DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

Biodiversity Assessment Method 2020 Operational Manual – Stage 3

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Shortened forms

Abbreviation	Description
AOBV	Area of Outstanding Biodiversity Value
API	Application Programming Interface
APZ	asset protection zone
ARMA	active restoration management action
BAR	Biodiversity Assessment Report; includes Biodiversity Development Assessment Reports (BDARs), Biodiversity Certification Assessment Reports (BCARs) and Biodiversity Stewardship Site Assessment Reports (BSSARs)
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BCT	Biodiversity Conservation Trust
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
BSA	biodiversity stewardship agreement
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	critically endangered ecological community
EEC	endangered ecological community
EMM	Ecological Monitoring Module
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
HTW	high threat weeds, also referred to as high threat exotic species
IBRA	Interim Biogeographic Regionalisation for Australia
LLS	Local Land Services
LLS Act	*Local Land Services Act 2013* (NSW)
the Manual	Biodiversity Assessment Method Operational Manual (this Manual)
MZ	management zone
PCT	plant community type
SEED	Sharing and Enabling Environmental Data
TBDC	Threatened Biodiversity Data Collection
TEC	collective term for threatened ecological communities (vulnerable ecological communities, endangered ecological communities, critically endangered ecological communities) listed under the BC Act and the EPBC Act
TFD	total fund deposit
VI	vegetation integrity

Introduction

The NSW *Biodiversity Conservation Act 2016* (BC Act), and Biodiversity Conservation Regulation 2017 (BC Regulation) outline the framework for addressing impacts on biodiversity from development and clearing. The framework requires a proponent to avoid, minimise and offset impacts on biodiversity from these actions using the Biodiversity Offsets Scheme (BOS).

The BOS establishes biodiversity stewardship agreements (BSAs), which are voluntary in-perpetuity agreements entered into by landholders. BSAs are the mechanism used to secure sites where the improvement in biodiversity values is used to offset the loss incurred by development and clearing of native vegetation elsewhere in New South Wales.

The BOS includes the Biodiversity Assessment Method 2020 (BAM), which is enabled by section 6.7 of the BC Act. The BAM provides:

- a transparent, consistent, and scientifically based approach for the assessment of biodiversity values on a proposed development, clearing or biodiversity stewardship site
- guidance on how a proponent can avoid and minimise potential biodiversity impacts
- a method for calculating the number and class of biodiversity credits that need to be offset to meet the standard of 'no net loss' of biodiversity.

At a proposed biodiversity stewardship site, the BAM is used to assess the biodiversity values on the site, identify the type of management actions and activities that must be undertaken as part of the management plan, and determine the number and class of biodiversity credits that can be created in respect of those management actions.

The types of development proposals that are assessed using the BAM include:

- applications for development consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), other than an application for state significant development or for a complying development certificate (see section 7.13(1) of the BC Act), and the modification of such consents
- applications for development consent for state significant development or for approval for state significant infrastructure under the EP&A Act (see section 7.14(1) of the BC Act), and the modification of such consents
- Part 5 activity, where the proponent has elected to obtain a biodiversity development assessment report (BDAR), under Division 2 of the BC Act (see section 7.15(1) of the BC Act), and the modifications of such approvals
- biodiversity certification of land (see sections 8.2 and 8.7(1) of the BC Act)
- applications to clear native vegetation on rural land under Division 6 of Part 5A of the NSW *Local Land Services Act 2013* (LLS Act) that do not meet the requirements of allowable activities or the Land Management (Native Vegetation) Code 2018
- clearing of native vegetation in urban areas and environmental conservation zones under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (i.e. clearing that does not need development consent under the EP&A Act), that exceeds the offset thresholds.

Biodiversity Assessment Method – Operational Manual

Purpose of this Manual

The Biodiversity Assessment Method Operational Manual (the Manual) provides operational guidance to assist applicants and accredited assessors in the application of the BAM. The Manual is a companion document to the BAM. In general, the Manual does not seek to repeat text in the BAM and therefore the two documents should be read together. Any updates to administrative structures, position titles and data sources since the BAM was last gazetted may also be reflected in the Manual.

Structure of the Manual

The Manual is structured to mirror the three stages of the BAM. Each stage is presented as a separate document to enable easy access to relevant information when implementing the BAM.

Stage 1: Biodiversity assessment identifies the types of biodiversity values on land, such as:

- land proposed as a development site, including for a Part 5 activity
- land subject to a vegetation clearing proposal which is required to be assessed by BAM under the LLS Act
- land proposed to be biodiversity certified
- land proposed as a biodiversity stewardship site under a biodiversity stewardship agreement.

Stage 1 focuses on the assessment of the landscape context, the vegetation integrity (VI) of native vegetation[1], and the suitability of habitat for threatened species.

Stage 2: Impact assessment (biodiversity values and prescribed impacts) applies the avoid, minimise and offset hierarchy and assesses direct, indirect and prescribed impacts associated with the development or clearing proposal. It is used to determine the offset requirements for all residual impacts on biodiversity values at a proposed site. In general, these are measured as ecosystem credits and species credits. Stage 2 determines the number, class and offset trading group of biodiversity credits.

Stage 3: Improving biodiversity values is used to assess the anticipated improvement (or gain) in the vegetation integrity of native vegetation and habitat suitability for threatened species, the management actions, and preparation of a management plan at a stewardship site. This stage determines the number of biodiversity credits created at the site from the improvement in biodiversity values. ***Stage 3 is the focus of this document*.**

Streamlined assessment modules are set out in Appendices B, C and D and may be used where the proposal impacts on scattered trees, a small area or planted native vegetation. Operational manuals are being developed for each of the streamlined assessment modules and will be published on the Biodiversity Assessment Method webpage.

[1] Native vegetation is defined under s. 60B of the *Local Land Services Act 2013* as plants native to New South Wales (trees, understorey plants, ground cover, plants occurring in a wetland), established in New South Wales before European settlement.

Stage 3: Improving biodiversity values

Introduction to Stage 3

The purpose of BAM Stage 3 is to predict the improvement (or gain) in biodiversity values at a proposed biodiversity stewardship site, based on management actions, and to calculate biodiversity credits generated. The assessment relies on the outcomes of Stage 1, which determines the current vegetation integrity (VI) score and habitat suitability.

Stage 3 of the Manual is divided into the following parts:

- Part 1 – Documenting Stage 3 outcomes (BAM Appendix M)
- Part 2 – Calculating gain in biodiversity values at a biodiversity stewardship site (BAM Chapter 11).

Resources

A range of online resources are available to assist assessors with the application of the BAM. All online resources and websites referred to in the Manual are listed in Appendix A. Key resources include:

Biodiversity Offsets and Agreement Management System

- The case management system used to administer the BOS.
- Assessors must use the BAM-C in Biodiversity Offsets and Agreement Management System (BOAMS) for assessing and submitting BSA applications. BOAMS is also used to save BAM assessments, submit BAM related applications, generate a credit obligation or apply to sell or retire credits.
- Assessors may also use BOAMS to submit an expression of interest for a biodiversity stewardship agreement on behalf of a landholder or submit a credit wanted listing on behalf of a development proponent.
- Important habitat area maps for those species for which the habitat constraint in the Threatened Biodiversity Data Collection (TBDC) refers to a mapped important area are accessed via BOAMS.
- For more information about how to use the BOAMS, the user guide can be accessed from the Frequently Asked Questions module after logging in to BOAMS.

Biodiversity Assessment Method Calculator

- The tool that operationalises the BAM. The Biodiversity Assessment Method Calculator (BAM-C) stores survey data recorded by the assessor and calculates the number and type of credits required to offset the impacts of development on, or credits generated from improvements in, biodiversity values.
- Two versions of the BAM-C exist:
    - a public standalone version (open to all but will not save data or print reports), and
    - a version accessed through the BOAMS for the use of assessors when preparing biodiversity assessment reports (see above).
- The case in the BOAMS version of the BAM-C for the proposed BSA must have a finalised status before it can be submitted to the Biodiversity Conservation Trust (BCT).
- Updates to the BAM-C, including to the underlying species and native vegetation data held in BioNet, occur periodically. All registered users of the BAM-C will be notified accordingly.

- Refer to the *Biodiversity Assessment Method (BAM) Calculator User Guide* for information on how to use the BAM-C.

Biodiversity Assessment Method Operational Manual – Stage 1

- The document that provides guidance for implementing Stage 1 of the BAM including practical advice and examples when assessing the landscape context, the VI of native vegetation, including threatened ecological communities (TECs), and habitat suitability for threatened species.

Biodiversity Conservation Trust Guidance

The 'Resources' page on the Biodiversity Conservation Trust (BCT) website includes a range of resources to support private land conservation.

BioNet Atlas

- A publicly accessible online database that contains biodiversity observation data for New South Wales.
- Ecological consultants must request a login to access detailed location information and contribute to, analyse or export data.
- NSW BioNet quick guides, information sheets, manuals and datasheets are available to support use of the database.

BioNet Threatened Biodiversity Data Collection

- The data collection contains information for listed threatened species, populations and ecological communities such as survey requirements and habitat constraints that can guide identification of species polygons.
- It houses the information and data used in the BAM-C, including whether a species is a 'species' or 'ecosystem' credit, or both.

BioNet Systematic Flora Survey

- Systematic vegetation survey data (VIS data) for New South Wales, including full floristic survey sites, rapid sites and site vegetation condition information.

BioNet Vegetation Classification

- A publicly accessible online database (user registration is required).
- The database contains information on plant community types (PCTs) described for New South Wales including general location, floristic composition and structure, condition benchmarks and percent cleared information.
- BioNet Vegetation Classification (Veg-C) is the primary source for defining equivalent or part equivalent associations between PCTs and TECs.

BioNet Web Services

- NSW biodiversity data held in BioNet is available via an Open Application Programming Interface (API).
- It enables organisations and individuals to directly integrate biodiversity data into their software systems.

Areas of Outstanding Biodiversity Value

- Declared Areas of Outstanding Biodiversity Value (AOBV) can be found in the Register of Areas of Outstanding Biodiversity Values. Links to declarations and maps of these sites are recorded within the register.

Sharing and Enabling Environmental Data

- Sharing and Enabling Environmental Data (SEED) is a shared resource for environmental data that includes public access to the Department of Planning, Industry and Environment (the Department) datasets.
- Available spatial datasets include:
    - NSW (Mitchell) Landscapes – version 3.1
    - Interim Biogeographic Regionalisation of Australia (IBRA region and sub-regions) – Version 7
    - NSW soil profiles
    - hydrogeological landscapes
    - acid sulfate soils risk maps
    - digital cadastral database.
    - BioNet Vegetation Map Collection (previously called the Vegetation Information System Maps).

PlantNET NSW

- An online database of the flora of New South Wales that contains the currently accepted taxonomy for plants found in the state, both native and exotic.
- Online keys for plant identification, as per the published Flora of NSW and updates.
- Plant taxonomy and naming in Biodiversity Assessment Report (BARs) must be consistent with the Flora of NSW, as per PlantNET.

1. Documenting Stage 3 outcomes

1.1 Requirements for the biodiversity stewardship agreement application

An application for a biodiversity stewardship agreement (BSA) (see Box 1) must be submitted to the Biodiversity Conservation Trust (BCT) via BOAMS, using the Upload Files function (BOAMS User Guide, Section 3.3.3 – see Appendix A). The BSA application submission must include the:

- signed BSA application form, with supporting documentation (e.g. Certificate of Title)
- BSSAR (Biodiversity Stewardship Site Assessment Report), including the:
    - finalised BAM-C biodiversity credit report and credits summary reports
    - completed management plan, detailing the management and monitoring actions that are proposed to be undertaken at the biodiversity stewardship site
    - digital copies (can be scanned hardcopies) of all survey data sheets and/or import plot data template from BAM-C (for the BAM Stage 1 assessment)
    - ESRI-compatible spatial datasets for all map components generated for the BSSAR and management plan (in single Zip file or geodatabase)
- completed total fund deposit (TFD) calculator.

The 'BCT BSA Application: Supporting Documents' (Appendix A) provides further guidance to assessors and landholders on preparing an application for a BSA. An application will not be considered complete until all documentation is submitted.

Box 1: Biodiversity stewardship agreements

BSAs are the legal mechanism used to secure a biodiversity stewardship site under the BC Act. The BSA will include a management plan that sets out proposed annual management actions, the cost of those actions over a 20-year period and the ongoing maintenance costs. The total costs are called the total fund deposit (TFD).

When a landowner enters into a BSA, biodiversity credits are created for the anticipated improvements in biodiversity values from undertaking management actions.

The BCT has responsibility for the approval and administration of BSAs. Approved BSAs are registered on the land title. The agreement includes provisions that require current and future landowners to carry out management actions set out in the management plan.

The TFD is met through proceeds from the sale or retirement of credits and is paid into an account established under the Biodiversity Stewardship Payment Fund, managed by the BCT. Once the TFD is fulfilled any additional funds will be retained by the landowner. Annual payments are then made to the landowner to fund implementation of the management plan.

For more information on establishing a BSA visit the BCT website (Appendix A).

1.2 Requirements for the Biodiversity Stewardship Site Assessment Report

At the completion of the BAM Stage 3, the assessor will have produced a BSSAR. The BSSAR compiles all the elements of the assessment including:

- application and outcomes of the BAM Stage 1
- justification for decisions made around management actions and activities
- consideration of additionality
- the finalised BAM-C case, and
- the management plan.

The BSSAR must include a summary of the management plan, but not duplicate the prescriptive detail. Instead the BSSAR provides the justification that supports how each required management action will be implemented. The assessor must include the information presented in Table 1 in the BSSAR (also see BAM Appendix M). The assessor must ensure they retain consistent use of data and information between the BSSAR, management plan, the BAM-C, and any other supporting documents.

Table 1 Requirements for a Biodiversity Stewardship Site Assessment Report

Information	Maps and data
Report section: Biodiversity stewardship site identification	
The BAM Stage 1 requirements are not detailed in this table but must be included in this section – see the BAM Operational Manual Stage 1 for more information.	
Details of the biodiversity stewardship site, including the: • location (property address) • Lot and DP numbers for the property • proposed site size • general site description (including any exclusions, considerations and constraints relevant to proposed and future use and planning) • land-use history • other relevant information, including any known proposed development adjacent to the site	**Map:** identify the biodiversity stewardship site, including: • biodiversity stewardship site boundary • cadastre (which forms the property boundary), including the Lot/DP and corner points where the boundary deviates from the cadastre • any existing legal obligations or encumbrances (e.g. existing agreements, covenants, asset protection zones, etc.) **Spatial data:** GIS files for the following: • biodiversity stewardship site boundary
Report section: Improving biodiversity at the biodiversity stewardship site	
Ecosystem credits and species credits created at the biodiversity stewardship site, including information describing the:	**Map:** PCTs/TECs on the biodiversity stewardship site, including vegetation zones and management zones
Required management actions Provide justification for: • any required management actions not to be implemented • choice of management activities and appropriateness for the site • location of management actions	**Map:** each species polygon based on the requirements set out in the BAM. Where relevant, clearly distinguish: • areas or features that will not generate credits but are habitat (e.g. waterbodies, caves, rockfaces, culverts), and/or • areas that will be restored on the biodiversity stewardship site to expand current extent of species habitat

Active restoration management actions

- objectives of the active restoration
- an assessment of whether active restoration management actions (and proposed management activities) are appropriate for the site
- documentation of risks and constraints, and analysis of how they will be addressed in the management plan
- restoration techniques to be used and supporting evidence demonstrating these are likely to be successful
- identification of active restoration management actions that will benefit biodiversity values including justifications for proposed credit generation
- justification for species polygons extended to include areas of active restoration
- likelihood of achieving predicted gains

The risk status (high or low) of the land used to calculate the averted loss and evidence to justify selection

Whether the security benefit score applies

Existing conservation obligations, associated management actions and additionality calculations (where relevant)

Justification for management plan costings and performance measures

Table: for each vegetation/management zone:

- current VI score
- future VI score without management (averted loss)
- future VI score with management (required actions)
- future VI score with management (active restoration actions, if proposed)
- total change in VI score
- total gain in VI score

Table: required and active restoration management actions:

- type of management action
- management activity description
- purpose
- location
- timing
- VI attributes targeted by the management action (as entered in the BAM-C) including:
    - benchmark value
    - current value
    - future value without management (averted loss)
    - future value with management (required actions)
    - future value with management (active restoration actions), if proposed
    - future value with management (active restoration actions, with restoration risk weighting), if proposed
- performance measures
- ecological response targets

Table: PCTs/TECs within the biodiversity stewardship site, detailing:

- vegetation zones
- management zones (if applicable)
- area (hectares)
- ecosystem credits created – number and type

Table: threatened species on the biodiversity stewardship site (only those generating species credits), detailing:

- common and scientific name
- whether the species is a dual credit species
- unit of measure (as outlined in the TBDC)
- area of suitable habitat (hectares) and/or counts of individuals
- future habitat suitability scores for species credit species
- species credits created – number

Data: proposal in BOAMS is submitted and finalised in the BAM-C

Information	Maps and data
	Spatial data: GIS files for the following: • PCTs/TECs • vegetation zones and management zones • species polygons
Appendix: Biodiversity Credit Reports	
Attach the BAM-C credit reports: • Biodiversity Credit Report • Credit Summary Report	
Appendix: Biodiversity stewardship site management plan	
Refer to the 'BCT Biodiversity Stewardship Site Management Plan template' (Appendix A) *Ensure consistency with other sections of the BSSAR (e.g. names, tables, maps).*	

1.2.1 Requirements for the management plan

The management plan is prepared by an assessor, prescribing the management actions, activities and monitoring to be undertaken on the BSA site.

The management plan must include:

- reference to the maps contained in the BSA
- management actions and activities (required and active restoration management actions)
- performance measures for required and proposed active restoration management actions
- monitoring activities to measure ecological response to management actions.

Assessors must use the most recent version of the 'Biodiversity Stewardship Site Management Plan template' (the template), available on the BCT website (Appendix A). The instructional text within the template provides guidance for completing the management plan. The standard wording within the template must not be amended – only include site specific information in the highlighted fields, or where otherwise directed.

The management plan must be prepared as an appendix to the BSSAR and submitted as a standalone Word document to enable its inclusion as part of the BSA.

Further information is detailed in Section 2.7 of this Manual.

1.2.2 Requirements for maps

Digital GIS files must be provided for spatial data underpinning figures in the BSSAR (and management plan) as requested by the BCT. The coordinate system for all GIS files must be defined. Primary data relevant to the production of the maps is to be submitted via BOAMS as part of the BSA application.

Printed maps can be produced at a scale suitable to illustrate the relevant features and text. For example, maps may be presented at a scale that can be displayed on an A4 page, in line with the rest of the report. Multiple maps can be used to present features in detail, providing each map is the same scale for comparison. Insets should be used to show each map location relative to the biodiversity stewardship site. Important features or boundary lines can be represented as a spatial point(s) with GPS coordinates referenced on the corresponding legend. All maps must be easy to read with clear headings, keys, unambiguous colour ramps, symbols and geo-references (e.g. a scalebar and north arrow). All maps must include the label 'biodiversity stewardship site' to enable their inclusion in the BSA.

2. Calculating gain in biodiversity values at a biodiversity stewardship site

Chapter 11 of the BAM sets out the method and requirements for:

- calculating gain from required and active restoration management actions
- calculating the biodiversity credits at a biodiversity stewardship site, and
- preparing a management plan.

2.1 Assessing gain in biodiversity values at the biodiversity stewardship site

(BAM Section 11.1)

To undertake an assessment of gain in biodiversity value at a biodiversity stewardship site the assessor must use the site context, VI and habitat suitability information collected in the BAM Stage 1 (Chapters 3–5).

Gain is estimated at biodiversity stewardship sites from the:

1. **averted loss** of biodiversity values
2. **management actions** that improve biodiversity values, and
3. **security benefit**, for sites in high to very high condition.

Averted loss is the difference in the current vegetation and habitat condition of the land compared with the probable future vegetation condition if the land was unmanaged over 20 years. It is calculated based on estimates of the annual rate of decline for VI attributes in the absence of management.

Management actions drive the improvements in biodiversity (referred to as *management gain* – see Box 2). *Required management actions* are a standard set of management actions prescribed in the BAM (Section 11.3.1), directed at reducing threats or pressures on biodiversity values; for example, weed control, livestock grazing management, ecological burning. The BAM (Section 11.3.2) also provides for additional gain to be derived through *active restoration management actions* (or ARMA), that require approval by the BCT. These actions aim to substantially alter the characteristics or processes of the environment to support the return of native vegetation and/or habitat features.

The **security benefit** applies to PCTs in good condition based on having a current VI score ≥60. The security benefit score recognises the conservation benefit of securing good condition vegetation under a BSA and provides a small increase in the credit generation (Section 2.3 of this Manual).

Further information on each of these components is provided in the following sections of this Manual.

Box 2: Calculating change in vegetation integrity score at a biodiversity stewardship site (adapted from Dorrough et al. 2019).

The BAM uses a model for estimating the gain in vegetation condition as a result of management actions. Gain is estimated from the change in vegetation condition with and without an offset. The total gain is the sum of three separate components: 1) gain from management, 2) gain from averted loss, and 3) security benefit (Figure 1).

Management gain is estimated as the future improvement in vegetation condition, relative to its current state (future value with offset – current value). Averted loss is estimated in relation to a 'counterfactual', those changes in vegetation condition that are predicted to occur if the site was not managed under a biodiversity stewardship agreement. It is the expected future loss in vegetation condition that would occur in the absence of securing the vegetation under an in-perpetuity management plan (current value – future value without offset). In the BAM the counterfactual is assumed to be an ongoing background rate of decline in vegetation condition, estimated as the annual probability of decline.

The annual rate of decline and rate of gain varies for each VI attribute as set out in the *Intrinsic rates of increase/Annual rate of decline* tables published in the BAM-C.

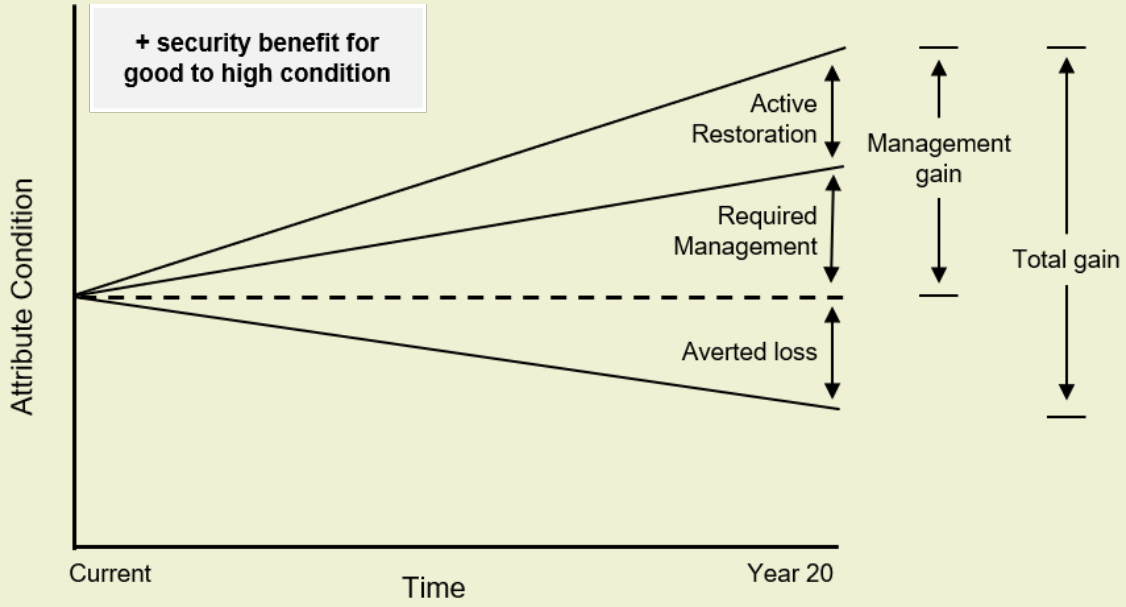

Figure 1 The total benefit (or gain) of implementing management actions at a biodiversity stewardship site (adapted from Maron et al. 2013)

2.2 Calculating the change (gain) in vegetation integrity score at a biodiversity stewardship site

(BAM Section 11.4)

For each vegetation/management zone, the assessor must enter the plot survey data, (collected in the BAM Stage 1 assessment) into the BAM-C. The BAM-C will calculate the current VI score, the future VI score (without management) and the future VI score (with management).

The BSSAR requirements 'Future VI score without management (averted loss)', 'Future VI score with management (required actions)', 'Future VI score with management (active restoration actions)' and 'Change in VI score' are available in the BAM-C Vegetation tab. The 'Gain in VI score' is available in the BAM-C Credit Summary report.

2.2.1 Estimating the decline in vegetation integrity attributes when the site is not managed under a biodiversity stewardship agreement (averted loss)

(BAM Section 11.4.1)

The *future value of VI attributes without management* represents the expected decline in vegetation condition under a 'business as usual' scenario (see Averted loss, Figure 1). In the BAM, this is referred to as the *annual rate of decline* (*Intrinsic rates of increase/Annual rate of decline* tables are published in the BAM-C).

The *annual rate of decline* is calculated by the BAM-C based on:

- the annual rate of decline for the VI attribute, and
- the presence of any high threat weeds (HTW) in the vegetation/management zone (based on the Stage 1 assessment), and
- the risk category ('high' or 'low') assigned to the biodiversity stewardship site by the accredited assessor, based on permissible land uses (BAM Subsection 11.4.1(6.)).

For example, native vegetation on low risk land may still have a high risk of decline if the presence of HTW is recorded during vegetation condition assessments.

The *annual rate of decline* is used in Equation 28 (BAM Appendix H.6) to generate the future condition of each attribute and growth form group without management, within a vegetation/management zone.

The assessor must clearly document in the BSSAR the risk category selected in the BAM-C for each vegetation zone. Justification can include:

- an assessment of the land identifying it as Category 1-exempt land via the Native Vegetation Regulatory Map, or
- a description of the land-use zones that apply to the site based on the local environmental plan for the local government area, or
- the site is located in a NSW (Mitchell) landscape that is ≥30% cleared, or
- the site adjoins urban or industrial development (or future urban development) if the proposed biodiversity stewardship agreement is part of the biodiversity certification proposal, or
- vegetation zones where the native vegetation is listed as an endangered or critically endangered community.

2.2.2 Estimating the increase in vegetation integrity attributes when the site is managed under a biodiversity stewardship agreement

(BAM Section 11.4.2)

Future value of VI attributes with management is estimated from the management actions proposed for a 20-year period at the biodiversity stewardship site.

Future value with required management actions

The BAM sets out the required management actions that must be implemented, where relevant, on the biodiversity stewardship site to generate biodiversity credits (BAM Table 6).

The BAM-C will calculate the predicted gain associated with required management actions for each vegetation/management zone.

The estimated future value of each composition and structure attribute is based on the probability of reaching benchmark condition over a 20-year period (BAM Appendix H.7, Equation 31 and Equation 32). It is calculated from the intrinsic rate of increase for VI attributes, which varies with landscape context, HTW cover and site resilience:

- *Native vegetation cover within the landscape:* Flora species are more likely to disperse into and establish at a biodiversity stewardship site that is situated within a landscape with more intact native vegetation, than a highly cleared or fragmented landscape (BAM Appendix G.4, Equation 10). Native vegetation cover is assessed in BAM Stage 1.
- *Presence of HTW species*: These species can be difficult to manage and significantly reduce the ability to improve vegetation condition (BAM Appendix G.5, Equation 11). HTW are assessed in BAM Stage 1.
- *Site resilience based on the VI score*: Native vegetation in high condition at the start of the management period is assumed to be more resilient and have a greater likelihood of recovery than vegetation in poorer condition. Ecological processes (e.g. soil microbial composition, pollination, etc.) are assumed to be more intact in good condition vegetation, than in degraded vegetation (e.g. lower diversity of soil mycorrhiza) (BAM Appendix G.6, Equation 12).

The intrinsic rate of increase varies for the following function attributes as follows:

- *number of large trees*, which is likely to have only a small increase over the 20-year period, is modified by native vegetation cover and site resilience (BAM Appendix G.7.1)
- *litter cover,* is not modified by vegetation cover, presence of HTW or site resilience (BAM Appendix G.7.2)
- *probability of tree regeneration,* is related to stem size class, extent of HTW cover and site resilience (BAM Appendix G.7.3)
- *stem size class,* is modified by native vegetation cover and site resilience only (excluding the <5 cm DBH and large tree classes) (BAM Appendix G.7.4), and
- *length of logs,* is modified by site resilience only (BAM Appendix G.7.5).

Future value with active restoration management actions

Undertaking active restoration management actions is optional but will generate more biodiversity credits than required management actions alone. This is because active restoration can increase the predicted gain in biodiversity values beyond that estimated for required management. Examples of active restoration management actions are set out in the BAM Table 7. The types of active restoration management actions selected must be appropriate and feasible for the biodiversity stewardship site and may apply to particular vegetation/management zones or a species polygon, rather than the site.

Where proposed, the assessor must unlock the active restoration components in the BAM-C and enter the predicted future value for each attribute and growth form group. The BAM-C will calculate the future VI score with active restoration.

Predicted future values, for each VI attribute and growth form group, must relate directly to the active restoration management actions being undertaken, as detailed in the management plan, and not exceed the benchmark value. In estimating the future condition, the assessor must consider which attributes and growth form groups the proposed active restoration will benefit and to what extent, within a 20-year timeframe. For example, actions that aim to eradicate invasive groundcovers will see improvements in ground and possibly shrub growth form groups.

The future value for each VI attribute will need to be documented and justified in the BSSAR (see Appendix B).

Important: The restoration risk weighting (a predefined multiplier of 0.3 modified by HTW – see BAM Appendix H.9, Equation 35) is applied to the future value of each VI attribute, restricting the amount of gain achieved with active restoration. The risk weighting addresses the inherent uncertainty in achieving the biodiversity outcomes via the active restoration actions over a 20-year period.

Manageable HTW do not contribute to the HTW modifier (BAM Appendix G.7.6, Equation 15), used in the restoration risk weighting, where there is evidence to support their control using appropriate techniques and those activities are documented in the management plan. Manageable HTW are detailed in the *High threat weeds list* published in the BAM-C.

The assessor may unlock the future HTW cover values in the BAM-C by selecting the 'High Threat Weed Cover' in the 'Future vegetation integrity score, with management' of the Vegetation tab. The future HTW cover value must include all cover scores for the non-manageable HTW species present in the vegetation/management zone.

2.2.3 Determine the future habitat condition score for threatened species

(BAM Section 11.4.2)

In the BAM, habitat suitability for a threatened species is assessed using one of two units of measure: area of suitable habitat (defined by the species polygon) or counts of individuals for flora. The unit of measure is prescribed for each species and identified in the TBDC and the BAM-C. This forms the basis for credit calculations.

Area species

The future habitat condition score (or gain) for threatened species assessed by area, is based on the change in VI scores for each vegetation/management zone within the species polygon (BAM Equation 5). *This is calculated by the BAM-C.*

Non-vegetated habitat features (e.g. waterbodies, caves, rock faces) are not included in credit calculations, although where assigned to a PCT area the buffer around these features is included (specified in the TBDC and/or taxa survey guides). Instead the features must be clearly identified in the species polygon recorded in the BSSAR. These features must be removed from the area of suitable habitat entered in the BAM-C to generate credits.

Species polygons

The area of suitable habitat for a species may be restricted to an area that is less than the total size of the vegetation zone.

Species polygons may be designed to include areas where active restoration will expand the area of suitable habitat currently used by the species on the biodiversity stewardship site. Evidence-based justification that the fauna species is likely to disperse unassisted into, and use, the restored habitat must be included in the BSSAR. Evidence could include peer-reviewed literature on the life history characteristics and habitat requirements of the species, and/or reference sites which demonstrate the ability of the species to recolonise areas of degraded habitat. An expert report, in accordance with Box 3 in the BAM, may be required where such evidence is unavailable.

Important: No survey is required for species assessed via a mapped important area and the species polygon must encompass all the mapped important area on the biodiversity stewardship site. Where active restoration management actions are undertaken to restore cleared PCTs associated with and immediately adjacent to an important mapped area, species credits may be available for the restored species habitat. If proposed this should be discussed with the BCT and the Department. Mapped important areas can be accessed via the Map Viewer available through BOAMS.

Count species

For species assessed by counts of individuals, gain will be limited to the intrinsic rate of increase for the relevant growth form group (BAM Equation 6).

The BAM-C will calculate gain for count species (Intrinsic rates of increase/Annual rate of decline tables are published in the BAM-C).

Species polygon

A species polygon is also required for species assessed by counts of individuals. The polygon should include a 30 metre buffer around individuals. Whilst the species polygon is not used in the calculation of credits, it identifies where individuals occur on the biodiversity stewardship site and the location of any required management actions and monitoring according to the management plan.

2.3 Calculating security benefit at a biodiversity stewardship site

(BAM Section 11.5)

The BAM-C will calculate the security benefit score.

The security benefit contributes to the overall gain achieved at biodiversity stewardship sites with vegetation in high to very high condition. These sites generate fewer credits than those supporting vegetation in lower condition, because attributes are close to or at benchmark. The additional gain from the security benefit score recognises the conservation value of securing high condition sites under a BSA. It provides a 4–5% increase in gain achieved for vegetation zones with a current VI score ≥60 and less than 10% cover of HTW (BAM Appendix H.10, Equation 37).

The security benefit does not apply to Crown land or sites that are already secured under an existing conservation obligation (see Section 2.6 of this Manual). In these circumstances the assessor must switch on the tick box ‘CL or conservation obligation’ and document this in the BSSAR.

2.4 Calculating the number of credits created at a biodiversity stewardship site

Ecosystem credits and species credits are calculated by the BAM-C.

2.4.1 Ecosystem credits

(BAM Section 11.6)

The calculation of ecosystem credits at a biodiversity stewardship site (BAM Equation 4) is based on the:

- change in VI score, resulting from required and active restoration (where relevant) management actions
- averted loss score
- security benefit score (where relevant), and
- area of the vegetation/management zone in hectares.

The credits calculated per vegetation/management zone are added together to determine the number of ecosystem credits generated per PCT (or TEC). Where the total number of credits is less than one, the BAM-C will always round up to one credit.

The assessor must include in the BSSAR:

- the number of ecosystem credits calculated for each PCT (or TEC), and
- the full biodiversity credit report from the BAM-C, identifying the number and type of ecosystem credits generated.

2.4.2 Species credits

(BAM Section 11.7)

The calculation of species credits depends on the unit of measure. Where the total number of credits is less than one the BAM-C will always round up to one credit.

For **species assessed by area**, the calculation of credits at a biodiversity stewardship site (BAM Equation 5) is based on the:

- change in habitat condition (taken as the change in VI score in the vegetation/management zone(s) within the species polygon), resulting from required and active restoration (where relevant) management actions
- averted loss score
- security benefit score (where relevant), and
- area of habitat (area of the vegetation/management zone within the species polygon) in hectares.

For **species assessed by count of individuals**, the calculation of species credits at a biodiversity stewardship site (BAM Equation 6) is based on the change in the number of individuals (determined by the intrinsic rate of increase for the species' growth form group).

The assessor must document in the BSSAR:

- the number of credits generated by the proposal for each species credit species
- the biodiversity credit report from the BAM-C, defining the number and type of species credits from the proposed site
- future habitat suitability scores (documented in the BAM-C Credit Summary Report), and
- justification for the design of the species polygon including any relevant habitat constraints (as outlined in the TBDC).

2.4.3 Uncertain outcomes

In some circumstances, achieving the predicted outcomes at a proposed BSA site using innovative or large-scale active restoration management actions may be highly uncertain. The landholder and the BCT may enter into the BSA but agree to structure the timing for the release of biodiversity credits based on evidence that the predicted biodiversity outcomes are being achieved. These circumstances are reviewed on a case by case basis by the BCT, with evidence of success criteria written into the BSA.

2.5 Identifying the credit class for biodiversity credits at a biodiversity stewardship site

(BAM Section 11.8)

The assessor must identify the credit class for the ecosystem and species credits generated at the biodiversity stewardship site. The BAM-C biodiversity credit report describes all the necessary attributes for credit class and must be included in the BSSAR.

The credit classes for ecosystem credits are identified by the following attributes:

- name of the PCT within the proposed site
- name of any threatened ecological community (TEC) associated with the PCT
- offset trading group (BAM Table 4 for TECs, or BAM Table 5 for other PCTs)
- vegetation class of the PCT
- vegetation formation of the PCT (only used in variation rules)
- presence of hollow bearing trees, and
- IBRA subregion.

The credit classes for species credits are identified by the following attributes:

- name of the species
- IBRA subregion (only used in variation rules)
- threat status (taken from the BC Act; only used in variation rules), and
- taxonomic ranking (animals or plants; only used in variation rules).

For more information, see the BAM Section 10.2 and the BAM Operational Manual – Stage 2 (Appendix A).

Important: Note that the offset rules are policy settings and are established outside of the BAM, in the BC Regulation.

2.6 Existing obligations and management actions

(BAM Section 11.9)

Assessors and landholders must confirm the land is eligible for a BSA prior to submitting their application to the BCT.

Land proposed for a BSA may already have obligations to manage and/or conserve biodiversity (e.g. required by legislation, covenants, etc.). These are known as *existing conservation obligations* and impact the number of credits that can be created at the biodiversity stewardship site. The BAM (Subsection 11.9.2) identifies the instruments, and any exemptions, for which existing conservation obligations must be reported. If an assessor is uncertain about obligations relevant to their BSA application, they can request confirmation from the appropriate agency (e.g. Department of Planning, Industry and Environment, local government, BCT).

The assessor must switch on the 'CL or conservation obligation' tick box in the BAM-C (as the security benefit score does not apply).

Existing conservation obligations will reduce the amount of biodiversity credits that can be generated at a biodiversity stewardship site – referred to as *additionality* (Box 3 below). In some circumstances, additionality may also be calculated based on the duration of the existing obligation.

Box 3: Calculating additionality on private land

A landowner is proposing their property as a biodiversity stewardship site. The land is partially covered by an existing conservation agreement under the *National Parks and Wildlife Act 1974* (listed in Schedule 2 of the Certificate of Title). The conservation agreement was not established as an offset, is in-perpetuity and includes the following recommended management actions:

- periodic ecological burning.

Site description

The site comprises two vegetation zones, with management zones used to define areas covered by the existing agreement:

- VZ 1 (PCT 504 – good) = 100% covered
- VZ 2 (PCT 504 – moderate) = 80% covered. Further divided into:
    - MZ 2a (PCT 504 – moderate) – additionality = 100% covered
    - MZ 2b (PCT 504 – moderate) – no additionality = 0% covered.

Calculating credit reductions (additionality)

Step 1 (BAM Subsection 11.9.1): Calculate the number of ecosystem and species credits generated across the biodiversity stewardship site. In this example:

- 60 PCT 504 ecosystem credits:
    - 38 in VZ 1
    - 14 in MZ 2a
    - 8 in MZ 2b.

Step 2 (BAM Subsection 11.9.2): Identify the required management actions under the conservation agreement. In this example:

- fire management (periodic ecological burning).

Step 3 (BAM Subsection 11.9.3): Determine the percent reduction in credits for required management actions proposed under the BSA, which are also included in the conservation agreement (BAM Table 10). In this example:

- fire management = 10% of reduction in credits.

Apply the reductions to the relevant biodiversity credits:

- PCT 504 ecosystem credits (VZ 1) = 10% reduction (reduce by 3.8 credits)
- PCT 504 ecosystem credits (MZ 2a) = 10% reduction (reduce by 1.4 credits)
- PCT 504 ecosystem credits (MZ 2b) = 0% reduction.

The final credits generated would be (after rounding):

- 55 PCT 504 ecosystem credits.

The percentage reduction in credits will depend on the:

- **land ownership:** whether it is publicly-owned (refer to BAM Table 9) or privately-owned land (refer to BAM Table 10)
- **instrument coverage:** only those areas covered by an existing obligation are subject to credit reductions. Where necessary, management zones should be used to define areas with and without the existing obligation
- **management actions:** for private land, where multiple types of management actions (required under the existing obligation) apply, the percent reduction is additive
- **biodiversity credits:** both ecosystem and species credits are subject to additionality.

All existing conservation obligations and associated management actions are to be detailed in the BSSAR. Evidence of the obligations must be included in the BSA application; for example, details in the Certificate of Title for a section 88b instrument; development consent; or a vegetation management plan. The assessor must indicate whether the biodiversity stewardship site has been used as an offset previously and include in the BSSAR:

- all additionality calculations and credit reductions
- any management action required under the existing obligation that does not affect credit generation, and justification for why it is not included in the calculations.

The BCT will review and process credit reductions based on the information provided in the BSSAR and supporting documents.

Where the landholder seeks to vary their existing BSA, to add ecosystem or species credits, they may incur similar reductions in credit generation. The BAM (Section 11.9(4.)) establishes when these are likely to occur (e.g. a population of a threatened plant has been identified on site or active restoration is now being proposed which will increase the quantum of ecosystem credits). Additionality for species and ecosystem credits will apply to BSA variations when they are submitted (whichever comes first):

- 12 months after the first annual management payment is made, or
- 36 months from the agreement date.

2.7 Preparation of a management plan for the biodiversity stewardship site

(BAM Section 11.2)

A biodiversity stewardship site management plan (the management plan) is prepared by an assessor, documenting the required and active restoration (where relevant) management actions to be undertaken at the biodiversity stewardship site, as agreed to by the landholder. The information in the management plan should be clear and concise, providing unambiguous instruction for the landholder.

The management plan is also used by the BCT as the basis for annual reporting, tracking the progress of the management actions and subsequent release of annual management payments.

It contains six sub-management plans that provide specific details of the required management actions. The sub-management plans include standard provisions for a five-yearly review. This review should be used to update the management plan to ensure it will achieve the expected biodiversity outcomes. The sub-management plans include:

- Fire for Conservation Management Plan
- Native Vegetation Management Plan
- Threatened Species Habitat Management Plan

- Integrated Feral Pest Management Plan
- Integrated Weed Management Plan
- Monitoring Management Plan.

2.7.1 Management plan maps

Required maps for the management plan are outlined in the template.

Consistent terminology must be used between the maps (e.g. management zone name, weed type), BSSAR, management plan and other documents submitted for the BSA application.

Site Map

The Site Map forms the base map for other maps within the management plan. It should be based on digital aerial photographs such as ADS40 or the best available imagery. The capture scale for the site map must be 1:1,000 or finer and include the:

- biodiversity stewardship site boundary
- cadastre (including labelling of Lot and DP, property boundary)
- existing legal obligations relevant to the ongoing management of the BSA, including those which restrict management actions or require activities that are not permissible under the BSA; for example, asset protection zones for bushfire protection (Box 4).

Box 4: Asset protection zones and easements

Asset protection zones (APZs) and easements may be included as part of a BSA. Although these areas typically require activities such as slashing or thinning of tree regeneration to maintain the asset, their inclusion can be used to manage weed control and other pests. APZs must be mapped as a separate management zone with restricted or no gain (Biodiversity Assessment Method Operational Manual – Stage 2).

The restricted gain must be reflected in the VI score when calculating biodiversity credits for the site. Justification for the restricted gain should be provided in the BSSAR.

There may also be opportunities to create species credits for flora species within an APZ or an easement. Assessors are encouraged to contact the BCT to discuss such a proposal.

Biodiversity Stewardship Site Management Actions Map

The Site Map should be used as the base map for the Biodiversity Stewardship Site Management Actions map, which is to record:

- management zones, including the location of required and active restoration (where relevant) management actions (Box 5), and
- management features (e.g. fencing, access tracks and built assets to be retained).

Box 5: Management zone mapping

Areas of a vegetation zone where the management actions will result in a different projected VI gain to the rest of the zone must be identified and mapped as separate management zones.

Some examples of when management zones may be required include:

- part of a vegetation zone that will be managed as an APZ (i.e. projected biodiversity gain is likely to be less than other areas of the vegetation zone managed solely for conservation)
- part of a vegetation zone that will be managed for threatened species
- where active restoration management actions apply to part of a vegetation zone
- where the type of active restoration management actions proposed within a vegetation zone vary and will result in different predicted future values (e.g. supplementary planting of trees and shrubs in part of the vegetation zone, but supplementary planting of trees, shrubs and native grasses in the other part).

Management zones should be identified with 'MZ' and the relevant vegetation zone number as the starting prefix (such as MZ1, MZ2 and MZ3), followed by an alphabetic identifier for the broad management approach to be applied to that zone (such as MZ1a, MZ1b and MZ1c) (see Figures 2 and 3). Labels should also include a summary description of the broad management approach to be undertaken in the zone. For example:

- MZ1a. (PCT 849) Required management
- MZ1b. (PCT 849) Supplementary planting.

Ecological Burn Map

The Ecological Burn Map should identify the following features:

- proposed burn compartments
- extent and dates of any recent previous burns
- areas to be temporarily excluded from fire (e.g. proposed revegetation sites)
- areas to be permanently excluded from fire (e.g. fire sensitive PCTs or threatened species habitat features), and
- species polygons identifying areas of threatened species habitat.

Threatened Species Habitat Map

The Threatened Species Habitat Map should identify:

- species polygons showing the current and predicted future extent of habitat for species credit species
- location of important habitat features for species credit species and ecosystem credit species (where known) that occupy the site (e.g. breeding sites), and
- location of where species-specific management actions occur.

Note: Where credits are created for more than one threatened species, separate maps may be provided if overlapping species polygons create confusion.

Weed Cover Map

A Weed Cover Map must be prepared for biodiversity stewardship sites that contain weed infestations or are proposing to use integrated weed management as an active restoration management action. The Weed Cover Map should identify:

- the weed species or suite of weed species (e.g. ‘blackberry’; ‘exotic perennial grasses’; ‘small-leaved privet and associated species’, etc.), combined with the percentage foliage cover. For example, a suite of weed species may be represented by multiple species with different percent foliage covers across the biodiversity stewardship site. A suite of weed species should reflect areas of weed infestation that will require a similar approach to weed management and that are expected to exhibit similar native vegetation community resilience.
- scattered or discrete weed infestations within primarily good condition vegetation may be mapped as point locations
- weeds listed in the *High threat weeds list* (published in the BAM-C).

Monitoring Map

The Monitoring Map should present the locations of the proposed monitoring actions described in the monitoring plan component of the management plan. As a minimum this should include photo monitoring points, and locations of ecological monitoring plots.

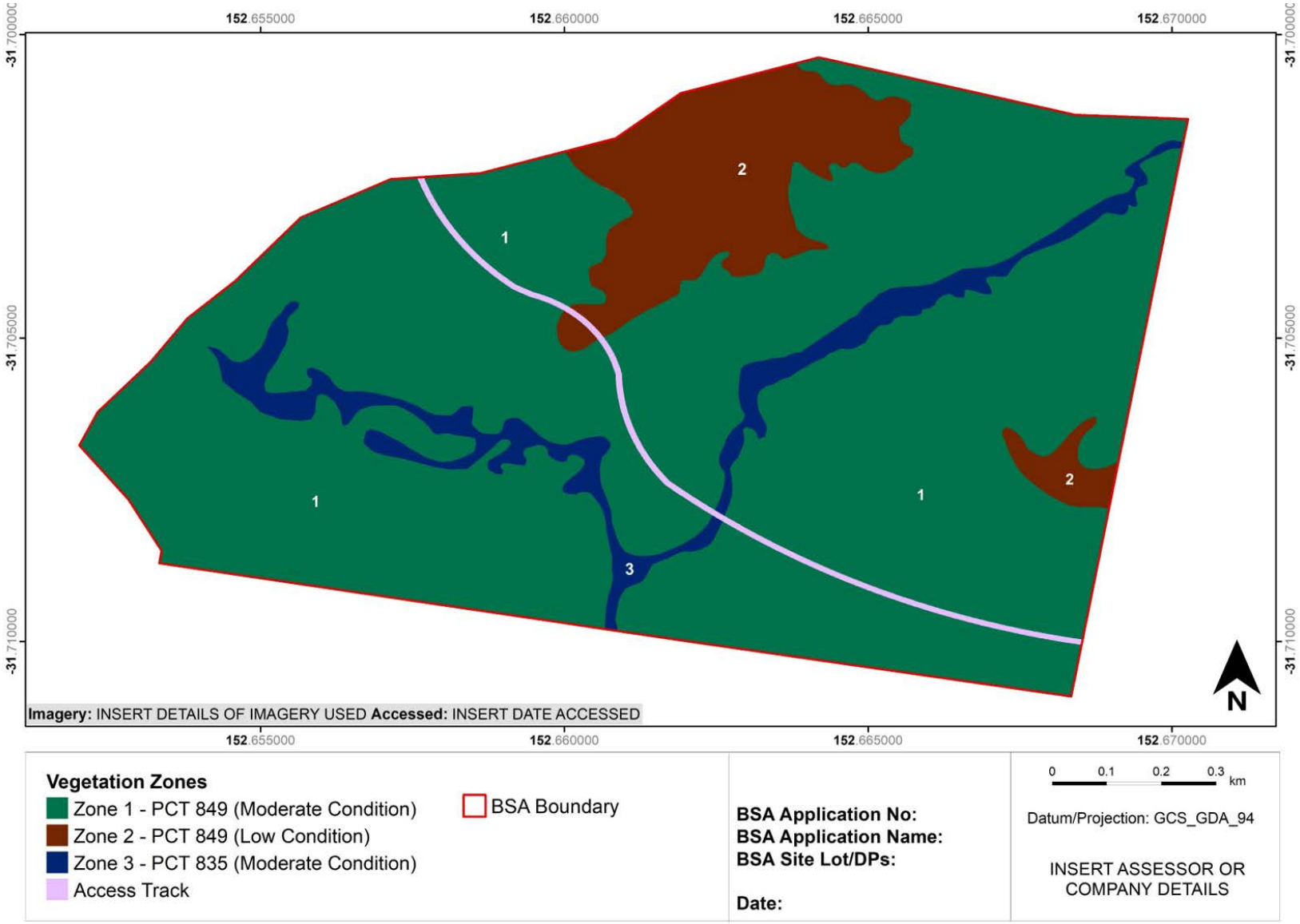

Figure 2 An example of vegetation zone mapping

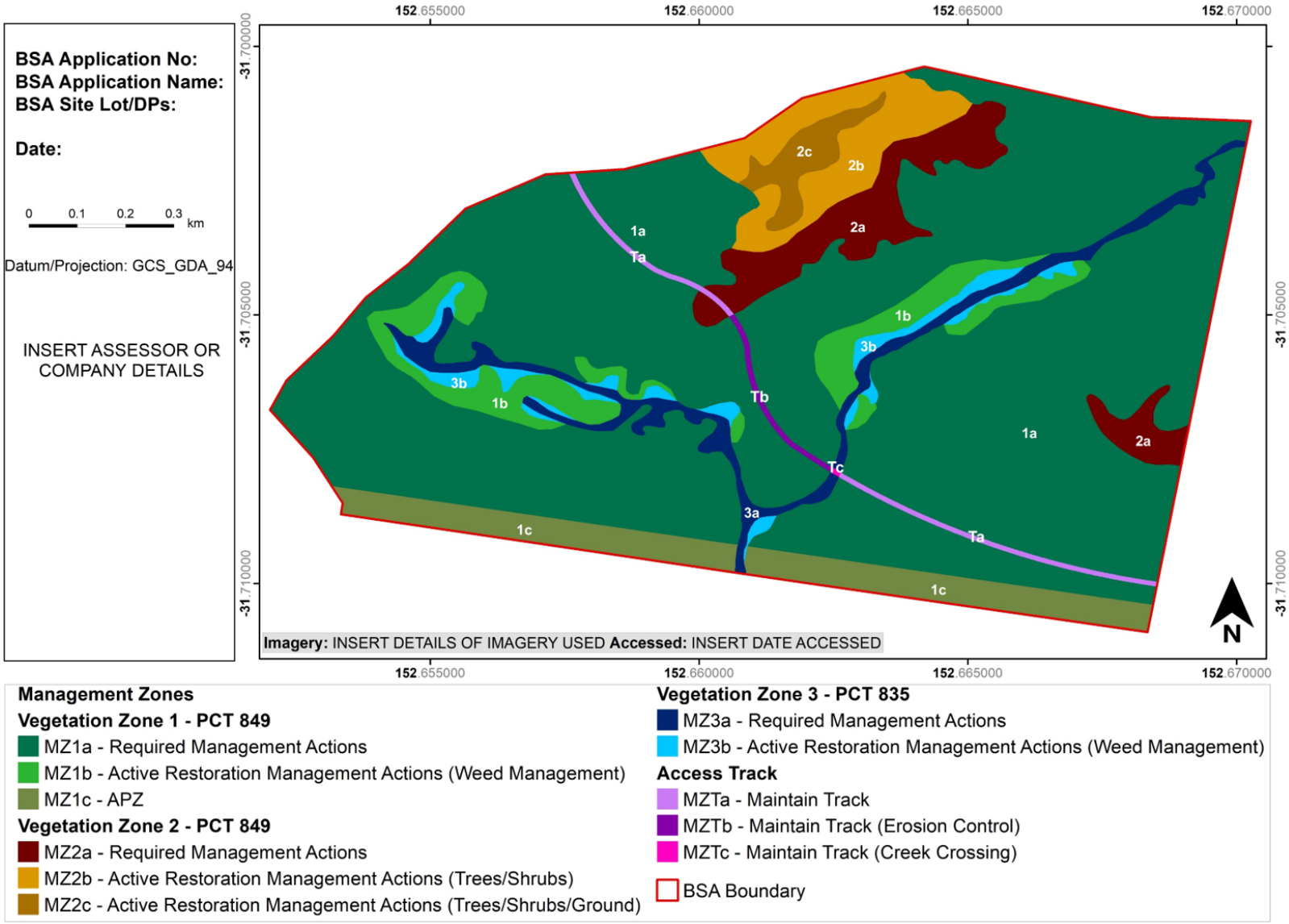

Figure 3 An example of management zone mapping

2.7.2 Documenting management actions in the management plan

As detailed in Sections 2.1 and 2.2 of this Manual, management actions are classified as either:

- required management actions, or
- active restoration management actions.

A clear explanation of the management action (including the description, location, timing and duration, etc.) must be included in the management plan, as per the template. The assessor must determine the management activities to be undertaken for each of the required management actions and outline these in the management plan. A *management activity* is the work undertaken to implement a management action.

In designing management activities, the assessor must consider the site context, constraints and best practice, tailoring them to the threats and pressures impacting the site's biodiversity values. Where a required management action will not be implemented, justification must be provided in the BSSAR; for example, the threat does not currently operate on the biodiversity stewardship site and is unlikely to operate in the future.

Where species credits have been created, the management plan **must include management actions that will benefit the target species**. Where such actions conflict with the generation of ecosystem credits, the landholder must decide which credits will be generated for the vegetation/management zone. For example, where a plant species (assessed by count) that requires long fire intervals (e.g. >10 years) occurs in the same vegetation/management zone as a PCT maintained by short fire intervals, the landholder must decide which management actions will be undertaken and only generate the relevant species OR ecosystem credits.

The management plan should include management actions to mitigate known threats to the species, such as specific control and monitoring of known predators and pathogens. If adequate measures to manage key threats operating on the site relevant to the target species cannot be undertaken, the gain in habitat suitability is unlikely to occur. In this circumstance, species credits cannot be created for the target species.

Timing and duration of management actions

The commencement of management actions must be specified in the management plan and categorised as either:

- ongoing from the agreement date, or
- ongoing from the first annual management payment date.

A biodiversity stewardship site is in *passive management* until the TFD is completely fulfilled. Management actions that are ongoing from the agreement date are commonly referred to as *passive management actions*; these are required management actions able to be undertaken prior to the release of the first annual management payment (e.g. removal of stock to reduce grazing). A biodiversity stewardship site is in *active management* from the release of the first annual management payment. Management actions that are ongoing from the first payment date are commonly referred to as *active management actions*.

A clear description of the frequency and duration of the management action must be documented in the management plan. The timing of management actions will be influenced by considerations such as:

- site condition and resilience
- seasonality and weather
- availability and costing of resources (e.g. local provenance seed and tube stock)

- interaction with other management actions (e.g. aligning weed removal with targeted planting for natural regeneration)
- site response to management actions (e.g. employing an adaptive management approach when the site is not responding as predicted), and
- life history and/or successional requirements of the target entities.

Costing of management plan

The management plan must be fully costed as part of determining the TFD. Management action costings must be listed in the TFD calculator and justified in the BSSAR. It must include one-off costs, recurring costs and contingency management activities, as well as costs related to the implementation and operation of the BSA.

The assessor should consider:

- commercial rates of contractors (see Box 6)
- obtaining licences or approvals
- materials required, and the timing of material collection and/or supply; for example, local provenance seed collection may be required over a number of years prior to revegetation
- contingency funds for adaptive management and emerging threats
- infrastructure maintenance
- project management
- administration and insurance
- inspections, monitoring and reporting on, as well as reviews and updates to, the management plan.

Box 6: Sourcing relevant knowledge and skills to prepare management plans

Where the assessor does not have the expertise to prepare elements of the management plan, it is recommended they seek assistance. A bush regenerator or restoration ecologist, with experience costing and delivering ecological management and restoration actions of a similar type and scale to those proposed, should be engaged when planning and costing management actions.

Similarly, seed suppliers and seed collectors will provide advice on the availability and process of obtaining locally sourced seed. Qualified fire ecologists can provide information on burn regimes for species or vegetation types.

Information sources

In preparing a management plan the assessor must consult various sources of information including, but not limited to:

- best practice guidelines, policies and fact sheets (e.g. BCT Livestock Grazing Guidelines for Private Land Conservation, BCT Ecological Monitoring Module (EMM), and former-OEH Conservation Management Notes)
- published and unpublished reports on restoration ecology
- scientific literature

- recovery plans and other threatened species management programs such as *Saving our Species*
- persons/organisations with relevant knowledge and skills (Box 6)

2.7.3 Documenting performance measures and ecological response in the management plan

Monitoring enables tracking of progress against threat management outputs (performance measures) and the associated improvement in target biodiversity values (ecological response).

The outcomes from monitoring can be used by the landholder and assessor during the five-year management plan review, and will support auditing by the BCT, to inform the need for any adaptive management over the 20-year management plan. Monitoring data will be used to review the effectiveness of management actions and contribute to ongoing improvement of the BAM.

Monitoring must:

- clearly describe the design, timing and implementation of monitoring actions
- be designed to meet the objectives of the management plan, and
- align with the guidance provided in the BCT EMM.

Performance measures and ecological response targets must be clearly differentiated in the management plan:

- *Performance measures* are outputs directly related to the successful implementation of management actions; for example, the target survival rate of tube stock in a management zone (see Appendix C for examples). These performance measures are audited by the BCT against the management plan in annual reviews. They must be documented against each management action in the relevant subsection of the management plan.
- *Ecological response targets* are biodiversity outcomes that are expected to occur in response to management actions; for example, improvement in VI attribute scores, increased threatened species abundance or occupancy. These must be described in the monitoring plan section of the management plan.

Performance measures and ecological response targets must adhere to the SMART principles (Appendix C), be derived from an understanding of the system, and developed for all management actions undertaken on the site (e.g. weeding actions, revegetation actions, pest animal control actions) as well as the target entities (e.g. species, vegetation community, habitat).

Performance measures are listed against the management actions throughout the management plan. The BSSAR must include justification for the:

- measure or ‘metric’ of performance in terms of a measurable target (e.g. % cover of HTW and/or area of weed infestation)
- target for each management action (see Appendix C)
- method of the monitoring design (e.g. surveillance, quadrats, transects, estimation), including spatial layout, intensity, frequency and timing.

The ecological response targets are detailed in the monitoring plan sub-section of the management plan, and must include the:

- measure or 'metric' of response (e.g. VI score, VI attributes)
- five-year interim (i.e. at 5, 10, 15 years) and long-term (at 20 years) targets (for the relevant area) for all biodiversity values for which credits have been generated. These must be consistent with the predicted improvement on which credit generation has been based
- layout, including any stratification of units (e.g. vegetation plots by zone); for example, the number and type of sampling units (e.g. five plots, three transects, four traplines), their design (e.g. purposeful placement, simple random sampling, etc.), the frequency and timing of sampling.

The assessor should refer to the current condition information contained in the BAM-C proposal for the site and guidance provided in the BCT EMM when defining the ecological response target. Where there is significant deviation from this guidance, the assessor must provide justification in the BSSAR, such as reference to an existing Threatened Species Recovery Plan, power analysis, peer-reviewed publication or expert advice.

2.7.4 Variation to the management plan, including after 20-year period

The BAM may be re-applied at a biodiversity stewardship site at the end of the 20-year management period to predict further improvement in biodiversity values over the next 20-year period. A new assessment will require updates to the management plan to reflect the management actions to be undertaken at the site for the second 20-year management period. Here a second tranche of biodiversity credits can be created for the expected gain in biodiversity values over that period. This will require re-application of the BAM Stages 1 and 3 to predict the future gain in biodiversity values on the site.

Other non-minor variations to the BSA or amendments to the management plan after 20 years may be made by a subsequent agreement between the BCT and the landowner (section 5.11 of the BC Act). All non-minor variations (defined in section 5.6 of the BC Regulation) to the management plan require a BSSAR (section 5.11(7) of the BC Act).

Section 5.6 of the BC Regulation allows for minor variations to the management plan or management actions without the need for a BSSAR. This may also include amendments to the amount or timing of payments relating to management actions set out in the BSA.

3. References

Dorrough J, Sinclair SJ and Oliver I 2019, Expert predictions of changes in vegetation condition reveal perceived risks in biodiversity offsetting, *PLOS ONE* vol.14, no.5, e0216703.

Gibson-Roy P 2017, 'Guidelines for assessing capacity to deliver restoration gains within the Biodiversity Assessment Method (BAM)', unpublished report for the Office of Environment and Heritage NSW.

Gibson-Roy P and Delpratt CJ 2015, The restoration of native grasslands, in N Williams, A Marshall and J Morgan (eds), *Land of Sweeping Plains – Managing and Restoring the Native Grasslands of South-eastern Australia*, pp.331–433, CSIRO Publishing, Canberra, ACT.

Maron M, Rhodes JR and Gibbons P 2013, Calculating the benefit of conservation actions, *Conservation Letters* vol.6, no.5, pp.359–367, https://doi.org/10.1111/conl.12007

Appendix A: Websites and online resources

Acid sulfate soils risk maps
www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/acid-sulfate-soils

Areas of Outstanding Biodiversity Value (AOBV)
www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/areas-of-outstanding-biodiversity-value

Assessor resources
www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/accredited-assessors/assessor-resources

BCT Biodiversity Stewardship Agreement
www.bct.nsw.gov.au/sites/default/files/2019-10/Biodiversity Stewardship Agreement template.pdf (PDF 478KB)

BCT Biodiversity Stewardship Agreement – Application form
www.bct.nsw.gov.au/sites/default/files/2020-02/BSA Application Form_Fillable.pdf (PDF 812KB)

BCT Biodiversity Stewardship Agreement – BSA variation application form
www.bct.nsw.gov.au/sites/default/files/2020-02/BSA Variation Form_Fillable.pdf (PDF 876KB)

BCT BSA Application – Supporting Documents Guide
www.bct.nsw.gov.au/sites/default/files/2020-06/BSA Application Supporting Documents Guide.pdf (PDF 469KB)

BCT Biodiversity Stewardship Site Management Plan template
www.bct.nsw.gov.au/cards/apply-agreement-generate-credits

BCT Entering a Biodiversity Stewardship Agreement (BSA)
www.bct.nsw.gov.au/sites/default/files/2019-12/BCT-FS-BOP-BSA Steps.pdf (PDF 496KB)

BCT Guideline for Biodiversity Stewardship Sites – Tracks, trails and other exclusions
www.bct.nsw.gov.au/sites/default/files/2019-08/Guidelines for BSA Sites (tracks and trails).pdf (PDF 220KB)

BCT Livestock Grazing Guidelines for Private Land Conservation
www.bct.nsw.gov.au/sites/default/files/2019-04/BCT Grazing Guidelines Master 2018.pdf (PDF 3.2MB)

BCT Restoring Native Vegetation – Guidelines for assisted regeneration and revegetation
www.bct.nsw.gov.au/sites/default/files/2019-08/Restoring Native Vegetation Guidelines.pdf (PDF 764KB)

BCT Ecological Monitoring Module (EMM)
www.bct.nsw.gov.au/sites/default/files/2020-06/BCT Ecological Monitoring Module_VersionForPublication_June2020.pdf (PDF 1.0MB)

BioBanking Public Registers
www.environment.nsw.gov.au/bimsprapp/biobankingpr.aspx

Biodiversity Assessment Method (BAM)
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-170206.pdf (PDF 1.2MB)

Biodiversity Assessment Method Calculator (BAM-C)
www.lmbc.nsw.gov.au/bamcalc

Biodiversity Assessment Method Calculator (BAM-C) – User Guide
www.lmbc.nsw.gov.au/bamcalc/app/assets/BAMTools_UserGuide.pdf (PDF 3.0MB)

Biodiversity Assessment Method Operational Manual – Stage 1
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-operational-manual-stage-1-180276.pdf (PDF 1.3MB)

Biodiversity Assessment Method Operational Manual – Stage 2
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-operational-manual-stage-2-190512.pdf (PDF 1.3MB)

Biodiversity Conservation Act 2016
www.legislation.nsw.gov.au/~/pdf/view/act/2016/63/whole (PDF 1.0MB)

Biodiversity Conservation Regulation 2017
www.legislation.nsw.gov.au/regulations/2017-432.pdf (PDF 513KB)

Biodiversity Conservation Trust (BCT)
www.bct.nsw.gov.au

Biodiversity Offsets and Agreement Management System (BOAMS)
www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/biodiversity-offsets-and-agreement-management-system

Biodiversity Offsets and Agreement Management System (BOAMS) – User Guide
Registration required then see FAQ
https://customer.lmbc.nsw.gov.au/assessment/s/userlogin

Biodiversity Offsets Scheme Public Registers
www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/public-registers

Biodiversity Values Map and Threshold Tool
www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap

BioNet Atlas
https://www.environment.nsw.gov.au/wildlifeatlas/about.htm

BioNet Atlas – Application for login access
www.environment.nsw.gov.au/atlaspublicapp/Registration.aspx

BioNet Atlas (Species Sightings) Search
www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx

BioNet – How to access the BioNet Web Service using Excel and Power Query
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/BioNet/bionet-access-using-excel-power-query-quick-guide-160403.pdf (PDF 1.0MB)

BioNet Systematic Flora Survey
www.environment.nsw.gov.au/research/VISplot.htm

BioNet quick guides, manuals, and datasheets
www.bionet.nsw.gov.au/bionet-guides-manuals.htm

BioNet Threatened Biodiversity Data Collection (TBDC)
www.environment.nsw.gov.au/asmslightprofileapp/Account/Login

BioNet Vegetation Classification
www.environment.nsw.gov.au/research/Visclassification.htm

BioNet Vegetation Classification user manual
www.environment.nsw.gov.au/resources/bionet/bionet-vegetation-classification-user-manual-170340.pdf (PDF 4.1MB)

BioNet Vegetation Map Collection (previously Vegetation Information System Maps)
www.environment.nsw.gov.au/research/VISmap.htm

BioNet Web Services
https://data.bionet.nsw.gov.au/

Coastal management
www.planning.nsw.gov.au/Policy-and-Legislation/Coastal-management

Digital cadastral database
https://datasets.seed.nsw.gov.au/dataset/nsw-cadastre-web-service

Directory of Important Wetlands in Australia (DIWA)
www.environment.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands

EPBC Act listed threatened species and ecological communities
www.environment.gov.au/epbc/what-is-protected/threatened-species-ecological-communities

Estuaries of NSW: Physical characteristics, tidal surveys and hydrographic surveys
www.environment.nsw.gov.au/topics/water/estuaries/estuaries-of-nsw

Policy and guidelines for fish habitat conservation and management (2013)
www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/468927/Policy-and-guidelines-for-fish-habitat.pdf (PDF 2.4MB)

High threat weeds list
www.lmbc.nsw.gov.au/bamcalc

Hydrogeological landscapes
www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation/salinity/salinity-locations-and-mapping

Interim Biogeographic Regionalisation of Australia (IBRA region and subregions) – Version 7
http://environment.gov.au/land/nrs/science/ibra#ibra

Intrinsic rates of increase/Annual rate of decline tables
www.lmbc.nsw.gov.au/bamcalc

Native Vegetation Integrity Benchmarks
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/BioNet/native-vegetation-integrity-benchmarks-170440.pdf (PDF 69KB)

Native Vegetation Interim Type Standard
www.environment.nsw.gov.au/resources/nativeveg/10060nvinttypestand.pdf (PDF 1.6MB)

Native Vegetation Regulatory Map
www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap

NSW (Mitchell) Landscapes – Version 3.1
https://datasets.seed.nsw.gov.au/dataset/nsw-mitchell-landscapes-version-3-1

NSW (Mitchell) Landscapes Descriptions
www.environment.nsw.gov.au/resources/conservation/LandscapesDescriptions.pdf (PDF 1.2MB)

NSW soil profiles
https://datasets.seed.nsw.gov.au/dataset/f66743bf-d395-4ab2-be41-87eae5009acc

NSW Threatened Species
www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species

PlantNET NSW
http://plantnet.rbgsyd.nsw.gov.au/

SEED (Sharing and Enabling Environmental Data) portal
www.seed.nsw.gov.au

Society for Ecological Restoration Australasia (SERA)
www.seraustralasia.org/

State Vegetation Type Map
www.environment.nsw.gov.au/vegetation/state-vegetation-type-map.htm

Survey guide: 'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/species-credit-threatened-bats-survey-guide-180466.pdf (PDF 1.2MB)

Survey guide: Surveying threatened plants and their habitats – NSW survey guide for the Biodiversity Assessment Method
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/surveying-threatened-plants-and-habitats-nsw-survey-guide-biodiversity-assessment-method-200146.pdf (PDF 2.1MB)

Survey guide: Threatened biodiversity survey and assessment – Guidelines for developments and activities (working draft 2004)
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/draft-threatened-biodiversity-survey-guide.pdf (PDF 487KB)

Survey guide: Threatened species survey and assessment guidelines – Amphibians
www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/amphibians-field-survey-methods-090213.pdf (PDF 177KB)

Total Fund Deposit (TFD) Calculator
www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/total-fund-deposit-discount-rate

Appendix B: Management actions that improve biodiversity

Management actions must be tailored to the biodiversity stewardship site and designed to meet the predicted gains in VI or habitat suitability against which biodiversity credits have been generated.

The required and active restoration (where relevant) management actions must be summarised in the BSSAR, in tabular form, including:

- type of management action and purpose
- description of management activity
- location and timing
- predicted gains in target vegetation attributes
- performance measures
- ecological response targets.

Table 2 provides guidance on the documentation of information related to management actions required in the BSSAR.

B.1 Active restoration management actions

Whilst supplementary planting and integrated weed management are common active restoration management actions, any activity that seeks to substantially change the abiotic and biotic environment could be considered active restoration (e.g. changes to a hydrological regime allowing the restoration of a wetland ecosystem). Often these actions are innovative and/or involve significant resources. It is recommended the assessor discuss the use of active restoration proposals with the BCT early in the assessment process.

Active restoration can generate ecosystem credits and species credits. In some cases, the same type of management action will generate both types of credits within the one management zone. For example, restoration of vegetation in low condition may generate ecosystems credits as well as species credits if the management zone is within the species polygon and the species is assessed by area of suitable habitat. Similarly, a species polygon could extend beyond suitable habitat to include a management zone where active restoration actions seek to restore or create habitat for the target species (where it is currently absent). For example, supplementary planting and relocation of fallen logs within a derived native grassland area are management actions that will also target restoration of habitat for the Cumberland Plain land snail (*Meridolum corneovirens*). The zone proposed for active restoration of habitat is then included in the species polygon, along with any areas on the site where this species have been recorded and suitable habitat already exists.

An adaptive management approach may include a combination of different active restoration management action types, introduced in stages. For example, integrated weed management may be implemented as an active restoration management action in vegetation zones with dense HTW cover. As weeds are controlled, the inherent resilience of the vegetation community may result in natural regeneration of selected growth form composition and cover attributes. Performance measures could trigger the need to implement a supplementary planting active restoration management action at a specified time period (e.g. 5 or 10 years) if it appears that the 20-year performance target is unlikely to be achieved with the integrated weed management active restoration management action only.

Table 2 An example of a management action summary, as required for the Biodiversity Stewardship Site Assessment Report

Management action	Native vegetation and habitat management and augmentation
Management activity	Supplementary planting
Purpose	Reinstate a native tree layer in the grassy woodland
Location	MZ1b. (PCT849) Supplementary planting
Timing	Year 2
Description	Undertake supplementary tube stock planting using the following rates: 5 native trees species planted at 250 trees/ha
VI attributes	**Attribute: Tree richness** Benchmark value: 5 Current value: 1 Future value (with offset): 1.1 Future value (with active restoration gain): 5 Future value with offset (after restoration): 2.3 **Attribute: Tree cover** Benchmark value: 52 Current value: 15 Future value (with offset): 16.6 Future value (with active restoration gain): 52 Future value with offset (after restoration): 27.2
Monitoring	**Performance measures:** • Target of >80% survival rate of tree plantings after 5 years • Survival rate assessed as a % of living plants against number planted, annually • Plants counted along 20 x 20m plot transects (in accordance with EMM plot-based methods) **Ecological response targets:**[2] • Year 5: 2–4.2 tree species, 18.1–24.3 % tree cover • Year 10: 2.2–5 tree species, 21.1–33.5 % tree cover • Year 15: 2.2–5 tree species, 24.2–42.8 % tree cover • Year 20: 2.2–5 tree species, 27.2–52% tree cover • Monitoring plots are identified in Map X, assessed in accordance with the EMM.

Note: In the BAM-C, *Future value with offset* is the calculated future value of the VI attribute with required management actions; *Future value with active restoration gain* is the predicted future value of the VI attribute with active restoration and is typically set as close to benchmark as possible; *Future value with offset (after restoration)* is the predicted future value of the VI attribute with active restoration, after the restoration risk weighting is applied.

[2] The interim ecological response target for composition attributes targeted by active restoration management (native vegetation and habitat management and augmentation; integrated weed management and control of high threat exotic vegetation) are expected to reach 80% of the total gain predicted over 20 years within the first five years of management.

B.1.1 Evaluating when to undertake active restoration

Active restoration is likely to form a key management component of many biodiversity stewardship sites. It is important the assessor evaluate when and how to undertake these actions to maximise gain in biodiversity values.

Initially, evaluation would involve consideration of the information/data collected during the Stage 1 assessment. Vegetation zones where attributes are currently well below benchmark are likely to benefit from active restoration. Similarly, actions that target growth form groups that contribute most to the dynamic weights for the PCT will likely result in significant gain in the VI score (dynamic weights can be viewed in the BAM-C within the current condition scores for composition, structure and function – under the 'Calculation results' tab). However, there may also be some circumstances where active restoration is unsuitable or could negatively impact other elements of biodiversity.

Important: In cases where the active restoration involves complete removal of the ground layer (i.e. scalping), the current condition of impacted VI attributes must be entered into the BAM-C as zero.

Once suitable active restoration actions have been identified assessors will need to consider the constraints and risks to successfully achieving predicted outcomes. Different constraints may apply to different management actions on the same biodiversity stewardship site, or a single constraint may be relevant to all actions. Table 3 highlights constraints and risks that may be relevant to active restoration and presents a pathway for determining whether the action is suitable at the biodiversity stewardship site. The assessor will need to provide evidence in the BSSAR, to demonstrate capacity to overcome constraints and address risks. Evidence could be in the form of written communication from a relevant expert, published information on past successes or industry best practice, or, if evidence is not available, development of a contingency plan (including costs) as part of the management plan.

The BAM (Subsection 11.3.2, Box 4) requires evidence of the landholder's ability to implement active restoration management actions. For example, actions to restore species richness of forb and grass growth forms have typically only been successful in circumstances where adequate and appropriate seed resources are available, where the site preparation manages excessive soil nutrients and weed competition, and where the restoration method delivers propagules onto a suitably prepared seed-bed (Gibson-Roy & Delpratt 2015, see Table 3).

While appropriate resourcing, site preparation and methods are crucial for the success of active restoration actions, ongoing management and monitoring remains essential for achievements to be long term. The aim of these actions is to achieve a well-managed and self-sustaining population(s) that is not dependent on restoration (e.g. reintroduction of seed or plants). For this reason, assessors should identify any threats likely to operate on the biodiversity stewardship site once active restoration is complete, and any associated ongoing management (see Table 3).

Table 3 A decision pathway to support the assessment of constraints to active restoration on a site (Gibson-Roy 2017)

Decision pathway to assess constraints to active restoration			
1	**Topographical constraints**	Are there topographical constraints that may impact on implementation of active restoration? For example: • Slope: Is it too steep for proposed actions? • Inundation: Will flooding affect the proposed actions? Physical structures and engineering works might reduce the effect of topographical constraints (e.g. reduce the slope angle, flood barriers); however, these may be expensive and negatively impact other proposed management actions.	Yes – but identified constraints cannot be accommodated. Active restoration is unlikely to be suitable at this location. Consider alternatives. **OR** Yes – but identified constraints can be accommodated, go to 2. **OR** No – go to 2.
2	**Biophysical constraints**	Are there biophysical and/or site resilience constraints that must be considered in the design of active restoration techniques and timing of implementation? These may relate to slope, soil erodibility or past land uses, such as: • soil or water contamination (e.g. soil seedbank, nutrient enrichment, acid sulphate, asbestos, salinity, debris, etc.) • soil surface condition (e.g. soil compaction) • hydrology and soil moisture availability (e.g. soil may no longer be appropriate to support vegetation restoration) • weed biomass and weed seed load (e.g. seed or bud banks, seed rain) • soil disturbance resulting in depleted or low site resilience (e.g. limited/absence of seed in the soil seedbank or absence of nearby seed sources). Extensive site preparation may remove some biophysical constraints; for example, contaminated soil may require physical removal or scalping. Water decontamination may involve physical cleaning or chemical applications. Deliberate stimulation of weed germination may be undertaken to activate seed banks.	Yes – but identified constraints cannot be accommodated. Active restoration is unlikely to be suitable at this location. Consider alternatives. **OR** Yes – but identified constraints can be accommodated, go to 3. **OR** No – go to 3.

Decision pathway to assess constraints to active restoration			
3	**Restoration methods**	Is the assessor confident the proposed active restoration actions (e.g. tube stock planting, direct-drilling, mechanical or hand broadcast seeding, seed hay/mulch, hydro-seeding, habitat enhancements, creation of ponds or other artificial habitats, nutrient controls) are suitably matched to prevailing site conditions? Are the management actions suited to the resilience of the site? The assessor may consider restoration literature and on-ground evidence to determine an appropriate method. Consideration should be given to the sequencing of restoration activities; for example, direct seeding prior to planting tube stock. Novel restoration methods could be proposed where traditional or known methods are likely to be unsuitable for the site.	Yes – they will be suitable, go to 4. **OR** No – there are no suitable methods. Active restoration is unlikely to be suitable at this location. Consider alternatives.
4	**Restoration capacity**	Having identified appropriate restoration method(s) is the assessor confident the necessary infrastructure required to plan, manage and complete these works (e.g. seed and/or tube stock supply, seed harvesters, seeders, planters, nursery facilities, weed spraying equipment, soil works equipment) is available and within budget? Consideration could be given to sourcing alternative resources or modification of restoration goals to reduce budget pressures.	Yes – all necessary infrastructure is available and within budget, go to 5. **OR** No – not all infrastructure is available or within budget. Active restoration is unlikely to be suitable at this location. Consider alternatives.
5	**Biological resources**	Is an acceptable proportion of the proposed range of species characteristic of the PCT (and growth form group) available from wild collection or by seed production methods? Are the species available of local provenance (and/or climate ready)? Is the quantum of seed or plants (for each species) required for the scale of restoration and proposed restoration method available (physically and within budget)? Is the assessor confident the testing and budgetary resources are available to ensure seed quality (i.e. purity, germination, viability) or plant quality (i.e. nursery capacity to produce hardy plant stock within planning timelines), and can these be assessed prior to use in restoration? Consideration could be given to conducting a staged approach, depending on the resources available.	Yes – all or a suitable proportion of seed/plants are available, go to 6. **OR** No – resources are not available. Active restoration is unlikely to be suitable at this location. Consider alternatives.

Decision pathway to assess constraints to active restoration			
6	**Post-restoration management**	Are detailed post-establishment management actions included in the management plan? Management actions may focus on weed threats, excess biomass, pests, disturbance, fire, flood and site security that are likely to threaten the restored vegetation. Directions for the management techniques may also be included, such as burning, strategic grazing (deferred, cell, crash, other), slashing, slashing and baling, herbicide application (methods, chemical types, rates and frequencies), woody biomass trittering, carbon addition (forms, rates, delivery methods) and litter/woody material addition. The assessor may consider the restoration literature or on-ground evidence to determine an appropriate method.	Yes – all post-establishment threats to the restored vegetation can be managed with actions documented in the management plan, go to 7. **OR** No – threats likely to affect the restored vegetation cannot be managed. Active restoration is unlikely to be suitable at this location. Consider alternatives.
7	**Financial resources**	Have the active restoration actions been fully costed and budgeted? Where there is uncertainty of outcome, has an appropriate contingency (collated with the uncertainty) been included in the total fund deposit (TFD) calculator? Costings for restoration methods (e.g. machinery, specialised personnel, etc.), biological resources (e.g. soil, seeds, plants), post-restoration management (e.g. actions to manage threats), and monitoring (e.g. additional to that required as part of the standard monitoring in the management plan) must be evaluated. Costs of the proposed active restoration could be reduced by restoring a smaller area of vegetation (although there are likely to be economies of scale in some techniques), staging restoration over a longer period of time and/or using alternative methods/sources for materials to achieve similar outcomes to increase the feasibility.	Yes – costs associated with active restoration documented, within budget and have been prepared by a suitably qualified and experienced person, go to 8. **OR** No – costs associated with active restoration are significant and beyond budget. Active restoration is unlikely to be suitable at this location. Consider alternatives.
8	**Monitoring**	Has the assessor developed (and costed) an appropriate monitoring plan for the restoration? Monitoring should include performance measures and ecological response targets as described in Section 2.7.3. The proposed methods, sampling design and frequency should be sufficient to evaluate progress against the relevant targets and should align with guidance provided in the Ecological Monitoring Module (EMM).	Yes – monitoring plan for active restoration is documented within the management plan for the site. Proceed with the proposal. **OR** No – monitoring plan has not been developed. Undertake this task before proceeding with the proposal.

B.2 Required versus active restoration management actions

Some required and active restoration management actions are on a continuum and defining the differences can be challenging (BAM Tables 6 and 7). Differences might relate to the:

- reliance on implementing a required management action before commencing with active restoration
- size of investment (time and resources)
- expertise required to plan and/or undertake the management action
- potential risks and constraints.

Table 4 provides an example based on integrated weed management. The information provided is not exhaustive – management actions must be tailored to the unique characteristics and context of the site.

Table 4 Examples of differences between required and active restoration management actions for integrated weed management

Required management action	Active restoration management action
When does this management action apply to a management zone?	
Where the assessor accepts the increase in the VI score identified by the BAM-C for required management actions alone. Management zones with: • weeds that are not listed has HTW • vegetation in high condition and a low cover of HTW that can be managed effectively • native vegetation that is likely to recover with required management actions alone.	Where the assessor can demonstrate that integrated weed management will achieve greater improvements in the VI score than identified in the BAM-C for required management actions alone. Management zones with: • high HTW cover and where a relatively small gain is predicted by the BAM-C based on required management. Supplementary planting may also be used to improve the VI score at a later stage of management • a low VI score, where supplementary planting is identified as the primary method of increasing scores above that provided by the BAM-C based on required management only.
Management activity requirements	
Management activities are targeted at: • limiting or reducing the spread of HTW • fine-scale intensive removal of non-high threat weeds over a small area. Weed control may be undertaken by a bush regenerator or qualified environmental weed control practitioner where relevant, under the direction of the landowner, using methods identified in the management plan.	Management activities are targeted at: • large-scale removal of HTW, and replacement of native vegetation (natural regeneration or supplementary planting) • repeated fine-scale intensive removal or control of manageable HTW, and replacement of native vegetation (natural regeneration or supplementary planting). Weed control is undertaken by (or under direct supervision of) a bush regenerator or qualified environmental weed control practitioner, using the methods identified in the management plan. A higher level of expertise will be required to achieve the additional gain in VI scores. Investment will be high.

Appendix C: Examples of SMART performance measures

Examples of SMART performance measures are provided for the following sections of a biodiversity stewardship site's management plan:

1. Required management actions (Table 5)
2. Fire for conservation management plan (Table 6)
3. Native vegetation management plan (Table 7)
4. Threatened species habitat management plan (Table 8)
5. Integrated weed management plan (Table 9).

Note: Performance measures are used to assess whether management actions have been implemented at the biodiversity stewardship site. This is supported by appropriate annual monitoring and reporting design to reflect these targets.

Table 5 Example of required management action performance measures

Action	Performance measure
Grazing management	• Existing stock-proof fencing and gates identified on the Biodiversity Stewardship Site Management Actions Map as *Existing fence (stock-proof) – maintain* or *Existing gate – maintain* are retained, inspected monthly, and maintained to exclude livestock from the biodiversity stewardship site in perpetuity. • Fencing and gates identified on the Biodiversity Stewardship Site Management Actions Map as *New fence (stock-proof) – install and maintain* or *New gate – install and maintain* are installed within 12 months of the first payment date and maintained to exclude livestock from the biodiversity stewardship site in-perpetuity. • Stock excluded from the biodiversity stewardship site in-perpetuity.

Table 6 Examples of fire for conservation management performance measures

Performance measure
One burn undertaken every 7 years within ecological burn units 1, 2 and 4 identified on the Ecological Burns Map.
Areas of potential habitat for *Pultenaea parviflora*, as identified on the Threatened Species Habitat Management Map, burnt at intervals of no less than 7 years.

Table 7 Example of native vegetation management performance measures

Management zone(s)	Management action	Performance measure
MZ1a MZ1b	Native vegetation and habitat management and augmentation: • supplementary planting	>80% survival rate of tree and shrub plantings after year 6.

Table 8 Example of threatened species habitat management performance measures

Management zone(s)	Management actions	Performance measure
MZ1a	Native vegetation and habitat management and augmentation: • artificial hollows	Artificial hollows installed, as per the management plan specifications, at a density of 1 hollow per 400 m^2 by year 2.

Table 9 Example of integrated weed management performance measures

Weed type	Performance measure

Weed zone A – African olive and associated HTW	Total combined foliage cover of African olive and associated HTW:
	• 5 years:
	  ○ 0% in the upper stratum
	  ○ 31–60% in the mid-stratum
	  ○ 31–60% in the ground stratum
	• 10 years:
	  ○ 0% in the upper stratum
	  ○ 11–30% in the mid-stratum
	  ○ 11–30% in the ground stratum
	• 15 years:
	  ○ 0% in the upper stratum
	  ○ 1–10% in the mid-stratum
	  ○ 11–30% in the ground stratum
	• 20 years:
	  ○ 0% in the upper stratum
	  ○ <1% in the mid-stratum
	  ○ 1–10% in the ground stratum.