# Vegetation Condition Method & Scoring Logic

## Method

TASVEG Vegetation Condition Assessment (TASVEG VCA) is a transparent, reliable and scientifically valid site–based method of vegetation condition assessment developed by DPIPWE in conjunction with the three Tasmanian Natural Resource Management (NRM) regions. The method is currently the standard method used in the state for undertaking condition assessments of vegetation communities and applies to both forest and non-forest native vegetation in Tasmania.

The Tasmanian VCA method is based on the 'Habitat Hectares' method of assessing the condition of native vegetation developed by Parkes et al. (2003) in Victoria, which is a well known, scientifically endorsed vegetation condition assessment method and largely consistent with methods used in several other Australian states.

The approach involves assessing landscape and site-based components of the vegetation against a defined 'benchmark' for the same vegetation community to arrive at a vegetation condition score for the assessed site.

The assessed vegetation condition score is not a measure of conservation significance in itself but it is critical in determining the conservation value of native vegetation in combination with other assessed biodiversity attributes (e.g. threatened ecological communities - http://dpipwe.tas.gov.au/conservation/flora-of-tasmania/species-and-communities-of-significance).

## Site Condition Section

### Large Trees (forest only)

This is calculated using

- field data collected for observed Large Trees per Ha
- field data collected for observed Large Tree Canopy Health percentage
- the benchmark number of Large Trees

Large Tree Percentage is calculated by dividing the observed number of Large Trees per Ha over the benchmark number of Large Trees per Ha and multiplying by 100.

$$\frac{\text{Observed Large Tree \#/ha}}{\text{Large Trees \#/ha}} \times 100 \quad \text{Benchmark}$$

The Large Trees score is determined by using the Large Trees scoring table matrix (Table 1). The score is the number that intersects with the calculated Large Tree percentage and the observed Large Trees Canopy percentage classes.

**Table 1. Large trees matrix.**

| | | % Large Tree Canopy Health | | |
|---|---|---|---|---|
| | | ≥70 | ≥30-<70 | <30 |
| Large Tree # % | None present | 0 | 0 | 0 |
| | ≥0- <20 | 3 | 2 | 1 |
| | ≥20- <40 | 4 | 3 | 2 |
| | ≥40- <70 | 6 | 5 | 4 |
| | ≥70- 100 | 8 | 7 | 6 |
| | ≥ to Benchmark # | 10 | 9 | 8 |

## Tree Canopy Cover (forest only)

This is calculated using

- field data collected for observed Tree Canopy Cover
- field data collected for observed Tree Canopy Health
- the benchmark Tree Canopy Cover

**Tree Canopy Cover Percentage**

This is calculated by dividing the observed Tree Canopy Cover by the benchmark Tree Canopy Cover and multiplying by 100.

$$\frac{\text{Observed Tree Canopy Cover \%}}{\text{Benchmark Tree Canopy Cover \%}} \times 100$$

**Tree Canopy Cover score**

This is determined by using the Tree Canopy scoring table matrix (Table 2). The score is the number that intersects with the calculated Tree Canopy Cover percentage and the observed Tree Canopy Health classes.

**Table 2. Tree canopy cover matrix.**

| | | % Canopy Health | | |
|---|---|---|---|---|
| | | ≥70 | ≥30-<70 | <30 |
| Tree Canopy Cover % | <10 | 0 | 0 | 0 |
| | ≥10-<50 | 3 | 2 | 1 |
| | ≥50-<150 | 3 | 2 | 1 |
| | ≥150 | 5 | 4 | 3 |

## Dominant Life Form Cover (non-forest only)

This is calculated using

- field data for observed Dominant Life Form Cover
- the Dominant Life Form Cover benchmark

**Dominant Life Form Cover Percentage**

This is calculated by dividing the Observed Dominant Life Form Cover by the Benchmark Dominant Life Form Cover and multiplying by 100.

$$\frac{\text{Observed Dominant Life Form Cover \%}}{\text{Dominant Life Form Cover \%}} \times 100 \quad \text{Benchmark}$$

**Dominant Lifeform Cover Score**

This is determined by using the Dominant Life Form Cover scoring table matrix (Table 3). The score is the number that intersects with the calculated Dominant Life Form Cover percentage and the observed Dominant Life Form Cover classes.

**Table 3. Dominant life form cover classes and scores.**

| Observed cover % | Benchmark Cover% | Score |
|---|---|---|
| <10% | | **0** |
| ≥10% | <50% | **5** |
| | ≥ 50% to <150% | **15** |
| | ≥150% | **9** |

## Lack of Weeds (forest and non-forest)

This is calculated using

- field data for the percentage of observed weed cover.
- the observed percentage of high threat weeds

**Proportion of High threat weeds**

This is calculated by dividing the percentage of the observed high threat weeds cover by the percentage of the observed weed cover and multiply by 100.

$$\frac{\text{Observed\% High Threat weeds}}{\text{Observed weed cover \%}} \times 100 = \text{Proportion of High threat weeds \%}$$

The weeds score is determined using the weeds score matrix (Table 4). The score is the number that intersects with the calculated high threat weeds and the weeds cover percentage classes.

**Table 4. Weeds cover matrix.**

| | | High threat weed category % | | |
|---|---|---|---|---|
| | | 0 | ≤50 | ≥50 |
| Weed cover category % | ≥75 | 0 | 0 | 0 |
| | ≥25- <75 | 4 | 2 | 0 |
| | ≥10- <25 | 7 | 6 | 4 |
| | ≥5 - <10 | 11 | 9 | 7 |
| | <5- 1 | 15 | 13 | 11 |
| | <1 | 15 | 13 | 13 |

## Understorey Life Forms Cover (forest and non-forest)

This is calculated using

- field data for the observed life form cover for each lifeform recorded.
- field data for the observed number of understorey lifeforms
- the benchmark number of understorey lifeforms
- the benchmark number of species for each of the benchmark number understorey

**Understorey life form presence/absence**

Presence/absence is calculated by first totaling the number of observed species and number of benchmark species. See the example in (table 5) below

**Table 5. Total observed and benchmark lifeforms.**

| Benchmark Lifeform | Number of species for lifeform | |
|---|---|---|
| | Observed | Benchmark |
| T | 5 | 6 |
| S | 0 | 5 |
| PS | 0 | 1 |
| H | 7 | 7 |
| TG | 4 | 4 |
| **Total** | **16** | **23** |

For each understorey lifeform the benchmark cover percentage is recorded against the observed understorey lifeform cover % for each life form observed. See example below (Table 6)

**Table 6. Observed and benchmark life form cover.**

| Benchmark Lifeform | Percentage cover for lifeform | |
|---|---|---|
| | Observed | Benchmark |
| T | 50 | 65 |
| S | 0 | 15 |
| PS | 30 | 10 |
| H | 10 | 10 |
| TG | 10 | 10 |

The observed and benchmark lifeforms totals and the observed and benchmark cover data recorded are used to determine the presence/absence status of the life form using the classes in table 7 below.

**Table 7. Lifeform presence/absence classes.**

| Observed number of species for life form | Benchmark cover for life form | Observed cover for lifeform | Status |
|---|---|---|---|
| 0 | | | Absent |
| ≥1 | <10% | | Present |
| ≥1 | ≥10% | ≥10% | Present |
| ≥1 | ≥10% | <10% | Absent |

The number of understorey lifeforms that are present is summed and used to calculate the percentage of the total number of understorey lifeforms present and the proportion of understorey lifeforms that are modified. Table 8 shows an example of data generated for future calculations at this point.

**Table 8. Example of all data generated for future lifeform calculations.**

| Benchmark Lifeform | Number of species for lifeform | | Percentage cover for lifeform | | Present |
|---|---|---|---|---|---|
| | Observed | Benchmark | Observed | Benchmark | |
| T | 5 | 6 | 50 | 65 | Yes |
| S | 0 | 5 | 0 | 15 | |
| PS | 0 | 1 | 30 | 10 | Yes |
| H | 7 | 7 | 10 | 10 | |
| TG | 4 | 4 | 10 | 10 | Yes |
| **Total** | **16** | **23** | | | **3** |

**Determination of lifeforms recorded as present and modified.**

Two calculations are used to determine if a life form that is present is modified. One to determine the proportion of observed understorey life form species diversity of the benchmark understorey life form species diversity and the other to determine the proportion of understorey life form cover of the understorey life form benchmark cover.

Calculation of the understorey life form species diversity proportion is done by dividing the observed number of species for each understorey lifeform by the benchmark number of species for each understorey life form and multiplying by 100

**Observed # of species for life form x 100 = % of species diversity**
**Benchmark # of species for life form**

Calculation of the understorey life form Benchmark Cover proportion is done by dividing the observed cover each understorey life form by the benchmark cover of each understorey life form and multiplying by 100

**Observed life form cover% x 100 = % of benchmark cover**
**Benchmark cover%**

The results of these calculations are used to determine which of the classes shown in Table 9, each life form that is present fits, in order to determine if that life form is modified. The number of modified lifeforms is then summed.

**Table 9. Classes for determining if a lifeform is modified.**

| Lifeform present bench mark cover % | Benchmark species diversity % | Reproductively mature life forms observed | Status |
|---|---|---|---|
| <10% | <50% | | Modified |
| ≥10% | <50% | | Modified |
| <10% | | 0 | Modified |
| ≥10% | | <50% | Modified |

Table 10 shows an example of the results generated by previous calculations. These are used to for subsequent calculations.

**Table 10. Example of results generated from previous calculations**

| Benchmark Lifeform | Number of species for lifeform | | Percentage cover for lifeform | | Present | Modified |
|---|---|---|---|---|---|---|
| | Observed | Benchmark | Observed | Benchmark | | |
| T | 5 | 6 | 50 | 65 | Yes | |
| S | 0 | 5 | 0 | 15 | | |
| PS | 0 | 1 | 30 | 10 | Yes | Yes |
| H | 7 | 7 | 10 | 10 | | |
| TG | 4 | 4 | 10 | 10 | Yes | |
| **Total** | **16** | **23** | | | **3** | **1** |

**Determination of expected percentage of life forms present**

Calculation of the expected percentage of understorey life forms present is done by dividing the total number of life forms present by the benchmark number of understorey life forms and multiplying by 100 (see below)

**Total # life forms present x 100 = Total # of expected life forms present%**
**Benchmark # Life forms**

The result of this calculation is used in a further calculation to determine the proportion of life forms present.

**Determination of the proportion of understorey life forms present**

Calculation of the proportion of understorey life forms present is done by dividing the total number of understorey life forms present, by the benchmark number of understorey life forms and multiplying by 100 (see below)

$$\frac{\text{Total \# life forms present \%}}{\text{Benchmark \# Life forms}} \times 100 = \text{Proportion of life forms present\%}$$

**Determination of the proportion of understorey life forms modified.**

Calculation of the proportion of understorey life forms modified is done by dividing the total number of understorey life forms present by the total number of understorey life forms modified and multiplying by 100 (see below).

$$\frac{\text{Total \# life forms present}}{\text{Total \# of Life forms modified}} \times 100 = \text{Proportion of life forms modified \%}$$

**Determination of the VCA Score for understorey lifeforms**

The results from the previous calculations for the proportion of understorey life forms present and the proportion of understorey life forms modified are used to determine which of the classes in Table 11 the results correspond.

**Table 11. Understorey lifeforms classes and scores**

| Proportion of life forms present | Proportion of life forms modified | Understorey lifeforms VCA score |
|---|---|---|
| 0 | | 0 |
| <50% | | 5 |
| ≥ 50%-<90% | ≥ 50% | 10 |
| | <50% | 15 |
| ≥ 90%-100% | ≥ 50% | 15 |
| | <50% | 20 |
| | 0 | 25 |

## Species Recruitment Score (forest only)

This is calculated using

- field data for the total number of observed native woody species
- field data for the total number of native woody species observed to be adequately recruiting

**Determination of the percentage of native woody species which are adequately recruiting**

Where native woody species are recorded as not adequately recruiting and the benchmark recruitment strategy is episodic, the evidence or lack of evidence of an episodic event is used to determine which of the classes in Table 11 apply, and thusthe VCA score for native woody species not adequately recruiting.

Where native woody species are recorded as adequately recruiting, the percentage of native woody species that are adequately recruiting is calculated by dividing the observed number of native woody species adequately recruiting by the total number of observed woody species and multiplying by 100.

**Observed # woody species adequately recruiting X 100 = % woody species adequately recruiting**
**Total number of observed woody species**

Calculation of the percentage of native woody species diversity is done by dividing the number of observed native woody species by the benchmark number of woody species and multiplying by 100 (these are the woody species sub totals from the Understorey Lifeform scoring section).

**Total # observed woody species X 100 = % woody species diversity**
**Benchmark # woody species**

### Determination of the VCA score for species recruitment

The percentage of native woody species adequately recruiting and the percentage of woody species diversity calculation results are used to determine the appropriate classes for 'evidence of recruitment' and 'woody species diversity', and thus the VCA recruitment score

**Table 12. Recruitment classes and scores**

| | Recruitment Episodic? | Evidence of Episodic Event | Recruitment % | Woody sp. Diversity % | Recruitment VCA Score |
|---|---|---|---|---|---|
| **NO** evidence of recruitment | **NOT episodic** | | | | **0** |
| | **episodic** | **episodic event evident** | | | **0** |
| | | **episodic event NOT evident** | | | **5** |
| Evidence of Recruitment | | | **<30%** | **≥50%** | **3** |
| | | | | **<50%** | **1** |
| | | | **≥30% - <70%** | **≥50%** | **6** |
| | | | | **<50%** | **3** |
| | | | **≥70%** | **≥50%** | **10** |
| | | | | **<50%** | **5** |

## Persistence Potential (non-forest only)

This score is calculated using

- the total number of observed species calculated from the understorey life forms scoring section.
- the total number of observed lifeforms calculated from the understorey life forms scoring section
- the benchmark number of understorey species
- the benchmark number of understorey lifeforms
- the persistence level information recorded.

### Determination of the proportion of the observed number of species

This is calculated by dividing the total number of observed species by the benchmark number of species and multiplying by 100

**# Species Observed X 100 =% Benchmark number of Species**
**Benchmark # Species**

**Determination of the proportion of the number of life forms present**

This is calculated by dividing the total number life forms observed by the benchmark number of life forms and multiplying by 100

$$\frac{\text{\# Life forms Present}}{\text{Benchmark \# Life forms}} \times 100 = \text{\% Benchmark Number of Life Forms}$$

**Determination of the level of diversity**

The proportion of observed number of species and the proportion of the number of lifeforms present results are used to determine the diversity category from Table 13 below.

**Table 13. Diversity level**

| Category | Diversity Level |
|---|---|
| ≥50% # species present **&** ≥50% life forms present | High |
| <50% life forms present | Low |

**Determination of persistence level**

The field data recorded is used to determine the persistence level based on the criteria given in Table 14 below.

**Table 14. Criteria for determining persistence level**

| Categories | Persistence Level |
|---|---|
| • Adequate regeneration (actual or potential) observed,<br>• appropriate management regime in place<br>• no evidence of PC | High |
| • Some regeneration (actual or potential) observed,<br>• management regime not completely appropriate<br>• some evidence of PC<br>• no significant changes to species # or cover | Medium |
| • no regeneration (actual or potential) observed,<br>• management regime completely inappropriate<br>• PC present<br>• Vegetation highly susceptible to PC | Low |

**Determination of the VCA score for persistence potential**

The score is the number in the cell in Table 15 that intersects with the two classes the diversity level and the persistence level results fall within.

**Table 15. Persistence score matrix.**

| | | Diversity Level | |
|---|---|---|---|
| | | **High diversity** | **Low Diversity** |
| **Persistence Level Category** | **Low** | 2 | 0 |
| | **Medium** | 6 | 4 |
| | **High** | 10 | 8 |

## Organic Litter Score (forest and non-forest)

This is calculated using

- the observed organic litter cover percentage recorded
- the observed native organic litter cover percentage recorded
- the benchmark organic litter cover percentage

**Determination of the proportion of litter cover**

The proportion of litter cover is calculated by dividing the observed cover of organic litter by the benchmark cover percentage of organic litter and multiplying by 100. See below.

$$\frac{\text{\% Observed Organic litter}}{\text{\% Benchmark Litter Cover}} \times 100 = \text{\% litter cover}$$

**Determination of the proportion of the litter cover that is native**

The proportion of the litter cover that is native is calculated by dividing the percentage of the native litter cover by the proportion of litter cover result and multiplying by 100

$$\frac{\text{\% Native litter cover}}{\text{\% total Litter Cover}} \times 100 = \text{\% litter cover}$$

**Determine the VCA score for Organic litter**

The organic litter score is determined using the organic litter score matrix (Table 16 below). The score is the number that intersects with the proportion of litter cover class and the proportion of litter cover which is native class in which the results of the calculations fall..

**Table 16. Organic litter score matrix**

| | | Native Litter % | |
|---|---|---|---|
| | | **<50** | **≥50** |
| **Total Litter %** | 0 | 0 | 0 |
| | 2 | 3 | 2 |
| | 4 | 5 | 4 |

## Log Component (forest only)

This is calculated using

- the total observed log length recorded
- the total observed large log length recorded
- the total benchmark long length

**Determination of the proportion of the total observed log length**

This is calculated by dividing the observed total log length by the benchmark log length and multiplying by 100

$$\frac{\text{Observed total log length}}{\text{Benchmark expected log length}} \times 100 = \%\ \text{total log length}$$

**Determination of the proportion of the total observed large log length**

This is calculated by dividing the observed large log length by the benchmark log length.and multiplying by 100

$$\frac{\text{Observed total large log length}}{\text{Benchmark expected log length}} \times 100 = \%\ \text{Large log length}$$

**Determination of the VCA log length score**

The log length score is determined using the log length score matrix (table 17 below). The score is the number that intersects the calculated log length percentage class and the calculated large log length class into which the result fall..

**Table 17 Log Length Score**

| | | Large Logs length % | |
|---|---|---|---|
| | | <25 | ≥25 |
| Log Length % | <10 | 0 | 0 |
| | ≥10 - <50 | 2 | 3 |
| | ≥50 | 4 | 5 |

# Landscape Context

## Patch Size

This VCA score is determined using GIS or field observations of patch size and information on the kinds and degree of disturbance of the patch.

The score is determined using the table 13 (see below) to establish which classes this information falls within.

**Table 18 Patch size classes and scores**

| Category (Ha) | Disturbance Level | VCA Patch Size Scores |
|---|---|---|
| < 2 | | 1 |
| ≥ 2 - <5 | | 2 |
| ≥5 - < 10 | | 4 |
| ≥10 - < 20 | | 6 |
| ≥20 | Significant | 8 |
| ≥20 | Not Significant | 10 |

## Neighbourhood

This score is determined by undertaking a GIS desktop investigation for 3 radii distances ( 100 km, 5 km, 1km) each measured from the perimeter of the assessment zone to determine an estimate of the percentage of native vegetation present in each radii. The percentage is recorded to the nearest 20% (i.e. 20%, 40%, 60%, 80% 100%).

The value for each radius is calculated by multiplying the estimated percentage of the native vegetation present in the zon, by the weightings shown in Table 19.

For neighborhood native vegetation within the 5km radius a determination of whether ≥50% of the vegetation is significantly disturbed or not is made.

The scores for the 3 radii distances are added together and the result is rounded off as shown in the example in table 19 below. This is the Neighbourhood VCA score.

**Table 19. Calculating neighbourhood score example**

| Radius distance (m) from site perimeter | % Native Vegetation (nearest 20%) | Weighting | ≥50% Vegetation significantly disturbed? | | Scores |
|---|---|---|---|---|---|
| 100 | 60 | 0.03 | | | 1.8 |
| 5 | 20 | 0.03 | Yes | -2 | -1.4 |
| | | | No | | |
| 1 | 20 | 0.04 | | | 0.8 |
| | | | Sum Scores (rounded off =VCA neighbourhood score | | 1 |

## Distance to Core Area

This score is determined by undertaking a GIS desktop investigation to

- determine the shortest distance from the edge of the zone being assessed to the edge of the nearest core area
- determine whether the core area identified is considered significantly disturbed.

The score is the number in the cell that intersects with the two classes in Table 20 below into which the results fall.

**Table 20. Neighbourhood Score Matrix**

| Distance km | Core area not significantly disturbed | Core area significantly disturbed |
|---|---|---|
| ≥5 | 0 | 0 |
| ≥1- <5 | 2 | 1 |
| <1 | 4 | 3 |
| Contiguous | 5 | 4 |

## Final VCA Score

To generate the final VCA score, all VCA score components are added together for forest. For non-forest all Site condition components are added and the total is then multiplied 1.07. The adjusted site condition sub-total is then added together with all the landscape context components. See the example in Table 21.

**Table 21 example of VCA score generation for all components**

| | Component | Score (max.) |
|---|---|---|
| **Site Condition** | Dominant Life Form Cover | 15 |
| | Understorey Life Forms | 25 |
| | Lack of Weeds | 15 |
| | Persistence Potential | 10 |
| | Organic Litter | 5 |
| | **Site condition total. Multiply by 1.07 Non forest only** | 70 |
| | **Sub Total (non- forest only)** | **75** |
| **Landscape Context** | Patch Size | **10** |
| | Neighborhood | **10** |
| | Distance to Core Area | **5** |
| **Final VCA Score** | **Total** | **100** |