year’s photos with you each time so that it is lined up the same way.

#### Photopoint Monitoring

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** |  | **Location** |  |
| **Monitoring site** |  | **Photographer** |  |
| GPS location of camera post |  | Map ref |  |
| Direction of photo, compass bearing | |  | |
| Height of camera post: |  | Portrait or Landscape |  |
| Height of sighter post: |  | Distance of sighter post from camera post: |  |
| Time of day: |  | Weather conditions: |  |
| Reason for photopoint monitoring: | | | |
| Photo – insert your initial photo here for reference for future monitoring: | | | |

On each subsequent time, record the following:

|  |  |  |  |
| --- | --- | --- | --- |
| Date: |  | Monitoring site number: |  |
| Time of day: |  | Weather conditions: |  |
| Description of the area at the time the photo was taken: | | | |
| Insert Photos – | | | |

## Indicator 1. Plant Species Diversity

**Method used**: 0.1 ha plot (usually 20 m x 50m)

**Instructions**

1. The 0.1 ha plot (usually 20 m x 50 m) is used for surveying species taller than 2 metres. Species smaller than 2 m in height are measured in the 0.04 ha sub-plot (usually 20 m x 20 m).
2. Traverse each area in a systematic way, and record each different species that you find;
   1. Record all trees over 2 m tall within the entire 0.1 ha plot.
   2. Record all other species up to 2 m tall within a 0.04 ha plot.
3. If you don’t know the correct name, write it down using your own “descriptive name”, for example, “Large Spiky Bush No. 1”.
4. Record each species as present, or apply a relative cover estimate, Abundant, Common, Occasional or Rare:

Abundant - species occurs in an almost continuous manner or over more than approximately 75% of the area;

Common - species encountered commonly i.e. without having to search for it, but not distributed continuously.

Occasional - more than four plants but not encountered frequently.

Rare – isolated, very infrequent, one to four plants.

1. Record each species as either N: Native, I: Introduced or U: Unknown. Introduced refers to species that have become naturalised, and include species from overseas (also called Exotic) or from other parts of Australia. The most well known example of an Australian introduced species within this region (except round Cootamundra) is the Cootamundra Wattle (*Acacia baileyana).*
2. For each unknown plant fill in the Unknown Species Identification Sheet and photograph the plant, including (wherever possible) its typical foliage, flowers and fruit. If you have a licence to take plants, collect a specimen, if it will assist in identification.
3. When samples of the unknown species are identified they can be transferred to their correct category of either native or introduced species. Until they are identified keep calling them by the name you first identified, to not confuse them with other species.

#### Indicator 1. Plant Species Diversity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, plot#** |  |
| **Surveyor** |  | **Recorder** |  | **Photographer** |  |

| **Species Name (or descriptive-name)** | **0.1 ha (e.g. 50 x 20 m plot) >2m height** | **0.04 ha (e.g. 20 x 20 m plot)  <2 m height** | **Native/ Introduced/ Unknown** | | | **Photo or specimen id** |
| --- | --- | --- | --- | --- | --- | --- |
| 1. |  |  | N | I | U |  |
| 2. |  |  | N | I | U |  |
| 3. |  |  | N | I | U |  |
| 4. |  |  | N | I | U |  |
| 5. |  |  | N | I | U |  |
| 6. |  |  | N | I | U |  |
| 7. |  |  | N | I | U |  |
| 8. |  |  | N | I | U |  |
| 9. |  |  | N | I | U |  |
| 10. |  |  | N | I | U |  |
| 11. |  |  | N | I | U |  |
| 12. |  |  | N | I | U |  |
| 13. |  |  | N | I | U |  |
| 14. |  |  | N | I | U |  |
| 15. |  |  | N | I | U |  |
| 16. |  |  | N | I | U |  |
| 17. |  |  | N | I | U |  |
| 18. |  |  | N | I | U |  |
| 19. |  |  | N | I | U |  |
| 20. |  |  | N | I | U |  |
| 21. |  |  | N | I | U |  |
| 22. |  |  | N | I | U |  |
| 23. |  |  | N | I | U |  |
| 24. |  |  | N | I | U |  |
| 25. |  |  | N | I | U |  |
| 26. |  |  | N | I | U |  |
| 27. |  |  | N | I | U |  |
| 28. |  |  | N | I | U |  |
| 29. |  |  | N | I | U |  |
| 30. |  |  | N | I | U |  |
| **TOTAL** |  |  |  |  |  |  |

## Indicator 2. Structural Diversity of Native and Introduced Plants

**Method used**: 0.1 ha (usually 20 x 50m) plot

**Instructions**

1. Estimate cover and abundance against all the growth form types of native species that are present in the 0.1 ha plot. Do the same for the introduced species.

* Abundant: feature occurs in an almost continuous manner or over more than approximately 75% of the area;
* Common: feature encountered commonly, approximately more than 25% of the area i.e. without having to search for it, but not distributed continuously.
* Occasional: more than one or a few cases but not encountered frequently, less than approximately 25% of the area.
* Rare: isolated, very infrequent, one to a few cases at most.

1. When estimating height, do not include flower or seed heads that grow above the main plant structure, e.g. the seed stems of native grasses.
2. For each of the growth form types, visually estimate which canopy cover abundance class the combined foliage would fit into. Use the examples of vegetative cover classes: side view and aerial view to see if it is less than 5%; between 5% and 25%; between 25% and 50%; between 50% and 75% or greater than 75%.

|  |  |
| --- | --- |
| **Growth form** | **Description/Comments** |
| **Tree**  Tall tree > 15 m  Medium tree 2 m -15 m Immature tree < 2 m | A woody plant at maturity more than 2 m tall with a single stem or branches well above the base. Include mallee form, which in the Capital Region are generally the result of either burns to trees that regrow from lignotubers (e.g. Snow Gums), or regrowth after the main stem has been cut or broken off.  **The growth form ‘shrub’ technically used for trees less than 2 m tall, but for practicality it is recommended to call trees that are less than 2 m tall, immature trees.** |
| **Shrub**  Tall Shrub > 2 m Medium shrub 1 m – 2 m Small shrubs <1 m | Woody plant multi-stemmed at the base or within 200 mm from the ground level, or if single-stemmed, less than 2 m tall. |
| **Grass**  Tall grass >0.5 m  Medium grass 0.2m -0.5 m  Low grass < 0.2 m | In the Capital Region native grasses are most commonly tussock grasses, although there are also rhizomatous grasses, including Weeping Grass.  **Measure height of vegetative growth, not height of seed stem.** |
| **Sedge or Rush**  Tall sedge or rush > 0.5 m Low sedge or rush < 0.5 m | Herbaceous, usually perennial, plants with a tufted habitat, usually occurring in damp or wet habitats. **Combine Sedges and Rushes, as they are difficult to tell apart.** |
| **Forb, herb or wildflower** | Herbaceous plant, either annual or perennial, that is not a grass. Often referred to as ‘wildflowers’, but also includes grass-like species that do not have obvious flowers, for example, *Lomandra* species. |
| **Fern** | Generally have large and usually branched leaves (fronds), with spores on the undersides of leaves and usually herbaceous (non-woody). |
| **Vine** | Climbing, twining, winding or sprawling plant, with or without a woody stem. |
| **Mistletoe** | Parasitic plants that grow on trees, usually eucalypts. |
| **Cryptogam** | These are plants that do not produce seed, and include mosses, liverworts, lichen, fungi and algae, that grow on soil, rocks or woody plants. **Count only the cover of cryptogams that are on bare soil.** |

#### Indicator 2. Structural Diversity of Native and Introduced Plants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, plot#** |  |
| **Surveyor** |  | **Recorder** |  | **Photographer** |  |

Indicate: A: abundant; C: common; O: occasional; R: rare

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Growth form** | **Native plants** | **Introduced plants** | **Comments** | |
| Tall trees >15 m |  |  |  |
| Medium trees 2 – 15 m |  |  |  |
| Immature trees <2 m |  |  |  |
| Tall shrubs >2 m |  |  |  |
| Medium shrubs 1 m – 2 m |  |  |  |
| Small shrubs <1 m |  |  |  |
| Tall perennial grasses >0.5 m |  |  |  |
| Medium perennial grass 0.2 m – 0.5 m |  |  |  |
| Low perennial grasses <0.2 m |  |  |  |
| Tall perennial sedges or rushes >0.5 m |  |  |  |
| Low to medium perennial sedges or rushes <0.5 m |  |  |  |
| Perennial forbs |  |  |  |
| Annual grasses, sedges or rushes |  |  |  |
| Annual forbs |  |  |  |
| Ferns |  |  |  |
| Vines, twiners, climbers |  |  |  |
| Mistletoe |  |  |  |
| Cryptogams on soil |  |  |  |
| **Total no. of plant forms observed** |  |  |  |

**Annual plants**: complete their full life cycle after one regenerative event.

**Perennial plants**: complete their full life cycle after two or more regenerative events. Many perennial herbaceous species die back to rootstock each year after seeding, but they regrow from that rootstock in future years.

Appendix C indicates which species are annual.

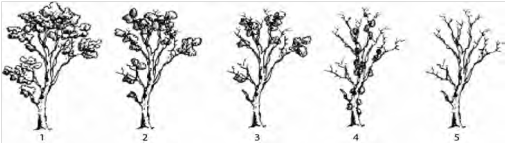
## Indicator 3. Condition of Native Trees and Shrubs

**Method used**: 0.1 ha (e.g. 20 m x 50 m) plot. This indicator is not used for monitoring in grassland.

**Instructions**

#### 3.1. Regeneration and tree health in the vegetation zone

1. Write down the names of all the native trees that are in the vegetation zone. There are likely to be more species than are present in the plot.
2. Identify if there is regeneration of any of these species within the vegetation zone (i.e where there are young trees with diameter less than 5 cm at 1.2 m height).
3. Calculate the proportion regenerating: number of species regenerating/total number of species present multiplied by 100.
4. Identify the health of the trees of each species in the vegetation zone.



1. Very good 2. Good 3. Moderate 4. Poor 5. Very poor

#### 3.2. Regeneration in the plot

1. Write the names of all the main tree and shrub species that are present on the plot. If Indicator 1 has been undertaken you will already have this list. Place a (P) next to plants you know have been planted.
2. For each species record the number of plants that are within each regenerative stage. If there are more than 10 plants, record in classes of ten (11-20; 21-30; etc).
3. For unknown species, write down your own name-description, e.g. narrow-leaved rough bark tree, on the score sheet. Use the Unknown Species Identification sheet to record their details so you can get these plants identified later.

#### 3.3. Length of fallen timber in the plot

Measure the total length of timber (include entire length, not the distance from one end to the other) that falls within the plot that is greater than 5 cm diameter and longer than 0.5 m in length. Use each cell to write down the lengths as you go, or else add them up cumulatively in your head.

#### 3.4. Number of trees with hollows in the plot

Count the total number of trees that contain hollows that are more than 1 m off the ground, where the entrance is wider than 5 cm with evident depth.

|  |  |  |
| --- | --- | --- |
|  | **Regenerative stages for trees** | **Regenerative stages of shrubs** |
| **Seedlings** | <1m for Eucalypts, may be multi-stemmed | have not flowered |
| **Juveniles and/or saplings** | Have not flowered, fruited, no buds or nuts, usually spindly, one main trunk with little side branching, and where the trunk is less than 5 cm in diameter at 1.2 m. |  |
| **Young** | May have flowered and fruited but have not attained maximum size or adult shape |  |
| **Mature** | Flowering, fruiting, full size, typical adult shape | have flowered |
| **Very old mature** | Most have lost branches or the main trunk, may have hollows, mostly very broad, gnarled |  |
| **Senescent** | Dead or dying, with many branches with few leaves or small branches | dead or dying |

#### Indicator 3. Condition of Native Trees and Shrubs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, Plot #** |  |
| **Surveyor** |  | **Recorder** |  | **Photographer** |  |

##### 3.1. Regeneration and tree health in the vegetation zone

|  |  |  |
| --- | --- | --- |
| **Tree species present in zone** | **Regenerating?** | **Health** |
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|  |  |  |
| Number regenerating |  |  |
| Proportion regenerating |  |  |

##### 3.2. Regeneration in the plot

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Species Name** | **Seedling (trees and shrubs)** | **Sapling/**  **Juvenile (trees)** | **Young**  **Adult (trees)** | **Mature**  **Adult (trees and shrubs** | **Very old mature trees** | **Senescent (trees and shrubs)** | **Age groups**  **present** |
| **Number** | **Number** | **Number** | **Number** | **Number** | **Number** | **Number** |
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##### 3.3 Length of fallen timber

Use the cells to write down amounts as you go, and then sum the whole:

|  |  |  |  |
| --- | --- | --- | --- |
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##### 3.4 Number of trees with hollows

Within 0.1 ha plot: count the number of hollows in trees where the trunk is within the plot; include hollows more than 1 m off ground and greater than 5 cm diameter where the entrance can be seen and the hollow appears to have depth.

|  |  |
| --- | --- |
| **No. trees with hollows** |  |

## Indicator 4. Species Cover

This indicator is used to measure changes in abundance of species groups in the groundlayer (plants less than 1 m tall), midstorey (plants between 1 and 2 m tall) and upperstorey. It provides an insight into how species groups are responding to management interventions.

In sites where monitoring change as a result of management intervention, repeat this measurement where intervention has not occurred (a control site). To increase your ability to interpret the differences, replicate this several times in your site.

Timing: usually spring or early summer

**Method used**: Transect (point-line):using a narrow wire within the plot if undertaking this as part of the condition monitoring.

**Field equipment:**

* Assessment site location sheet
* Pens, pencils, rubbers, clipboard
* Camera
* Field guides
* Measuring tape, preferably 50 m long
* Point wire (less than 3 mm thick) (e.g. a ‘piano wire’ obtainable from hobby shops).

**Instructions**

#### 4.1. Groundcover

Use this to calculate cover for all groundcover, including species less than 1 m in height. Take at least 50 measurements.

1. At each metre interval place the point of the fine wire directly adjacent to the tape. Record what is touched as a tally. If you ‘hit’ two or more species groups or a species group and another attribute, for example a rock, at one point, mark it as a hit for each group.
2. If touching a stem that appears to be dead, but is still attached to the plant, count it as that plant. If the stem is detached, count it as litter.
3. If touching a plant and also bare ground that is clearly visible through the plants, record both. If the bare ground is not clearly visible through the plant, do not record it (effectively the bare ground is protected by the plant).
4. To calculate percentage cover for each group or species, add up the number of hits (tallies) for each group (F), divide by the total number of measurements made (P) and multiply by 100. For example, if you have a tally of 12, from 50 points that were measured, the percentage cover is (12/50)x100 = 24%. Note that the total percentage cover may be over 100% due to overlapping plants.
5. Calculate the proportion of native species compared to introduced perennial species (N/(N+EP)).

#### 4.2. Overstorey

Use this to measure the tallest woody stratum present over one metre. For a shrub-dominated community the overstorey may be less than 2m. Measure native and exotic overstorey separately. Take at least 10 measurements for each.

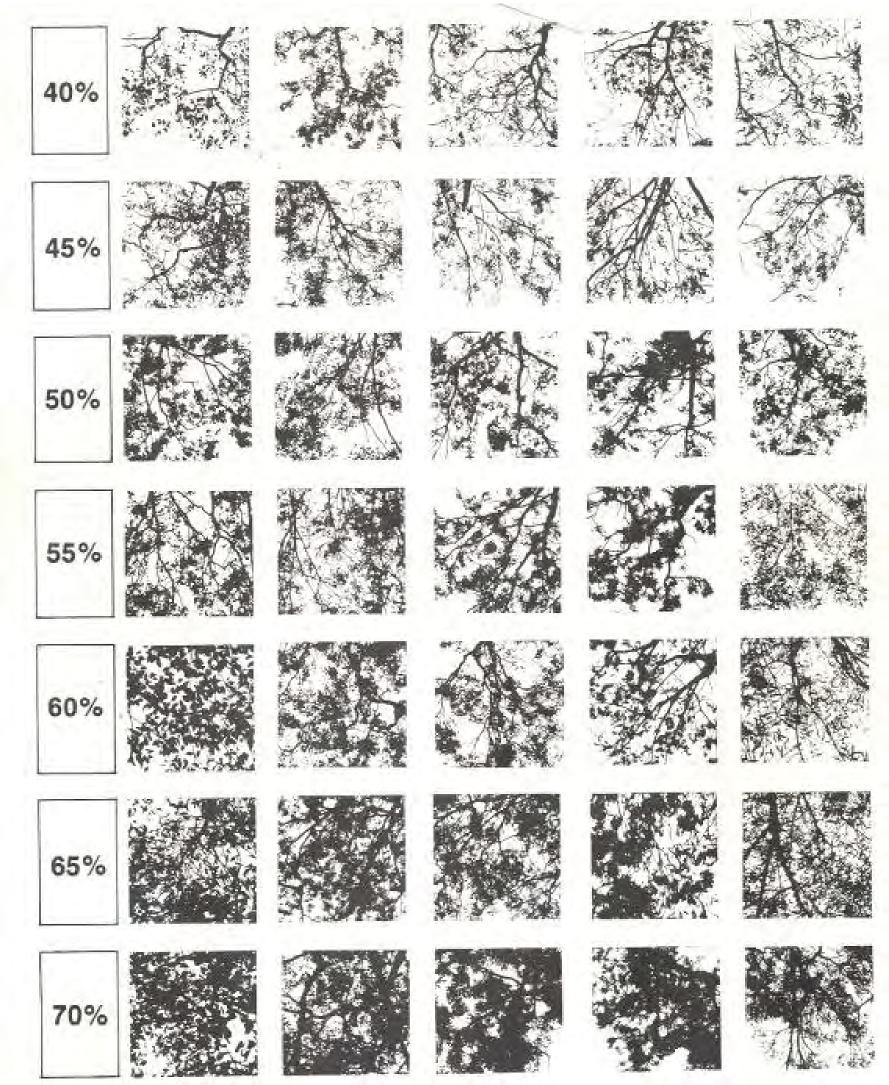
1. Every five metres along the transect estimate the percent foliage cover directly overhead using the images in the table below. View the cover directly overhead through your fingers making a circle of about 8 cm in diameter or use a cut off piece of polypipe of the same diameter to view through. If the canopy is not 100% you will need to reduce the overall cover (for example if there is tree cover over 40% of the view and the % cover according to the diagram is close to 40%, the total projective foliage cover at that point will be 0.4 x 0.40/100 = 16%.
2. Alternatively, if you have an android smartphone you can download an app that calculates the cover on the basis of a photo taken of the canopy overhead. The app is available at <https://play.google.com/store/apps/details?id=com.scrufster.habitapp>
3. To calculate percentage cover for overstorey, average the ten measurements.

#### 4.3. Midstorey

Use this to calculate cover for all species taller than 1 m and less than the overstorey height. Measure native and exotic midstorey separately. Take at least 10 measurements for each.

1. Undertake the measurements as for overstorey, at ten points along the transect at 5 m intervals, but in this case the cover may not be overhead.
2. Calculate percentage foliage cover as per the overstorey species: average the measurements taken.

These photos assist with estimates of percent foliage cover (Hnatiuk et al., 2009, p85). Rows show similar crown types for different leaf sizes (large to small, left to right). Acacia phyllodesare in the right-hand row. Most Australian woody plants are in the range 40–70%.



#### Indicator 4. Species Cover

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** |  | | **Location** |  | **Veg Zone, plot#** | |  | |
| **Surveyor** |  | | **Recorder** |  | **Photographer** | |  | |
| **4.1. Groundcover** | | **Tally over at least 50 points:**  **Total no of points measured (P): ................** | | | | **Frequency (F)** | | **% cover**  **(F/P)x100** |
| Cryptogams (mosses, lichens, fungi and/or algae) tally only if bare ground | |  | | | |  | |  |
| Bare Earth | |  | | | |  | |  |
| Rocks | |  | | | |  | |  |
| Litter/Dead Vegetation | |  | | | |  | |  |
| Annual introduced grass and forbs | |  | | | |  | |  |
| Perennial introduced grasses, forbs and shrubs < 1m | |  | | | |  | |  |
| Native grasses | |  | | | |  | |  |
| Native shrubs < 1 m tall | |  | | | |  | |  |
| Other native ground stratum species | |  | | | |  | |  |
| **4.2. Overstorey cover** | | **Cover (%) tally over at least ten points** | | | | | | **Average** |
| Native overstorey cover (%) | |  | | | | | |  |
| Introduced overstorey cover (%) | |  | | | | | |  |
| **4.3. Midstorey cover** | | **Cover (%) tally over at least ten points** | | | | | | **Average** |
| Native midstorey cover (%) (> 1m to < overstorey height) | |  | | | | | |  |
| Introduced midstorey cover (%) | |  | | | | | |  |
| **Calculated cover values** | | | | | | | | **Totals** |
| Native groundlayer cover (sum of native grasses, native shrubs < 1 m tall and other native ground stratum species ) | | | | | | | |  |
| Proportion of native groundlayer cover compared to perennial introduced groundlayer: N/(N+PE) | | | | | | | |  |
| Total native cover (sum of groundlayer, midstorey and overstorey cover) | | | | | | | |  |
| Exotic plant cover (sum of annual exotic grasses and forbs, perennial exotic grasses, forbs and shrubs, exotic overstorey cover and exotic midstorey cover) | | | | | | | |  |

## 

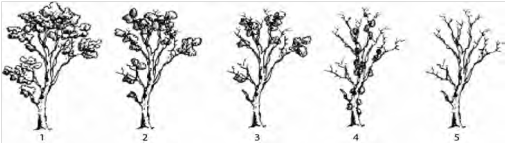
## Indicator 5. Terrestrial Habitat Condition

**Method used**: 0.1 ha (e.g. 20 m x 50 m) plot for questions 1to 8 and 14 to 20, and the entire vegetation zone for questions 9 to 13 and 21 to 24. If you are doing multiple plots the questions relating to the entire zone will be replicated for each one done in each vegetation zone.

**Instructions**

1. Most of the questions are assessed within the 0.1 ha plot. Some questions relate to the entire vegetation zone, where indicated.
2. Most of the information used to complete this sheet will be found on other recording sheets, as indicated.
3. In plots with no trees you will be only answering questions 1 to 13. In plots with trees you will be answering questions 1 to 24.
4. Write in the score from the description that best characterises the plot.
5. Use the following descriptions to assist in identifying the best score:

* Abundant: feature occurs in an almost continuous manner or over more than approximately 75% of the area;
* Common: feature encountered commonly, approximately more than 25% of the area i.e. without having to search for it, but not distributed continuously.
* Occasional: more than one or a few cases but not encountered frequently, less than approximately 25% of the area.
* Rare: isolated, very infrequent, one to a few cases at most.

1. Hollows (q. 16) include those with a width of more than 5 cm, which have depth, can be seen and are more than one metre above ground level.
2. Tree health:

1. Very good

2. Good

3. Moderate

4. Poor

5. Very poor

1. Add the scores together to get your total habitat condition score.

#### Indicator 5. Terrestrial Habitat Condition

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | | | | **Veg Zone, plot** | |  | | |
| **Surveyor** |  | **Recorder** |  | | | | **Photo #** | |  | | |
| **Assessment questions** | | | | **Score** | | **0** | | **1** | **2** | **3** | |
| **All sites** | | | | | | | | | | | |
| 1. In the plot, are there native plants (< 0.5 m tall) in the groundlayer? (Indicator 1) | | | | |  | <10 species | | 10-15 species | 16- 20 species | | >20 species |
| 2. In the plot, what is the cover and abundance of native groundflora greater than 20 cm in height? (Indicator 2) | | | | |  | None | | Occasional or rare | Abundant | | Common |
| 3. In the plot, what is the cover and abundance of native groundflora less than 20 cm height? (Indicator 2) | | | | |  | None | | Abundant or rare | Common | | Occasional |
| 4. In the plot, what is the cover and abundance of annual introduced species? (Indicator 2, 4) | | | | |  | Abundant or common | | Occasional | Rare | | None |
| 5. In the plot, what is the cover and abundance of perennial introduced groundflora? (Indicator 2, 4) | | | | |  | Abundant or common | | Occasional | Rare | | None |
| 6. In the plot, what is the cover and abundance of bare ground? (Indicator 4) | | | | |  | Abundant or common | | None |  | | Occasional or Rare |
| 7. In the plot, what is the cover and abundance of cryptogams (mosses, lichens, fungi or algae) on the soil surface? (Ind. 4) | | | | |  | None | | Abundant or common |  | | Occasional or Rare |
| 8. In the vegetation zone, are there signs of native animal groups? (marsupials, monotremes, small birds, large birds, reptiles, amphibians) | | | | |  | None | | 1 group | 2-4 groups | | >4 groups |
| 9. In the vegetation zone, are there ant or termite mounds? | | | | |  | No | |  | Yes | |  |
| 10. In the vegetation zone, is there evidence of rabbits? | | | | |  | Burrows | | Scat piles | Digging | | None |
| 11. In the vegetation zone, are there any stock camps? | | | | |  | Active | | Past | Recovering | | None |
| 12. In the vegetation zone, what is the cover and abundance of loose surface rocks? | | | | |  | None | |  | Abundant or Rare | | Common or Occasional |
| 13. In the vegetation zone, are there rocky outcrops? | | | | |  | No | |  |  | | Yes |
| **Additional habitat features in sites with treed vegetation** | | | | | | | | | | | |
| 14. In the plot, are there trees with hollows? (Indicator 3) | | | | |  | None | | 1 | 2 or 3 | | >3 |
| 15. In the plot, what is the cover and abundance of leaves, bark and twigs on the ground? (Indicator 4) | | | | |  | None | | Rare | Abundant or Occasional | | Common |
| 16. In the plot, what is the cover and abundance of native shrubs or patches of immature eucalypts less than 2 m tall? (Indicator 2, 4) | | | | |  | Rare | | Abundant | Common | | Occasional |
| 17. In the plot, what is the abundance of logs and/or fallen timber> 5 cm diameter on the ground? (Indicator 3) | | | | |  | None | | Rare | Abundant | | Common or Occasional |
| 18. In the plot, how many cohorts of tree ages are present (seedlings, saplings, young trees, mature trees and very old trees? (Ind. 3) | | | | |  | None | | One cohort | 2 cohorts | | <10% |
| 19. In the vegetation zone, what is the proportion of tree species that are regenerating? (Indicator 3) | | | | |  | None | | 1-50% | 50 – 99% | | 100% |
| 20. In the vegetation zone, are the trees mainly healthy, with little or no dieback? (Indicator 3) | | | | |  | Very poor | | Poor | Good | | Very good |
| 21. In the vegetation zone, how many species of local (endemic) eucalypts are present? (Indicator 3) | | | | |  | None | | One | Two | | Three or more |
| 22. In the vegetation zone, have you heard or seen small native birds? | | | | |  | No species | | 1 species | 2-4 species | | > 4 species |
| 23. In the vegetation zone, are there any kangaroo camps? | | | | |  | Under >50% trees | | Under 25-50% trees | Under < 25% trees | | none |
| 24. In the vegetation zone, is there evidence of ringbarking or rubbing of trees? | | | | |  | Extensive | | on >25% trees | on <25% trees | | none |
| **Total score (max 39 non-treed veg; 72 treed veg)** | | | | |  |  | |  | | |  |
| **% score (x/39% or x/72%)** | | | | |  |  | |  | | |  |

## Indicator 6. Revegetation Success

**Method used:** 0.04 ha plots (20 m x 20 m or other shape depending on the shape of the revegetation area), or the size of the revegetation plot.

**Instructions**

1. If possible obtain a list of the species that were planted. This will help identification, especially while the plants are small.
2. Choose and mark your site as per the standard procedure outlined in the Plot Location Recording Sheet. Take at least one photo according to the Photopoint Monitoring Sheet.
3. For a small revegetation project count all species. For a large revegetation project count the survival in subsets.
4. Write down whether it is a full population count or a subset, and what proportion of the total revegetation area is being quantitatively assessed.
5. Estimate overall the survival rate and patchiness of surviving plants.
6. Count the tubestock plantings according to their health and survival by species if possible or by growth form.
7. Calculate the survival rate of each species by dividing the number of living plants by the total for that species then times by 100. For example, 21 plants of species A have survived out of a total of 25 planted (21/25x100) gives an 84% survival rate.
8. Calculate the approximate average height cover of the surviving species in the plot.

#### Indicator 6. Revegetation Success

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, plot #** |  |
| **Surveyor** |  | **Recorder** |  | **Photographer** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Estimation of survival rate of revegetation overall** | ≤10% | 11-20% | 21-40% | 41–60% | 61-80% | 80%+ |

|  |  |  |  |
| --- | --- | --- | --- |
| **Survival patchiness of revegetation overall** | Uniform | Slightly Patchy | Very Patchy |

|  |  |
| --- | --- |
| **Population count or subset** |  |
| **Size of area being assessed** |  |
| **If subset, proportion of total areas assessed** |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Alive, healthy** | **Alive, stressed** | **Dead** | **Height of surviving plants** | **Average height of surviving plants for each species** |
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| **Total** |  |  |  |  |  |
| **Total percentage alive (alive/(alive + dead))\*100** |  |  |  |  |  |

## Indicator 7. Distribution and Abundance of a Species

**Method used**: Polygon (the area around the population, which may be any shape) and a plot for a sub-population

**Instructions**

1. Mark out with stakes or flags the boundaries of the area encompassing the population you are studying. It may be any shape. If you are monitoring the population it may be useful to put in permanent markers at key points. Fill out your Plot Location Recording Sheet. Take at least one photo according to the Photopoint Monitoring Sheet.
2. Use a GPS to identify the boundary, walking from one flag to the next. Transfer this later onto a map. Alternatively, or as well, draw it accurately onto a map. Work out the size of the area.
3. Count all the plants inside the mapped area. If there are more than approximately 100 plants, divide the area up into smaller areas and count the plants in several sub-samples. Calculate the entire population abundance if the species has been counted in plots within the population by multiplying the sub-sample population count by the total area divided by the plot area:   
   Total population = population count x (total area/plot area)
4. For ‘desirable’ species, i.e. one you wish to maintain or increase in population (e.g. a threatened or uncommon species):

* Count the plants that are flowering or seeding; and those that are not flowering or seeding.
* Calculate the plants that are potentially regenerating by dividing the number of flowering or seeding plants by the total number of plants counted and then multiply by 100:  
  Regeneration rate % = (number of flowering seeding plants/total number of plants) x 100

1. For ‘undesirable’ species, i.e. one you are trying to eradicate or control (e.g. a weed that is being treated):

* Count the plants that are alive, not sprayed; alive and sprayed; partially alive or dead or use a GPS to calculate the area of each, in the case of a large area or large population.
* Calculate the survival rate of the weeds by dividing the number of living plants by the total number of plants counted, then times by 100:   
  Survival rate % = (number of surviving plants/number of plants counted) x 100

#### Indicator 7. Distribution and Abundance of a Species

##### 7.1 Desirable species

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, plot #** |  |
| **Surveyor** |  | **Recorder** |  | **Photographer** |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species** | **Number flowering or seeding** | **Number not flowering or seeding** | **Percent regenerating** | **Population count or estimate** |
|  |  |  |  |  |
|  |  |  |  |  |
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|  |  |  |  |  |
|  |  |  |  |  |
| **Total** |  |  |  |  |

##### 7.2 Undesirable species

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, plot #** |  |
| **Surveyor** |  | **Recorder** |  | **Photographer** |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species treated** | **Number alive not treated** | **Number alive treated** | **Number partially alive** | **Dead** | **Alive population count or estimate** | **Survival rate** |
|  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |

## Indicator 8. Waterbody Habitat Condition

**Method used**: The size of the area to be monitored will depend on the size of the waterbody.

**Instructions**

1. Include in the assessment area the entire waterbody that occurs within the vegetation zone. For a dam this includes the inlet and outlet areas, the dam and dam walls. For a creek or river it includes the direct catchment area, the banks and the stream.

Use the table to identify the width beyond the extent of the waterbody to include (based on DECCW 2011).

|  |  |  |  |
| --- | --- | --- | --- |
| Minor wet areas, drainage lines or small dams | Minor creeks, dams and lagoons | Minor rivers, wetlands or major creeks | Major rivers |
| 10 m | 20 m | 30 m | 40 m |

1. If you are not measuring other Indicators, fill out the Plot Location and Plot Description recording sheets and establish photopoint monitoring sites.
2. Decide which is the best answer to each question and put in the corresponding score.

* Abundant: feature occurs in an almost continuous manner or over more than approximately 75% of the area;
* Common: feature encountered commonly, approximately more than 25% of the area i.e. without having to search for it, but not distributed continuously.
* Occasional: more than one or a few cases but not encountered frequently, less than approximately 25% of the area.
* Rare: isolated, very infrequent, one to a few cases at most.

1. Hollows (q. 13) include those with a width of more than 5 cm, which have depth, can be seen and are more than one metre above ground level.
2. Add these together to get your total habitat condition score.
3. Note the features that are absent or poorly represented for consideration of enhancement of habitat.

#### Indicator 8. Waterbody Habitat Condition

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** |  | **Location** |  | **Veg Zone, plot #** | |  | | | |
| **Surveyor** |  | **Recorder** |  | **Photographer** | |  | | | |
| **Description of waterbody type and condition**; include comments on condition or issues upstream if possible | | | | | | | | | |
| **Assessment questions** | | | | | **Score** | | **0** | **1** | **2** |
| All waterways (dams, artificial wetlands, natural wetlands, chains of ponds, creeks, rivers) | | | | | | | | | |
| 1. Is the waterway constructed or natural? | | | | |  | | Mostly constructed | Partly constructed | Very little modified |
| 2. Is the water regime significantly modified e.g. by significant dams upstream impeding flows? | | | | |  | | Largely | Partly | Minimal or none |
| 3. Is there any erosion on the banks? | | | | |  | | Actively eroding | Isolated unstable bank areas | Stable |
| 4. Is all or part of the waterway free from stock access (fenced or no stock ever present)? | | | | |  | | No | Part | All |
| 5. Is the area immediately adjacent free from cultivation? | | | | |  | | No |  | Yes |
| 6. Are the banks stabilised by native or exotic perennial vegetation? | | | | |  | | < 50% | 50-75% | > 75% |
| 7. Is the waterway surrounded by predominantly native vegetation? | | | | |  | | None | <10 ha | >10 ha |
| 8. What is the cover and abundance of herbaceous native species in the groundlayer surrounding the waterway | | | | |  | | None | Occasional or Rare | Abundant or Common |
| 9. What is the cover and abundance of herbaceous weeds directly adjacent to the waterway? | | | | |  | | Abundant or Common | Isolated | Rare or None |
| 10. What is the cover and abundance of blackberries, willows or poplars present along the edge of the waterway? | | | | |  | | Abundant or Common | Isolated | Rare or None |
| 11. What is the cover and abundance of foliage of deciduous trees hanging over the waterway? | | | | |  | | Abundant or Common | Isolated | Rare or None |
| 12. What is the cover and abundance of bare slopes above and bordering the waterway? | | | | |  | | Abundant | Isolated | Rare or None |
| 13. Are there any standing trees (dead or alive), with hollows near to, or within the waterway? | | | | |  | | None | 1 | 2 or more |
| 14. Are there submerged or semi-submerged logs with a diameter greater than 15 cm in the waterway? | | | | |  | | No |  | Yes |
| 15. Is there submerged aquatic vegetation? | | | | |  | | No | Very little | Yes |
| 16. Is there emergent aquatic vegetation? | | | | |  | | No | Very little | Yes |
| 17. Are there water holes deeper than 1 m? | | | | |  | | No | Probable or mostly deep or mostly shallow | Mix of shallow and water holes |
| 18. Are there rocks, cobbles (> 65 mm) or boulders around or in the waterway? | | | | |  | | No | Small patch | Clumps or patches |
| 19. Are there any native fish species present in the waterway? | | | | |  | | No | Possible | Yes |
| 20. Are introduced fish species (e.g. carp, trout or gambusia) present in the waterway? | | | | |  | | Yes | Possible | No |
| 21. Are aquatic insects present under rocks or logs? | | | | |  | | No | Possible | Yes |
| 22. Is the water free from regular algal blooms? | | | | |  | | No or likely | Infrequently or unlikely | Yes |
| Additional features in farm dams or wetlands | | | | | | | | | |
| 23. Is there an earthen or floating island within the dam or wetland? | | | | |  | | No | <2m2 | >2m2 |
| 24. Does the dam or wetland edge have a gentle slope? | | | | |  | | No |  | Yes |
| 25. Are there any reeds or rushes around the edges of the dam or wetland? | | | | |  | | No | Few | Many |
| **Total score (max 44 rivers, creeks; 50 dams or wetlands)** | | | | |  | |  |  |  |
| **% score (score/max)\*100** | | | | |  | |  |  |  |

## Unknown Species Identification

**Instructions**

1. If you come across an unknown species there are a range of resources available to identify it. There are various field guides that can be taken in the field. If you have internet access in the field you can google Plantnet, which provides excellent clear descriptions of plants, if you think you know what the species is. Flickr is a website that contains lots of photos of plants that you can use to compare against your plant. Appendix B lists a lot of these resources. As more become available the list will be updated on the Molonglo Catchment Group website.
2. If you do not have a licence to collect plants, or only require photos for identification, take photos of several parts of the plants, including whole plant, flowers, leaves and buds.
3. If you believe that you need to collect a specimen and have a licence to do so, collect specimens (required for collection in any public sites, including roadsides), following these instructions:

* If a species is likely to be uncommon or a threatened species, or if only several plants are present, **do not** collect a specimen.
* Specimens should consist of a small branch or portion of the stem about 20–30 cm long, with leaves, flowers and/or fruits still attached (or the whole plant if small).
* Transport the specimen from the field in a plastic bag, but remove it from the plastic bag as soon as possible. Store the specimen temporarily in a fridge.
* If you are unable to identify the specimen within several days, preserve the specimen as follows:Press specimens between sheets of newspaper using moderate pressure, for example under a heavy book, and dry them. When drying plants, it is essential to change the paper every day for the first few days. Wetland or water plants may need more frequent paper changes. This prevents specimens from becoming mouldy and helps to keep their colour. Some species fall apart on drying. If this happens, try to keep all the fragments together.
* Some groups of plants have special requirements for collection:

**Orchids**

Do not collect or handle orchids. Take a photograph, and avoid touching the plant, as it can harm the plant. Use a twig if you need to look more closely at it.

**Eucalypts**

Fruits and buds, as well as adult leaves, are required for identification. A description of the bark (recording the type of bark and how far it extends on the trunk and branches) is essential. Information on the habit (e.g. single or multi-stemmed) and habitat is important. A photograph of the plant showing the base of the tree can be useful.

**Ferns and fern allies**

Collect ferns (except tree ferns) and fern allies with a sample of the root-like structure (rhizome) attached to the frond. For tree ferns, the scales or hairs at the base of the stalk of the frond are essential for identification. Using a small knife, remove a sliver of the outer stalk (with scales attached) and include in the sample.

**Grasses, sedges and small plants**

For identification of grasses and sedges, collect the whole plant. Plants which have underground runners, stems, bulbs or tubers should be collected with at least part of these organs still attached to the specimen. Both mature flower-heads (inflorescences) and the base of the plant (with some roots attached) are essential for identification.

**Weeds**

Strict hygiene must be observed when collecting specimens of weeds in order to prevent the further spread of these pests.

1. For all unidentified species, on the Unknown Species Identification recording sheet:
   * Write the date and exact locality where each specimen was collected. This should be sufficiently detailed to enable another person to return to the site e.g. distance from nearest road. Include GPS or map grid coordinates if available.
   * Write a description of the plant’s habit of growth (e.g. tree, vine, herb), height, flower colour, abundance in area, situation (e.g. landform, aspect, proximity to water), surrounding vegetation, soil type. For trees, the appearance of the bark, is also necessary.
   * Include any features that cannot be seen in the dried specimen e.g. bark, tree size and shape, flower colour.

#### Unknown Species Identification Recording Sheet

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** |  | | **Location, Vegetation Zone** |  |
| **Recorder** |  | | **Sample Plant Identification Number** |  |
| **Description of site (circle)** | | Forest; Woodland; Grassland; Shrubland; Wetland; Riparian | | |
| **Dominant species in site** | |  | | |
| **Description of habitat:**  **Landform, aspect, proximity to water** | |  | | |
| **Description of plant (circle):**  **(see Indicator 2, for the growth form)** | | Tree; Shrub; Subshrub; Orchid; Lily; Other forb; Grass; Climber; Sedge/Rush | | |
| **Description of plant:**  **bark, size and shape, flower colour, height of plant** | |  | | |
| **Flowering (circle)** | | Yes No | | |
| **Abundance (circle)** | | Abundant; Common; Occasional; Rare | | |
| **Attach photo** | | | | |

Abundant - species occurs in an almost continuous manner or over more than approximately 75% of the area;

Common - species encountered commonly i.e. without having to search for it, but not distributed continuously.

Occasional - more than four plants but not encountered frequently.

Rare – isolated, very infrequent, one to four plants.