DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

Guidance for assessors and decision-makers in applying modified benchmarks to assessments of vegetation integrity

Biodiversity Assessment Method

environment.nsw.gov.au

Cover photo: Peery Lake is one of the largest overflow lakes in the Paroo system RAMSAR site. Peery Lake forms part of the Paakantji people's dreaming stories. John Spencer/DPIE

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1. Purpose of this document

This practice note provides guidance for assessors and decision-makers in using modified benchmarks to assess vegetation integrity (VI) when applying the Biodiversity Assessment Method (BAM). Modified benchmarks include any benchmark data not contained within the BAM Calculator (BAM-C). Modified benchmarks are referred to in the BAM as more appropriate local data.

Vegetation condition benchmarks describe the reference state to which sites are compared, to score their site-scale biodiversity values or set goals for management or restoration. The three primary attributes of biodiversity – that is, composition, structure and function – are described by benchmarks. When scores for composition, structure and function are combined into a VI score, they provide the rigour and transparency needed to make site-scaled comparisons of biodiversity values to inform VI assessment under the BAM.

A VI score represents the degree to which the composition, structure and function of the plant community type (PCT) at a site differs from the best-on-offer condition. Best-on-offer sites are those sites within the contemporary landscape with higher numbers of native plant species, greater structural complexity and replete with functional components, relative to other sites within the same vegetation type and bioregion.

For further information about the benchmarks contained within the BAM-C see the Vegetation Condition Benchmarks webpage.

It is recommended that an assessor considers the use of modified benchmarks, in accordance with BAM Subsection 1.4.2, when:

- extreme climatic variation is adversely affecting the composition and structure of growth form groups important to a PCT
- finer-scale benchmarks are available for the relevant PCT from a published peer-reviewed source
- the vegetation class by Interim Biogeographic Regionalisation for Australia (IBRA) bioregion benchmark is demonstrated to be unsuitable for the PCT (due to the broad scale of the benchmark classification)
- the available BAM-C benchmark data has a low confidence rating.

2. Wet or dry benchmarks published by the Department

BAM Subsection 1.4.2(3.) provides that assessors may use benchmark data in the BioNet Vegetation Classification (Veg-C) that reflect seasonal or climatic variation in the benchmark values for a PCT as more appropriate local data (wet or dry benchmarks).

Benchmarks available in the BAM-C are based on average environmental conditions (e.g. rainfall) and represent an average attribute state across seasons. Where prior climatic conditions are far from average the use of BAM-C benchmarks may result in a VI score that is not representative of vegetation condition during more average climatic conditions. For example, during dry periods the vegetation condition is much lower overall and BAM-C benchmark values may be unrealistically high, resulting in an assessment that underestimates the vegetation condition. Alternatively, in very wet conditions, the BAM-C benchmark values may lead to an overestimation of vegetation condition values. These short-term variations in VI may result in an assessment of VI that does not accurately represent the inherent biodiversity values of the site.

BAM-C benchmarks assume average past rainfall; therefore, the use of wet and dry benchmarks is encouraged in accordance with this practice note following a wet or dry rainfall year. This is indicated when the rainfall total for 12 months prior to the assessment exceeds the vegetation class/IBRA bioregion rainfall threshold for a wet or dry rainfall year[1].

Wet or dry rainfall year thresholds are based on the long-term average rainfall data and are assigned to vegetation classes within each IBRA bioregion. Wet and dry benchmarks are predicted for vegetation classes in each IBRA bioregion according to the following metrics:

- *dry* benchmarks are predicted for rainfall periods that fall below the 20th percentile of the annual totals in long-term rainfall records, referred to as a *dry* rainfall year
- *average* benchmarks are predicted for rainfall periods that fall between the 20th percentile and the 80th percentile of the annual totals in long-term rainfall records, referred to as an *average* rainfall year, and
- *wet* benchmarks are predicted for 12-month rainfall periods that reach above the 80th percentile of the annual totals in long-term rainfall records, referred to as a *wet* rainfall year.

As an example, Table 1 shows the rainfall thresholds for the Pilliga Outwash Dry Sclerophyll Forests vegetation class located in the Darling Riverine Plains IBRA bioregion.

Table 1 Rainfall classes for prior 12-month rainfall period in the Pilliga Outwash Dry Sclerophyll Forests – Darling Riverine Plains

Cumulative rainfall class	Cumulative rainfall threshold (mm)
AVERAGE rainfall year	366 – 608
WET rainfall year	>608
DRY rainfall year	<366

Where wet or dry benchmarks are not yet available in the BioNet Veg-C, local benchmark data from nearby reference sites may be collected in accordance with BAM Appendix A (see Section 3 of this practice note).

[1] The wet and dry rainfall year thresholds are scheduled to be published in the BioNet Veg-C in early 2021. If you require this information prior to publishing, please contact bam.support@environment.nsw.gov.au.

Extreme drought is considered to occur where the cumulative rainfall totals for the prior 12-month period fall well below the dry threshold. This is considered as less than 10% (the 10th percentile) of the long-term average annual rainfall. During an extreme drought, it is recommended that a BAM Stage 1 assessment is deferred until conditions improve. This is particularly important for proposed biodiversity stewardship agreement (BSA) assessments, because it increases the uncertainty around the predicted ecological response of habitats and communities to management actions undertaken at a site.

In circumstances where delaying the assessment is not possible, including for a BSA, it is recommended that further advice is sought from BAM Support (bam.support@environment.nsw.gov.au).

Figure 1 shows the decision process to apply wet or dry benchmarks to a BAM Stage 1 assessment.

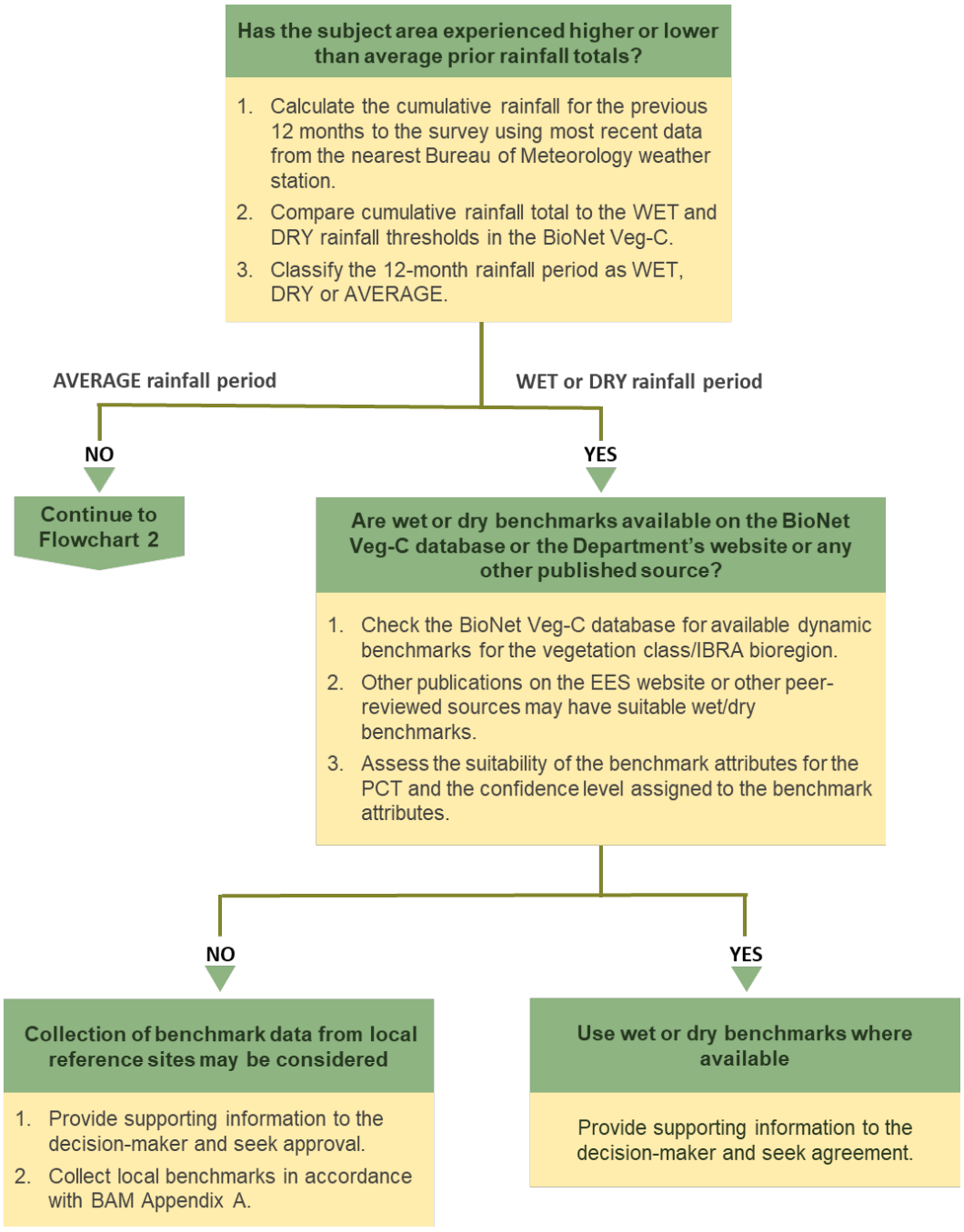

Figure 1 Decision process to apply wet or dry benchmarks to a BAM assessment

2.1 How to apply wet or dry benchmarks published by the Department to a BAM assessment

Step 1: Calculate the cumulative total rainfall for the 12 months prior to survey.

Calculate the cumulative rainfall for the 12 months prior to the survey using data from the nearest Bureau of Meteorology (BOM) weather station.

Where rainfall data for the previous 12 months is not available, use the next closest BOM weather station (up to 35 km) and select the most recent 12-month period to the survey date for which rainfall data are available.

A full rainfall record of 12 months prior to the survey date must be used to calculate the annual cumulative rainfall and the end date of this rainfall period must fall within three months of the survey date.

Step 2: Determine the appropriate rainfall threshold class.

Refer to the relevant vegetation class/IBRA bioregion wet and dry rainfall thresholds in the BioNet Veg-C and compare this to the cumulative rainfall total for the previous 12-month period to conclude whether the wet or dry thresholds are exceeded.

Step 3: Check for availability and evaluate suitability of the wet or dry benchmark data for the PCT.

Check the BioNet Veg-C or other published sources, including the Environment, Energy and Science (EES) website, for availability of wet and dry benchmarks and, where necessary, consider the confidence level assigned to each value. In cases where no suitable wet or dry benchmarks are available consider using more appropriate local data (see Section 3 of this practice note).

Step 4: Seek approval from the decision-maker.

Submit supporting information to the decision-maker and seek written agreement (see Section 4.1 ‘Information requirements for decision-maker agreement to use modified benchmarks’).

Step 5: Use the agreed modified benchmarks in the BAM-C.

Amend the benchmark data in the BAM-C by applying the modified benchmarks and reassess the proposal. Refer to the BAM-Calculator User Guide (PDF 3MB) for technical support on modifying benchmark values in the BAM-C.

Step 6: Document the results in the Biodiversity Assessment Report (BAR).

Document results in the BAR according to Section 4.2 of this practice note.

3. Using more appropriate local benchmark data (or other peer-reviewed published sources)

BAM Appendix A sets out the requirements for the collection of benchmark data from local reference sites or other published peer-reviewed sources. Figure 2 shows the decision path for considering more appropriate local benchmark data in a BAM assessment.

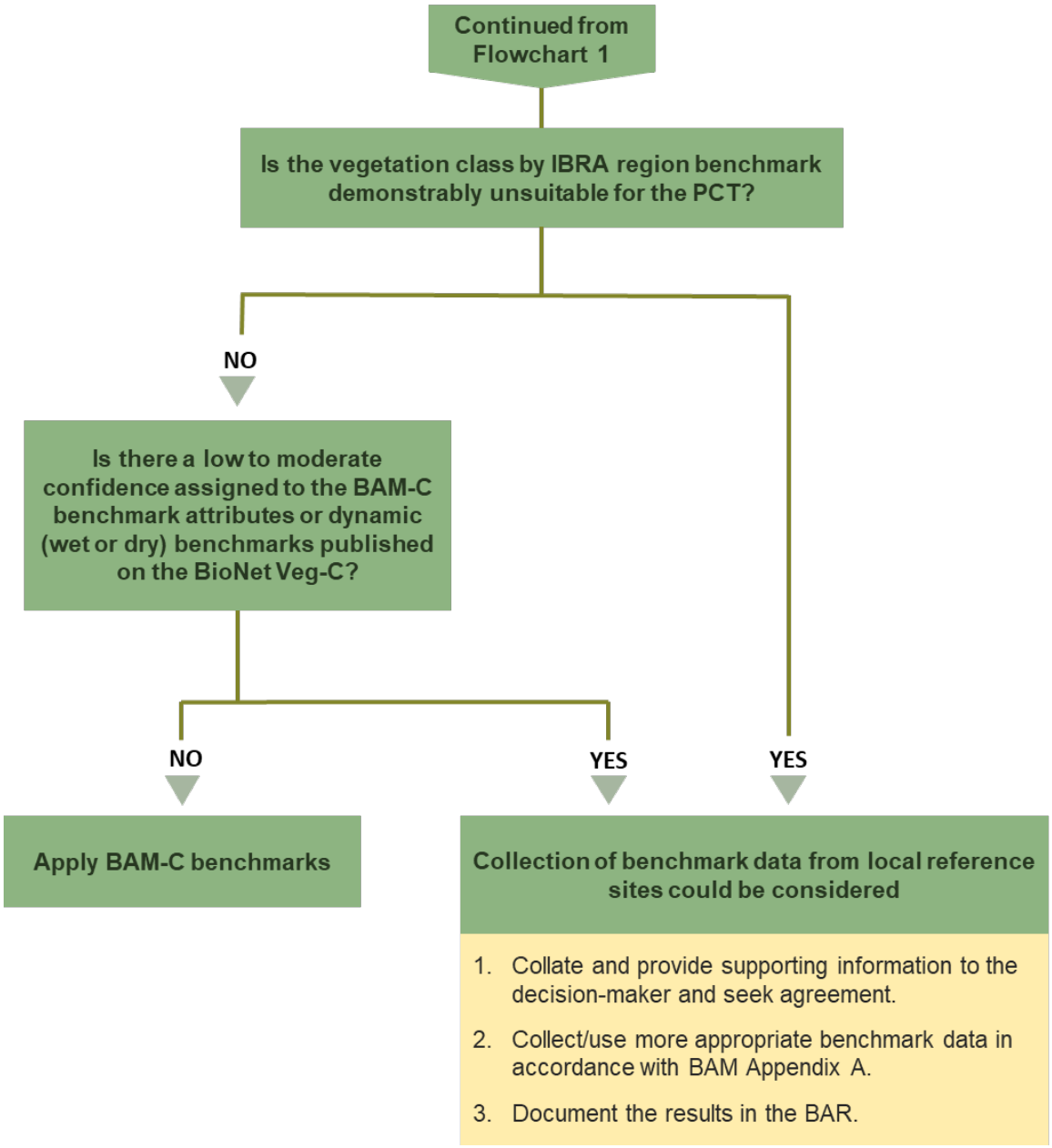

Figure 2 **Decision process to apply more appropriate benchmark data from local reference sites or other published peer-reviewed sources to a BAM assessment**

Confidence levels assigned to each benchmark value vary according to the composition, structure and function scores.

Assessors may choose to collect local data to improve the confidence in one or more of the benchmark values that contribute to a VI score. Table 2 shows how assessors should consider the confidence of each benchmark value before collecting local data. Assessors should consider the confidence level in conjunction with the dynamic weighting of the benchmark value and ensure a high confidence in those values that have the most influence on the overall VI score for a PCT.

Table 2 How to consider benchmark value confidence before using local benchmarks

Confidence	Recommendation
Low – Very Low	Local benchmarks should be considered
Moderate	Local benchmarks may be considered
High – Very High	Local cover benchmarks should only be considered where the benchmark at the scale of vegetation class by IBRA bioregion is demonstrably unsuitable for the PCT, or following a wet or dry rainfall year

For some PCTs, benchmarks at the scale of vegetation class by IBRA bioregion may not accurately describe the best-on-offer conditions. Where the assessor is of the opinion that existing regional vegetation class benchmark values do not accurately describe the best-on-offer condition for a PCT they can consider the use of local benchmark data or data from published peer-reviewed sources.

Assessors cannot use more appropriate local data to change the:

- sensitivity to loss class for a threatened ecological community (TEC), a PCT, or a threatened species or a component of its habitat
- sensitivity to gain class for a TEC, a PCT, or a threatened species or a component of its habitat
- biodiversity risk weighting for a TEC, a PCT, or a threatened species or a component of its habitat.

3.1 How to use more appropriate local data from reference sites or peer-reviewed published literature

Step 1: Collect information to demonstrate to the decision-maker that benchmarks in the BAM-C or, where available, wet and dry benchmarks in the BioNet Veg-C are not suitable for the PCT.

When the BAM-C benchmarks are unsuitable due to the influence of wet or dry periods, and no other suitable wet and dry benchmarks are available in the BioNet Veg-C (or other published peer-reviewed sources), collect rainfall data and demonstrate the site falls within the thresholds for a wet and dry period (in accordance with Section 2.1 Step 1 and Step 2 of this guideline).

Where the vegetation class/IBRA bioregion benchmark is demonstrably unsuitable for the PCT due to the broad scale of the vegetation class/IBRA bioregion benchmark or other specific ecological features, collate relevant data and information for the decision-maker to justify the use of more appropriate local data. This may include species lists, photos or maps and any other information as required by the decision-maker.

Step 2: Seek early approval from the decision-maker.

See Section 4.1 ‘Information requirements for decision-maker agreement to use modified benchmarks’.

Step 3: Proceed with the agreed approach.

Collect more appropriate local data in accordance with BAM Appendix A. Modify the benchmarks in the BAM-C where required according to the guidance in the BAM-Calculator User Guide (PDF 3MB).

Step 4: Document the results in the BAR.

The assessor must describe methods used to apply local benchmarks. Refer to Section 4.2 of this practice note for further guidance.

4. Decision-maker must approve use of modified benchmarks

The assessor must provide the decision-maker with supporting information to justify the use of modified benchmarks and seek written agreement (BAM Subsection 1.4.2 (1)). It is recommended assessors engage early with the decision-maker to discuss and reach agreement on a proposal to use modified benchmarks.

The decision-maker must provide their decision in writing, documenting their agreement or refusal of use of modified benchmarks in the assessment of vegetation integrity.

It is not mandatory for an assessor to collect more appropriate local benchmark data, however, where modified benchmarks are more appropriate according to rainfall thresholds are met, and wet and dry benchmarks are published in the BioNet Veg-C, it is recommended they are used in an assessment.

4.1 Information requirements for decision-maker agreement to use modified benchmarks

The following details should be provided to the decision-maker when seeking agreement to use modified benchmarks:

- reason for using modified benchmarks according to Section 1 of this practice note
- the PCT/s and associated vegetation classes proposed to be assessed with modified benchmark values
- the specific benchmark values proposed to be modified and why
- the existing BAM-C benchmark values and the confidence levels assigned in the BioNet Veg-C
- an indication of whether the assessor proposes to collect benchmark data from local reference sites
- the source of the data for the modified benchmark including, where relevant, references and citations of published literature
- for a proposal to use modified benchmarks due to climate variability, the details of prior rainfall for the site and evidence that the climate variability falls within the wet and dry rainfall year thresholds published in the BioNet Veg-C (see Section 2.1)
- where relevant, detailed justification for a benchmark at the vegetation class by IBRA bioregion level being unsuitable for the PCT including, where appropriate, photos, survey results and maps.

4.2 Documenting results in the BAR

The BAR should include any information that was previously provided to the decision-maker to seek approval and any documentation received from the decision-maker.

Where benchmark data is collected from local reference sites, the BAR must document the methods used including:

- the benchmark values that have been modified with more appropriate local data
- PCTs/vegetation classes for which local data has been used
- method used to select best-on-offer sites in accordance with BAM Appendix A
- reference site survey results including a map of reference site locations
- the analysis of local benchmark data in accordance with BAM Appendix A.

When applying modified benchmarks due to climate variability, the BAR must demonstrate the site conditions fall within the wet and dry thresholds in the BioNet Veg-C and the following information should be documented in the BAR:

- relevant wet/dry rainfall thresholds for each vegetation class
- cumulative rainfall totals and the relevant long-term rainfall percentile
- dates of the 12-month period
- distance to the nearest BOM station used for rainfall data (including a map to demonstrate proximity).

5. Support

Contact bam.support@environment.nsw.gov.au if you have any questions.

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