



Updating BioNet plant community types: PCT master list C2.0 (2023)

Department of Planning and Environment

Acknowledgement of Country

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

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Cover photo: River, South East Forests National Park.
John Spencer/DPE

Published by:

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ISBN 978-1-923132-45-0

EHG 2023/0379

December 2023

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1. Introduction

1.1 Purpose

This report presents the summary of changes arising from release of the first update of the NSW plant community type (PCT) master list under the Integrated BioNet Vegetation Data (IBVD) program. The purpose of the update cycle is to regularly improve the PCT master list by responding to user feedback, augmenting the list with new types where evidenced by new data, boosting confidence in the robustness of existing types, and/or removing low confidence types no longer evidenced by data. It also aims to ensure that PCT data, PCT associations with threatened ecological communities (TECs), and related biodiversity attributes are current and remain suitable for dependent land management and land-use decision applications including the Biodiversity Offsets Scheme.

1.2 Background

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. A master typology of PCTs in New South Wales is defined in BioNet and known as the 'PCT master list'.

In June 2022 the IBVD program released the first fully integrated version of the PCT master list and State Vegetation Type Map (SVTM). That release (version C1.1) included major revisions to PCTs for eastern New South Wales (see DPE 2022a, 2022b, 2022c). Version C1.1 introduced a plot-based and data-driven 'quantitative' PCT typology for the coast and tablelands bioregions, replacing the regionally-sourced PCTs in operation between 2011 and 2022. Version C1.1 did not amend the PCTs in western New South Wales.

The update summarised in this report is PCT master list version C2.0, released in December 2023.

1.3 Bioregional study areas

A major revision of PCTs is progressing from east to west (see DPE 2022a, 2022b) and is being managed in 3 broad bioregional study areas (Figure 1).

'Coast and tablelands bioregions' include the Australian Alps, New England Tablelands, NSW North Coast, South East Corner, South Eastern Highlands, South Eastern Queensland and Sydney Basin IBRA v7 bioregions (DAWE 2021). New 'quantitative' PCTs covering this area were published in June 2022 in version C1.1. The 2023 updates for this area are the focus of this report.

'Western slopes bioregions' comprise the Brigalow Belt South, Nandewar and NSW South Western Slopes IBRA v7 bioregions. PCTs across this area are currently being reviewed as part of the IBVD program, with quantitative PCTs scheduled to replace the existing qualitative PCTs in a subsequent version of the PCT master list.

'Western bioregions' cover the remainder of New South Wales. Qualitative PCTs currently apply in this area. A survey program is underway to collect new standard floristic survey plot data to support future revisions in this region, however no revision timetable is in place at this stage. In the meantime, qualitative PCTs across this area may be subject to minor updates in response to user feedback.

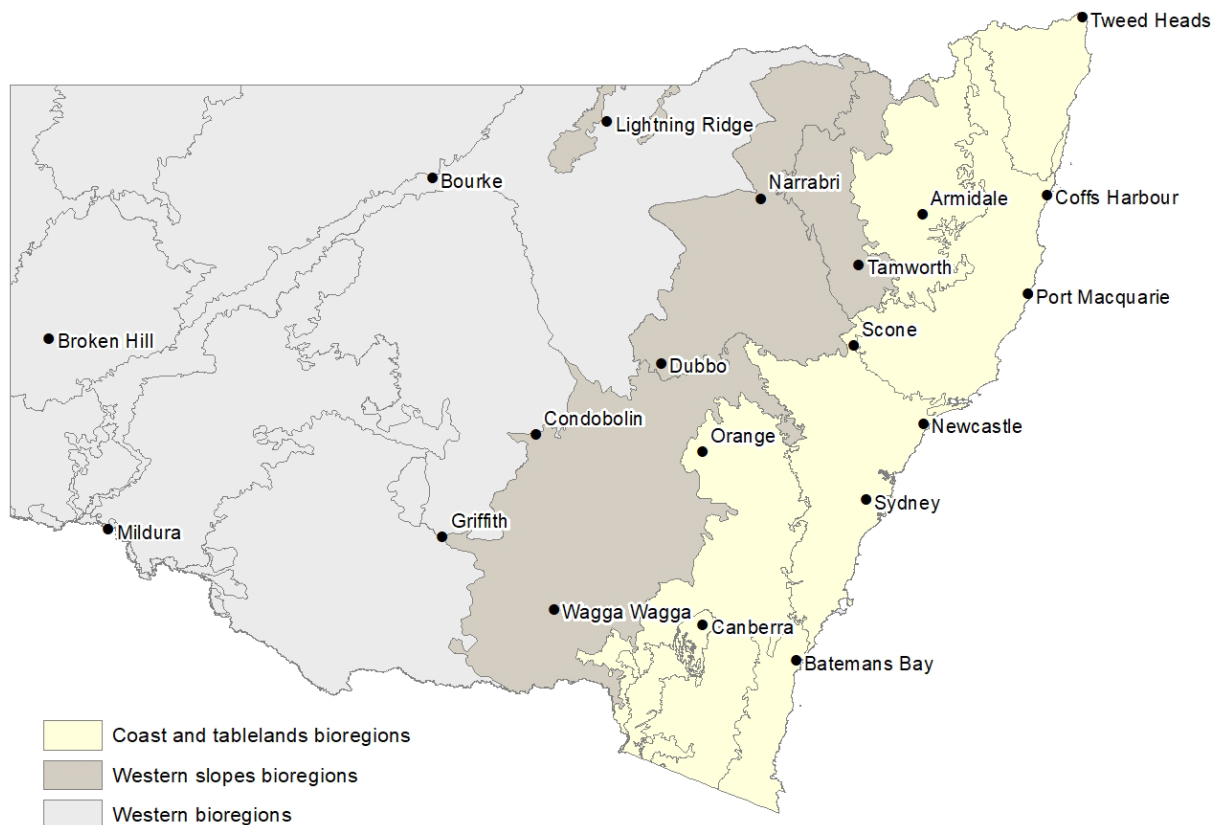


Figure 1 NSW plant community type bioregional study areas

1.4 BioNet data repositories

PCT data is held in the BioNet biodiversity data repository. For quantitative PCTs data is available to the public in 2 applications, as described in DPE 2022c and summarised in Table 1. Most PCT data is also accessible in machine readable form via the BioNet web services.

Table 1 PCT data in BioNet for quantitative PCTs

BioNet application name	PCT information held
Flora surveys module of the BioNet Atlas application	PCT identification number (PCT ID)
	PCT name
	Vegetation class
	Authority
	Classification type
	Plot membership (site and replicate)

BioNet application name	PCT information held
	Floristic, environmental and geospatial data for member plots (species composition, IBRA region and subregion, local government area (LGA), environmental variables) PCT classification taxonomic assignment file
BioNet Vegetation Classification public application	References and profile source Vegetation description Species summary data Median native species richness per plot Environmental summary data Spatial summary data Number of member plots (replicates) Classification confidence level Associations with TECs Percent cleared data Vegetation condition benchmark data Lineage information

2. Review of PCT master list C1.1

2.1 Coast and tablelands bioregions

2.1.1 Audit of new plot data

Standard floristic survey plot data added to the Flora surveys module of BioNet Atlas are the basis for the systematic evaluation of quantitative PCTs in the PCT master list. For this update (C2.0) all floristic survey plot data added to the Flora surveys module since September 2019 were reviewed. Each plot was categorised as one of 9 data types (see Table 1 in DPE 2022b) based on attributes including completeness of the floristic inventory, size of the sample search area, and species importance scoring method. This categorisation determined whether the plot would be included in the updated classification analysis dataset. Plots were included if they were:

- located within the coast and tablelands bioregions
- a 'standard floristic survey plot' or 'alternative CA plot' according to the definitions in Table 1 of DPE 2022b
- not characterised by a high proportion of plant identifications unresolved beyond genus level
- not characterised by a high proportion or cover of exotic species.

In total, 2,425 plots were considered suitable for addition to the classification analysis dataset. The distribution of these plots is shown in Figure 2.

2.1.2 Incorporation of new plot data

The incorporation of the large block of new plot data into the quantitative PCT classification proceeded as a round of plot addition, assignment and review using the process described in DPE 2022b. Following update of the taxonomic treatment (see Section 2.1.4 below), a revised classification analysis data matrix, including new plots, was exported from the Flora surveys module of BioNet Atlas. C1.1 PCT plot memberships were used to generate 'centroid' definitions for all C1.1 quantitative PCTs. 'Distance to centroid' values were then calculated for every plot against all quantitative PCTs, and the 10 closest-match PCTs were tabulated for each plot.

Plot locations were populated with 3 environmental predictor variables equivalent to those held in the Flora surveys module of BioNet Atlas: elevation (metres above sea level), annual rainfall (millimetres) and annual mean temperature (degrees Celsius). This generated a matrix of environmental values for all plots. A tabulation of each plot's fit with the environmental domain of each of its 10 closest-match PCTs was then generated, with each plot summarised as 'below', 'within' or 'above' each PCT's typical range, mirroring the method used in the Plot to PCT Assignment Tool.

All new plots were then reviewed against C1.1 quantitative PCTs using the standardised workflow and membership rules developed during the C1.1 classification (DPE 2022b). The review process applied distance to centroid values, environmental fit, PCT group

metrics (species summary, median distance to centroid, median species richness), plot information (species richness, observer, proportions of native and exotic species, census notes) and spatial data for plots and PCTs. Plots were reviewed in groups based on closest centroid, and individual plot assignments to PCT followed the same distance to centroid threshold value of 0.695 (Bray–Curtis dissimilarity) applied for the C1.1 classification, with categorisation of each plot as either Primary member plot, Secondary member plot, unresolved or excluded.

New plots had been added to the classification analysis set from targeted sampling of spatial and environmental gaps in coverage of previous standard floristic plot data, and so potentially included previously unsampled vegetation types. A subset of new plots were not within distance to centroid threshold to any C1.1 PCT, and were examined for potential genesis of new PCTs following the process described in DPE 2022b. A small number of new groups were accepted using this method (see Section 3).

Following initial assignment of all new plots to PCTs (C1.1 PCTs or new PCTs), Primary member plots were used to recalculate centroids, and then distance to centroid values for all plots, followed by another iteration of plot review. Group review processes were then applied including group accuracy and reliability, and final spatial checks. New PCTs were given unique PCT IDs and PCT names and assigned to vegetation class and vegetation formation following the processes outlined in DPE 2022b.

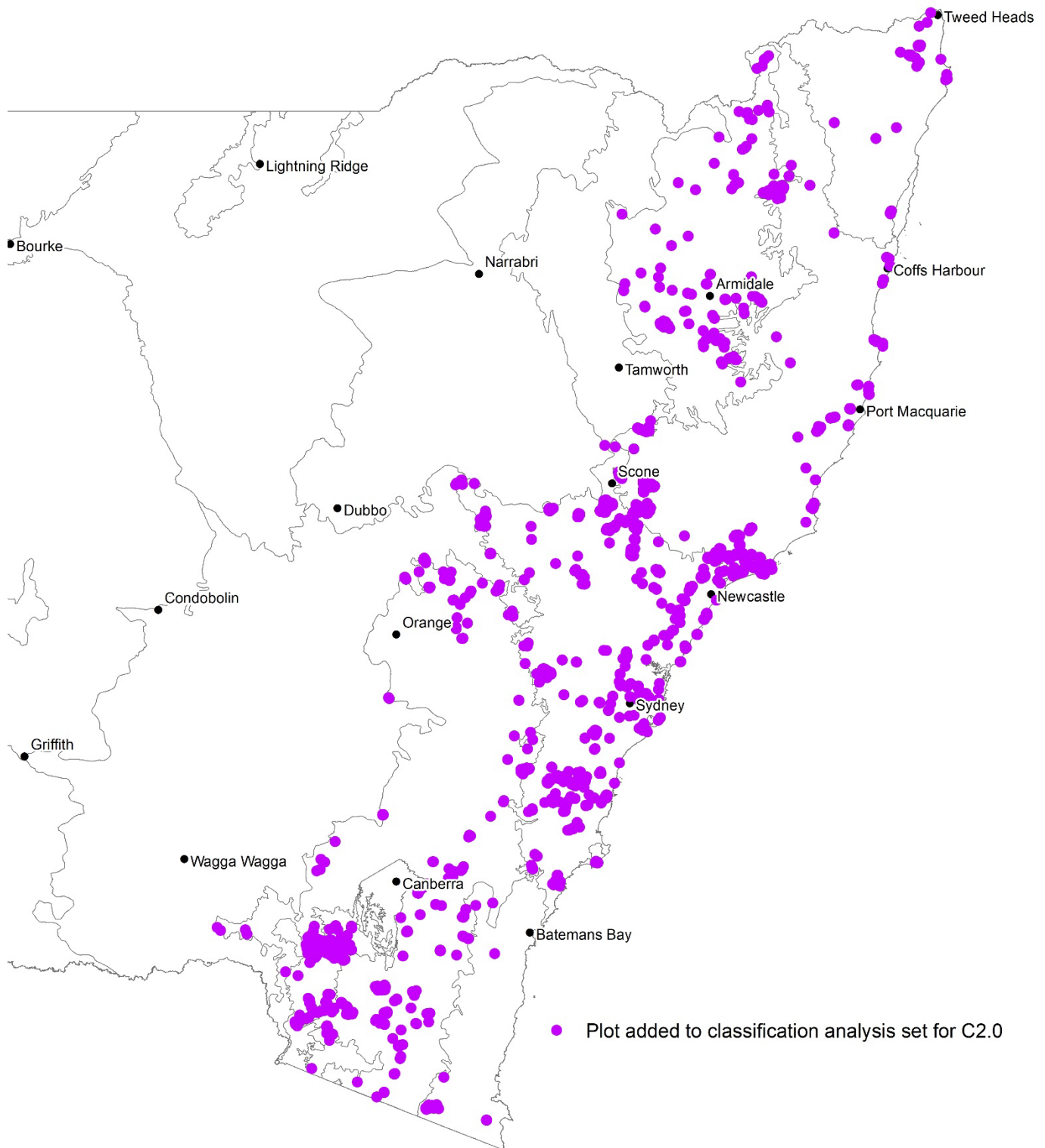


Figure 2 Distribution of standard floristic survey plots added to the classification analysis set for C2.0, coast and tablelands bioregions

2.1.3 Revision of C1.1 plot membership and PCT data

During review processes for new plots, a subset of previous C1.1 plot memberships and PCT data were also reviewed. This review targeted issues raised by user feedback since C1.1 release (see Section 2.1.5 below), and PCTs with group membership amended by 10% or more following assignment of new plots. Systematic review of each user feedback issue followed the principles and conventions for quantitative PCTs outlined in DPE 2022b and DPE 2022c. Review of plot membership for groups augmented by new plots followed the processes described above.

Following completion of revised plot assignments, systematic checks of PCT-level data were undertaken to identify any updates required due to amended plot membership. This included review of a subset of PCT names, vegetation descriptions and classification confidence level. Where updates were necessary, these followed the rules and conventions for quantitative PCTs outlined in DPE 2022b and DPE 2022c.

After finalising the C2.0 plot assignments, all of the quantitative PCT data that is automatically generated from member plots was updated to reflect the C2.0 plot membership, specifically: the list of replicates and the number of Primary and Secondary replicates; IBRA bioregions and subregions; LGAs; maximum, minimum and median elevation, annual rainfall and annual mean temperature; median native species richness per plot; species by growth form group data (also see Section 2.1.4 below).

2.1.4 Taxonomic changes

A review of changes to plant species nomenclature within the analysis set is undertaken periodically or when the addition of new plots requires a revised taxonomic treatment for data analysis. For this version C2.0 the addition of 2,425 new plots to the classification analysis dataset necessitated a review of taxonomic names across the analysis set. Given the passage of time since the taxonomic review undertaken for C1.1, with potential for changes to nomenclature by plant taxonomists over that time, there was also a need to review the taxonomic treatment to be applied during export of plot floristic data from BioNet Atlas.

This review followed the process described in DPE 2022b, and produced a revised taxonomic treatment that was applied during export of the 2023 classification analysis set. Appendix A lists the taxonomic names for which taxonomic treatment *changed* from C1.1 to C2.0.

The C2.0 'PCT classification taxonomic assignment' was loaded to the Flora surveys module of BioNet Atlas and is available for users to export standard floristic plot data for use in the Plot to PCT Assignment Tool.

2.1.5 User feedback

Users submit comments and feedback on the PCT master list and data via the BioNet mailbox. Comments are compiled in a log then assessed and incorporated into the update cycle of classification data, as appropriate. A summary of the types of comments received on quantitative PCTs in version C1.1 is presented in Table 2.

Table 2 Summary of feedback on C1.1, coast and tablelands bioregions

Type of feedback	Approx. no. of incidences	Action taken for C2.0
Plot location or plot assignment query	15	Plot locations corrected Plot assignments re-examined during incorporation of new plot data, and either left in place or reassigned in accordance with plot classification metrics and rules
Comment on PCT vegetation description	7	Text errors corrected
Query on PCT-TEC association	6	Associations reviewed and either left in place or changed in accordance with TEC interpretation principles and metrics (see DPE 2022c)
Query on PCT name	1	PCT name reviewed but left unchanged in accordance with PCT naming conventions (see DPE 2022c)
Query on PCT vegetation class	1	Vegetation class reviewed but left unchanged in accordance with the protocol for assigning vegetation class (see DPE 2022c)
Query on PCT legacy relationships	2	PCT lineage updated for C2.0

2.2 Western slopes bioregions and western bioregions

2.2.1 User feedback

Users submit comments and feedback on the PCT master list and data via the BioNet mailbox. Comments are compiled in a log then assessed and incorporated into the update cycle of classification data, as appropriate. A summary of comments received on qualitative PCTs in version C1.1 is presented in Table 3.

Table 3 Summary of feedback on C1.1, western slopes and western bioregions

Type of feedback	Number of incidences	Action taken for C2.0
Comment on PCT vegetation description	1	Minor text error corrected (PCT 171)
Query on PCT vegetation class	1	Vegetation class reviewed and changed (PCT 101)

3. Amendment of PCTs – coast and tablelands bioregions

3.1 Changes to C1.1 quantitative plant community types

3.1.1 PCT plot membership

The addition of new plots to the classification analysis set has improved the circumscription and the accuracy of floristic, spatial and environmental data for 416 quantitative PCTs.

Of the new and previously unassigned plots added to the classification analysis set:

- 2,004 plots were assigned to an approved C1.1 quantitative PCT
- 40 plots were assigned to a new C2.0 quantitative PCT (see Section 3.2 below)
- 1 plot was assigned to a quantitative PCT previously only recorded in the western slopes bioregions (see Section 3.2 below).

Of the existing plots that had been assigned to a quantitative PCT in version C1.1, 37,366 plots have unchanged PCT assignments in C2.0 (99.5% of classified plots in the coast and tablelands bioregions). A small subset of these (105 plots) retained the same PCT ID assignment but had a change in PCT assignment category (from Primary to Secondary or vice versa). A total of 141 plots had their assignment changed from one quantitative PCT to another quantitative PCT, while 33 plots were removed from a quantitative PCT assignment with no reassignment (see Appendix B). These included plots with georeferencing or assignment errors that were unable to be resolved, and weak plots used to define placeholder types that were replaced by new survey effort.

3.1.2 PCT name

The PCT name was edited for 9 PCTs, as shown in Table 4. Four of these amendments were made because of taxonomic changes to genus names (see Section 2.1.4) – PCT IDs 3084, 3959, 3968, 3969. Five of the changes were corrections to better reflect the topographic position, frequent species in the tallest stratum, or vegetation structure of the PCT, in accordance with the PCT name convention described in Section 5.2.4 of DPE 2022c – PCT IDs 3396, 3397, 3743, 4015, 4023.

Table 4 PCT name changes from C1.1 to C2.0

PCT ID	PCT name C1.1	PCT name C2.0
3084	Lower North Choricarpia Wet Forest	Lower North Brown Myrtle Wet Forest
3396	Northwest Flats Box-Blakelys Red Gum Forest	Northwest Slopes Box-Blakelys Red Gum Woodland
3397	Northwest Flats Yellow Box Woodland	Northwest Yellow Box Grassy Woodland
3743	Monaro Ranges Sheltered Shrub Forest	Monaro Ranges Exposed Shrub Forest
3959	Coast Sands Baumea articulata Sedgeland	Coast Sands Jointed Twig-rush Sedgeland

PCT ID	PCT name C1.1	PCT name C2.0
3968	Northern Sands Baloskion-Baumea Wetland	Northern Sands Baloskion-Machaerina Wetland
3969	Northern Sands Baumea-Eleocharis Sedgeland	Northern Sands Machaerina-Eleocharis Sedgeland
4015	Central Hunter Swamp Oak Riparian Forest	Central Hunter Riparian Forest
4023	Coastal Valleys Swamp Oak Riparian Forest	Coastal Valleys Riparian Forest

3.1.3 Vegetation class and formation

No changes were made to the assigned vegetation class or vegetation formation for C1.1 approved PCTs in the coast and tablelands bioregions.

3.1.4 Vegetation description

Edits to PCT ‘vegetation description’ are made when changes to plot membership amend the spatial, floristic or environmental attributes of quantitative PCTs. They also occur where users seek clarification or refinement on particular attributes. Changes were made to the text of 120 PCTs, resulting in refinement of the description of geographic extent, environmental variable limits, floristic composition and structural features, and substrate characteristics.

In addition, updates were made to the taxonomic names of species included in the vegetation description text of 189 quantitative PCTs, in accordance with the revised taxonomic treatment described in Section 2.1.4.

3.1.5 Species summary data

Quantitative PCT species summary data (‘species by growth form group’ lists and ‘median native species richness per plot’) are updated in response to changes in plot membership (addition or removal of plots). This resulted in minor changes to approximately 400 PCTs for C2.0.

In addition, updates were made to the taxonomic names of species in the ‘species by growth form group’ lists for quantitative PCTs, in accordance with the revised taxonomic treatment described in Section 2.1.4.

3.1.6 Environmental and spatial summary data

Quantitative PCT environmental and spatial summary data are updated in response to changes in plot membership. The changes for each PCT are outlined in Appendix C. In summary:

- 200 C1.1 quantitative approved PCTs had a minor change to minimum and/or maximum values for elevation, average annual rainfall and/or annual mean temperature
- 80 C1.1 quantitative approved PCTs had a change to IBRA subregion of which 17 also had a change to IBRA bioregion

- 81 C1.1 quantitative approved PCTs had a change to the LGA in which they are known to occur.

Spatial summary data is also updated if there are changes in the underlying spatial data themselves. Between C1.1 and C2.0 updates were made to LGA names in BioNet. These LGA name updates were adopted into the PCT data for this release.

3.1.7 Classification confidence level

The 5-class categorisation of ‘classification confidence level’ used for quantitative PCTs is described in Section 5.3.8 of DPE 2022c.

The addition of new plots to the classification analysis set has improved the classification confidence level of 11 PCTs, from Very Low (placeholder PCTs) to either High or Very High (see Appendix C).

One PCT was corrected from a Low to a Very Low classification confidence level.

3.2 Newly approved plant community types

The addition of new plot data to the classification analysis set resulted in the addition of 9 approved PCTs to the PCT master list:

- 3 PCTs represent replacements of qualitative PCTs with quantitative PCTs, as these types were targeted in standard floristic plot surveys and now have data to describe them quantitatively
- 6 PCTs are types not previously approved in the PCT master list, meaning the new plot data has increased the comprehensiveness of the NSW PCT typology.

Table 5 PCTs added to the approved PCT master list for version C2.0

PCT ID	PCT name	Notes
3014	Liverpool Range Daphnandra Rainforest	PCT changing from Draft-working to Approved as new plot sampling has confirmed occurrence in the coast and tablelands bioregions. Related to PCT 845 in the western slopes bioregions
4157	Hunter Escarpment Footslopes Singleton Mallee	New PCT described from new plots sampling rare mallees in the Hunter Valley (Bell 2019)
4158	Hunter Escarpment Pokolbin Ironbark Woodland	New PCT described from new plots sampling rare mallees in the Hunter Valley (Bell 2019)
4159	Nightcap Rhyolite Rocky Red Gum Woodland	New PCT described from new plots undertaken in Nightcap National Park
4160	Mid North Conglomerate Blackbutt Shrub Forest	New plots in previously unsampled environments support the replacement of qualitative PCT 2247 with quantitative PCT 4160

PCT ID	PCT name	Notes
4161	Mid North Stringybark-Turpentine Shrub Forest	New plots in previously unsampled environments support the replacement of qualitative PCT 2250 with quantitative PCT 4161
4163	Mount Gibraltar Melaleuca Heath	New PCT described from new plots in previously unsampled areas
4162	Elderslie Banksia Scrub	New plots in previously unsampled TEC of the same name support the replacement of qualitative PCT 774 with quantitative PCT 4162
4164	New England Peppermint Swamp Margin Woodland	New PCT described from new plots

3.3 Newly decommissioned plant community types

New standard floristic plot surveys were undertaken in qualitative PCTs in the coast and tablelands bioregions, as well as a placeholder quantitative PCT. The addition of this new plot data to the classification analysis set has resulted in 4 PCTs being decommissioned:

- 3 qualitative PCTs were replaced by quantitative PCTs
- 1 Very Low classification confidence level (placeholder) quantitative PCT was merged into a Very High classification confidence level quantitative PCT.

Table 6 PCTs decommissioned from the PCT master list for version C2.0

PCT ID	PCT name	Notes
774	Coast Banksia scrub on sand in the Elderslie area, Sydney Basin Bioregion	New plots support the replacement of qualitative PCT 774 with quantitative PCT 4162
2247	Large-fruited Blackbutt shrubby open forest on conglomerates of the Broken Bago Range near Wauchope on the Mid North Coast, NSW North Coast Bioregion	New plots support the replacement of qualitative PCT 2247 with quantitative PCT 4160
2250	Blue-leaved Stringybark open forest on exposed sites in the Macleay-Hastings region, NSW North Coast Bioregion	New plots support the replacement of qualitative PCT 2250 with quantitative PCT 4161
3128	Mid North Littoral Rainforest	New standard floristic plot surveys were undertaken in this placeholder PCT to understand its relationship to other littoral rainforests. Addition of the new plots to the classification analysis set

PCT ID	PCT name	Notes
		resolved that the placeholder was not a distinct community. The type has been merged into PCT 3129

4. Amendment of PCTs – western slopes bioregions and western bioregions

4.1.1 PCT name

No changes were made to PCT names in the western slopes bioregions or western bioregions.

4.1.2 Vegetation class and formation

The vegetation class and vegetation formation was changed for one PCT. The vegetation class assignment of PCT 101 was changed from Brigalow Clay Plain Woodlands to Floodplain Transition Woodlands, and accordingly the vegetation formation was changed from Semi-arid Woodlands (Grassy sub-formation) to Grassy Woodlands.

4.1.3 Vegetation description

One minor edit was made to PCT 171 to correct the bioregion name. In addition, minor edits were made to the vegetation description for PCTs 301, 320, 343, 416, 2068, 2079 and 2101 to remove non-standard characters.

4.1.4 Species summary data

No changes were made to species summary data for qualitative PCTs.

4.1.5 Environment and spatial summary data

No changes were made to environmental and spatial summary data for qualitative PCTs, other than the adoption of revised LGA names in BioNet.

4.1.6 Classification confidence level

No changes were made to classification confidence level for qualitative PCTs.

5. PCT master list C2.0

Following the above revisions, there are a total of 1,846 approved PCTs in PCT master list C2.0, as maintained in the BioNet Vegetation Classification application. This includes:

- 1,075 quantitative PCTs
- 771 qualitative PCTs. These primarily occur in the western and western slopes bioregions, with just 4 qualitative PCTs remaining in the coast and tablelands bioregions.

The approved PCTs in PCT master list C2.0 are tabulated in Appendix C.

6. Threatened ecological communities

Threatened ecological communities (TECs) are listed under either the NSW *Biodiversity Conservation Act 2016* (BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The PCT update cycle aims to identify changes to TEC listings (new listings, revised listings and de-listings) since the previous release and update the PCT–TEC association data in BioNet. The PCT–TEC associations available in the Vegetation Classification public application are source data for the BioNet Atlas Threatened Biodiversity Data Collection and the Biodiversity Assessment Method Calculator (BAM-C) that underpins components of the Biodiversity Offsets Scheme.

6.1 Commonwealth TECs

There have been 10 new or revised EPBC Act listings of TECs in New South Wales between 1 July 2021 and 31 August 2023 inclusive (Table 7). This includes 9 relating to coast and tablelands bioregions and one relating to western bioregions.

A total of 51 EPBC Act TECs are now associated with C2.0 approved PCTs in New South Wales.

Table 7 Summary of Commonwealth TEC listings since DPE 2022c

TEC name	In effect from date
Araluen Scarp Grassy Forest	22/04/2022
Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest	5/10/2022
Brogo Vine Forest of the South East Corner Bioregion	22/04/2022
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	8/12/2021
Dunn's white gum (<i>Eucalyptus dunnii</i>) moist forest in north-east New South Wales and south-east Queensland	11/08/2022
Eastern Suburbs Banksia Scrub of the Sydney Region [revised]	8/12/2021
Grey box-grey gum wet forest of subtropical eastern Australia	11/08/2022
Mallee Bird Community of the Murray Darling Depression Bioregion	7/12/2021
Mount Kaputar land snail and slug community	5/10/2022
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	5/10/2022

6.2 NSW TECs

There were no new or revised BC Act listings of TECs between 1 July 2021 and 31 August 2023 inclusive.

A total of 109 BC Act TECs are now associated with C2.0 approved PCTs, which excludes TECs listed for Lord Howe Island.

6.3 Relationships to plant community types

DPE 2022c describes the method for assessing relationships between TECs and approved PCTs. C1.1 included associations to TECs listed as at 30 June 2021. The same method of TEC assessment was applied for C2.0 to:

- assess all C2.0 approved PCTs against TEC listings published between 1 July 2021 and 31 August 2023, inclusive
- assess the 9 newly approved PCTs against all TECs listed as at 31 August 2023
- review the C1.1 PCT–TEC associations based on C2.0 PCT data to check for any changes in relationships arising from PCT amendments, including those based on user feedback.

6.3.1 New or revised TECs

A total of 67 PCTs were found to be related to the 9 new Commonwealth TECs, including 17 qualitative PCTs from western slopes and western bioregions, and 50 quantitative PCTs from coast and tablelands bioregions. These numbers are dominated by the associations with the 2 new Commonwealth coastal floodplain TECs, for which Conservation Advice documents directly link these TECs to 38 C2.0 quantitative approved PCTs.

The revised listing of Eastern Suburbs Banksia Scrub of the Sydney Basin Bioregion was associated with the same PCTs as the previous listing.

6.3.2 Newly approved plant community types

Of the 9 newly approved PCTs in C2.0, 5 were found to be related to TECs. These 5 PCTs relate to 5 separate NSW TECs, and 2 of them also relate to Commonwealth TECs.

The TECs associated with the newly approved PCTs are:

- Elderslie Banksia Scrub Forest in the Sydney Basin Bioregion (NSW)
- Elderslie Banksia Scrub Forest in the Sydney Basin Bioregion (Commonwealth)
- Mount Gibraltar Forest in the Sydney Basin Bioregion (NSW)
- New England Peppermint (*Eucalyptus nova-anglica*) Woodland on Basalts and Sediments in the New England Tableland Bioregion (NSW)
- New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands (Commonwealth)
- Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin Bioregion (NSW)
- Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions (NSW).

6.3.3 Revised associations

Review of PCT–TEC associations resulted in minor amendments for some TECs to the set of PCTs associated with the TEC or the qualifying statements that guide the

relationship (the ‘TEC Comment’). Table 8 summarises the amendments made to PCT–TEC associations for C2.0.

Table 8 Amendments made to C1.1 PCT–TEC associations

TEC	Change
White Box - Yellow Box - Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (NSW)	Minor edit to TEC Comment for PCT 3359 regarding tree species dominance
White Box-Yellow Box-Blakely’s Red Gum Grassy Woodland and Derived Native Grassland (Commonwealth)	Minor edit to TEC Comment for PCT 3359 regarding tree species dominance
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (NSW)	Two additional PCT associations added (3959 and 3961)
Sydney Freshwater Wetlands in the Sydney Basin Bioregion (NSW)	Minor edit to TEC Comment for PCT 3997 due to expanded distribution with addition of new plots Minor edits to TEC Comments for PCTs 3959 and 3961 to reflect association with 2 TECs
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	One PCT association removed (101)
Mount Kaputar high elevation and dry rainforest land snail and slug community in the Nandewar and Brigalow Belt South Bioregions	One additional PCT association added (1166)
Elderslie Banksia Scrub Forest (NSW)	Two additional PCT associations added (3145 and 4025)
Elderslie Banksia Scrub Forest (Commonwealth)	Two additional PCT associations added (3145 and 4025)

6.4 Update of non-standard characters in TEC names and TEC comments in BioNet

A subset of the names by which TECs are listed use extended ASCII characters that cause problems in BioNet. This includes TEC names with an em dash (—) or a smart/curly apostrophe (’), which when exported from BioNet convert to different characters that are problematic in the web services and confusing for users. To address one of these issues, 5 TEC names were updated in BioNet to replace the em dash with a

hyphen (Table 9). Problems associated with use of smart/curly apostrophes will be addressed in a future release.

Table 9 TEC names updated in BioNet to remove problematic characters

Act	Previous TEC name	Updated TEC name released with C2.0
BC Act	Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion	Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion
BC Act	Grey Box – Grey Gum Wet Sclerophyll Forest in the NSW North Coast Bioregion	Grey Box-Grey Gum Wet Sclerophyll Forest in the NSW North Coast Bioregion
BC Act	Porcupine Grass – Red Mallee – Gum Coolabah hummock grassland/low sparse woodland in the Broken Hill Complex Bioregion	Porcupine Grass-Red Mallee-Gum Coolabah hummock grassland/low sparse woodland in the Broken Hill Complex Bioregion
BC Act	Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions
BC Act	Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions

Particular non-standard characters included in the TEC comments field for some PCTs are also problematic in BioNet and for users. To address this a subset of TEC comments were edited in the BioNet Vegetation Classification application to remove the problematic or corrupted characters.

7. References

Bell SJ (2019) *Baseline surveys for two threatened mallees (Eucalyptus castrensis and Eucalyptus pumila) in the lower Hunter Valley of New South Wales*, a technical report to NSW Department of Planning, Industry and Environment, Newcastle.

DAWE (Department of Agriculture, Water and the Environment) (2021) *Australia's bioregions (IBRA)*, version 7.0, Australian Department of Agriculture, Water and the Environment, Canberra, ACT, www.environment.gov.au/land/nrs/science/ibra

DPE (Department of Planning and Environment) (2022a) *Evaluation of BioNet Plant Community Types (2018) of Eastern New South Wales*, NSW Department of Planning and Environment, Parramatta.

DPE (2022b) *A Revised Classification of Plant Communities of Eastern New South Wales*, NSW Department of Planning and Environment, Parramatta.

DPE (2022c) *Updating BioNet Plant Community Types: Eastern New South Wales PCT Classification Version 1.1 (2022)*, NSW Department of Planning and Environment, Parramatta.

Sivertsen D (2009) *Native Vegetation Interim Type Standard*, Department of Environment, Climate Change and Water NSW, Sydney.

8. Glossary

Term	Definition
BioNet	The NSW biodiversity data repository administered by the Department of Planning and Environment (the department)
BioNet Vegetation Classification public application	The application (user interface) where public users can access the PCT master list and PCT summary data
BioNet Vegetation Classification edit application	The application (user interface) where department staff undertake edits to the PCT master list and PCT data. PCT data is published from the edit application to the public application
Flora surveys module of the BioNet Atlas application	The application (user interface) where users can access and edit flora survey data in the Systematic Surveys data collection
PCT	Plant community type. The finest level of classification in the NSW vegetation classification hierarchy
PCT master list	The cumulative set of PCTs in the BioNet Vegetation Classification applications, including 'PCT definition status' of Approved, Draft-Working, Decommissioned
quantitative PCT	A quantitative PCT in the BioNet Vegetation Classification public application. A quantitative PCT has its plot membership defined in the Flora surveys module of the BioNet Atlas application. PCT profile data is based on the data of member plots. Quantitative PCTs are distinguished by having a PCT ID above 3000
qualitative PCT	A qualitative PCT in the BioNet Vegetation Classification public application. Qualitative PCTs have been determined from a wide range of sources and methods, but do not have plot membership defined in the Flora surveys module of the BioNet Atlas application. Qualitative PCTs are distinguished by having a PCT ID below 3000
standard floristic survey plot	A plot that represents a search of a bounded area, usually in the range of 400–1,000 m ² , within which all vascular plants are identified to the finest taxonomic level possible, with standardised estimates made of the abundance and projected foliage cover of each taxon present, and where those estimates can be reliably converted to a common cover–abundance scale of modified Braun-Blanquet (BB) cover–abundance 1–6. This includes plots that follow the survey standards defined by Sivertsen (2009)
member plot	A plot that is assigned to a quantitative PCT in BioNet

Term	Definition
Primary member plot	A plot that has a distance to centroid value to its member group/PCT of 0.695 or less. These plots are entered into BioNet with a 'PCT assignment category' of Primary. An exception is non-woody freshwater wetland groups, some of which include some Primary member plots that have greater than 0.695 distance to centroid value to their member group
Secondary member plot	A plot that has a distance to centroid value to its member group/PCT of greater than 0.695. These plots are entered into BioNet with a 'PCT assignment category' of Secondary
distance to centroid	A measure of the floristic difference between a plot and the central value or 'centroid' of the member plots (reference sites) that define a quantitative PCT
coast and tablelands bioregions	Parts of New South Wales that fall within one of the following 7 IBRA v7 bioregions (DAWE 2021): the Australian Alps, New England Tablelands, NSW North Coast, South East Corner, South Eastern Highlands, South Eastern Queensland, Sydney Basin
western slopes bioregions	Parts of New South Wales that fall within one of the following 3 IBRA v7 bioregions (DAWE 2021): Brigalow Belt South, Nandewar and NSW South Western Slopes
western bioregions	Parts of New South Wales that do not fall within the 'coast and tablelands bioregions' or the 'western slopes bioregions'
PCT master list C1.1	The PCT classification published in BioNet in June 2022
PCT master list C2.0	The PCT classification published in BioNet in December 2023

Appendix A: List of taxonomic names for which taxonomic treatment changed from C1.1 to C2.0

This table lists assigned taxonomic names from the C1.1 taxon assignment file for which treatment was modified in some way in the C2.0 taxon assignment file.

Taxonomic names were updated for quantitative PCT data in C2.0 (vegetation description and species by growth form group lists), not for qualitative PCTs.

Name in C1.1	Name in C2.0
<i>Acaena</i> sp. A	<i>Acaena</i> sp. Thredbo River Gorge
<i>Alania endlicheri</i>	<i>Alania cunninghamii</i>
<i>Arthropodium</i> sp. A	<i>Arthropodium</i> sp. Snowy R. catchment
<i>Arthropodium</i> sp. B	<i>Arthropodium</i> sp. South-east Highlands
<i>Baumea acuta</i>	<i>Machaerina acuta</i>
<i>Baumea arthropphylla</i>	<i>Machaerina arthropphylla</i>
<i>Baumea articulata</i>	<i>Machaerina articulata</i>
<i>Baumea gunnii</i>	<i>Machaerina gunnii</i>
<i>Baumea johnsonii</i>	<i>Machaerina johnsonii</i>
<i>Baumea juncea</i>	<i>Machaerina juncea</i>
<i>Baumea muelleri</i>	<i>Machaerina muelleri</i>
<i>Baumea nuda</i>	<i>Machaerina nuda</i>
<i>Baumea planifolia</i>	<i>Machaerina planifolia</i>
<i>Baumea rubiginosa</i>	<i>Machaerina rubiginosa</i>
<i>Baumea teretifolia</i>	<i>Machaerina teretifolia</i>
<i>Baumea tetragona</i>	<i>Machaerina tetragona</i>
<i>Blechnum neohollandicum</i>	<i>Doodia aspera</i>
<i>Caldcluvia paniculosa</i>	<i>Ackama paniculosa</i>
<i>Carex austroflaccida</i>	<i>Carex flaccida</i>
<i>Cassinia adunca</i>	<i>Cassinia heleniae</i>
<i>Cassinia theodori</i>	<i>Cassinia theodori</i>
<i>Centratherum australianum</i>	<i>Centratherum riparium</i>
<i>Chamaesyce dallachyana</i>	<i>Euphorbia dallachyana</i>

Name in C1.1	Name in C2.0
<i>Chamaesyce drummondii</i>	<i>Euphorbia drummondii</i>
<i>Chamaesyce macgillivrayi</i>	<i>Euphorbia bifida</i>
<i>Chamaesyce</i> sp. A	<i>Euphorbia papillifolia</i>
<i>Chamaesyce</i> sp. B	<i>Euphorbia inappendiculata</i> var. <i>queenslandica</i>
<i>Chenopodium carinatum</i>	<i>Dysphania carinata</i>
<i>Chenopodium cristatum</i>	<i>Dysphania cristata</i>
<i>Chenopodium melanocarpum</i>	<i>Dysphania melanocarpa</i>
<i>Chionohebe densifolia</i>	<i>Veronica densifolia</i>
<i>Choricarpia leptopetala</i>	<i>Backhousia leptopetala</i>
<i>Convolvulus erubescens</i>	<i>Convolvulus angustissimus</i>
<i>Convolvulus erubescens</i>	<i>Convolvulus clementii</i>
<i>Convolvulus erubescens</i>	<i>Convolvulus recurvatus</i> subsp. <i>recurvatus</i>
<i>Convolvulus erubescens</i>	<i>Convolvulus remotus</i>
<i>Cucumis melo</i> subsp. <i>agrestis</i>	<i>Cucumis melo</i>
<i>Cyphanthera albicans</i> subsp. <i>albicans</i>	<i>Cyphanthera albicans</i>
<i>Derwentia arcuata</i>	<i>Veronica arcuata</i>
<i>Derwentia nivea</i>	<i>Veronica nivea</i>
<i>Derwentia perfoliata</i>	<i>Veronica perfoliata</i>
<i>Derwentia velutina</i>	<i>Veronica velutina</i>
<i>Desmodium brachypodium</i>	<i>Oxytes brachypoda</i>
<i>Desmodium varians</i>	<i>Desmodium gunnii</i>
<i>Dichondra</i> sp. A	<i>Dichondra</i> sp. Inglewood
<i>Dichopogon fimbriatus</i>	<i>Arthropodium fimbriatum</i>
<i>Dichopogon</i> sp. A	<i>Arthropodium</i> sp. Albury
<i>Dichopogon strictus</i>	<i>Arthropodium strictum</i>
<i>Epaltes australis</i>	<i>Sphaeromorphaea australis</i>
<i>Eriochilus petricola</i>	<i>Eriochilus cucullatus</i>
<i>Flindersia bennettiana</i>	<i>Flindersia bennettii</i>
<i>Geranium sessiliflorum</i> subsp. <i>brevicaule</i>	<i>Geranium brevicaule</i>
<i>Guioa chrysantha</i>	<i>Guioa semiglauca</i>
<i>Heritiera actinophylla</i>	<i>Argyrodendron actinophyllum</i>
<i>Heritiera trifoliolata</i>	<i>Argyrodendron trifoliolatum</i>

Name in C1.1	Name in C2.0
<i>Hibbertia cistiflora</i> subsp. <i>cistiflora</i>	<i>Hibbertia cistiflora</i>
<i>Hibbertia incana</i>	<i>Hibbertia crinita</i>
<i>Keraudrenia corollata</i>	<i>Seringia corollata</i>
<i>Keraudrenia hillii</i> var. <i>hillii</i>	<i>Seringia hillii</i>
<i>Kunzea</i> sp. 'Mt Kaputar'	<i>Kunzea occidentalis</i>
<i>Kunzea</i> sp. 'Wadbilliga'	<i>Kunzea badjaensis</i>
<i>Leptospermum namadgiensis</i>	<i>Leptospermum namadgiense</i>
<i>Melichrus</i> sp. <i>Gibberagee</i>	<i>Melichrus gibberagee</i>
<i>Mimulus prostratus</i>	<i>Elacholoma prostrata</i>
<i>Muehlenbeckia costata</i>	<i>Muehlenbeckia</i> sp. Mt Norman
<i>Oncinocalyx betchei</i>	<i>Teucrium betchei</i>
<i>Osteocarpum acropterum</i> var. <i>acropterum</i>	<i>Osteocarpum acropterum</i>
<i>Osteocarpum acropterum</i> var. <i>deminuta</i>	<i>Osteocarpum acropterum</i>
<i>Parahebe lithophila</i>	<i>Veronica lithophila</i>
<i>Persoonia acuminata</i> x <i>media</i>	<i>Persoonia acuminata</i>
<i>Persoonia fastigiata</i>	<i>Persoonia cornifolia</i>
<i>Persoonia oleoides</i>	<i>Persoonia cornifolia</i>
<i>Pimelea latifolia</i>	<i>Pimelea altior</i>
<i>Pimelea latifolia</i>	<i>Pimelea latifolia</i> subsp. <i>elliptifolia</i>
<i>Pimelea latifolia</i>	<i>Pimelea latifolia</i> subsp. <i>hirsuta</i>
<i>Pimelea latifolia</i>	<i>Pimelea latifolia</i> subsp. <i>latifolia</i>
<i>Pomaderris phyllicifolia</i> subsp. <i>ericoides</i>	<i>Pomaderris phyllicifolia</i>
<i>Pomaderris phyllicifolia</i> subsp. <i>phyllicifolia</i>	<i>Pomaderris phyllicifolia</i>
<i>Prostanthera staurophylla</i> sensu stricto	<i>Prostanthera staurophylla</i>
<i>Pterostylis</i> sp. B	<i>Pterostylis ampliata</i>
<i>Ptilotus polystachyus</i> var. <i>polystachyus</i>	<i>Ptilotus polystachyus</i>
<i>Ptilotus sessilifolius</i> var. <i>sessilifolius</i>	<i>Ptilotus sessilifolius</i>
<i>Ptilotus spathulatus</i> f. <i>spathulatus</i>	<i>Ptilotus spathulatus</i>
<i>Rupicola sprengelioides</i>	<i>Epacris sprengelioides</i>
<i>Stylidium graminifolium</i>	<i>Stylidium armeria</i> subsp. <i>armeria</i>
<i>Teucrium</i> sp. A	<i>Teucrium albicaule</i>
<i>Triglochin calcitrapa</i>	<i>Triglochin isingiana</i>

Name in C1.1	Name in C2.0
<i>Triglochin microtuberosa</i>	<i>Cycnogeton microtuberosum</i>
<i>Triglochin multifructa</i>	<i>Cycnogeton multifructum</i>
<i>Triglochin procera</i>	<i>Cycnogeton procerum</i>
<i>Wurmbea dioica</i> subsp. <i>dioica</i>	<i>Wurmbea dioica</i>
<i>Zehneria cunninghamii</i>	<i>Neoachmandra cunninghamii</i>
<i>Zygophyllum ammophilum</i>	<i>Roepera ammophila</i>
<i>Zygophyllum apiculatum</i>	<i>Roepera apiculata</i>
<i>Zygophyllum glaucum</i>	<i>Roepera glauca</i>
<i>Zygophyllum iodocarpum</i>	<i>Roepera iodocarpa</i>

Appendix B: PCT plot membership changes from C1.1 to C2.0

A list of *changes* for plots that were assigned to a quantitative PCT in C1.1 is available as a separate download here. It does not include plots that were *added* to the classification for C2.0.

Appendix C: PCT master list C2.0 and summary of PCT-level data changes from C1.1 to C2.0

A list of approved PCTs in the PCT master list C2.0 [is available as a separate download here](#). For the PCTs included, it also summarises PCT-level data changes from C1.1 to C2.0, excluding any changes to species summary data.