NSW State Vegetation Type Map

Technical notes – release C2.0M2.0 (2023)

Department of Planning and Environment

NSW GOVERNMENT

Acknowledgement of Country

The Department of Planning and Environment acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

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1. Introduction

These technical notes describe the 2023 updates to the regional-scale mapping of plant community types for New South Wales, Australia. The NSW State Vegetation Type Map (SVTM) represents the most complete and consistent information about the distribution of vegetation across New South Wales, benefitting landholders, planners and local communities.

Plant community types (PCTs) are the finest level of classification in the NSW vegetation classification hierarchy. They identify and describe recurring patterns of native plant species assemblages in relation to environmental conditions; that is, sets of species that commonly occur together in association with combinations of soil, temperature, moisture and other factors.

The Department of Planning and Environment has taken a systematic approach to mapping PCTs based on vegetation plot data. The SVTM methodology applies a hierarchical approach where groups of co-occurring species are successively delineated into smaller subsets at progressively finer spatial scales.

Broad vegetation physiognomy have been delineated using digital aerial photography interpretation (API) and placed into vegetation photo pattern (VPP) classes (e.g. woodlands, wetlands, shrublands, rainforests). VPPs are based on the influence of regional-scale environmental factors such as climate and geology and are assigned to the landscape even in areas where the vegetation has been cleared. This allows us to map pre-clearing vegetation across New South Wales.

At finer levels, where classification units become increasingly descriptive, we use expert rules to define limits on the extent of PCTs based on landform and topography (e.g. gullies, ridges, plateaus, depressions). PCTs have been assigned at the finest level using machine learning and then checked by expert interpreters. We have masked out cleared areas using a 5 m resolution map of native vegetation.

The SVTM is based on the best available aerial (ADS40/80) and satellite imagery (SPOT 5, SRTM, Landsat), a comprehensive collection of environmental variables, and existing vegetation mapping. The map covers all of New South Wales and can be viewed on a mobile device or downloaded as a 5 m resolution raster.

2. Background

The NSW vegetation classification hierarchy and the SVTM are part of the Integrated BioNet Vegetation Data (IBVD) program. This program unifies delivery of native vegetation classification data and maps for New South Wales. The program is recognition of the need to provide consistent statewide vegetation data to support the implementation of NSW legislation, regulations and policies, underpinned by scientific standards and methods.

Integrated BioNet Vegetation Data includes:

- the 3-tiered NSW native vegetation classification hierarchy (vegetation formations, vegetation classes and PCTs)
- the SVTM (including extant and pre-clearing maps)
- threatened species, population and ecological community to PCT association data
- estimates of clearing loss (%) for PCTs
- vegetation condition benchmark data
- the BioNet systems that store and deliver data content.

The State Vegetation Type Map (C1.1M1) was published in September 2022, followed by an update (C1.1M1.1) in December 2022.

Revising the SVTM annually is an ongoing commitment undertaken by the department as part of the Integrated BioNet Vegetation Data program.

C1.1M1.1 has been revised and updated to include new sources of information including survey sites, expert opinion, revisions, corrections, and new mapping. The revised version is C2.0M2.0, which aligns with PCT Master List C2.0 (see DPE 2023b).

The Native Vegetation Extent Raster has also been updated to include selected additions and deletions of woody vegetation. This raster has been applied to the SVTM pre-clearing map to create the SVTM extant map.

3. Revising the SVTM

3.1 Uplifting new PCT mapping

Objective

Add new selected fine-scale PCT mapping to the SVTM.

Process

To be considered for uplift to the SVTM, new PCT mapping must have been attributed using approved PCTs in the PCT Master List C1.1 and it must demonstrate new or improved information including on-ground survey, attribution and linework accuracy.

'Uplifting' refers to the process of transferring raster pixel values to polygons. In this case, the new PCT mapping was 'uplifted' directly into the pre-clearing map polygons based on 'majority rules'. Uplifts were 'edge matched' manually, where required. If proposed new PCT mapping attribution conflicted with the PCT classification of a PCT reference plot in BioNet, that information (and related polygons) was excluded from the uplift.

New PCT mapping comprised:

- **Brindingabba National Park** Vegetation: VIS ID 5125 in north-western New South Wales (DPE 2023a)

- **Nightcap**: fire management mapping provided by NSW National Parks and Wildlife Service (NPWS) North Coast Branch
- **Coffs Harbour**: mapping related to threatened ecological communities (TECs) updated and revised by Coffs Harbour City Council
- **Wingecarribee**: TECs mapping within the Wingecarribee local government area.

3.2 Removing legacy grassland PCTs

Objective

Remove selected legacy 'derived' grassland PCTs from the SVTM.

Process

Benson (2010) described several 'grassland' PCTs as most likely derived from prior non-grassland communities. The derived communities are described as most likely resulting from significant modification and disturbance. While derived grasslands may undoubtedly retain some native species of grasses (and other native plants) of conservation value, they are unlikely to represent the vegetation community before disturbance.

The SVTM product does not include derived PCTs, and they have been removed from the pre-clearing map for version C2.0M2.0 (see Table 1).

Table 1 Grassland PCTs removed from the SVTM

PCT ID	Approximate locations
150	Western and Lower Murray Darling (see note below)
183	Western and Lower Murray Darling (see note below)
484	Namoi and Central West
511	Namoi and Border Rivers Gwydir
633	Murrumbidgee and Murray

Note: Where pre-clearing grasslands mapping occurred in western New South Wales, deleting the above derived grassland type would have resulted in spatial voids. Accordingly, derived grasslands were replaced by nearby alternative natural native grassland PCTs that have otherwise been retained in the SVTM (see Table 2).

Table 2 Deleted and substituted grassland PCTs

PCT ID in C1.1M1.1	Substituted PCT ID in C2.0M2.0
150	155
183	157

3.3 Updating the SVTM to PCT Master List C2.0

Objective

Update the pre-clearing map in eastern New South Wales to align with approved PCTs in PCT Master List C2.0.

Process

PCT Master List C2.0 incorporates approximately 2,000 previously unclassified standard floristic survey plots into the quantitative PCT classification of coast and tablelands bioregions in eastern New South Wales. This process resulted in the description of 9 new approved PCTs and the decommissioning of one very low-confidence PCT (see DPE 2023b). The C2.0 plot classification assignments (PCT member plot locations) and new and revised PCT vegetation descriptions were used to update the pre-clearing map.

New approved PCTs were manually mapped into the SVTM pre-clearing map (see Table 3).

Table 3 Nine newly approved PCTs in PCT Master List C2.0 added to the SVTM

PCT ID	PCT name
3014	Liverpool Range Daphnandra Rainforest
4157	Hunter Escarpment Footslopes Singleton Mallee
4158	Hunter Escarpment Pokolbin Ironbark Woodland
4159	Nightcap Rhyolite Rocky Red Gum Woodland
4160	Mid North Conglomerate Blackbutt Shrub Forest
4161	Mid North Stringybark-Turpentine Shrub Forest
4163	Mount Gibraltar Melaleuca Heath
4162	Elderslie Banksia Scrub
4164	New England Peppermint Swamp Margin Woodland

Each newly classified site (PCT member plot) was examined in the context of existing site data and mapping. Either no change was made to the pre-clearing map or scaled changes implemented.

3.4 Including user feedback

Objective

Revise the SVTM pre-clearing map to incorporate new PCT information provided from user feedback.

Process

The department has widely publicised and invited users to provide feedback through the SEED and Trees Near Me (TNM) NSW app feedback functions. Appendix A lists

submissions received through the department's incident system from SEED and TNM as well as email correspondence. Feedback was evaluated by the mapping team for its suitability for inclusion to the SVTM. Not all feedback may have been included if it did not meet scale and floristic requirements or relevance. The 'feedback date' refers to when the map was revised.

Revisions based on user feedback were applied only to eastern New South Wales, as central New South Wales is currently under revision. No feedback was received relating to western New South Wales.

3.5 Correcting modelling errors

Objective

Correct for PCT modelling error in the SVTM.

Process

The SVTM C1.1M1.1 included some PCT attribution errors resulting from the original work that predicted distribution of PCTs. Both over-prediction and under-prediction of PCT distribution had occurred, i.e. PCTs occurring outside of known occurrences and ecological envelopes. Where detected during editing or reported through feedback, PCT attributions were corrected and manually replaced with the nearest PCT consistent with that particular environmental envelope.

Modelling also created small and/or isolated predictions evidenced by single or small groups of polygons (or 'modelling noise'). In some cases it is desirable that some communities are mapped as small areas, for example rainforests along creeklines which reflect niche environments. However, for dry sclerophyll forests this is rarely the case as they generally occupy broad contiguous facets of the landscape.

Modelling noise in dry sclerophyll forest vegetation classes was removed by eliminating attribution where mapped PCTs were less than 1 hectare (most unlikely case) in area. This process was undertaken post-editing using a pixel count to calculate area, then using Nearest Neighbour to blend in the treated areas with surrounding dry sclerophyll forest PCTs.

3.6 Removing non-approved PCTs from the SVTM

Objective

Remove non-approved PCTs from the SVTM.

Process

Table 18 in Roff et al. (2022) identifies PCTs that are not in the approved PCT Master List but were shown in the SVTM C1.1M1.1; these PCTs are either decommissioned, withdrawn or 'draft – working'. All non-approved PCTs will be gradually removed and replaced with new mapping in future updates. C2.0M2.0 mapping continues to show some non-approved PCTs across central and western New South Wales. As a result, there is some misalignment with the PCT Master List C2.0.

Five non-approved PCTs from eastern New South Wales (PCT 3516, PCT 3526, PCT 3750, PCT 3751 and PCT 3755) mapped in SVTM C1.1M1.1 were systematically removed from the map and replaced with currently approved PCTs. For eastern New South Wales, only approved PCTs now occur in C2.0M2.0.

4. Revising the Native Vegetation Extent Raster v1.5

4.1 Background

The Native Vegetation Extent Raster v1.5 is a binary (raster) layer that illustrates the overall current extent of native plant communities across New South Wales. For the purposes of the SVTM the raster is updated to include or exclude areas corresponding to increases or decreases in native vegetation. Increases may, for example, include revised woodland extents or improved detection of natural native grasslands. Decreases include land-clearing activities or errors in the raster layer.

The raster is spatially subtracted from the SVTM pre-clearing layer to derive the SVTM current extent map (see Section 5).

4.2 Woody matrix

Objective

Improve the representation of woodland extent.

Process

Feedback from field practitioners (see Appendix A) has indicated the extent of native woodlands is systematically underrepresented in the SVTM by not including a greater extent of grassy areas between closely spaced tree canopies- called ‘the woody matrix’.

To better represent the woody matrix, a binary morphological closing filter was used. The filter accounts for potential vegetation between the most closely spaced tree crowns and was applied to the 5m native vegetation extent raster in ENVI image analysis software (kernal size: 3 x 3, cycle: [iterations] = 5). The closing filter is designed to smooth contours, fuse narrow breaks, eliminate small holes, and fill gaps in the contours of an image (ENVI Geospatial n.d.). The resulting raster was then uplifted by majority to the eastern New South Wales (ENSW) segmentation.

Figure 1 shows the before and after results of this process. The process was applied only to eastern NSW PCTs comprising the ‘grassy open woodland’ vegetation photo pattern types listed in Appendix B. The process was not applied to either central or western New South Wales as those areas are currently undergoing revision.

The changed woodland extents were added to the Native Vegetation Extent Raster v1.5.

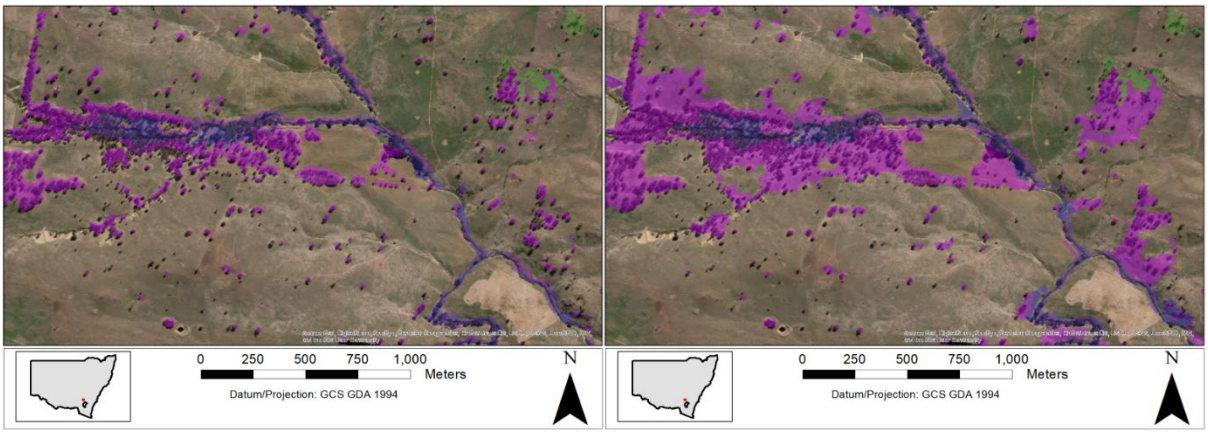

Figure 1 **A mapped area of PCT 3376 (Southern Tableland Grassy Box Woodland) showing improved representation of the woody matrix**

The map on the left shows version C1.1M1.1 without the woody matrix process applied. The revised map on the right captures more grassy area between closely spaced tree crowns.

4.3 Natural native grasslands

Objective

Improve representation of natural native grasslands.

Process

The extent of natural native grasslands is defined in the SVTM, by thresholding the department's Seasonal Cover Disturbance Index (SCDI). The indexed version of the SCDI ranges in values from zero to one. A lower value indicates a lower occurrence of variance in colour change for a particular pixel over time. This is interpreted for grassland types as less likely to have been modified over time. For more information on the SCDI see Appendix 4 of the *Native vegetation regulatory map: method statement appendices* (OEH 2017).

Version C1.1M1.1 of the SVTM (ENSW) applied an indexed version of the 1988–2018 seasonal cover disturbance image. The threshold applied was 0.47 calibrated with available PCT plot data and expert opinion, at that time.

The raster was amended in C2.0M2.0 by varying the threshold to 0.55 based on new PCT plot data (Figure 2).

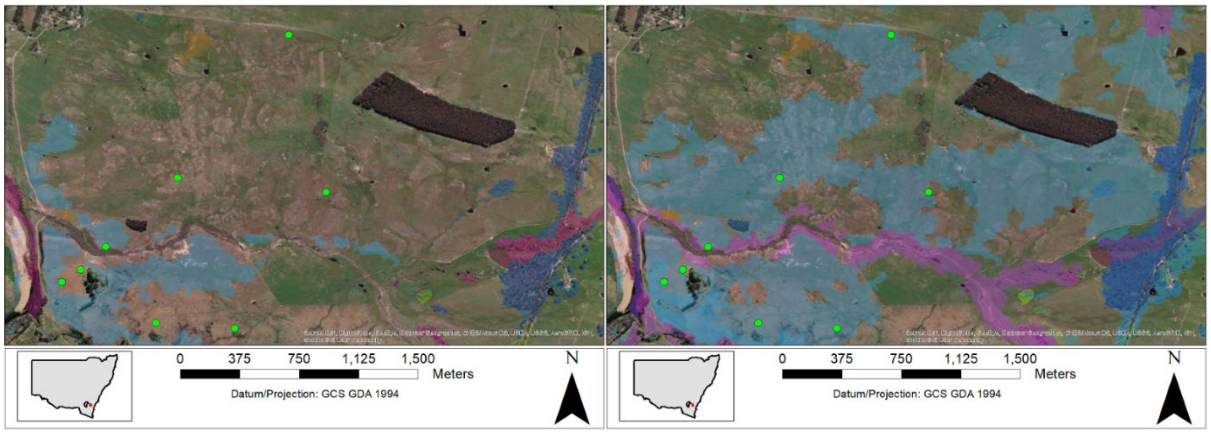

Figure 2 Improved representation of natural native grasslands

The map on the left in Figure 2 shows version C1.1M1.1 of the ENSW SVTM with PCT 3413 shown in light blue (Monaro Kangaroo Grass Woodland-Grassland Complex). The green points are new ground-truthed native grassland sites. The map on the right shows the revised version (C2.0M2.0)

4.4 Land clearing

Objective

Update the raster with recent Statewide Landcover and Tree Study (SLATS) information.

Process

SLATS is a program that monitors woody and non-woody vegetation change based on the analysis of multi-date Sentinel 2 satellite imagery (DPE 2020b). Yearly woody change rasters have been produced since 1988 while non-woody change rasters have been produced since 2018.

The raster was revised by applying the 'woody extent' SLATS pixels from 2015 to 2021 and the 'non-woody' disturbance pixels from 2018 to 2021. The SLATS categories that typically indicate fire disturbance were not included.

SLATS pixels were vectorised, buffered 5 m then dissolved and smoothed with a 60m smoothing tolerance (Figure 3.1–3.4). Polygons with an area greater than 1 hectare were included to mask areas mapped as native vegetation in the central and western NSW study areas. Polygons with an area less than 1 hectare were excluded to minimise residual artefacts in the absence of manual edits to the central and western NSW study areas during this revision period.

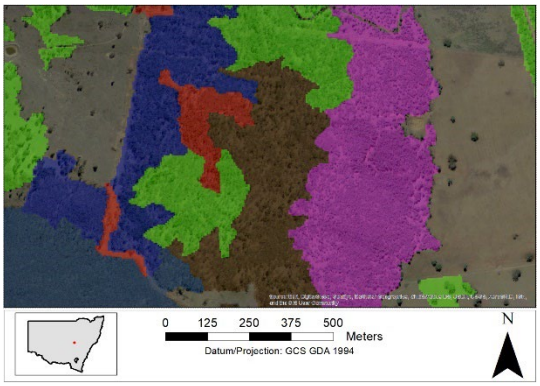

Figure 3.1 Base map: SVTM C1.1M1.1

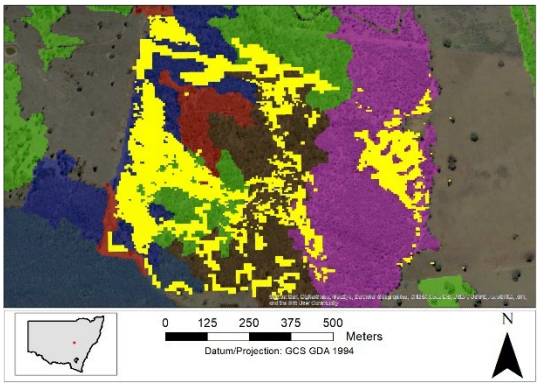

Figure 3.2 2015–2018 SLATS pixels are projected onto the SVTM, shown in yellow. Pixels need to be processed and simplified to minimise residual artifacts and noise.

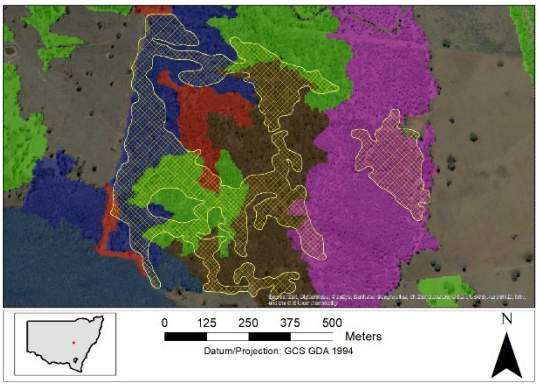

Figure 3.3 Clearing areas (cross-hatched) mask the SVTM

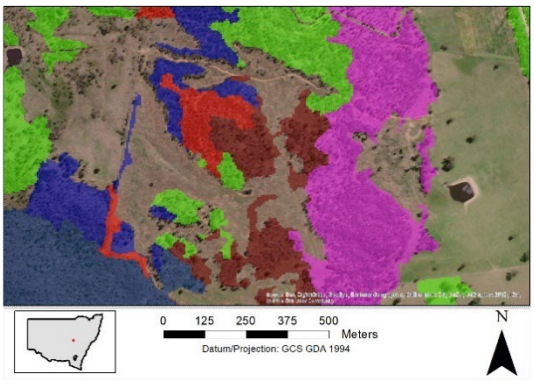

Figure 3.4 Updated extant native vegetation

Figure 3 Example: applying SLATS to the Native Vegetation Extent Raster v1.5

Images 3.1 to 3.4 show the process of simplifying and applying the SLATS pixels to the central and western study areas. Pixels shown in yellow are from clearing events between 2015 and 2018.

4.5 Land use

Objective

Revise the raster by removing 'non-native' land-use.

Process

The NSW Landuse 2017 v1.2 dataset (DPE 2020a) includes a range of mapped classes that are most unlikely to comprise native plant communities. The classes listed in Appendix C were deleted from the raster.

4.6 Native vegetation extent

Objective

Improve the accuracy of native vegetation extent.

Process

The native vegetation extent contains observable errors, for example where windrows and plantations have been included as native vegetation. Errors were removed from the raster following systematic air photo interpretation at a scale of approximately 1:15,000 using a high-resolution Esri basemap with imagery dates ranging from 2018 to 2022.

5. Results of editing

5.1 Creating the C2.0M2.0 version of the SVTM

Revisions to C1.1M1.1 began in December 2022. Iteratively, edits were undertaken as new information became available. Editing finished in August 2023.

All PCT attribution editing was carried out on one master-copy ArcGIS geodatabase of the pre-clearing map. Note: pre-clearing information for central NSW is not currently available and SVTM editing did not occur across this region. Editing only the pre-clearing map ensured that when the raster was applied, both the pre-clearing map and the extant map were spatially identical. Attribution changes to C1.1M1.1 included a comment on the source for the change and are listed in the master attribution file.

The main locations where larger-scaled revisions were implemented include:

- selected lowland rainforest and environments in the Northern Rivers, Hunter and Shoalhaven regions
- Bonalbo woodland/grasslands matrix
- Inverell granites
- Wingecarribee local government area

- Araluen grasslands complex
- Illawarra rainforest complex
- Blue Gum High Forest/shale interfaces
- Gosford hinterland.

In addition, the vegetation class and vegetation formation of PCT 101 were updated in the SVTM to align with a change implemented in PCT Master List C2.0 (see Table 4).

Table 4 **Approved PCT with updated vegetation class and vegetation formation in PCT Master List C2.0**

PCT ID	PCT name	C1.1 vegetation class	C1.1 vegetation formation	C2.0 vegetation class	C2.0 vegetation formation
101	Poplar Box–Yellow Box–Western Grey Box Grassy Woodland on Cracking Clay Soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Brigalow Clay Plains Woodlands	Semi-arid Woodlands (Grassy sub-formation)	Floodplain Transition Woodlands	Grassy Woodlands

The extent of attribution revisions is shown in Figure 4.

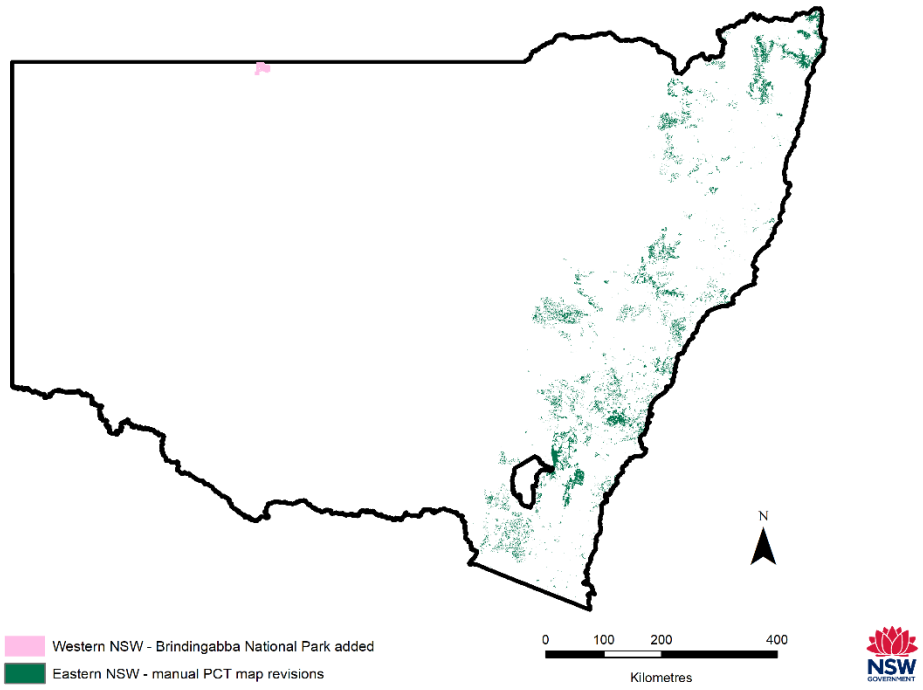

Figure 4 **Mapping changes vs C1.1M1.1**

5.2 Assessing map accuracy

A field-based approach to map accuracy is outlined in the SVTM technical notes (Roff et al. 2022). The method requires an independent ecologist to identify the PCT encountered at approximately 100 random-stratified locations across a 1:100,000 map sheet. Three assessments on C1.1M1.1 mapping have been completed. The map sheets selected for assessment represent different bioregions and were selected to meet access and coverage considerations.

The results provide a guide to likely map accuracy as experienced by actual users on the ground. Likely PCTs were identified using the Plot to PCT Assignment Tool and PCT descriptions. In most cases the assessors provided alternative PCTs for a site. Results are shown in Table 5.

Table 5 **Indicative SVTM on-ground map accuracy results**

1:100,000 map	Undetermined	Correct	Incorrect	Incorrect but acceptable	Overall accuracy
Goulburn	8	51	22	12	74%
Newcastle	2	68	28	13	74%
Batemans Bay	1	52	29	15	69%

5.3 NSW SVTM publishing

5.3.1 Vector and raster products

Western, central and eastern New South Wales pre-clearing vectors (see Figure 5) were merged to create the SVTM Pre-clearing Map – Vector Version (see Figure 5). The same was undertaken to create the SVTM Current PCT Extent Map (see Figure 7). Separate 5 m Geotiff rasters were created from both pre-clearing and extant products. All vector and raster maps are packaged for publishing, in GDA94/NSW Lambert projection (EPSG:3308). The data package can be viewed and downloaded from the SEED data portal and other department applications.

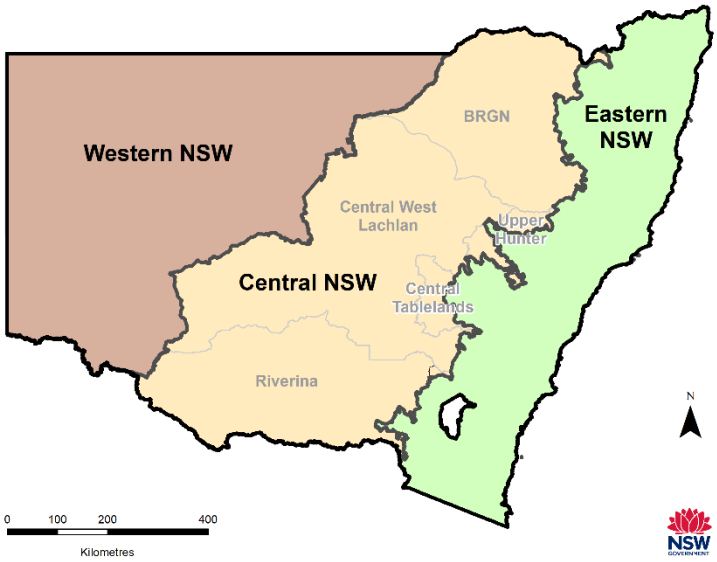

Figure 5 The 3 current SVTM regions of western, central and eastern New South Wales

Central NSW is collated from older SVTM maps (grey text) wherever eastern NSW does not overlap.

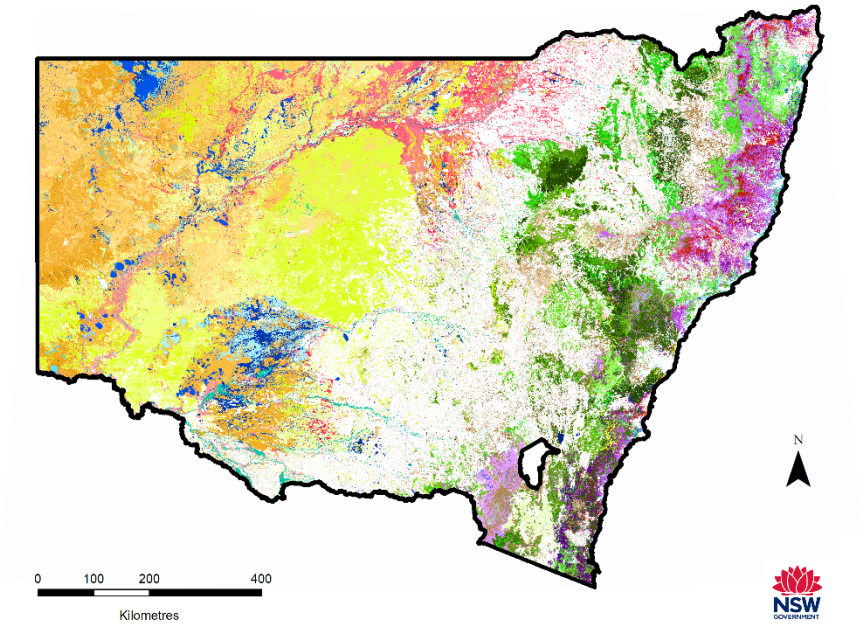

Figure 6 **NSW extant vegetation PCTs**

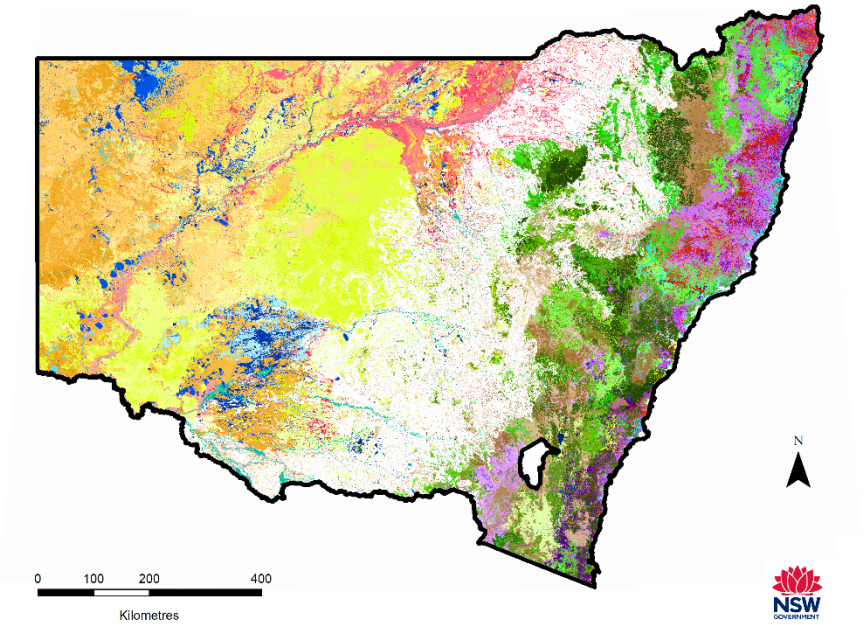

Figure 7 **NSW pre-clearing native vegetation**

Note that pre-clearing is not currently available for central New South Wales.

5.3.2 Improved map presentation

Previous SVTM maps presented on SEED included superfluous linework that was not related to vegetation information. This was a result of software used to speed up the display in the SVTM online viewer. To improve map presentation these lines have been removed by:

- making the software lines transparent where there is no native vegetation
- not using the software where there is native vegetation.

Improvements were made to enhance colour discrimination between some PCTs. Those colours were manually changed to improve contrast.

5.3.3 Complementary SVTM products

Vegetation data in the Trees Near Me NSW app are derived from the SVTM extant map and SVTM pre-clearing map and updated with each new release. The same mapping products are used, with some exceptions:

- rasters – no changes made
- vectors – new vectors have been created by resampling the NSW SVTM rasters to 50 m, then vectorising. The new vector increases performance on the app due to its smaller size. This map is not visually displayed on the app and is used purely for querying PCT information.

6. References

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Roff A, Day M, Thonell J and Denholm B (2022) *NSW State Vegetation Type Map: Technical Notes*, NSW Department of Planning and Environment, Parramatta, Australia.

Wiseman M (2023) Nightcap National Park and Whian Whian State Conservation Area, Matthew Wiseman, Team Leader Rangers, pers comm, unpublished PCT mapping provided to Science, Economics and Insights Division, NSW Department of Planning and Environment.

Appendix A: Feedback received

Table 6 Feedback received on version C1.1M1.1 and general location of comments

Note: 'Feedback date' refers to the date the SVTM was revised.

Feedback date	Location
20/09/2021	ENSW (Armidale)
20/10/2021	ENSW (Kempsey)
22/10/2021	ENSW
23/10/2021	ENSW
17/03/2022	ENSW
9/06/2022	ENSW (Wingello)
18/07/2022	ENSW (Wingecarribee)
25/07/2022	SWS
4/08/2022	SWS
9/08/2022	SWS
19/08/2022	SWS
24/08/2022	Nowra
25/08/2022	Nowra
26/08/2022	Nowra
26/08/2022	Nowra
26/08/2022	Kybean
26/08/2022	Cooma
26/08/2022	Cooma
26/08/2022	Nowra
1/08/2022	Wollongong
13/09/2022	Wollongong
19/09/2022	Wingecarribee
19/09/2022	Wingecarribee
19/09/2022	Wingecarribee
19/09/2022	Wingecarribee
19/09/2022	Wingecarribee
19/09/2022	Wingecarribee
24/10/2022	SWS

Feedback date	Location
26/10/2022	SWS
02/11/2022	NSW grassy woodlands
22/11/2022	Riverina
22/11/2022	DRP
24/11/2022	SWS
29/11/2022	Cobar Peneplain
9/12/2022	Cobar Peneplain
11/01/2023	Lake Macquarie
18/12/2022	Coasts
28/09/2022	Coasts
9/01/2023	Coasts
16/02/2023	SWS
24/02/2023	Wingecarribee
14/03/2023	Michelago
31/03/2023	Wingecarribee
28/04/2023	Shoalhaven
29/05/2023	Nandewar
13/06/2023	Ryde LGA
21/06/2023	Mt Pleasant
1/06/2023	Karuah
11/06/2023	Lake Macquarie
15/06/2023	Other location (ref INC0674971)
16/06/2023	Other location (ref INC0674969)
16/06/2023	Other location (ref INC0674962)
22/06/2023	Other location (ref INC0678849)
22/06/2023	Other location (ref INC0679125)
28/07/2023	Coffs Harbour
28/07/2023	Nightcap NP
28/07/2023	Bonalbo area
31/07/2023	BBS/Nandewar

Appendix B: PCTs where the woody matrix process was applied

Table 7 **Eastern New South Wales woodland PCTs where the woody matrix process was applied to include grassy areas between tree crowns**

PCT ID	PCT name
3350	Macleay Gorge Rims Shrub Woodland
3351	Armidale Creekflat Snow Gum Woodland-Scrub
3352	Armidale Quartz Hills Stringybark Forest
3353	Guyra Silvertop Stringybark Moist Forest
3354	Liverpool Range Box-Silvertop Stringybark Forest
3355	Moonbi Range Stringybark-Yellow Box Forest
3356	Northwest Ranges Apple-Stringybark Sheltered Forest
3357	Western New England Flats Apple-Box Grassy Forest
3358	New England Fuzzy Box Grassy Forest
3359	New England Hills Stringybark-Box Woodland
3361	Tenterfield Plateau Stringybark-Apple Forest
3363	Western New England Blakelys Red Gum-Box Grassy Forest
3365	Bondo Slopes Red Stringybark Grassy Forest
3366	Central Tableland Clay Apple Box Grassy Forest
3367	Central Tableland Granites Grassy Box Woodland
3368	Central Tableland Limestone Woodland
3369	Central Tableland Ranges Peppermint-Gum Grassy Forest
3370	Central Tableland Red Stringybark Grassy Forest
3372	Dalton Hills Grassy Stringybark Forest
3373	Goulburn Tableland Box-Gum Grassy Forest
3374	Goulburn Tableland Peppermint Grassy Forest
3375	Monaro-Queanbeyan Rolling Hills Grassy Forest
3376	Southern Tableland Grassy Box Woodland
3377	Southwest Foothills Apple Box Grassy Forest
3337	Bondo Frost Hollow Grassy Woodland
3338	Goulburn Tableland Frost Hollow Grassy Woodland
3339	Guyra Basalt Snow Gum Woodland

PCT ID	PCT name
3341	Monaro-Gourock Frost Hollow Grassy Woodland
3344	New England Ribbon Gum Grassy Forest
3345	New England Snow Gum-Black Sally Woodland
3346	Northeast Plateau Snow Gum Valley Woodland
3347	Southern Tableland Creekflat Ribbon Gum Forest
3348	Southern Tableland Granites Ribbon Gum Grassy Forest
3387	Central West Creekflat Grassy Woodland
3388	Central West Valleys White Box Forest
3394	Northwest Basalt Grassland-Woodland Complex
3395	Northwest Elevated White Box Woodland
3396	Northwest Flats Box-Blakelys Red Gum Forest
3397	Northwest Flats Yellow Box Woodland
3398	Northwest Slopes Box-Apple Woodland
3399	Southwest Hills White Box-Blakelys Red Gum Forest
3401	Upper Hunter Sheltered Viney Shrub Forest
3402	Western Blue Mountains White Box Forest
3403	Western Hunter Creekflat Apple Grassy Forest
3404	Central West Flats Grassy Box Woodland
3405	Central West Flats Inland Grey Box Grassy Forest
3406	Southwest Ranges White Box Woodland
3485	Central Hunter Slaty Gum Grassy Forest
4147	Northwest White Box Sparse Grassy Woodland
3119	Upper Hunter White Box Vine Thicket
3413	Northwest Olive-Wilga Vine Thicket

Appendix C: Excluded land uses

Table 8 **Land-use classes masked out of woody PCTs for the revised native vegetation extent raster (refer to section 4.5)**

ALUMLUSE_Tertiary
3.1.0 Plantation forests
3.1.1 Hardwood plantation forestry
3.1.2 Softwood plantation forestry
3.1.3 Other forest plantation
3.1.4 Environmental forest plantation
3.2.3 Pasture legumes
3.3.1 Cereals
3.3.2 Beverage and spice crops
3.3.4 Oilseeds
3.3.5 Sugar
3.3.6 Cotton
3.3.8 Pulses
3.4.0 Perennial horticulture
3.4.1 Tree fruits
3.4.2 Olives
3.4.3 Tree nuts
3.4.4 Vine fruits
3.4.5 Shrub berries and fruits
3.4.6 Perennial flowers and bulbs
3.4.7 Perennial vegetables and herbs
3.4.8 Citrus
3.4.9 Grapes
3.5.0 Seasonal horticulture
3.5.2 Seasonal flowers and bulbs
3.5.3 Seasonal vegetables and herbs
3.6.1 Degraded land
3.6.2 Abandoned land
3.6.5 Abandoned perennial horticulture

ALUMLUSE_Tertiary
4.1.0 Irrigated plantation forests
4.1.1 Irrigated hardwood plantation forestry
4.1.3 Irrigated other forest plantation
4.1.4 Irrigated environmental forest plantation
4.2.0 Grazing irrigated modified pastures
4.2.1 Irrigated woody fodder plants
4.2.2 Irrigated pasture legumes
4.2.3 Irrigated legume/grass mixtures
4.2.4 Irrigated sown grasses
4.3.0 Irrigated cropping
4.3.1 Irrigated cereals
4.3.3 Irrigated hay and silage
4.3.4 Irrigated oilseeds
4.3.6 Irrigated cotton
4.3.8 Irrigated pulses
4.3.9 Irrigated rice
4.4.1 Irrigated tree fruits
4.4.2 Irrigated olives
4.4.3 Irrigated tree nuts
4.4.4 Irrigated vine fruits
4.4.5 Irrigated shrub berries and fruits
4.4.6 Irrigated perennial flowers and bulbs
4.4.7 Irrigated perennial vegetables and herbs
4.4.8 Irrigated citrus
4.4.9 Irrigated grapes
4.5.0 Irrigated seasonal horticulture
4.5.1 Irrigated seasonal fruits
4.5.2 Irrigated seasonal flowers and bulbs
4.5.4 Irrigated turf farming
4.6.0 Irrigated land in transition
4.6.2 Abandoned irrigated land
4.6.3 Irrigated land under rehabilitation

ALUMLUSE_Tertiary
4.6.5 Abandoned irrigated perennial horticulture
5.1.0 Intensive horticulture
5.1.1 Production nurseries
5.1.3 Glasshouses
5.1.4 Glasshouses - hydroponic
5.1.5 Abandoned intensive horticulture
5.2.2 Feedlots
5.2.3 Poultry farms
5.2.4 Piggeries
5.2.5 Aquaculture
5.2.7 Saleyards/stockyards
5.3.0 Manufacturing and industrial
5.3.1 General purpose factory
5.3.2 Food processing factory
5.3.3 Major industrial complex
5.3.4 Bulk grain storage
5.3.5 Abattoirs
5.3.6 Oil refinery
5.3.8 Abandoned manufacturing and industrial
5.6.0 Utilities
5.6.1 Fuel powered electricity generation
5.6.2 Hydro electricity generation
5.6.3 Wind electricity generation
5.6.4 Solar electricity generation
5.6.5 Electricity substations and transmission
5.6.6 Gas treatment, storage and transmission
5.7.1 Airports/aerodromes
5.7.3 Railways
5.7.4 Ports and water transport
5.7.5 Navigation and communication
5.8.1 Mines
5.8.2 Quarries

ALUMLUSE_Tertiary
5.8.3 Tailings
5.8.4 Extractive industry not in use
5.9.0 Waste treatment and disposal
5.9.1 Effluent pond
5.9.2 Landfill
5.9.3 Solid garbage
5.9.4 Incinerators
6.1.1 Lake - conservation
6.1.3 Lake - intensive use
6.2.0 Reservoir/dam
6.2.2 Water storage - intensive use/farm dams
6.2.3 Evaporation basin
6.3.1 River - conservation
6.3.3 River - intensive use
6.4.0 Channel/aqueduct
6.4.1 Supply channel/aqueduct
6.4.2 Drainage channel/aqueduct
6.4.3 Stormwater
6.5.2 Marsh/wetland - production
6.5.3 Marsh/wetland - intensive use

Table 9 **Land-use classes masked out of non-woody PCTs for the revised native vegetation extent raster (refer to section 4.5)**

ALUMLUSE_Tertiary
2.2.0 Production native forests
3.1.0 Plantation forests
3.1.1 Hardwood plantation forestry
3.1.2 Softwood plantation forestry
3.1.3 Other forest plantation
3.1.4 Environmental forest plantation
3.2.1 Native/exotic pasture mosaic
3.2.3 Pasture legumes
3.3.0 Cropping

ALUMLUSE_Tertiary
3.3.1 Cereals
3.3.2 Beverage and spice crops
3.3.3 Hay and silage
3.3.4 Oilseeds
3.3.5 Sugar
3.3.6 Cotton
3.3.8 Pulses
3.4.0 Perennial horticulture
3.4.1 Tree fruits
3.4.2 Olives
3.4.3 Tree nuts
3.4.4 Vine fruits
3.4.5 Shrub berries and fruits
3.4.6 Perennial flowers and bulbs
3.4.7 Perennial vegetables and herbs
3.4.8 Citrus
3.4.9 Grapes
3.5.0 Seasonal horticulture
3.5.2 Seasonal flowers and bulbs
3.5.3 Seasonal vegetables and herbs
4.1.0 Irrigated plantation forests
4.1.1 Irrigated hardwood plantation forestry
4.1.3 Irrigated other forest plantation
4.1.4 Irrigated environmental forest plantation
4.2.0 Grazing irrigated modified pastures
4.2.1 Irrigated woody fodder plants
4.2.2 Irrigated pasture legumes
4.2.3 Irrigated legume/grass mixtures
4.2.4 Irrigated sown grasses
4.3.0 Irrigated cropping
4.3.1 Irrigated cereals
4.3.3 Irrigated hay and silage

ALUMLUSE_Tertiary
4.3.4 Irrigated oilseeds
4.3.6 Irrigated cotton
4.3.8 Irrigated pulses
4.3.9 Irrigated rice
4.4.0 Irrigated perennial horticulture
4.4.1 Irrigated tree fruits
4.4.2 Irrigated olives
4.4.3 Irrigated tree nuts
4.4.4 Irrigated vine fruits
4.4.5 Irrigated shrub berries and fruits
4.4.6 Irrigated perennial flowers and bulbs
4.4.7 Irrigated perennial vegetables and herbs
4.4.8 Irrigated citrus
4.4.9 Irrigated grapes
4.5.0 Irrigated seasonal horticulture
4.5.1 Irrigated seasonal fruits
4.5.2 Irrigated seasonal flowers and bulbs
4.5.3 Irrigated seasonal vegetables and herbs
4.5.4 Irrigated turf farming
4.6.0 Irrigated land in transition
4.6.2 Abandoned irrigated land
4.6.3 Irrigated land under rehabilitation
4.6.5 Abandoned irrigated perennial horticulture
5.1.0 Intensive horticulture
5.1.1 Production nurseries
5.1.2 Shadehouses
5.1.3 Glasshouses
5.1.4 Glasshouses - hydroponic
5.1.5 Abandoned intensive horticulture
5.2.0 Intensive animal production
5.2.1 Dairy sheds and yards
5.2.2 Feedlots

ALUMLUSE_Tertiary
5.2.3 Poultry farms
5.2.4 Piggeries
5.2.5 Aquaculture
5.2.6 Horse studs
5.2.7 Saleyards/stockyards
5.2.8 Abandoned intensive animal production
5.3.0 Manufacturing and industrial
5.3.1 General purpose factory
5.3.2 Food processing factory
5.3.3 Major industrial complex
5.3.4 Bulk grain storage
5.3.5 Abattoirs
5.3.6 Oil refinery
5.3.7 Sawmill
5.3.8 Abandoned manufacturing and industrial
5.4.0 Residential and farm infrastructure
5.4.1 Urban residential
5.9.1 Effluent pond
5.9.2 Landfill
5.9.3 Solid garbage
5.9.4 Incinerators
6.4.0 Channel/aqueduct
6.4.2 Drainage channel/aqueduct