NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 299

Common Name: **Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes and South East Highlands Bioregions**

Scientific Name: *Eucalyptus viminalis - Eucalyptus robertsonii subsp. robertsonii - Eucalyptus bridgesiana / Acacia melanoxylon - Acacia dealbata / Pteridium esculentum - Acaena novae-zelandiae - Geranium solanderi var. solanderi - Echinopogon ovatus*

Veg. Comm. ID.: **299** ***Original Entry:*** J.S Benson 5/07/2006

Photo 1: ID299a_DX27941.jpg Ribbon Gum (Eucalyptus viminalis) - Norton's Box (Eucalyptus nortonii) tall open forest along Tumut River below Blowering Dam, [AGD66 35°24.062'S 148°13.936'E], 30/4/2006, Jaime Plaza.

Photo 2: ID299b_DX27921.jpg Ribbon Gum (Eucalyptus viminalis) - Robertson's Peppermint (Eucalyptus robertsonii) tall open forest along creek east of Tumut, [AGD66 35°23.443'S 148°13.920'E], 30/4/2006, Jaime Plaza.

Photo 3: ID299c_DX28431.jpg Riparian Ribbon Gum (Eucalyptus viminalis) - Robertson's Peppermint (Eucalyputs robertsonii) _ Apple Box (Eucalyptus bridgesiana) tall open forest on red earth soil along a creek in Bogandyera Nature Reserve, [AGD66 35°53.767'S 147°52.813'E], 4/5/2006, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus viminalis; Eucalyptus robertsonii subsp. robertsonii; Eucalyptus bridgesiana; Eucalyptus macrorhyncha.*

Shrubs/Vines/Epiphytes: *Acacia dealbata; Acacia melanoxylon; Cassinia arcuata.*

Ground Cover: *Pteridium esculentum; Acaena novae-zelandiae; Geranium solanderi var. solanderi; Echinopogon ovatus; Stellaria pungens; Poa labillardierei var. labillardierei; Acrotriche serrulata; Carex appressa; Hydrocotyle laxiflora; Dichondra repens; Cymbonotus preissianus; Elymus scaber var. scaber; Microlaena stipoides var. stipoides; Senecio tenuiflorus; Rumex brownii; Acaena echinata; Gonocarpus tetragynus; Lagenifera stipitata; Asperula conferta; Viola betonicifolia; Daucus glochidiatus; Luzula flaccida form A; Alternanthera denticulata; Polystichum proliferum; Juncus amabilis.*

Weed Species: *Rubus discolor; Anthoxanthum odoratum; Stellaria media; Hypochaeris radicata; Ligustrum sinense; Anagallis arvensis; Trifolium repens; Acetosella vulgaris; Aira elegantissima; Phalaris aquatica.*

Weediness: Medium (5-15%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Very Tall.

Vegetation Description: Very tall open forest dominated Ribbon Gum (Eucalyptus viminalis) and Robertson's Peppermint (Eucalyptus robertsonii) sometimes with Apple Box (Eucalyptus bridgesiana). The shrub layer is very sparse and commonly includes Mountain Cedar Wattle (Acacia dealbata) and Blackwood (Acacia melanoxylon). The ground cover is dense and may be dominated by Bracken Fern (Ptyridium esculentum) and contains forbs such as Acaena novae-zelandiae, Geranium solanderi var. solanderi, Stellaria pungens, Hydrocotyle laxiflora, Dichondra repens and Cymbonotus preissianus. Grasses include Echinopogon ovatus, Elymus scaber var. scaber, Microlaena stipoides var. stipoides and Poa labillardierei var. labillardierei. The rushes Juncus amabilis and Luzula flaccida and the sedge Carex appressa are often present in wet areas. Occurs on deep brown or red loam soils derived from alluvium, igneous and metamorphic rocks on valley flats and along streams in mountain landforms in the southern-most part of the Upper Slopes sub-region of the NSW South-western Slopes Bioregion and in the adjacent areas of the South Eastern Highlands Bioregion, generally between 350 and 850 m altitude. Extensively cleared throughout its range for grazing or pine plantation due to its occurrence in valleys with reasonably rich soils. Weed invasion, including by Blackberry (Rubus discolor), is a major threat in some areas.

Level of Classification: Association. ***Classification Confidence Level:*** High.

Formation Group: Eucalyptus Tall Wet Forests of the Tablelands and Western Slopes.

State Veg Map (Keith 2004): Southern Tableland Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 131 - Peppermint-Mountain/Manna Gum (P).

Authority(s): (Quantitative Data). Vegetation group 8 in EcoGIS (2005) and perhaps part of vegetation group 17 in Gellie & Fanning (2004). Probably includes Vegetation Group 94 in Gellie (2005).

Interstate Equivalent(s): Victoria: similar to EVC 18 Riparian Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: EcoGIS (2006) maps small areas in a some reserves. Not mapped over range as of 2007.

Climate Zone: Montane: no dry season (mild summer).

IBRA Bioregion (v6): NSW South-western Slopes (30-70%); South Eastern Highlands (30-70%).

IBRA Sub-Region: Upper Slopes (30-70%); Bondo (30-70%).

Botanical Division: South Western Slopes (SWS) (30-70%); Southern Tablelands (ST) (30-70%).

Local Govt. Areas: Tumbarumba (30-70%); Tumut (1-30%); Snowy River (1-30%).

CMAs: Murray (>70%); Murrumbidgee (1-30%).

MD Basin: Yes.

Substrate Mass: Colluvium; Plutonic rocks; Metamorphic rocks.

Lithology: Alluvial loams and clays; Colluvial sediments; Granite; Phyllite.

Great Soil Group: Brown earth; Krasnozem; Red-brown earth.

Soil Texture: Clay loam; Loam.

Landform Patterns: Mountains.

Landform Elements: Gully; Valley flat.

Land Use: Grazing; Timber Production.

Impacts of European Settlement: Major reduction (>70%) in extent and/or range.

Pre-European Extent: 8000 ha ±30%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Restricted to riparian areas and valley flats.

Current Extent: 4000 ha ±30% or 50% ± 50% of pre-European extent remaining.

Current Extent Comments: (Expert estimate). flats have been mainly cleared on private land but riparian strips remain. Blackberry has invaded many locations.

Conservation Reserves: Clarkes Hill NR 30 (M); Bogandyera NR 195 (M); Jingellic NR 2 (M); Wereboldera SCA 10 (E3); Kosciuszko NP 500 (E3).

Reserves Total Area: 737 ha. ***No. Representatives in Reserves:*** 5

Protected Area Explanation: Jingellic, Bogandyera and Clarkes Hill NRs measurements from mapping in EcoGIS (2006). Wereboldera SCA estimate observed by J Benson 2006. Kosciuszko National Park is a very rough estimate as it is not mapped there as of 2007.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 18.42% 737 ha ± 50%. ***No. Representatives in Protected Areas:*** 5

Protected Pre-European Extent: 9.21% which is inadequately protected across distribution.

Restricted in 1750: Code 4b: 5-15% of pre-European extent in protected areas (1,000<area<10,000 ha).

Key Sites for Protection: Valley flats and along rivers and creeks in the Tumut - Tumbarumba region.

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Fire and grazing history dictate ground cover composition. Bracken Fern is more abundant in areas regularly burnt.

Fire Regime: Natural fires are probably I frequent due to the protected location but some landholders may burn regularly.

Adjoining Communites: Grades into ID295 Robertson's Peppermint - Norton's Box tall open forest.

Threatening Processes: While some stands are in reserves, many are threatened by clearing for pine plantations. Weed invasion is the other main threat.

Threatening Process List: Acid soils due to fertilizer use; Clearing for agriculture; Clearing for pine plantations; Forestry activities including logging; Soil erosion, water: gully, tunnel, landslips; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/4b ***Threat Criteria:*** 4; 1.

Planning Controls:

Planning and Management: Control weeds including Blackberry. Protect some creek banks from stock trampling.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (350; 340; 353). EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban); Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 352

Common Name: **Red Stringybark - Blakely's Red Gum hillslope open forest on meta-sediments in the Tumut - Crookwell region of the NSW South-western Slopes and South Eastern Highlands Bioregions**

Scientific Name: *Eucalyptus macrorhyncha - Eucalyptus blakelyi / Acacia mearnsii - Daviesia leptophylla - Brachyloma daphnoides subsp. daphnoides - Acacia implexa / Bothriochloa macra - Austrodanthonia racemosa var. racemosa - Hydrocotyle laxiflora - Lomandra filiformis subsp. coriacea*

Veg. Comm. ID.: **352** ***Original Entry:*** J.S. Benson 7/07/2007

Photo 1: ID352a_SWS0507063.jpg Red Stringybark (Eucalyptus macrorhyncha) and Blakely's Red Gum (Eucalyptus blakelyi) open forest on red clay soil on a hillslope on Blackery's Road north-east of Yass, [AGD66 34°49.07'S 148°52.450'E], 29/5/2007, Jaime Plaza.

Photo 2: ID352b_SWS0507199.jpg Blakely's Red Gum (Eucalyptus blakelyi) and Red Stringybark (Eucalyptus macrorhyncha) open forest on a rocky outcrop above the upper Lachlan River between Rye Park and Crookwell, [AGD66 34°25.204'S 149°05.668'E], 29/5/2007, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus macrorhyncha; Eucalyptus blakelyi; Eucalyptus melliodora; Eucalyptus goniocalyx.*

Shrubs/Vines/Epiphytes: *Acacia mearnsii; Daviesia leptophylla; Brachyloma daphnoides subsp. daphnoides; Acacia implexa; Acacia dealbata; Exocarpos cupressiformis; Dillwynia sericea; Pultenaea procumbens.*

Ground Cover: *Bothriochloa macra; Austrodanthonia racemosa var. racemosa; Hydrocotyle laxiflora; Lomandra filiformis subsp. coriacea; Rumex brownii; Desmodium varians; Gonocarpus tetragynus; Tricoryne elatior; Oxalis perennans; Geranium solanderi var. solanderi; Elymus scaber var. scaber; Microlaena stipoides var. stipoides; Austrodanthonia pilosa; Joycea pallida; Poa sieberiana; Juncus subsecundus; Luzula densiflora.*

Weed Species: *Hypochaeris glabra; Hypochaeris radicata; Vulpia myuros; Phalaris aquatica; Trifolium campestre; Cirsium vulgare; Rosa rubiginosa.*

Weediness: High (15-30%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest; Woodland.

Height Class (WH): Mid-High.

Vegetation Description: Mid-high open forest or woodland dominated by Red Stringybark (Eucalyptus macrorhyncha) and Blakely's Red Gum (Eucalyptus blakelyi) often with Yellow Box (Eucalyptus melliodora) or Long-leaved Box (Eucalyptus goniocalyx). The shrub layer is very sparse or absent and includes Acacia mearnsii, Daviesia leptophylla, Brachyloma daphnoides subsp. daphnoides, Acacia implexa, Acacia dealbata, Exocarpos cupressiformis and Dillwynia sericea. The ground cover is often very sparse due to grazing or rocky outcrops. It includes the grass species Bothriochloa macra, Austrodanthonia racemosa var. racemosa, Elymus scaber var. scaber, Microlaena stipoides var. stipoides, Austrodanthonia pilosa, Joycea pallida and Poa sieberiana. The mat-rush Lomandra filiformis subsp. coriacea amy be present. Forb species include Hydrocotyle laxiflora, Rumex brownii, Gonocarpus tetragynus, Tricoryne elatior, Oxalis perennans and Geranium solanderi var. solanderi. The rush Juncus subsecundus and the rush Luzula densiflora may be presnet along with the climber Desmodium varians. Occurs on shallow, red clay soils derived mainly from metamorphic substrates on hillslopes in a hill landform pattern in the upper slopes sub-region of the NSW South-western Slopes Bioregion and the western side of the South eastern Highlands Bioregion in the region arount the towns of Yass, Crookwell, Boorowa and Tumut. Mainly cleared and over-grazed, therefore consider to be a threatened community. Grades into the widespread Blakely's Red Gum - Yellow Box grassy woodland (ID277) on better soils on flatter country and into other Red Stringybark dominated communities on poorer soils and ridges.

Level of Classification: Association. ***Classification Confidence Level:*** Low.

Formation Group: Eucalyptus (Mostly Grassy) Box Woodlands of the Tablelands and Western Slopes.

State Veg Map (Keith 2004): Southern Tableland Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 124 - Red Stringybark (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Part of Vegetation Group 116 in Gellie (2005). Probably most of Biolandscape EasS39 in Friday (2006) in the Boorowa - Crookwell area. A major part of the "Tableland Red Stringybark - Long-leaved Box forest" map unit in NSW NPWS (2002a) covering Boorowa Shire. Field checked in Benson (1999-2009).

Interstate Equivalent(s): None..

Mapped/Modelled: Pre-European extent mapped or modelled. ***Plot Sampling:*** .

Mapping Info: Gellie (2005) models Vegetation Group 116 but this may include other types of vegetation. mapped as part of broader group in Boorowa Shire (NSW NPWS 2002a).

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (30-70%); South Eastern Highlands (30-70%).

IBRA Sub-Region: Crookwell (1-30%); Murrumbateman (1-30%); Upper Slopes (30-70%).

Botanical Division: Southern Tablelands (ST) (1-30%); South Western Slopes (SWS) (1-30%); Central Western Slopes (CWS) (1-30%); Central Tablelands (CT) (1-30%).

Local Govt. Areas: Upper Lachlan (1-30%); Boorowa (1-30%); Yass Valley (1-30%); Tumut (1-30%).

CMAs: Lachlan (30-70%); Murrumbidgee (30-70%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks; Sedimentary rocks.

Lithology: Arkose; Metamorphic rock (unidentified); Quartz sandstone; Sandstone.

Great Soil Group: Red clay; Red podzolic soil.

Soil Texture: Light clay.

Landform Patterns: Hills; Plateau.

Landform Elements: Footslope; Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Major reduction (>70%) in extent and/or range.

Pre-European Extent: 50000 ha ±30%. Modelled from sound site or polygon data.

Pre-European Extent Comments: Gellie (2005) estimate 80000 ha of a similar type (VG116) with over 90% having been cleared. However, this probably include other types.

Current Extent: 7000 ha ±30% or 14% ± 60% of pre-European extent remaining.

Current Extent Comments: (Modelled from sound site data over unclassified map of extant vegetation). Based on clearing rates in Gellie (2005).

Conservation Reserves: None.

Reserves Total Area: 0 ha. ***No. Representatives in Reserves:*** 0

Protected Area Explanation: Some samples may be represented in protected areas but this is not documented as of 2007.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: Not known to be protected. ***No. Representatives in Protected Areas:*** 0

Protected Pre-European Extent: 0% which is inadequately protected across distribution.

Common in 1750: Code 5a: <1% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Hillslopes in the Crookwell - Boorowa - Yass - Tumut regions and perhaps beyond. Most areas are degraded by grazing.

Degree of Fragmentation: Human induced highly fragmented small stands with <30% extent remaining and high edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Not well documented as of 2007. Floristic composition varies with lithology and landform position and due to grazing history with heavily grazed sites lacking shrubs and ground cover.

Fire Regime: Unknown but now rare due to fragmentation and lack of ground cover due to grazing pressure.

Adjoining Communites: Grades into Red Stringybark - Inland Scribbly Gum open forest (ID349) or Red Stringybark - Long-leaved Box open forest (ID348) upslope or into Blakely's Red Gum - Yellow Box woodland (ID277) on better soils on lower slopes and flats. Riparian Argyle Apple open forest (ID344) may occur in creeks nearby.

Threatening Processes: Mainly cleared with most remnants overgrazed by domestic stock. Some nutrification from fertiziers and possibly high salinity in some areas.

Threatening Process List: Clearing for agriculture; Disease and/or dieback (abnormal); Nutrient changes through fertilizers or runoff; Salinity; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Endangered. ***Threat/Protected Area Code:*** E/5a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Protect samples in protected areas. Limit grazing on hills. It is unclear whether this community is listed as part of the Box-Gum woodland EEC under the Australian EPBC and NSW TSC Acts.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (308; 353; 356; 336). Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254; Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; NSW National Parks and Wildlife Service (2002a) The native vegetation of Boorowa Shire (NSW National Parks and Wildlife Service: Hurstville).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 285

Common Name: **Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South-western Slopes and adjoining South Eastern Highlands Bioregions**

Scientific Name: *Eucalyptus camphora subsp. humeana - Eucalyptus stellulata / Acacia melanoxylon - Acacia dealbata - Acacia kettlewelliae - Leptospermum continentale / Carex appressa - Poa labillardierei var. labillardierei - Juncus holoschoenus - Acaena novae-zelandiae*

Veg. Comm. ID.: **285** ***Original Entry:*** J.S. Benson 1/02/2006

Photo 1: ID285a_DX28027.jpg Broad-leaved Sally (Eucalyptus camphora subsp. humeana) bordering Tarcutta Swamp near Batlow, NSW South East Highlands Bioregion [AGD66 35°40.470'S 148°02.096'E], 1/5/2006, Jaime Plaza.

Photo 2: ID285b_DX28285.jpg Broad-leaved Sally (Eucalyptus camphora subsp. humeana) with a sedgeland wetland at Tin Mines Camping Area Woomargama National Park east of Albury NSW south western slopes, [AGD66 35°51.665'S 147°28 503'E], 3/5/2006, Jaime Plaza.

Photo 3: ID285c_DX28231.jpg Broad-leaved Sally (Eucalyptus camphora subsp. humeana) with the tall sedge Carex fasicularis lining a narrow creek in Woomargama National Park east of Albury NSW, [AGD66 35°52.683'S 147°19 820'E], 2/5/2006, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus camphora subsp. humeana; Eucalyptus stellulata; Eucalyptus robertsonii subsp. robertsonii; Eucalyptus bridgesiana.*

Shrubs/Vines/Epiphytes: *Acacia dealbata; Acacia melanoxylon; Acacia kettlewelliae; Leptospermum continentale; Mirbelia oxylobioides; Hibbertia obtusifolia; Hovea linearis; Dicksonia antarctica; Cassinia aculeata; Epacris breviflora; Bossiaea foliosa.*

Ground Cover: *Carex appressa; Poa labillardierei var. labillardierei; Juncus holoschoenus; Acaena novae-zelandiae; Senecio bathurstianus; Microlaena stipoides var. stipoides; Geranium solanderi var. solanderi; Stellaria pungens; Phragmites australis; Themeda australis; Echinopogon ovatus; Hydrocotyle laxiflora; Ranunculus lappaceus; Geranium neglectum; Rubus parvifolius; Senecio minimus; Senecio diaschides; Calochlaena dubia; Blechnum nudum; Eleocharis sphacelata; Carex fascicularis; Juncus sarophorus; Dichondra repens; Persicaria decipiens; Gonocarpus tetragynus; Euchiton gymnocephalus; Mentha diemenica; Asperula conferta; Clematis aristata; Lomandra confertifolia subsp. rubiginosa; Lomandra longifolia; Lepidosperma laterale; Adiantum aethiopicum; Pteridium esculentum; Urtica incisa.*

Weed Species: *Rubus discolor; Hypericum perforatum; Aira elegantissima; Taraxacum officinale; Briza minor; Hypochaeris radicata; Holcus lanatus; Acetosella vulgaris; Rosa rubiginosa; Centaurium erythraea; Cirsium vulgare; Plantago lanceolata; Phalaris aquatica.*

Weediness: Very high (>30%) with 10-30% cover.

Threatened Plants: Eucalyptus camphora subsp. humeana (restricted).

Threatened Fauna: Not assessed.

Mean Species Richness: 40 +/- 10 spp in 20 X 20 m plot (Gellie & Fanning 2004).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland.

Height Class (WH): Mid-High.

Vegetation Description: Mid-high woodland dominated by Broad-leaved Sally (Eucalyptus camphora subsp. humeana) sometimes with Black Sally (Eucalyptus stellulata) grading into open forest dominated by Robertson's Peppermint (Eucalyptus robertsonii subsp. robertsonii), Blakely's Red Gum (Eucalyptus blakelyi) or Apple Box (Eucalyptus bridgesiana). The shrub layer is usually sparse and includes the tall shrubs Acacia dealbata, Acacia melanoxylon, Acacia kettlewelliae, Leptospermum continentale and the low shrubs Mirbelia oxylobioides, Hibbertia obtusifolia, Hovea linearis, Cassinia aculeata, Epacris breviflora and rarely Bossiaea foliosa. The tall tree fern Dicksonia antarctica occurs in some narrow creeks and Bracken Fern (Pteridium esculentum) may occur. The ground cover is usually dense being dominated by grasses such as Poa labillardierei var. labillardierei, Microlaena stipoides var. stipoides and Echinopogon ovatus. The sedges Carex appressa is most often present and in some wetter sites Eleocharis sphacelata and Carex fascicularis occur, along with the Common Reed (Phragmites australis). Rushes, including Juncus holoshchoenus and Juncus sarophorus, also occur at wet sites. Forbs include Senecio bathurstianus, Hydrocotyle laxiflora, Ranunculus lappaceus, Geranium neglectum and Acaena novae-zelandie. Occurs on alluvial or colluvial organic grey to brown podzolic clay loam soils, on poorly drained valley flats, surrounding swamps or lining creeks in hill or mountain landscapes generally above 600 m altitude in the southern section of the NSW South Western Slopes and adjoining South Eastern Highlands Bioregions. The underlying lithology is mainly granite or granodorite. This community is substantially cleared on private land but small patches ocurr in state forests and conservation reserves such as at Tin Mines Camping Area in Woomargama National Park. This community is restricted in extent and most areas on private land and some on public land are infested with weeds, particuarly Blackberry (Rubus discolor). Another riparian shrubland community (ID302) in this region contains Broad-leaved Sally as an emergent tree.

Level of Classification: Association. ***Classification Confidence Level:*** High.

Formation Group: Eucalyptus Swamp Communities of the Eastern Coast and Tablelands.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus low open woodlands with a grassy understorey.

Forest Type (RN 17): 143 - Swamp Gum/Black Gum/Broadleaved Sally (P).

Authority(s): (Quantitative Data). South West Slopes Swamp Gum Forest map unit in Gellie & Fanning (2004) and Vegetation Group 14 in EcoGIS (2005) for Upper Murray Valley reserves. Listed as a vegetation profile for Upper Tarcutta and Greenhills and Paddys river - Burra Valley land units in Stelling (1998). Noted as occurring in small patches south-east parts of Wagga Wagga Shire (Priday 2004). Grades into Tea Tree Shrubland riparian Broad-leaved Sally community ID302.

Interstate Equivalent(s): Victoria: EEC 83: Swamp Riparian Woodland.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped and sampled in some reserves. Relatively easy to map from aerial photographs due to its canopy signature and occurrence along creeks or on flats but only small patches occur and these are best mapped at scales > 1:25000.

Climate Zone: Montane: no dry season (mild summer); Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (30-70%); South Eastern Highlands (30-70%).

IBRA Sub-Region: Bondo (30-70%); Upper Slopes (30-70%).

Botanical Division: South Western Slopes (SWS) (>70%).

Local Govt. Areas: Greater Hume (1-30%); Tumbarumba (1-30%); Tumut (1-30%).

CMAs: Murray (>70%); Murrumbidgee (1-30%).

MD Basin: Yes.

Substrate Mass: Alluvium; Plutonic rocks.

Lithology: Alluvial loams and clays; Granite.

Great Soil Group: Gleyed podzolic soil; Humic gley; Peaty podzol.

Soil Texture: Clay loam.

Landform Patterns: Hills; Mountains.

Landform Elements: Swamp; Terrace flat; Valley flat.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: Major alteration of species composition.

Pre-European Extent: 8000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Priginally would have been present on the edges of low lying poorly drained swamps, along drainage lines and on some river flats in the upper slopes of the NSW SW Slopes and western side of South East Highlands Bioregion from just north of Tumut to Victoria.

Current Extent: 2000 ha ±30% or 25% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Remnants occur along drainage lines and on the edges of swamps in the Tumut to Tumbarumba region but many areas have been cleared for agriculture or pine plantations. Some small stands occur in reserves.

Conservation Reserves: Bogandyera NR 6 (M); Murraguldrie FR 10 (E3); Woomargama NP 113 (M); Woomargama SCA 6 (E1).

Reserves Total Area: 135 ha. ***No. Representatives in Reserves:*** 4

Protected Area Explanation: Woomargama NP and SCA areas from Vegetation Group 20 in Gellie & Fanning (2004). Murrugulderie Flora Reserve estimate from text in Priday (2002). Mapped in Boganderya NR on the western side of Mount Ikes by EcoGIS (2005). A similar community is present in north-western Kosciuszko National Park.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 6.75% 135 ha ± 50%. ***No. Representatives in Protected Areas:*** 4

Protected Pre-European Extent: 1.68% which is inadequately protected across distribution.

Restricted in 1750: Code 5b: <5% of pre-European extent in protected areas (1,000<area<10,000 ha).

Key Sites for Protection: Some sites on private land may be worth protection through conservation agreements. Good stands surround Tarcutta Swamp near Courabyra and on public land on Mount Garland Track 5 km south of Tumbarumba. Areas occur along Paddy's River south-east of Tumbarumba and along other creeks in the Tumbarumba region.

Degree of Fragmentation: Naturally fragmented stands of variable patch sizes with <50% extent remaining.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Species composition varies with altitude and degree of water-logging. Some areas are sedge-dominated, others contain more shrubs and grasses.

Fire Regime: Occasionally burnt by wildfire. Perhaps a 30-60 year variable fire frequency. Some areas on private land may be burnt more often by landholders.

Adjoining Communites: Grades into open forests dominated by Eucalpytus robertsonii (ID295) and woodlands dominated by Apple Box (Eucalyptus bridgesiana) (ID283) or Blakely's Red Gum (Eucalyptus blakelyi). Broad-leaved Sally also occurs in ID302 that is dominated by woody Myrtaceous shrub species along major rivers.

Threatening Processes: Considered to tbe a threatened community because of its limited extent mainly on private land, weed invasion - particularly by Blackberry (Rubus discolor) and hydrological changes along rivers and creeks. Many areas have been cleared and clearing for pine plantations continues as of 2007.

Threatening Process List: Clearing for agriculture; Chemical pollution (incl. herbicides, pesticides); Hydrology (disruption of natural flooding regimes); Nutrient changes through fertilizers or runoff; Weed (exotic) invasion.

Threat Category: Endangered. ***Threat/Protected Area Code:*** E/5b ***Threat Criteria:*** 4; 2.

Planning Controls:

Planning and Management: Avoid clearing, over-grazing and draining flats that support this community. Fence off and maintain riparian vegetation. Avoid grading roads and soil disturbance in this community. Controlling weeds, including Blackberry, is an imperative for enhancing the condition of this community. Should be listed as a TEC similar and related to listed TEC: Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions. A similar community is listed as endangered in Victoria.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (340; 341; 316; 350). Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Stelling, F. (Ed.) (1998) South West Slopes Revegetation Guide (Murray Catchment Management Committee and Department of Land & Water Conservation: Albury); Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan); EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 289

Common Name: **Mugga Ironbark - Inland Scribbly Gum - Red Box shrub/grass open forest on hills in the upper slopes sub-region of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus sideroxylon - Eucalyptus rossii - Eucalyptus macroryncha - Eucalyptus polyanthemos / Brachyloma daphnoides subsp. daphnoides - Acacia genistifolia - Acacia paradoxa - Dillwynia sericea / Goodenia hederacea subsp. hederacea - Dianella revoluta var. revoluta - Poa sieberiana var. sieberiana - Lomandra filiformis subsp. coriacea*

Veg. Comm. ID.: **289** ***Original Entry:*** J.S. Benson 10/02/2006

Photo 1: ID289a_PC208-17.jpg Mugga Ironbark (Eucalyptus sideroxylon) - Inland Scribbly Gum (E. rossii) - E.goniocalyx hill woodland in Ellerslie Nature Reserve, [AGD66 35°14'42"S 147°52'01"E], 20/10/02, Jaime Plaza.

Photo 2: ID289b_SWS0507243.jpg Mugga Ironbark - Inland Scribbly Gum open forest with Lissanthe strigosa on hillcrest north west of Boorowa, [AGD66 34°19.906'S 148°38.853'E], 30/5/07, Jaime Plaza.

Photo 3: ID289c_SWS0507183.jpg Mugga Ironbark - Scibbly Gum - Long-leaved Box open forest on red clay from phyllite on Rugby - Crookwell Road [AGD66 34°23.981'S 149°00.963'E], 29/5/2007, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus sideroxylon; Eucalyptus rossii; Eucalyptus polyanthemos subsp. polyanthemos; Eucalyptus macrorhyncha; Eucalyptus blakelyi; Eucalyptus goniocalyx; Eucalyptus albens.*

Shrubs/Vines/Epiphytes: *Brachyloma daphnoides subsp. daphnoides; Acacia genistifolia; Acacia paradoxa; Dillwynia sericea; Daviesia leptophylla; Cassinia aculeata; Pultenaea subspicata; Indigofera australis; Acacia dealbata; Dillwynia phylicoides; Acacia gunnii; Phyllanthus hirtellus; Pultenaea foliolosa; Hibbertia riparia; Melichrus urceolatus; Xanthorrhoea glauca subsp. angustifolia; Amyema miquelii.*

Ground Cover: *Goodenia hederacea subsp. hederacea; Dianella revoluta var. revoluta; Poa sieberiana var. sieberiana; Lomandra filiformis subsp. coriacea; Lomandra filiformis subsp. filiformis; Gonocarpus tetragynus; Austrostipa scabra subsp. falcata; Aristida ramosa var. ramosa; Stypandra glauca; Hydrocotyle laxiflora; Austrodanthonia setacea; Cheilanthes austrotenuifolia; Microseris lanceolata; Chrysocephalum apiculatum; Dichelachne rara; Drosera peltata; Galium gaudichaudii; Daucus glochidiatus; Burchardia umbellata; Microtis unifolia; Caladenia cucullata; Luzula flaccida form A; Dichelachne micrantha; Hardenbergia violacea.*

Weed Species: *Hypochaeris radicata; Hypochaeris glabra; Briza maxima; Vulpia myuros.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Not assessed..

Threatened Fauna: Swift Parrot, Turquoise Parrot, Black-chinned honeyeater, Squirrel Glider.

Mean Species Richness: 25 +/- 5 (Gellie & fanning 2004 in 20 x 20 plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Mid-High; Tall.

Vegetation Description: Mid-high to tall open forest dominated by Mugga Ironbark (Eucalyptus sideroxylon) and Inland Scribbly Gum (Eucalyptus rossii) and often with Red Box (Eucalyptus polyanthemos), Red Stringybark (Eucalyptus macroryhnca) and Blakely's Red Gum (Eucalyptus blakelyi). The shrub layer is very sparse and tall shrubs are largely absent. Low shrubs include Brachyloma daphnoides subsp. daphnoides, Acacia genistifolia, Indigofera australis, Pultenaea subspicata, Dillwynia sericea, and Daviesia leptophylla. The grass tree Xanthorrhoea glauca subsp. angustifolia may be present. The ground cover is very sparse to sparse often with a stony surface. Grass species include Poa sieberiana var. sieberiana, Joycea pallida, Aristida ramosa var. ramosa, Austrodanthonia setacea and Dichelachne rara along with the mat-rushes Lomandra filiformis subsp. filiformis and Lomandra filiformis subsp. coriacea. Forb species include Gonocarpus tetragynus, Hydrocotyle laxiflora, Goodenia hederacea subsp. hederacea, Chrysocephalum apiculatum, Dianella revoluta, Stypandra glauca, Drosera peltata, Galium gaudichaudii, Daucus glochidiatus. and Burchardia umbellata. Occurs on shallow clayey soils derived from mainly metamorphic substrates such as phyllite or arkose on hillcrests or upper hillslopes in the upper slopes sub-region of the NSW South-western Slopes Bioregion. Although substantially cleared, some areas remain due to its location on shallow soils and steep hills.

Level of Classification: Sub-association. ***Classification Confidence Level:*** High.

Formation Group: Eucalyptus Ironbark Woodlands and Forests of the Inland Slopes, Plains and Peneplains.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 205 - Ironbark-Red Gum (P); 117 - Scribbly Gum (P); 205 - Ironbark-Red Gum (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Vegetation Group 30 in Gellie & Fanning (2004). Probably part of community 11.1 in Box & Lockwood (1996). Community 1 in ABHF (2001). Includes part of the Coreinbob Hills Open Forest map unit in Friday (2004) for the south-eastern portion of the Wagga Wagga Shire. Probably includes Biolandscape WagM39a in Friday (2006). Includes community 3c in Porteners (2007). Species list in Benson (1999-2009).

Interstate Equivalent(s): None.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped for some reserves by Gellie & Fanning (2004). Mapped in Tarcutta Bush Heritage Reserve.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%); South Eastern Highlands (1-30%).

IBRA Sub-Region: Upper Slopes (>70%); Murrumbateman (1-30%); Crookwell (1-30%); Bondo (1-30%).

Botanical Division: South Western Slopes (SWS) (30-70%); Central Western Slopes (CWS) (1-30%); Central Tablelands (CT) (1-30%); Southern Tablelands (ST) (1-30%).

Local Govt. Areas: Gundagai (1-30%); Tumut (1-30%); Cootamundra (1-30%); Wagga Wagga (1-30%); Greater Hume (1-30%); Boorowa (1-30%); Upper Lachlan (1-30%); Yass Valley (1-30%).

CMAs: Murray (1-30%); Murrumbidgee (30-70%); Lachlan (1-30%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks; Sedimentary rocks.

Lithology: Arkose; Phyllite; Quartz sandstone.

Great Soil Group: Brown clay; Brown podzolic soil; Red podzolic soil.

Soil Texture: Clay loam; Light clay; Light medium clay.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: Minor reduction (<30%) in extent and/or range.

Pre-European Extent: 20000 ha ±50%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Restricted to upper slopes and crests on hills in the central to southern part of the upper slopes sub-region of the NSW South-western Slopes Bioregion.

Current Extent: 8000 ha ±50% or 40% ± 70% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Mostly cleared but remnants occur on ridges on hills including in some reserves.

Conservation Reserves: Ellerslie NR 250 (E2); Tumblong SCA 280 (E1); Downfall NR 13 (E2); Murraguldrie FR 100 (E2); Koorawatha NR

320 (E1).

Reserves Total Area: 963 ha. ***No. Representatives in Reserves:*** 5

Protected Area Explanation: Ellerslie NR (including area in 2006 addition) and Tumblong SCA from vegetation group 30 in Gelling & Fanning (2004). Downfall NR observed by J. Benson. Tarcutta Hills BHR from description in ABHR (2001). Murraguldrie FR from Priday (2004). Koorawatha NR from community 3c in Porteners (2007).

Secure Property Agreements: Tarcutta Hills BHR 167 (M).

Secure PAs Total Area: 167 ha. ***No. Representatives in Secure Property Agreements:*** 1

Protected Current Extent: 14.12% 1130 ha ± 30%. ***No. Representatives in Protected Areas:*** 6

Protected Pre-European Extent: 5.65% which is inadequately protected across distribution.

Common in 1750: Code 3a: 5-15% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Poorly protected in the northern part of its range north of Yass and around Boorowa.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Shrub and ground cover species vary across range from south to north.

Fire Regime: Unknown. Possibly 10-30 years and variable.

Adjoining Communites: Grades into Norton's Box, Long-leaved Box and Red Box (e.g. ID287) on mid-slopes, into Apple Box, White Box or Blakely's Red Gum in valleys or Inland Scribbly Gum - Black Cypress Pine (ID322) low woodland on the central western slopes. A similar heath-dominated community occurs in the Livingston National Park region in the Wagga Wagga Shire (ID291). Grades into a Mugga Ironbark - Western Grey Box - Red Box (ID343) community on hills in the vicinity of Tarcutta and into Blakely's Red Gum - Yellow Box (ID277) on better soils on flatter terrain.

Threatening Processes: Inappropriate fire may threaten some understorey species in this community. Goat grazing may also affect species composition and lead to soil erosion.

Threatening Process List: Clearing for pine plantations; Inappropriate fire regimes; Soil erosion, water: sheet erosion; Unsustainable grazing by introduced animals.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/3a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Protect from overgrazing and too-frequent fire. Increase protection of northern areas.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (308; 340; 177; 316; 344; 356; 379). Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan); Australian Bush Heritage Fund (2001) Tarcutta Hills Reserve Management Plan (Australian Bush Heritage Fund: Melbourne); Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; Porteners, M.F. (2007) Vegetation survey and mapping of Koorawatha, Dananbilla, Gungewalla and Illunie Nature Reserves. Report to Department of Environment and Climate Change NSW.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 290

Common Name: **Red Stringybark - Red Box - Long-leaved Box - Inland Scribbly Gum tussock grass - shrub low open forest on hills in the southern part of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus macrorhyncha - Eucalyptus polyanthemos subsp. polyanthemos - Eucalyptus goniocalyx - Eucalyptus rossii -/ Brachyloma daphnoides subsp. daphnoides - Hibbertia obtusifolia - Monotoca scoparia - Phyllanthus hirtellus / Joycea pallida - Poa sieberiana var. sieberiana - Gonocarpus tetragynus -Lomandra filiformis subsp. filiformis*

Veg. Comm. ID.: **290** ***Original Entry:*** J.S. Benson 14/02/2006

Photo 1: ID290a_PC189-16.jpg Eucalyptus rossii - Eucalyptus macrorhyncha - Eucalyptus polyanthemos tussock grass - shrub woodland, Livingstone National Park, [AGD66 35°21'35"S 147°21'28"E], 15/10/02, Jaime Plaza.

Photo 2: ID290b_PC191-8.jpg Eucalyptus rossii - E.macrorhyncha - Eucalyptus goniocalyx woodland on lower slopes in Nest Hill Nature Reserve, [AGD66 35°31'24"S 147°22'42"E], 15/10/02, Jaime Plaza.

Photo 3: ID290c_DX28358.jpg Red Box (Eucalyptus polyanthemos) - Long-leaved Box (Eucalyptus goniocalyx) - Red Stringybark (Eucalyptus macrorhyncha) low open forest on red soils on a hillcrest in Jingellic Nature Reserve, [AGD66 35°54.227'S 147°45.906'E], 3/5/2006, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus macrorhyncha; Eucalyptus polyanthemos; Eucalyptus goniocalyx; Eucalyptus rossii; Eucalyptus blakelyi.*

Shrubs/Vines/Epiphytes: *Brachyloma daphnoides subsp. daphnoides; Dillwynia phylicoides; Hibbertia obtusifolia; Xanthorrhoea glauca subsp. angustifolia; Acacia dealbata; Phyllanthus hirtellus; Daviesia leptophylla; Calytrix tetragona; Pultenaea procumbens; Acacia paradoxa; Leucopogon ericoides; Leucopogon attenuatus; Lissanthe strigosa subsp. strigosa; Melichrus urceolatus; Grevillea ramosissima; Grevillea floribunda.*

Ground Cover: *Poa sieberiana var. sieberiana; Austrodanthonia eriantha; Gonocarpus tetragynus; Cheilanthes sieberi subsp. sieberi; Goodenia hederacea subsp. hederacea; Stypandra glauca; Lomandra filiformis subsp. coriacea; Lomandra filiformis subsp. filiformis; Dianella revoluta var. revoluta; Lomandra multiflora subsp. multiflora; Poranthera microphylla; Craspedia variabilis; Dichelachne micrantha; Dichelachne rara; Hydrocotyle laxiflora; Senecio prenanthoides; Thysanotus patersonii; Opercularia hispida; Pomax umbellata; Microseris lanceolata; Microtis unifolia; Wahlenbergia stricta subsp. stricta; Drosera auriculata; Senecio quadridentatus; Senecio bathurstianus; Lepidosperma laterale; Geranium solanderi var. solanderi; Hovea linearis; Hardenbergia violacea; Ranunculus sessiliflorus var. sessiliflorus; Daucus glochidiatus; Drosera auriculata; Crassula sieberiana subsp. sieberiana.*

Weed Species: *Not assessed.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: 20 +/- 5 (Gellie & Fanning 2004 in 20 x 20 m plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest; Woodland.

Height Class (WH): Mid-High.

Vegetation Description: Mid-high open forest or woodland dominated by Red Stringybark (Eucalyptus macrorhyncha) with Red Box (Eucalyptus polyanthemos), Long-leaved Box (Eucalyptus goniocalyx) with Scribbly Gum (Eucalyptus rossii) sometimes present. The shrub layer is usually sparse but may be mid-dense where fire has been less frequent. Shrub species include Brachyloma daphnoides subsp. daphnoides, Hibbertia obtusifolia, Dillwynia phylicoides, Phyllanthus hirtellus, Acacia dealbata, Daviesia leptophylla, Calytrix tetragona, Acacia paradoxa, Leucopogon ericoides and Melichrus urceolatus. The grass tree Xanthorrhoea glauca subsp. angustifolia is common at some locations. The ground cover is mid-dense to sparse. Grass species include Austrodanthonia eriantha, Joycea pallida, Poa sieberiana var. sieberiana and Dichelachne micrantha with the mat-rush Lomandra filiformis. Forb species include Gonocarpus tetragynus, Goodenia hederacea subsp. hederacea, Stypandra glauca, Dianella revoluta var. revoluta, Poranthera microphylla, Hydrocotyle laxiflora, Senecio prenanthoides, Thysanotus patersonii, Opercularia hispida, Pomax umbellata, Microseris lanceolata and Drosera auriculata. The rock fern Cheilanthes sieberi subsp. sieberi may be abundant. The sedge Lepidosperma laterale may also be present. Occurs on shallow red to brown to yellow podzolic sandy clay-loam soils derived mainly from metamorphic substrates on well-drained upper hillslopes and hillcrests on steep hills mainly in the southern part of the upper slopes sub-region of the NSW South-western Slopes Bioregion from the upper Murray River region to Livingstone National Park south of Wagga Wagga. While substantially cleared, this community is less threatened than woodlands and forests that grow on flatter terrain. Trees and shrubs may be prone to dieback during drought.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 117 - Scribbly Gum (P); 124 - Red Stringybark (P).

Authority(s): (Quantitative Data). Possibly includes most of Vegetation Groups 119 and 121 in Gellie (2005). Includes Vegetation Group 45 in Gellie & Fanning (2004) and Vegetation Group 4 in EcoGIS (2005) in southern areas. Probably includes Red Stringybark- Red Box - Inland Scribbly Gum part of the broad Coreinbob Hills Open Forest map unit in Priday (2004). Probably includes part of Biolandscape SouV39 in Priday (2006).

Interstate Equivalent(s): Victoria: possibly part of the broadly classified EVC 22: Grassy Dry Forest or EVC 20: Heathy Dry Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped and sampled in some reserves by Gellie & Fanning (2004), EcoGIS (2005). Modelled over part of range by Gellie (2005). Probably mainly within Biolandscape SouV39 mapped in Priday (2006).

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%); South Eastern Highlands (1-30%).

IBRA Sub-Region: Upper Slopes (>70%); Bondo (1-30%).

Botanical Division: South Western Slopes (SWS) (>70%); Southern Tablelands (ST) (1-30%).

Local Govt. Areas: Greater Hume (1-30%); Gundagai (1-30%); Junee (1-30%); Tumut (1-30%); Tumbarumba (1-30%); Wagga Wagga (1-30%).

CMAs: Murrumbidgee (30-70%); Murray (30-70%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks; Volcanic rocks.

Lithology: Arkose; Greywacke; Rhyolite; Phyllite; Quartzite.

Great Soil Group: Brown podzolic soil; Red podzolic soil.

Soil Texture: Clay loam; Sandy clay loam.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: Minor reduction (<30%) in extent and/or range.

Pre-European Extent: 30000 ha ±30%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Gellie (2005) VG119 models over 100,000 pre-European extent but this includes several plant communities. Confined to hills in the southern parts of the Upper Slopes sub-region of the NSW South-western Slopes Bioregion.

Current Extent: 10000 ha ±30% or 33% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Gellie (2005) estimates 80% ha been cleared but this also accounts for some other plant communities.

Conservation Reserves: Ellerslie NR 30 (E2); Downfall NR 176 (E1); Nest Hill NR 678 (E2); Livingstone NP 800 (E1); Livingstone SCA 85 (E1); Jingellic NR 487 (M); Tumblong SCA 210 (E1).

Reserves Total Area: 2466 ha. ***No. Representatives in Reserves:*** 7

Protected Area Explanation: Downfall NR, Livingston NP and Ellerslie NR (includes estimate for 2006 addition) from vegetation group 45 in Gellie & Fanning (2004). Nest Hill NR includes veg groups 45 and 44 mapped by Gellie & Fanning (2004) based on field checking by Benson (2000-2005). Jingellic NR area from vegetation group 4 in EcoGIS (2005). Tumblong SCA from ADS-40 mapping DECCW South 2010.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 24.66% 2466 ha ± 30%. ***No. Representatives in Protected Areas:*** 7

Protected Pre-European Extent: 8.22% which is inadequately protected across distribution.

Common in 1750: Code 3a: 5-15% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Reasonably well sampled in reserves.

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Healthy, structure and composition intact. Insignificant indicators of degradation. Likely to continue in good health if maintained.

Variation & Disturbance: Variation in shrub and ground cover species over range. Tussock grass Joycea pallida is common throughout but some sites are dominated by shrub species.

Fire Regime: Unknown. Would occasionally be subjected to intense wildfires unless isolated from fire in small remnants.

Adjoining Communites: Grades into Long-leaved Box open forest on sheltered slopes and Mugga Ironbark - Inland Scribbly Gum open forest on ridges. Similar ground cover to ID291. Grades into Black Cypress Pine forest (ID309) or Dwyer's Red Gum - Black Cypress Pine (ID186 and ID315) on rocky ridges. Similar to ID348 that occurs in the northern part of the SWS Bioregion.

Threatening Processes: Over half has been cleared. The main current threats are overgrazing by stock or goats leading to soil erosion and too-frequent fire. Less threatened than grassy box woodlands on lower hillslopes and flats.

Threatening Process List: Clearing for agriculture; Disease and/or dieback (abnormal); Inappropriate fire regimes; Nutrient changes through fertilizers or runoff; Salinity; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/3a ***Threat Criteria:*** 4; 5.

Planning Controls:

Planning and Management: Control over-grazing of hills by stock and maintain appropriate fire regimes.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (340; 316; 308; 350; 353; 356). Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan); Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban); Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254; Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 294

Common Name: **Norton's Box - Red Box - White Box tussock grass open forest of the southern section of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus nortonii - Eucalyptus polyanthemos subsp. vestita / Acacia dealbata - Cassinia arcuata / Joycea pallida - Lomandra filiformis subsp. coriacea - Geranium solanderi var. solanderi - Daucus glochidiatus*

Veg. Comm. ID.: **294** ***Original Entry:*** J.S. Benson 8/03/2006

Photo 1: ID294a_DX28161.jpg Norton's Box (Eucalyptus nortonii) - Red Box (Eucalyptus polyanthemos) open forest with Joycea pallida ground cover on shallow grey sandy loam on granite, Wangra Trail, Woomargama National Park, [AGD66 35°56.148'S 147°17.458'E], 2/5/2006, Jaime Plaza.

Photo 2: ID294b_DX28098.jpg Red Box (Eucalyptus polyanthemos) - White Box (Eucalyptus albens) - Red Stringybark (Eucalyptus macrorhyncha) open forest at Tunnel Creek in Woomargama National Park, [AGD66 35°52.847'S 147°17.874'E], 1/5/2006, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus nortonii; Eucalyptus polyanthemos subsp. polyanthemos; Eucalyptus polyanthemos subsp. vestita; Eucalyptus albens.*

Shrubs/Vines/Epiphytes: *Acacia dealbata; Cassinia aculeata; Hibbertia obtusifolia; Calytrix tetragona; Pultenaea procumbens.*

Ground Cover: *Joycea pallida; Lomandra filiformis subsp. coriacea; Poranthera microphylla; Geranium solanderi var. solanderi; Daucus glochidiatus; Acaena novae-zelandiae; Wahlenbergia stricta subsp. stricta; Hypericum gramineum; Gonocarpus tetragynus; Dichondra repens; Hydrocotyle laxiflora; Cymbonotus preissianus; Rumex brownii; Myosotis discolor; Cynoglossum suaveolens; Veronica peregrina; Wurmbea dioica subsp. dioica; Scutellaria humilis; Euchiton gymnocephalus; Cheilanthes austrotenuifolia; Luzula densiflora; Microlaena stipoides var. stipoides; Austrodanthonia pilosa; Echinopogon ovatus; Elymus scaber var. scaber; Poa sieberiana; Senecio tenuiflorus; Dichopogon strictus; Ranunculus sessiliflorus var. sessiliflorus; Oxalis perennans; Dichelachne hirtella; Senecio quadridentatus; Drosera auriculata; Desmodium varians; Geranium retrorsum; Senecio bathurstianus; Senecio prenanthoides; Brachyscome multifida var. multifida.*

Weed Species: *Trifolium subterraneum; Trifolium campestre; Trifolium arvense; Bromus diandrus; Bromus molliformis; Cirsium vulgare; Cerastium glomeratum; Cerastium vulgare; Hypochaeris radicata; Briza minor; Aira elegantissima; Vulpia myuros; Orobanche minor; Echium plantagineum.*

Weediness: High (15-30%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: 40 +/- spp (Gellie & Fanning 2004 in 20 x 20 m plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Mid-High; Tall.

Vegetation Description: Mid-high to tall open forest dominated by Norton's Box (Eucalyptus nortonii) with Red Box (Eucalyptus polyanthemos) often with Red Stringybark (Eucalyptus macrorhyncha) and White Box (Eucalyptus albens). The shrub layer is very sparse and may include Acacia dealbata, Cassinia aculeata and Hibbertia obtusifolia. Grass species include Joycea pallida, Poa sieberiana, Elymus scaber var. scaber, Microlaena stipoides var. stipoides. Austrodanthonia pilosa and Echinopogon ovatus. Forb species include Acaena novae-zelandiae, Hypericum gramineum, Gonocarpus tetragynus, Dichondra repens, Hydrocotyle laxiflora, Cymbonotus preissianus, Rumex brownii, Geranium spp. and Senecio spp. The graminioise Lomandra filiformis subsp. coriacea us usually common. Weeds are common in some sites. The rush Luzula densiflora is often present. Occurs on shallow clay loam soils derived from sedimentary and igneous substrates (granite) in hill landform pattern on hillslope landform element in the southern part of the NSW South-western Slopes Bioregion. Represented in some reserves but extensively cleared over its range.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus (Mostly Grassy) Box Woodlands of the Tablelands and Western Slopes.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 99 - Red Box (P).

Authority(s): (Quantitative Data). Includes vegetation Groups 22 and 25 in Gellie & Fanning (2004) from which characteristic species are listed.

Interstate Equivalent(s): Victoria: similar to EVC175_62 Rainshadow Grassy Woodland or EVC 22: Grassy Dry Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped for some reserves by Gellie & Fanning (2004) but not mapped over range. Difficult to distinquish from Long-leaved Box open forest.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%); South Eastern Highlands (1-30%).

IBRA Sub-Region: Upper Slopes (>70%); Bondo (1-30%); Murrumbateman (1-30%).

Botanical Division: South Western Slopes (SWS) (>70%); Southern Tablelands (ST) (1-30%).

Local Govt. Areas: Greater Hume (1-30%); Tumbarumba (1-30%); Tumut (1-30%); Yass Valley (1-30%).

CMAs: Murray (30-70%); Murrumbidgee (30-70%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Sedimentary rocks.

Lithology: Granite; Sandstone; Shale; Siltstone.

Great Soil Group: Brown earth; Brown podzolic soil.

Soil Texture: Clay loam.

Landform Patterns: Hills.

Landform Elements: Hillslope.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: Minor reduction (<30%) in extent and/or range.

Pre-European Extent: 15000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Estimate based on extrapolation from limited current extent mapping.

Current Extent: 8000 ha ±30% or 53% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from pre-European map: part range). Some reserves are mapped in Gellie & Fanning (2004).

Conservation Reserves: Woomargama NP 950 (E1); Mullengandra NR 70 (E3); Woomargama SCA 1450 (E1).

Reserves Total Area: 2470 ha. ***No. Representatives in Reserves:*** 3

Protected Area Explanation: Woomargama NP, Woomargama SCA and Mullengrandra NR from combining vegetation groups 22 and 25 in Gellie & Fanning (2004) but with some areas removed from Woomargama and added to ID268.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 30.87% 2470 ha ± 30%. ***No. Representatives in Protected Areas:*** 3

Protected Pre-European Extent: 16.46% which is adequately protected across distribution.

Common in 1750: Code 2a: 15-25% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Requires survey.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Tree species vary in dominance over range depending on soils, aspect and position on hillslope. Ground species varies with grazing management and with altitude.

Fire Regime: Unknown but now rare due to framented landscape.

Adjoining Communites: Grades into Apple Box, Blakely's Red Gum or White Box woodland on flats or lower slopes and into Black Cypress Pine on rocky ridges. Grades into other Norton's Box forests in gullies and at higher altitudes. A heathy form of this community (ID306) occurs on higher slopes on quartzite ridges.

Threatening Processes: Overgrazing on private land, inappropriate fire and localised weed invasion are the main threats. Pine plantations may threaten some stands.

Threatening Process List: Clearing for agriculture; Clearing for pine plantations; Inappropriate fire regimes; Soil erosion, water: gully, tunnel, landslips; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/2a ***Threat Criteria:*** 4; 5.

Planning Controls:

Planning and Management: Manage fire regimes, control weeds and protect further stands in protected areas.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (340). Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 297

Common Name: **Broad-leaved Peppermint - Norton's Box - Red Stringybark tall open forest on red clay on hills in the southern part of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus dives - Eucalyptus nortonii - Eucalyptus macrorhyncha / Acacia dealbata - Hibbertia calycina - Cassinia aculeata / Poa sieberiana - Lomandra filiformis subsp. filiformis - Viola betonicifolia - Glycine clandestina*

Veg. Comm. ID.: **297** ***Original Entry:*** J.S. Benson 30/03/2006

Photo 1: ID297a_DX28155.jpg Broad-leaved Peppermint (Eucalyptus dives) - Norton's Box (Eucalyptus nortonii) - Red Stringybark (Eucalyptus macrorhyncha) open forest on slopes with red clay, Wangra Trail, Woomargama National Park, [AGD66 35°55.607'S 147°17.719'E], 2/5/2006, Jaime Plaza.

Photo 2: ID297b_DX28318.jpg Broad-leaved Peppermint (Eucalyptus dives) - Norton's Box (Eucalyptus nortonii) - Red Stringybark (Eucalyptus macrorhyncha) open forest with Joycea pallida on red clay loam, Tin Mines Fire Trail, Woomargama National Park, [AGD66 35°51.055'S 147°34.347'E], 3/5/2006, Jaime Plaza.

Photo 3: ID297c_DX28413.jpg Broad-leaved Peppermint (Eucalyptus dives) - Red Stringybark (Eucalyptus macrorhyncha) - Ribbon Gum (Eucalyptus viminalis) open forest, Bogandyera Nature Reserve, [AGD66 35°54.351'S 147°51.822'E], 4/5/2006, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus dives; Eucalyptus nortonii; Eucalyptus macrorhyncha; Eucalyptus mannifera subsp. mannifera.*

Shrubs/Vines/Epiphytes: *Acacia dealbata; Cassinia aculeata; Hibbertia obtusifolia; Pimelea linifolia subsp. linifolia; Daviesia latifolia; Dillwynia phylicoides; Hibbertia calycina; Platylobium formosum subsp. formosum; Melichrus urceolatus; Dichelachne rara; Acrotriche serrulata.*

Ground Cover: *Poa sieberiana var. sieberiana; Lomandra filiformis subsp. filiformis; Joycea pallida; Echinopogon ovatus; Viola betonicifolia; Brachyscome multifida var. multifida; Euchiton gymnocephalus; Hypericum gramineum; Hydrocotyle laxiflora; Dichondra repens; Gonocarpus tetragynus; Glycine clandestina; Oxalis perennans; Acaena novae-zelandiae; Plantago hispida; Senecio quadridentatus; Senecio species E., Solenogyne gunnii; Hovea linearis; Lomandra multiflora subsp. multiflora; Brunonia australis; Wahlenbergia stricta subsp. stricta; Podolepis jaceoides; Plantago varia; Stellaria pungens; Pteridium esculentum; Xerochrysum viscosum.*

Weed Species: *Hypochaeris radicata; Centaurium erythraea; Taraxacum officinale; Aira elegantissima.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: None known.

Threatened Fauna: Not assessed.

Mean Species Richness: 30 +/- 5 (vegetation group 48 in Gellie & Fanning in 20 x 20 plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Tall; Mid-High.

Vegetation Description: Tall or mid-high open forest dominated by Broad-leaved Peppermint (Eucalyptus dives), Norton's Box (Eucalyptus nortonii) and Red Stringybark (Eucalyptus macrorhycha). Brittle Gum (Eucalyptus mannifera) may also be present. The shrub layer is sparse and includes Acacia dealbata, Cassinia aculeata, Hibbertia calycina, Hibbertia obtusifolia, Daviesia latifolia and Dillwynia phylicoides. The ground cover is generally mid-dense and includes the grasses Poa sieberiana var. sieberiana, Joycea pallida and Echinopogon ovatus and the forbs Euchiton gymnocephalus, Hypericum gramineum, Viola betonicifolia, Hydrocotyle laxiflora, Dichondra repens and Gonocarpus tetragynus. The daisy Brachyscome multifida var. multifida my be abundant in places along with the mat-rush Lomandra filiformis. The scambler Glycine clandestina is common. Occurs on shallow loamy clay soils derived from igneous, sedmentary or metamorphic rocks on ridges and upper slopes in the hills landform pattern in the southern section of the NSW South-western Slopes Bioregion. Grades into Broad-leaved Peppermint - Brittle Gum (ID296) in some locations. Sampled in a number of reserves as of 2007 and reasonably non-threatened.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 111 - Peppermint (P).

Authority(s): (Quantitative Data). Includes vegetation group 48 in Gellie & Fanning (2004) and vegetation group 1 in EcoGIS (2005).

Interstate Equivalent(s): Victoria: part of EVC 22: Shrubby Dry Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Adequate.

Mapping Info: As of 2007 some areas had been mapped and surveyed in reserves but this cfommunity has note been mapped outside reserves.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%).

IBRA Sub-Region: Upper Slopes (>70%).

Botanical Division: South Western Slopes (SWS) (>70%).

Local Govt. Areas: Greater Hume (1-30%); Tumbarumba (1-30%); Tumut (1-30%); Gundagai (1-30%).

CMAs: Murrumbidgee (30-70%); Murray (30-70%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Metamorphic rocks; Sedimentary rocks.

Lithology: Arkose; Granite; Quartz sandstone; Slate.

Great Soil Group: Red clay; Red earth.

Soil Texture: Clay loam; Silty clay loam.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing; Nature Conservation; Timber Production.

Impacts of European Settlement: No significant impacts known.

Pre-European Extent: 40000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: This community would have covered a large area of hilly country between Albury and Tumut.

Current Extent: 25000 ha ±30% or 62% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from pre-European map: part range). Due to its location on upper slopes on shallow soils a large proportion of this community remains.

Conservation Reserves: Bogandyera NR 3000 (E2); Courabyra NR 150 (E2); Downfall NR 157 (M); Jingellic NR 532 (M); Minjary NP 11 (E1); Mullengandra NR 80 (E3); Woomargama NP 7200 (E2); Woomargama SCA 3580 (E1).

Reserves Total Area: 14710 ha. ***No. Representatives in Reserves:*** 8

Protected Area Explanation: Woomargama NP, Mullengandra NR, Downfall NR, Minjari NR, Courabyra NR from vegetation group 48 in Gellie & Fanning (2004). Courabyra NR is an estimate only. Mullengandra NR area estimated. Bogandyera NR area includes vegetation groups 1 and 3 in EcoGIS (2005).

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 58.84% 14710 ha ± 30%. ***No. Representatives in Protected Areas:*** 8

Protected Pre-European Extent: 36.77% which is adequately protected across distribution.

Common in 1750: Code 1a: >25% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Well represented in reserves. Some other stands may require protection across its range or for wildlife corridors.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Healthy, structure and composition intact. Insignificant indicators of degradation. Likely to continue in good health if maintained.

Variation & Disturbance: Several Eucalyptus species vary in their dominance depending on site variation of soils and aspect. Frequency of burning would have significant impacts on variation in ground flora. Joycea varies in abundance. Shrub species vary in density depending on grazing history.

Fire Regime: Unknown. Due to landscape position was unlikely to have been frequently burnt prior to European settlement. Occasional wildlfire may burn this community every 30-50 years. Some landholders may burn areas more regularly.

Adjoining Communites: Grades into ID295 Robertsons Peppermint tall OF in sheltered sites and into ID296 Brittle Gum - Broad-leaved Peppermint open forest on poorer soils.

Threatening Processes: Partly cleared but large areas remaining. Frequent burning may impact negatively on shrub species in some locations. Some remnants may be affected by nearby pine plantations. Some areas including those in reserves such as Courabyra NR are heavily grazed by native animals.

Threatening Process List: Clearing for pine plantations; Inappropriate fire regimes; Soil erosion, water: gully, tunnel, landslips; Unsustainable grazing and trampling by stock; Unsustainable grazing by native animals.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/1a ***Threat Criteria:*** 4; 5.

Planning Controls:

Planning and Management: Prevent too-frequent burning and manage total grazing pressure.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (340; 350). Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 298

Common Name: **Apple Box - Norton's Box - Blakely's Red Gum valley flat moist grassy tall open forest in the southern NSW South-western Slopes and adjoining South East Highlands Bioregions**

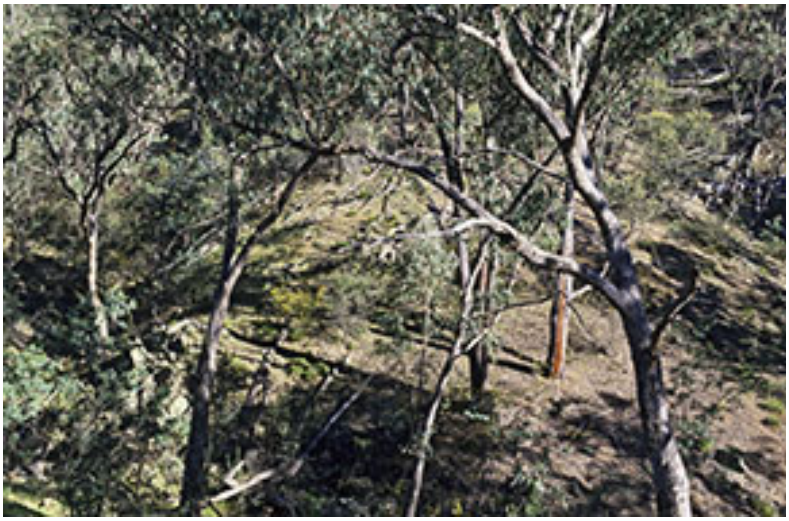
Scientific Name: *Eucalyptus bridgesiana - Eucalyptus nortonii - Eucalyptus macrorhyncha / Acacia dealbata - Melicytus dentatus / Microlaena stipoides var. stipoides - Dichondra repens - Senecio prenanthoides - Luzula densiflora*

Veg. Comm. ID.: **298** ***Original Entry:*** J.S. Benson 4/04/2006

Photo 1: ID298a_S7300406.jpg Norton's Box (Eucalyptus nortonii) - Apple Box (Eucalyptus bridgesiana) with Silver Wattle (Acacia dealbata) and sedge-grass ground cover on a valley flat in Wereboldera SCA near Tumut, [AGD66 35°20.134'S 148°13.427'E], 30/5/2006, Jaime Plaza.

Photo 2: ID298b_DX28340.jpg Norton's Box (Eucalyptus nortonii) - Apple Box (Eucalyptus bridgesiana) - Acacia dealbata valley flat open forest, Jingellic Nature Reserve, [AGD66 35°54.515'S 147°48.694'E], 3/5/2006, Jaime Plaza.

Photo 3: ID298c_PC199-1.jpg Eucalyptus nortonii - Eucalyptus polyanthemos - E. macrorhyncha gully woodland in Downfall Nature Reserve, [AGD66 35°34'14"S 147°50'52"E], 17/10/02, Jaime Plaza.



Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus bridgesiana; Eucalyptus nortonii; Eucalyptus blakelyi; Eucalyptus macrorhyncha; Eucalyptus polyanthemos subsp. vestita; Eucalyptus melliodora.*

Shrubs/Vines/Epiphytes: *Acacia dealbata; Bursaria spinosa subsp. spinosa; Exocarpos cupressiformis; Melicytus dentatus; Dodonaea viscosa subsp. spatulata; Cassinia longifolia; Brachyloma daphnoides subsp. daphnoides; Correa reflexa var. reflexa; Hovea linearis; Hibbertia obtusifolia; Amyema miquelii.*

Ground Cover: *Microlaena stipoides var. stipoides; Dichondra repens; Senecio sp. E; Luzula densiflora; Pteridium esculentum; Rumex brownii; Abutilon oxycarpum; Oxalis perennans; Acaena echinata; Acaena novae-zelandiae; Asperula conferta; Senecio quadridentatus; Poranthera microphylla; Elymus scaber var. scaber; Hydrocotyle laxiflora; Cymbonotus preissianus; Gonocarpus tetragynus; Solenogyne gunnii; Montia fontana subsp. fontana; Drosera peltata; Geranium solanderi var. solanderi; Ranunculus sessiliflorus var. sessiliflorus; Bulbine bulbosa; Euchiton involucratus; Epilobium billardiereanum subsp. cinereum; Scutellaria humilis; Austrodanthonia penicillata; Poa labillardierei var. labillardierei; Austrodanthonia racemosa var. racemosa; Echinopogon ovatus; Asplenium flabellifolium; Oxalis perennans; Glycine clandestina; Persicaria lapathifolia; Juncus flavidus.*

Weed Species: *Rubus discolor; Hypochaeris radicata; Cyperus eragrostis; Centaurium erythraea; Verbena officinalis; Ligustrum sinense; Crataegus monogyna; Paspalum dilatatum; Hypericum perforatum; Echium plantagineum; Plantago lanceolata; Phalaris aquatica.*

Weediness: High (15-30%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest; Woodland.

Height Class (WH): Tall.

Vegetation Description: Tall open forest or woodland dominated by Apple Box (Eucalyptus bridgesiana), Norton's Box (Eucalyptus nortonii) sometimes with Blakely's Red Gum (Eucalyptus blakelyi), Red Stringybark (Eucalyptus macrorhyncha), Red Box (Eucalyptus polyanthemos subsp. vestita) or Yellow Box (Eucalyptus melliodora). Shrubs are sparse although mid-dense stands may occur. Shrub species include Acacia dealbata, Bursaria spinosa subsp. spinosa, Exocarpos cupressiformis, Melicytus dentatus, Dodonaea viscosa subsp. spatulata, Cassinia longifolia and Brachyloma daphnoides subsp. daphnoides. The ground cover is dense and often moist and is dominated by grasses such as Microlaena stipoides var. stipoides, Elymus scaber and Austrodanthonia spp. The rush Luzula densiflora and sedge Carex appressa may be abundant along with the rush Juncus flavidus. Bracken Fern (Pteridium esculentum) may also be present. Forb species include Dichondra repens, Senecio sp. E, Oxalis perennans, Acaena echinata, Acaena novae-zelandiae, Asperula conferta, Senecio quadridentatus, Poranthera microphylla and Rumex brownii. Occurs on on deep grey or yellow clays or clay loams that may be colluvium derived from metamphoric or granitic substrates on valley flats or in gullies in hill or mountain landform patterns in the southern upper slopes sub-region of the NSW South western Slopes Bioregion and adjoining areas in the South East Highlands Bioregion. Mainly cleared for grazing. Weed species such as Blackberry may dominate the ground cover. A threatened community due to its level of clearing and weed infestation.

Level of Classification: Sub-association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus (Mostly Grassy) Box Woodlands of the Tablelands and Western Slopes.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 103 - Apple Box (P); 104 - Longleaved Box (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Includes vegetation groups 14 and 24 in Gellie & Fanning (2004) and vegetation groups 6, 18 and 20 in EcoGIS (2005). Noted in Benson (1999-2009). A sub-association to the more widespread ID283 woodland. Restricted to southern upper slopes.

Interstate Equivalent(s): Not assessed.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped for some reserves by Gellie & Fanning (2004) and EcoGIS (2005). Not sampled or mapped outside reserves as of 2007.

Climate Zone: Montane: no dry season (mild summer); Temperate: no dry season (warm summer).

IBRA Bioregion (v6): South Eastern Highlands (30-70%); NSW South-western Slopes (30-70%).

IBRA Sub-Region: Bondo (1-30%); Upper Slopes (30-70%).

Botanical Division: South Western Slopes (SWS) (30-70%); Southern Tablelands (ST) (30-70%).

Local Govt. Areas: Tumut (1-30%); Tumbarumba (1-30%); Yass Valley (1-30%); Greater Hume (1-30%).

CMAs: Murrumbidgee (30-70%); Murray (30-70%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Metamorphic rocks.

Lithology: Granite; Metamorphic rock (unidentified).

Great Soil Group: Grey earth; Yellow earth; Yellow podzolic soil.

Soil Texture: Clay loam; Light medium clay; Medium clay.

Landform Patterns: Hills; Mountains.

Landform Elements: Gully; Valley flat.

Land Use: Grazing.

Impacts of European Settlement: Major alteration of species composition; Major reduction (>70%) in extent and/or range.

Pre-European Extent: 5000 ha ±50%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Restricted to the southern part of the Upper Slopes sub-region and adjoining highlands regions in the Murrumbidgee and Murray catchments.

Current Extent: 700 ha ±50% or 14% ± 70% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Mainly cleared along creeks for grazing. Weeds infest many remnants.

Conservation Reserves: Bogandyera NR 30 (E1); Jingellic NR 30 (M); Wereboldera SCA 11 (M); Downfall NR 12 (M); Woomargama NP 100 (E2); Woomargama SCA 30 (E1).

Reserves Total Area: 213 ha. ***No. Representatives in Reserves:*** 6

Protected Area Explanation: Boganderya and Jingellic NRs areas from vegetation groups 6, 18 and 20 in ECOGIS (2005). Wereboldera SCA, Downfall NR, Woomargama NP and Woomargama SCA from vegetation groups 24 and 14 in Gellie & Fanning (2004).

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 30.42% 213 ha ± 30%. ***No. Representatives in Protected Areas:*** 6

Protected Pre-European Extent: 4.26% which is inadequately protected across distribution.

Restricted in 1750: Code 5b: <5% of pre-European extent in protected areas (1,000<area<10,000 ha).

Key Sites for Protection: Mostly cleared with small remnants in valleys in the upper Murray and Murrumbidgee catchments.

Degree of Fragmentation: Human induced highly fragmented small stands with <30% extent remaining and high edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Eucalyptus nortonii may be absent from some sites. Shrub may be absent or if present their density varies depending on fire and grazing history. Ground cover varies depending on soil moisture with more sedges in wet areas.

Fire Regime: Original fire regime unknown. Fire is now rare.

Adjoining Communites: Grades into Norton's Box - Red Stringybark forest on the slopes above the valleys. Similar to ID278 in the central and nother of the SWS Bioregion and also similar to ID283.

Threatening Processes: Past clearing that has lead to fragmented remnants and weed infestation ar the main threats. Some weeds such as Blackberry can dominate the ground cover. Somea reas are subject to erosion from roading and recreation use.

Threatening Process List: Clearing for agriculture; Clearing for pine plantations; Recreation over-use; Soil erosion, water: gully, tunnel, landslips; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Endangered. ***Threat/Protected Area Code:*** E/5b ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Prevent further clearing of remnants. Some remnants may require weed control for Blackberry. Fence off some remnants and allow them to regenerate.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (308; 340; 350). Benson, J.S. (1999-2006) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 306

Common Name: **Red Box - Red Stringybark - Norton's Box hill heath shrub - tussock grass open forest of the Tumut region**

Scientific Name: *Eucalyptus polyanthemos subsp. polyanthemos - Eucalyptus macrorhyncha - Eucalyptus nortonii / Platylobium formosum subsp. formosum - Hibbertia obtusifolia - Melichrus urceolatus - Acacia pravissima / Joycea pallida - Stypandra glauca - Poa sieberiana var. sieberiana - Lomandra filiformis subsp. coriacea*

Veg. Comm. ID.: **306** ***Original Entry:*** J.S. Benson 15/07/2006

Photo 1: ID306a_S8300406.jpg Red Box (Eucalyptus polyanthemos) with Red Stringybark (Eucalyptus macrorhyncha) with shrubby understorey including Acacia pravissisma on quartzite hillcrest in Wereboldera SCA near Tumut, [AGD66 35°20.277'S 148°13.428'E], 30/4/2006, Jaime Plaza.

Photo 2: ID306b_S9300406.jpg Red Box (Eucalyptus polyanthemos) with Red Stringybark (Eucalyptus macrorhyncha) with a tussock grass (Joycea pallida) Noddling Blue Lily (Stypandra glauca) and shrub understorey on a quartzite hillcrest in Wereboldera SCA near Tumut, [AGD66 35°21.064'S 148°13.405'E], 30/4/2006, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus polyanthemos subsp. polyanthemos; Eucalyptus macrorhyncha; Eucalyptus nortonii; Eucalyptus melliodora.*

Shrubs/Vines/Epiphytes: *Platylobium formosum subsp. formosum; Hibbertia obtusifolia; Melichrus urceolatus; Acacia pravissima; Acacia paradoxa; Dillwynia phylicoides; Pultenaea spinosa; Grevillea ramosissima subsp. ramosissima; Hovea linearis; Acacia ulicifolia; Persoonia rigida; Leptospermum polygalifolium subsp. polygalifolium; Astrotricha latifolia; Correa reflexa var. reflexa; Xanthorrhoea glauca subsp. angustifolia; Persoonia rigida; Hovea linearis; Exocarpos cupressiformis; Billardiera scandens var. sericata; Leucopogon virgatus; Acacia dawsonii.*

Ground Cover: *Joycea pallida; Stypandra glauca; Poa sieberiana var. sieberiana; Lomandra filiformis subsp. coriacea; Dianella revoluta var. revoluta; Pomax umbellata; Stylidium graminifolium; Gonocarpus tetragynus; Chrysocephalum semipapposum; Hardenbergia violacea; Austrodanthonia racemosa var. racemosa; Cassytha pubescens; Lomandra multiflora subsp. multiflora; Dichelachne micrantha; Stylidium graminifolium; Dianella revoluta var. revoluta.*

Weed Species: *Few weeds are present.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Western limit for Acacia dawsonii.

Threatened Fauna: Not assessed.

Mean Species Richness: Estimated at 25 +/- 10 spp. in 20 X 20 plot (J Benson pers. ob)..

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Mid-High; Tall.

Vegetation Description: Mid-high to tall open forest dominated by Red Box (Eucalyptus polyanthemos subsp. polyanthemos), Red Stringybark (Eucalyptus macrorhyncha) with Norton's Box (Eucalyptus nortonii). Shrubs vary in density from dense in protected sites with better soils and lower fire frequency to sparse on shallow soils on steep ridges or where fire is more common. Shrub species include Acacia pravissima, Hibbertia obtusifolia, Dillwynia phylicoides, Pultenaea spinosa, Grevillea ramosissima subsp. ramosissima and Persoonia rigida. The grass tree Xanthorrhoea glauca subsp. angustifolia may occur. The ground cover is mid-dense to sparse and includes the tussock grass Joycea pallida, Nodding Blue Lily (Stypandra glauca) and snow grass (Poa sieberiana var. sieberiana) along with the mat-rush Lomandra filiformis subsp. coriacea and the forbs Dianella revoluta var. revoluta, Pomax umbellata, Stylidium graminifolium and Gonocarpus tetragynus. Occurs on shallow, yellow clay or loam soil derived from quartz shale in mountain landforms on steep upper hillslopes or hillcrests 350 - 700 m altitude on the south-western corner of the South East Highlands bioregion and the upper slopes of the NSW South-western Slopes Bioregion, particuarly near the town of Tumut. Remaining areas are generally in good condition and less threatened than most other plant communities in the region due to occurrence on poor soils on steep hillslopes and hillcrests.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a shrubby understorey.

Forest Type (RN 17): 99 - Red Box (P).

Authority(s): (Quantitative Data). Includes Vegetation Group 50 in Gellie & Fanning (2004). Field notes in Benson (1999-2009).

Interstate Equivalent(s): Victoria: possibly part of EVC 20: Heathy Dry Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped in reserves by Gellie & Fanning (2004). Not mapped outside reserves as of 2007. Not sampled in Koscoiszko NP.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): South Eastern Highlands (30-70%); NSW South-western Slopes (30-70%).

IBRA Sub-Region: Bondo (30-70%); Upper Slopes (30-70%).

Botanical Division: Southern Tablelands (ST) (>70%); South Western Slopes (SWS) (1-30%).

Local Govt. Areas: Tumut (30-70%); Tumbarumba (1-30%).

CMAs: Murrumbidgee (30-70%); Murray (1-30%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks; Sedimentary rocks.

Lithology: Quartz; Shale.

Great Soil Group: Lithosol; Yellow podzolic soil.

Soil Texture: Light clay; Light medium clay.

Landform Patterns: Mountains.

Landform Elements: Hillcrest; Hillslope.

Land Use: Nature Conservation; Timber Production.

Impacts of European Settlement: No significant impacts known.

Pre-European Extent: 12000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Would have been widespread on hills around Tumut.

Current Extent: 8000 ha ±30% or 67% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Mostly cleared on private land with some stands in State Forests and conservation reserves.

Conservation Reserves: Wereboldera SCA 1691 (E1); Kosciuszko NP 3000 (E4); Mundaroo FR 96 (E4).

Reserves Total Area: 4787 ha. ***No. Representatives in Reserves:*** 3

Protected Area Explanation: Mapped in Wereboldera SCA by Gellie & Fanning (2004). Probably also occurs on the lower western slopes of Kosiuszko National Park but it is not mapped there as of 2006 so a coarse estimate is provided that will require refining. Mundaroo FR needs checking.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 59.83% 4787 ha ± 30%. ***No. Representatives in Protected Areas:*** 3

Protected Pre-European Extent: 39.89% which is adequately protected across distribution.

Common in 1750: Code 1a: >25% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Eastern areas are represented in reserves but remnants in cleared country to the west of Tumut are not represented as of 2007.

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Healthy, structure and composition intact. Insignificant indicators of degradation. Likely to continue in good health if maintained.

Variation & Disturbance: Nodding Blue Lily (Stypandra glauca) and the tussock grass Joycea pallida are more abundant on shallow quartzitic soils on narrow ridges while many of the shrub species are more abundant on broader ridges where the soils are deeper and less quartzitic. Areas west of Tumut contain less Norton's Box and some different understorey species.

Fire Regime: Unknown, but the maintenance of shrub species populations probably requires a inter-fire period of 15 - 50 years.

Adjoining Communites: May grade into Norton's Box - Red Box open forest ID294. Similar to ID310 that lacks Red Box and some shrub species that occurs in Boganderya NR near Tumbarumba. Similar to ID316 but ID316 contains a different understorey and generally lacks Joycea. Similar to ID290 that occurs to the south and west and ID348 that occurs to the north near Boorowa.

Threatening Processes: Forest structure has changed due to native forest logging and some areas may be threatened by clearing for pine plantaitons. Otherwise the main threat could be too-frequent fire for the survival of some shrub species. Fire trails and 4WD use are having minor impacts.

Threatening Process List: Clearing for pine plantations; Inappropriate fire regimes; Recreation over-use; Soil erosion, water: sheet erosion.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/1a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Maintain appropriate fire regimes and limit damage from 4WD tracks in state forests and in reserves such as Wereboldera SCA.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (340; 308). Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Benson, J.S. (1999-2006) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 310

Common Name: **Norton's Box - Red Stringybark grassy tall open forest on sheltered slopes in the Tumbarumba - Murray River region of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus nortonii - Eucalyptus macrorhyncha / Acacia dealbata - Hibbertia obtusifolia - Cassinia longifolia / Poa meionectes - Hydrocotyle laxiflora - Geranium solanderi var. solanderi - Glycine clandestina*

Veg. Comm. ID.: **310** ***Original Entry:*** J.S. Benson 10/08/2006

Photo 1: ID310a_DX28624.jpg Norton's Box (Eucalyptus nortonii) - Red Stringybark (Eucalyptus macrorhyncha) grassy tall open forest with Cassinia longifolia and Melicytus dentatus on sheltered slopes in Tumbarumba-Murray River region, southern Bogandyera Nature Reserve, [AGD66 35°57.660'S 147°59.920'E], 5/5/2006, Jaime Plaza.

Photo 2: ID310b_DX28408.jpg Norton's Box (Eucalyptus nortonii) - Red Stringybark (Eucalyptus macrorhyncha) open forest on granite, Bogandyera Nature Reserve, [AGD66 35°54.081'S 147°50.753'E], 4/5/2006, Jaime Plaza.

Photo 3: ID310c_PC198-18.jpg Eucalyptus nortonii - E. macrorhyncha in Carabost Flora Reserve surrounded by pine plantation, [AGD66 35°36'24"S 147°41'47"E], 17/10/02, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus nortonii; Eucalyptus macrorhyncha; Eucalyptus rossii; Eucalyptus blakelyi.*

Shrubs/Vines/Epiphytes: *Acacia dealbata; Hibbertia obtusifolia; Acrotriche serrulata; Cassinia longifolia; Melicytus dentatus.*

Ground Cover: *Poa meionectes; Hydrocotyle laxiflora; Geranium solanderi var. solanderi; Glycine clandestina; Oxalis perennans; Hypericum gramineum; Cymbonotus preissianus; Wurmbea dioica subsp. dioica; Microtis unifolia; Plantago varia; Acaena novae-zelandiae; Ranunculus sessiliflorus var. sessiliflorus; Austrodanthonia pilosa; Austrodanthonia penicillata; Gonocarpus tetragynus; Lomandra filiformis subsp. coriacea; Lomandra filiformis subsp. filiformis; Luzula densiflora; Senecio bathurstianus; Senecio prenanthoides; Poranthera microphylla; Echinopogon caespitosus var. caespitosus; Viola betonicifolia; Drosera auriculata; Daucus glochidiatus; Themeda australis.*

Weed Species: *Hypochaeris radicata; Hypericum perforatum.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Grevillea rosmarinifolia.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Tall.

Vegetation Description: Tall open forest dominated by Norton's Box (Eucalyptus nortonii), Red Stringybark (Eucalyptus macrorhyncha) and sometimes red gum such as Eucalyptus blakelyi with a sparse shrub cover that includes Acacia dealbata, Hibbertia obtusifolia, Acrotriche serrulata and Cassinia longifolia. The ground cover is sparse to mid-dense and includes grasses such as Poa meionectes, Echinopogon caespitosus var. caespitosus, Austrodanthonia pilosa and Austrodanthonia penicillata; forbs such as Hydrocotyle laxiflora. Geranium solanderi var. solanderi, Oxalis perennans, Hypericum gramineum, Cymbonotus preissianus, Wurmbea dioica subsp. dioica, Plantago varia, Acaena novae-zelandiae, Senecio bathurstianus, Senecio sp. E, Poranthera microphylla and Gonocarpus tetragynus; the climber Glycine clandestina is often present along with the mat-rushes Lomandra filiformis subsp. coriacea and Lomandra filiformis subsp. filiformis and the rush Luzula densiflora. Occurs on yellow to brown loam-clay soils derived from granite and sedimentary rocks on sheltered slopes in hill or mountain landforms in the southern part of the upper slopes sub-region of the NSW South-western Slopes Bioregion and adjoining South East Highland Bioregion. While some areas have been cleared, large areas are protected in reserves as of 2007.

Level of Classification: Sub-association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Eastern Tablelands.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 124 - Red Stringybark (P).

Authority(s): (Quantitative Data). Vegetation Group 5 in EcoGIS (2005) and checked by Benson (1999-2009). A sub-association of the more widespread ID306 but this community lacks Red Box.

Interstate Equivalent(s): Victoria: possibly part of EVC 22: Grassy Dry Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Adequate.

Mapping Info: A large of part of this community is mapped in several reserves near Tumbarumba by EcoGIS (2005). It is well sampled in these reserves.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): South Eastern Highlands (30-70%); NSW South-western Slopes (30-70%).

IBRA Sub-Region: Upper Slopes (30-70%); Bondo (30-70%).

Botanical Division: Southern Tablelands (ST) (30-70%); South Western Slopes (SWS) (30-70%).

Local Govt. Areas: Greater Hume (1-30%); Tumbarumba (>70%); Wagga Wagga (1-30%).

CMAs: Murray (>70%); Murrumbidgee (1-30%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Sedimentary rocks.

Lithology: Granite; Sedimentary rock (unidentified); siltstone.

Great Soil Group: Yellow earth.

Soil Texture: Clay loam; Light clay.

Landform Patterns: Hills; Mountains.

Landform Elements: Hillslope.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: Minor reduction (<30%) in extent and/or range.

Pre-European Extent: 10000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Restricted to hills in the Tumbarumba - Murray River region on the south western slopes.

Current Extent: 6000 ha ±30% or 60% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Some areas have been cleared on private land.

Conservation Reserves: Bogandyera NR 4500 (E2); Clarkes Hill NR 44 (M); Jingellic NR 860 (E1); Carabost FR 1000 (E3); Mundaroo FR 400 (E4).

Reserves Total Area: 6804 ha. ***No. Representatives in Reserves:*** 5

Protected Area Explanation: Bogandyera, Clarkes Hill and Jingellic NR areas (including acquired lands as of Oct 2006) from vegetation group 13 in EcoGIS (2005). Carobost FR estimate based on observation (Benson 1999-2007). Mundaroo FR estimate only - needs checking.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 113.4% 6804 ha ± 10%. ***No. Representatives in Protected Areas:*** 5

Protected Pre-European Extent: 68.04% which is adequately protected across distribution.

Common in 1750: Code 1a: >25% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Well protected in reserves as of 2007. Some areas on private land may be critical for corridor linkages.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Healthy, structure and composition intact. Insignificant indicators of degradation. Likely to continue in good health if maintained.

Variation & Disturbance: Reasonably consistent floristics but restricted in extent and range. Different fire regimes may alter ground cover composition.

Fire Regime: Unknown. Some shrubs may be eliminated if burnt too-frequently. An appropriate fire frequency may be 10-30 years.

Adjoining Communites: Similar to ID294 and ID306 but these contain Red Box. Grades into ID297 (BL Peppermint - Red Stringybark - Norton's Box) open forest on less sheltered hillslopes.

Threatening Processes: Some areas have been cleared or logged and pine plantations may threaten remnants outside reserves.

Threatening Process List: Clearing for pine plantations; Forestry activities including logging; Inappropriate fire regimes; Unsustainable grazing and trampling by stock.

Threat Category: Least Concern. ***Threat/Protected Area Code:*** LC/1a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Manage fire frequency. Minimise clearing for pine plantations and link patches via corridors across private land.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (308; 350). Benson, J.S. (1999-2006) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 342

Common Name: **Mugga Ironbark - mixed box woodland on hills in the Cowra - Boorowa - Young region of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus sideroxylon - Eucalyptus macrorhyncha - Eucalyptus blakelyi - Callitris endlicheri / Acacia implexa - Acacia verniciflua - Cassinia arcuata - Lissanthe strigosa subsp. strigosa / Austrostipa scabra subsp. falcata - Austrodanthonia racemosa var. racemosa - Dianella revoluta var. revoluta - Aristida ramosa*

Veg. Comm. ID.: **342** ***Original Entry:*** J.S. Benson 3/04/2007

Photo 1: ID342a_benson.jpg Eucalyptus sideroxylon - E. polyanthemos woodland in Ilunie Nature Reserve south east of Koorawatha, [AGD66 34°09.806'S 148°35.671'E], 13/2/2007, J.S. Benson.

Photo 2: ID342b_SWS0507440.jpg Eucalyptus sideroxylon with Eucalyptus macrorhyncha and Eucalyptus polyanthemos) in Wyangala State Recreation Area south of Lyndhurst, [AGD66 33°53.406'S 148°59.701'E], 1/6/2007, Jaime Plaza.

Photo 3: ID342c_benson.jpg Eucalyptus sideroxylon woodland with E. blakelyi and Callitris endlicheri on roadside near"Fernhill", south-east of Koorawatha, [AGD66 34°08.437'S 148°34.424'E], 13/2/2007, J.S. Benson.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus sideroxylon; Eucalyptus macrorhyncha; Eucalyptus blakelyi; Eucalyptus polyanthemos subsp. polyanthemos; Eucalyptus goniocalyx; Eucalyptus albens; Eucalyptus rossii; Eucalyptus microcarpa; Callitris endlicheri.*

Shrubs/Vines/Epiphytes: *Acacia verniciflua; Lissanthe strigosa subsp. strigosa; Acacia implexa; Cassinia arcuata; Kunzea parvifolia; Hibbertia obtusifolia; Acacia buxifolia subsp. buxifolia; Acacia genistifolia; Acacia dealbata; Dillwynia sericea; Styphelia triflora; Phyllanthus hirtellus; Grevillea ramosissima subsp. ramosissima; Brachyloma daphnoides subsp. daphnoides; Allocasuarina verticillata.*

Ground Cover: *Austrostipa scabra subsp. falcata; Austrodanthonia racemosa; Dianella revoluta var. revoluta; Aristida ramosa var. ramosa; Cheilanthes sieberi subsp. sieberi; Stypandra glauca; Gonocarpus tetragynus; Chrysocephalum apiculatum; Bothriochloa macra; Austrodanthonia eriantha; Joycea pallida; Panicum effusum; Lepidosperma laterale; Juncus filicaulis; Poa sieberiana; Rumex brownii; Oxalis perennans; Chamaesyce drummondii; Hypericum gramineum; Euchiton gymnocephalus; Solenogyne dominii; Lomandra filiformis subsp. filiformis; Lomandra multiflora subsp. multiflora; Austrodanthonia pilosa; Xerochrysum viscosum; Stypandra glauca; Opercularia aspera.*

Weed Species: *Hypochaeris radicata; Echium plantagineum; Aira cupaniana; Acetosella vulgaris; Trifolium campestre.*

Weediness: Medium (5-15%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Barking Owl; Gilbert's Whistler; Regent Honeyeater; Swift Parrot; Turquoise Parrot; Suberb Parrot; Glossy Black Cuckotoo.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland.

Height Class (WH): Tall.

Vegetation Description: Tall woodland dominated by Mugga Ironbark (Eucalyptus sideroxylon) with Red Stringybark (Eucalyptus macrorhyncha) and a mix of other eucalypt species including Blakely's Red Gum (Eucalyptus blakelyi), Red Box (Eucalyptus polyanthemos), Long-leaved Box (Eucalyptus goniocalyx) and occasionally White Box (Eucalyptus albens). Cypress Pine (Callitris endlicheri) may occur as a small tree layer. The shrub layer is sparse and absent in heavily grazed sites. Common shrub species include Hickory (Acacia implexa), Sifton Bush (Cassinia arcuata), Lissanthe strigosa subsp. strigosa, Acacia verniciflua, Hibbertia obtusifolia, Brachyloma daphnoides, Styphelia triflora and Acacia buxifolia subsp. buxifolia. The ground cover is sparse but may be mid-dense depending on grazing and rainfall. Grass species include Austrodanthonia racemosa var. racemosa, Aristida ramosa var. ramosa, Austrostipa scabra subsp. falcata, Poa sieberiana and Bothriochloa macra. Forb species include Gonocarpus tetragynus, Chrysocephalum apiculatum, Oxalis perennans, Stypandra glauca, Chamaesyce drummondii, Hypericum gramineum and Solenogyne dominii. The graminodes Lomandra filiformis subsp. filiformis and Lomandra multiflora subsp. multiflora may occur along with the rock fern Cheilanthes sieberi subsp. sieberi. The rush Juncus filicaulis occurs in depressions. Occurs on yellow to brown gravel, clay-loam soils derived from volcanic rocks such as rhyolite and sedimentary soils such as shale or metamorphic rocks such as phyllite on hillcrests and upper hillslopes in hill landform patterns in the upper slopes sub-region of the NSW South-western Slopes Bioregion in the Cowra - Boorowa - Young regions. Mainly cleared with remnants on public land and along roadsides or on hilltops on private land most of which have been heavily grazed. Some small areas are sampled in reserves as of 2007.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Ironbark Woodlands and Forests of the Inland Slopes, Plains and Peneplains.

State Veg Map (Keith 2004): Upper Riverina Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 206 - Red Ironbark (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Part of the Red Stringybark - Joycea tussock grass woodland map unit in Boorowa Shire in NSWNPWS (2002a). Probably part of Biolandscapes HerS53c, IIIV39, UlaV53 and WagM53c in Priday (2006) although WagM53c could be split off. Possibly includes part of Vegetation Group 118 in Gellie (2005). Probably community C10 in Bos & Lockwood (1996). Part of BVT 12 in DEC (2006a). Observed by Benson (1999-2009) and sampled in Ilunie region south of Cowra, for example see site KWA08.

Interstate Equivalent(s): Victoria: some similarities with Box-Ironbark Forest EVC 61.

Mapped/Modelled: Current extent and pre-European extent not mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Sampled and mapped in some reserves but not mapped over range - requires detailed mapping to map remnants. Mapped as part of a broader map unit in Boorowa Shire. Partly mapped in DECCW (2010b).

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): South Eastern Highlands (1-30%); NSW South-western Slopes (>70%).

IBRA Sub-Region: Crookwell (1-30%); Murrumbateman (1-30%); Upper Slopes (>70%).

Botanical Division: South Western Slopes (SWS) (1-30%); Central Western Slopes (CWS) (30-70%); Central Tablelands (CT) (1-30%).

Local Govt. Areas: Yass Valley (1-30%); Young (1-30%); Upper Lachlan (1-30%); Cowra (1-30%); Boorowa (1-30%); Junee (1-30%).

CMAs: Murrumbidgee (1-30%); Lachlan (30-70%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks; Sedimentary rocks; Volcanic rocks.

Lithology: Phyllite; Rhyolite; Sandstone; Shale.

Great Soil Group: Brown podzolic soil; Red podzolic soil; Yellow podzolic soil.

Soil Texture: Light clay; Light medium clay.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Major alteration of species composition; Major reduction (>70%) in extent and/or range.

Pre-European Extent: 12000 ha ±30%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: This community would have been one of the main communities occurring on hillcrests in the Cowra - Boorowa - Young - Wyangala regions on the NSW central western slopes.

Current Extent: 5000 ha ±30% or 42% ± 50% of pre-European extent remaining.

Current Extent Comments: (Expert estimate). Most areas have been cleared with patches remaining on hill tops or in public lands.

Conservation Reserves: Illunie NR 45 (E2); Dananbilla NR 700 (E1); Gungewalla NR 10 (E3); Jindalee NP 760 (E1).

Reserves Total Area: 1515 ha. ***No. Representatives in Reserves:*** 4

Protected Area Explanation: Ilunie NR from Benson (1999-2007 and part of Porteners (2007) White Box - Mugga Ironbark community. Dananbilla NR estimate from community 3b in Porteners (2007) and descriptions in NSW NPWS (undated e). Gunawalla NR not mapped by Porteners (2007) but described in NSWNPWS (undated e). Jindalee NP from DECCW (2010b). VCA044 and VCA033 estimates from DECC file notes.

Secure Property Agreements: VCA044 VCA 20 (E3); VCA033 VCA 100 (E3).

Secure PAs Total Area: 120 ha. ***No. Representatives in Secure Property Agreements:*** 2

Protected Current Extent: 32.7% 1635 ha ± 10%. ***No. Representatives in Protected Areas:*** 6

Protected Pre-European Extent: 13.62% which is inadequately protected across distribution.

Common in 1750: Code 3a: 5-15% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Reasonably well protected. Large areas occur in the Wyangala State Recreation Area (which is not an IUCN conservation reserve) and this is a key area for protecting this community. Patches occur on the Ilunie Range and on hills between Cowra and Boorowa but most areas are in poor condition. Also in Bendick Murrell State Forest (reserved in 2011).

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Unknown - greatly affected by grazing pressure - areas protected from grazing contain shrubs.

Fire Regime: Unknown - now rarely burns due to fragmentation and grazing of ground cover. Pre-European wildfires may have burnt this community every two decades or so.

Adjoining Communites: Grades into ID342 - Red Box - White Box woodland. A similar community occurs on the lower slopes to the west (ID217).

Threatening Processes: Mainly cleared with some remnants on hills or in rugged valleys. At most locations the understorey has been heavily grazed by stock or goats - this has reduce the shrub cover.

Threatening Process List: Age class of woody vegetation; Clearing for agriculture; Disease and/or dieback (abnormal); Firewood collection; Unsustainable grazing and trampling by stock.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/3a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Prevent further clearing of remnants, fence remnants off from stock and allow regeneration of shrubs and trees. Improve protection status of the Wyangala State Recreation Area.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (308; 336; 356; 362; 353; 177; 373; 379; 634). Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); NSW National Parks and Wildlife Service (2002a) The native vegetation of Boorowa Shire (NSW National Parks and Wildlife Service: Hurstville); Priday, S. (in prep. 2006) The native vegetation of the New South Wales South-western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; NSW National Parks and Wildlife Service (undated e) Sandy Creek (Wambanumba) Nature Reserve Proposal (Dananbilla NR). Investigation report (NSWNPWS file M2502); Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254; Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); Porteners, M.F. (2007) Vegetation survey and mapping of Koorawatha, Dananbilla, Gungewalla and Illunie Nature Reserves. Report to Department of Environment and Climate Change NSW; DECCW (2010b) Vegetation Mapping by 3-D Digital Image Interpretation - DECCW South Branch Report Series Report No. 3: Vegetation of the Cootamundra and Junee 1:100,000 mapsheets. Technical Report DECCW 2010/70. NSW Department of Environment, Climate Chang.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 54

Common Name: **Buloke - White Cypress Pine woodland in the NSW South-western Slopes Bioregion**

Scientific Name: *Allocasuarina luehmannii - Callitris glaucophylla - Eucalyptus sideroxylon - Eucalyptus microcarpa / Acacia doratoxylon - Ozthamnus diosmifolius - Leptospermum divaricatum / Aristida ramosa - Gonocarpus elatus - Xerochrysum viscosum - Cheilanthes sieberi subsp. sieberi*

Veg. Comm. ID.: **54** ***Original Entry:*** John Benson 31/12/2005

Photo 1: ID54a_PC251-6.jpg Allocasuarina luehmannii - Eucalyptus microcarpa woodland, west side of Goobang National Park, [AGD66 32°46'22.5"S 148°16'49.5"E], 4/05/2005, Jaime Plaza.

Photo 2: ID54b_PC251-9.jpg Allocasuarina luehmannii - E. microcarpa woodland, west side of Goobang National Park, [AGD66 32°46'22.5"S 148°16'49.5"E], 04/05/2005, Jaime Plaza.

Photo 3: ID54c_Img393mp.jpg Allocasuarina luehmannii and Callitris glaucophylla open woodland with Acacia hakeoides, in the north-west section of Goobang National Park, NSW south west slopes, 1997, M.F. Porteners.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Allocasuarina luehmannii; Callitris glaucophylla; Eucalyptus populnea subsp. bimbil; Eucalyptus sideroxylon; Eucalyptus microcarpa; Acacia doratoxylon; Casuarina cristata; Brachychiton populneus subsp. populneus; Callitris endlicheri.*

Shrubs/Vines/Epiphytes: *Ozothamnus diosmifolius; Acacia hakeoides; Leptospermum divaricatum; Acacia havilandiorum; Acacia deanei subsp. paucijuga; Olearia decurrens; Olearia ramulosa; Myoporum montanum; Daviesia genistifolia; Pultenaea largiflorens; Dodonaea heteromorpha; Dodonaea viscosa subsp. cuneata; Calytrix tetragona; Micromyrtus striata; Cassinia quinquefaria; Beyeria viscosa; Melaleuca uncinata; Melaleuca uncinata.*

Ground Cover: *Aristida ramosa; Gonocarpus elatus; Xerochrysum viscosum; Cheilanthes sieberi subsp. sieberi; Austrostipa densiflora; Austrodanthonia setacea; Enteropogon acicularis; Elymus scaber var. plurinervis; Eragrostis lacunaria; Austrodanthonia monticola; Panicum decompositum; Dampiera lanceolata var. lanceolata; Laxmannia gracilis; Hibbertia obtusifolia; Poranthera microphylla; Stuartina muelleri; Dianella revoluta var. revoluta; Dianella revoluta var. revoluta; Lomandra filiformis subsp. coriacea; Melichrus urceolatus; Tricoryne elatior; Thyridolepis mitchelliana; Juncus flavidus; Monachather paradoxus.*

Weed Species: *Vulpia myuros; Lolium rigidum.*

Weediness: Medium (5-15%) with 10-30% cover.

Threatened Plants: Tylophora linearis (E).

Threatened Fauna: Not assessed.

Mean Species Richness: 25±3 (Lewer et al. 2003 in 20x50 m plots), 23 +/- 8 (community 8 in Porteners 1997a in 20 x 20 m plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland.

Height Class (WH): Mid-High; Tall.

Vegetation Description: Woodland or open woodland dominated by Buloke (Allocasuarina luehmannii) usually as a small tree under White Cypress Pine (Callitris glaucophylla), Poplar Box (Eucalyptus populnea subsp. bimbil), Mugga Ironbark (Eucalyptus sideroxylon), Grey Box (Eucalyptus microcarpa) and Currawang (Acacia doratoxylon). Buloke may occur in monspecific stands. Shrub layer may be mid-dense or sparse and is quite diverse including species such as Ozothamnus diosmifolius, Acacia hakeoides, Leptospermum divaricatum, Acacia havilandiorum, Acacia deanei subsp. paucijuga, Olearia decurrens, Olearia ramulosa, Myoporum montanum, Daviesia genistifolia and Hibbertia obtusifolia. Patches of Broombush (Melaleuca uncinata) may occur. The ground cover is often bare and usually sparse and includes grasses such as Aristida ramosa, Austrostipa densiflora, Austrodanthonia setacea, Enteropogon acicularis, Elymus scaber var. plurinervis and Eragrostis lacunaria. Forbs include Gonocarpus elatus, Xerochrysum viscosum, Dampiera lanceolata var. lanceolata, Laxmannia gracilis, Poranthera microphylla, Stuartina muelleri, Dianella revoluta var. revoluta and Tricoryne elatior. The rock fern Cheilanthes sieberi subsp. sieberi is often abundant. Occurs on colluvial sandy loam soils on the mid-slopes of rises or footslopes on undulating plains. Most of this community has been cleared for grazing or cropping and most remaining stands have been heavily grazed and subject to sheet erosion. Most often occurs in small patches, in the central wheatbelt of NSW mainly in the NSW South-western slopes Bioregion in the temperate (hot summer) climate zone. Small stands may occur in the Darling Riverine Plains Bioregion north of Dubbo. Contains different associate species to the White Cypress Pine and Buloke communities along the Murray River in southern NSW and those in the Pilliga to the north. This community is threatened due to its limited extent and fragmentation effects.

Level of Classification: Association. ***Classification Confidence Level:*** High.

Formation Group: Casuarina Woodlands of the Inland Slopes and Plains.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Casuarina and Allocasuarina forests and woodlands.

Forest Type (RN 17): 213 - Bull Oak (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Estimated to be much of map unit P7 in Sivertsen & Metcalfe (1995) and southern areas of P7 in Sivertsen & Metcalfe (2001) where it is described as occurring on backplains on earthy-sandy soils. Part of BVT 8 in Kerr et al. (2003). Recorded in the Mid-Lachlan regional vegetation planning area (DLWC 1999). Incorporates community 10 in Austin et al. (2000) for the central Lachlan region as part of their Western Grey Box alliance. Community 9 in Porteners (1997) in Goobang NP west of its western boundary. Equivalent to Floristic Group 27 which is part of map unit HFS1 in Lewer et al. (2003) in the vegetation mapping of central NSW. Part of BVT 73 in DEC (2006a). Closely allied to the Mugga Ironbark-Western Grey Box association of the NSW South-western Slopes (ID217). Grades into ID55 Belah woodland where Belah dominates.

Interstate Equivalent(s): None.

Mapped/Modelled: Current extent and pre-European extent mapped or modelled as part of a broader complex. ***Plot Sampling:*** Adequate.

Mapping Info: Mapped as a minor part of map unit HFS1 in Lewer et al. (2003) in central NSW. Mapped as minor part of P7 in Sivertsen & Metcalfe (1995 & 2001). Mapped as community 9 in Goobang NP (Porteners (1997). Modelled for central Lachlan region by Austin et al. (2000).

Climate Zone: Temperate: no dry season (hot summer).

IBRA Bioregion (v6): Darling Riverine Plains (1-30%); NSW South-western Slopes (>70%).

IBRA Sub-Region: Bogan-Macquarie (1-30%); Lower Slopes (>70%).

Botanical Division: Central Western Slopes (CWS) (>70%).

Local Govt. Areas: Forbes (1-30%); Lachlan (1-30%); Narromine (1-30%); Parkes (1-30%).

CMAs: Central West (1-30%); Lachlan (30-70%).

MD Basin: Yes.

Substrate Mass: Colluvium; Sedimentary rocks.

Lithology: Colluvial sediments; Sedimentary rock (unidentified).

Great Soil Group: Grey earth; Red-brown earth.

Soil Texture: Loamy sand; Sandy loam.

Landform Patterns: Peneplain; Plain.

Landform Elements: Flood-out; Footslope; Plain.

Land Use: Cropping and Horticulture; Grazing.

Impacts of European Settlement: Major reduction (>70%) in extent and/or range; Major alteration of species composition.

Pre-European Extent: 20000 ha ±50%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Mostly cleared on lower ground in the NSW wheatbelt but some areas remaining. A minor part of the map unit BVT 8 in Kerr et al. (2003) for around Dubbo. Most of BVT8 is ID56 - Poplar Box-Belah.

Current Extent: 4000 ha ±50% or 20% ± 80% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Austin et al. (2000) modelled Buloke with Western Grey Box for central Lachlan area and predict only 3% remains but this samples only part of the area. Lewer et al. (2003) map 38300 ha of map unit HSL1 that includes this community but it is estimated that this community would comprise a small proportion of that map unit. Kerr et al. (2003) estimate that 21% of their broader map unit BVT8 remains.

Conservation Reserves: Goobang NP 600 (M).

Reserves Total Area: 600 ha. ***No. Representatives in Reserves:*** 1

Protected Area Explanation: Porteners (1997) maps this community in Goobang National Park near Peakhill, central NSW. Buloke occurs in other reserves but as a sub-dominant in other communities. Areas in PAs GE9902 and GE9903 from Sivertsen & Metcalfe (1995) but this may be inaccurate.

Secure Property Agreements: GE9902 PA 8 (E2); GE9903 PA 4 (E2).

Secure PAs Total Area: 12 ha. ***No. Representatives in Secure Property Agreements:*** 2

Protected Current Extent: 15.3% 612 ha ± 30%. ***No. Representatives in Protected Areas:*** 3

Protected Pre-European Extent: 3.06% which is inadequately protected across distribution.

Common in 1750: Code 4a:1-5% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Flats west of the northern section of Goobang National Park. Requires advice on areas mapped by Lewer et al. (2003) and checking of other sites.

Degree of Fragmentation: Human induced highly fragmented small stands with <30% extent remaining and high edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Buloke is more common as a sub-ordinant species in ironbark forests and is relatively restricted in extent as a dominant but it becomes dominant on certain loamy sand soils types.

Fire Regime: Infrequent. Intense fires may kill Buloke.

Adjoining Communites: Grades into Mugga Ironbark on ridges, Poplar Box woodland on loamy soils and Grey Box woodland on clayey alluvial soils. Occurs as distinct stands within major woodland types such as Poplar Box - Callitris Woodland.

Threatening Processes: Clearing for cropping and grazing, lack of regeneration due to grazing pressures and soil erosion and salinity in some locations.

Threatening Process List: Age class of woody vegetation; Clearing for agriculture; Dryland cropping; Irrigated cropping (incl. horticulture); Salinity; Soil erosion; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Endangered. ***Threat/Protected Area Code:*** E/4a ***Threat Criteria:*** 1; 3; 4.

Planning Controls:

Planning and Management: Requires protection from clearing in catchment or other planning instruments and some remnants should be fenced off from continuous grazing by stock. This community should be added to the EEC listings of Buloke Woodland in southern NSW listed under the NSW TSC Act and Commonwealth EPBC Act.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (183; 318; 293; 67; 69; 34; 46; 373). Austin, M.P., Cawsey, E.M., Baker, B.L., Yialeloglou, M.M., Grice, D.J. & Briggs, S.V. (2000) Predicted vegetation cover in the central Lachlan region. National Heritage Trust Project AA 1368.97. (CSIRO Division of Wildlife and Ecology: Canberra); Kerr, M., Jowett, A. & Robson, D. (2003) Reconstructed distribution and extent of native vegetation within the lower Macquarie-Castlereagh Region. Unpublished Report. (NSW National Parks and Wildlife Service, Western Directorate: Dubbo); Lewer, S., Ismay, K., Grounds, S., Gibson, R., Harris, M., Armstrong, R., Deluca, S. & Ryan, C. (2003) Native vegetation map report Bogan Gate, Boona Mount, Condobolin, Dandaloo, Tottenham and Tullamore 1:100 000 map sheets. (NSW Department of Infrastructure, Planning and Natural Resources). Submitted to Cunninghamia; Mid-Lachlan Regional Vegetation Committee (1999) Plan Draft Mid-Lachlan Regional Vegetation Management Plan for Public Exhibition. (Mid-Lachlan RVC: Forbes); Porteners, M. (1997) Vegetation communities of Goobang National Park and adjoining areas. Unpublished report and vegetation map to NSW National Parks and Wildlife Service: Bathurst; Sivertsen, D. & Metcalfe, L. (1995) Natural vegetation of the southern wheat-belt (Forbes and Cargelligo 1:250 000 map sheets). Cunninghamia 4(1): 103-128; Sivertsen, D. & Metcalfe, L. (2001) Northern wheatbelt vegetation mapping. Unpublished 1:250 000 scale vegetation maps and vegetation descriptions covering northern NSW wheatbelt. (NSW National Parks and Wildlife Service: Hurstville); DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 110

Common Name: **Western Grey Box - Cypress Pine shrubby woodland on stony footslopes in the NSW South Western Slopes and Riverina Bioregions**

Scientific Name: *Eucalyptus microcarpa - Callitris endlicheri / Acacia buxifolia subsp. buxifolia - Acacia deanei subsp. deanei - Acacia paradoxa / Austrodanthonia eriantha - Cheilanthes sieberi*

Veg. Comm. ID.: **110** ***Original Entry:*** John Benson 31/12/2005

Photo 1: ID110a_img001pc.jpg Eucalyptus microcarpa - Callitris glaucophylla shrubby woodland, The Rock Nature Reserve, [AGD66, 35°15'43.4"S 147°04'31.1"E], 8/4/02, Jaime Plaza.

Photo 2: ID110b_img002pc.jpg Eucalyptus microcarpa - Callitris glaucophylla shrubby woodland, The Rock Nature Reserve, [AGD66, 35°15'43.4"S 147°04'31.1"E], 8/4/02, Jaime Plaza.

Photo 3: ID110c_PC167.jpg Eucalyptus microcarpa - Callitris glaucophylla woodland, Nangar National Park, [AGD66 33°24'28"S 148°27'49"E], 9/10/02, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus microcarpa; Callitris endlicheri; Callitris glaucophylla; Eucalyptus sideroxylon; Eucalyptus albens; Brachychiton populneus subsp. populneus.*

Shrubs/Vines/Epiphytes: *Dodonaea viscosa subsp. cuneata; Acacia buxifolia subsp. buxifolia; Acacia deanei subsp. deanei; Acacia paradoxa; Cassinia laevis; Beyeria viscosa; Acacia doratoxylon; Phyllanthus hirtellus; Ozothamnus obcordatus subsp. obcordatus; Cassinia arcuata; Acacia verniciflua; Philotheca difformis subsp. difformis; Acacia difformis; Hibbertia riparia.*

Ground Cover: *Austrodanthonia eriantha; Cheilanthes sieberi subsp. sieberi; Microlaena stipoides var. stipoides; Einadia nutans subsp. nutans; Einadia hastata; Poa sieberiana; Stuartina muelleri; Daucus glochidiatus; Dianella revoluta var. revoluta; Xerochrysum viscosum; Xerochrysum bracteatum; Austrostipa scabra subsp. falcata; Calotis cuneifolia; Elymus scaber var. scaber; Sida cunninghamii; Chrysocephalum apiculatum; Goodenia pinnatifida; Austrostipa setacea; Vittadinia cuneata; Stypandra glauca; Laxmannia gracilis; Oxalis perennans; Solanum esuriale; Dichondra repens; Hydrocotyle laxiflora; Wahlenbergia luteola; Austrodanthonia caespitosa; Goodenia hederacea subsp. hederacea; Eragrostis leptostachya; Oxalis corniculata; Gonocarpus elatus.*

Weed Species: *Echium plantagineum; Marrubium vulgare; Medicago polymorpha.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland; Open Woodland.

Height Class (WH): Mid-High.

Vegetation Description: Mid-high woodland dominated by Western Grey Box (Eucalyptus microcarpa) with Black Cypress Pine (Callitris endlicheri) and sometimes White Cypress Pine (Callitris glaucophylla). A sparse shrub layer includes Beyeria viscosa, Dodonaea viscosa subsp. cuneata, Acacia buxifolia subsp. buxifolia, Acacia paradoxa, Acacia deanei subsp. deanei, Acacia doratoxylon, Cassinia aculeata and Ozothamnus obcordatus subsp. obcordatus. Weeds include Echium plantagineum and Marrubium vulgare. A mid-dense to sparse ground cover includes Austrodanthonia spp., Aristida spp., Austrostipa spp., Stuartina muelleri, Daucus glochidiatus, Cheilanthes sieberi subsp. sieberi, Dianella revoluta var. revoluta and Xerochrysum viscosum. Occurs on stony clay or loam colluvial soils on footslopes of low hills or hills on sloping terrain sometimes with rock outcropping. These soils are often derived from sandstones. Distributed mainly on the NSW South-western Slopes Bioregion with some areas in the Cobar Peneplain Bioregion (Cocoparra National Park). Ecotonal between hill communities upslope and box woodland on the plains. A vulnerable community as most of it has been cleared but not as threatened as the grassy woodlands on the plains.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus (Mostly Grassy) Box Woodlands of the Inland Plains.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 182 - Black Cypress Pine-Box (P); 203 - Western Box (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Community C3.4 in Bos & Lockwood (1996). Includes to community 1b in Whiting 1997 for Cocoparra NP and NR. Community 1 in Whiting (20060 for The Rock NR. Probably includes Biolandscape LacM25a in Priday (2006). Species recorded by J Benson (pers. comm). An ecotonal community between the plains and hills.

Interstate Equivalent(s): Probably in Victoria.

Mapped/Modelled: Current extent and pre-European extent not mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Partly surveyed by Bos & Lockwood (1996) but not mapped. Mapped in Cocoparra NP and NR by Whiting (1997). Also mapped in other reserves e.g. Nangar NP.

Climate Zone: Temperate: no dry season (hot summer).

IBRA Bioregion (v6): Cobar Peneplain (1-30%); NSW South-western Slopes (>70%).

IBRA Sub-Region: Lower Slopes (>70%); Nymagee (1-30%).

Botanical Division: Central Western Slopes (CWS) (1-30%); South Western Plains (SWP) (1-30%); South Western Slopes (SWS) (30-70%).

Local Govt. Areas: Bland (1-30%); Carrathool (1-30%); Coolamon (1-30%); Narrandera (1-30%); Wagga Wagga (1-30%); Weddin (1-30%); Lockhart (1-30%).

CMAs: Lachlan (1-30%); Murray (1-30%); Murrumbidgee (1-30%).

MD Basin: Yes.

Substrate Mass: Colluvium; Decomposed rock; Metamorphic rocks; Sedimentary rocks.

Lithology: Conglomerate; Greywacke; Metamorphic rock (unidentified); Sandstone; Siltstone.

Great Soil Group: Red clay; Red earth.

Soil Texture: Clay loam; Light clay.

Landform Patterns: Hills; Low hills.

Landform Elements: Footslope; Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Major alteration of species composition; Major reduction (>70%) in extent and/or range.

Pre-European Extent: 40000 ha ±50%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Requires detailed modelling or mapping.

Current Extent: 10000 ha ±50% or 25% ± 80% of pre-European extent remaining.

Current Extent Comments: (Expert estimate). Requires detailed mapping - most areas occur as small hillside remnants.

Conservation Reserves: Cocoparra NP 100 (M); Cocoparra NR 41 (M); Nangar NP 17 (M); The Rock NR 130 (E2).

Reserves Total Area: 288 ha. ***No. Representatives in Reserves:*** 4

Protected Area Explanation: Cocoparra NP and NR from community 1b in Whiting (1997). The Rock NR based on NPWS (undated a) and Whiting (2006). Ingalba NR from NSW NPWS (1987e) - where it possibly mixes with other box communities. Nangar NP from community 1 in ERM Mitchell McCotter (1996). Pucawan NR estimate from NSW NPWS (1976).

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 2.88% 288 ha ± 30%. ***No. Representatives in Protected Areas:*** 4

Protected Pre-European Extent: 0.72% which is inadequately protected across distribution.

Common in 1750: Code 5a: <1% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: May be present in several state forests between Forbes and Naranderra and at the base of some rocky outcrops - see Bos & Lockwood (1996). Otherwise requires survey to determine sites. Pleasand Hills South-west of Wagga. Footslopes of Mt Boormanooma near Tocumwal near the Murray River (Norris & Thomas 1991) contains a stand on fine-grained metamorphic substrate. Back Yamma and Warraderry State Forests may contain this community.

Degree of Fragmentation: Human induced highly fragmented small stands with <30% extent remaining and high edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: An ecotonal community between the more widespread Western Grey Box communities (ID76 and 80) on the plains and hill communities. The species composition contains species from both of these landforms.

Fire Regime: May be burnt every few decades. Fires do not carry as far due to fragmentation due to surrounding cropping and grazing lands.

Adjoining Communites: Grades downslope into either ID80 or ID76 that occur on flatter terrain. Grades into Eucalyptus dwyeri - Acacia doratoxylon - Allocasuarina verticillata low woodland (ID185) upslope on rocky hills or Mugga Ironbark-Western Grey Box (ID217).

Threatening Processes: Most of the footslopes and lower slopes of this community have been cleared. Remnants remain in some state forests and nature reserves. Less threatened than the Western Grey Box woodlands on the plains.

Threatening Process List: Clearing for agriculture; Dryland cropping; Soil erosion; Unsustainable grazing and trampling by stock.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/5a ***Threat Criteria:*** 1; 5.

Planning Controls:

Planning and Management: Requires protection from clearing in regional vegetation plans and catchment plans. Some areas should be fenced off from stock to allow the ground cover to recover from past heavy grazing.

Listed Under Legislation: Listed TSC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (Part).

Recovery Plan: Doesn't exist, but required.

Reference List: (177; 151; 263; 154; 207; 153; 143; 356; 522). Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Brickhill, J. (1976c) Investigation report: Pucawan Nature Reserve proposal. File note RN 18. (NSW National Parks and Wildlife Service: Griffith); ERM Mitchell McCotter Pty. Ltd. (1996) Bathurst vegetation survey for NSW National Parks and Wildlife Service: Bathurst District covering Winburndale NR, Nangar NP, Conimbla NP and Weddin Mountains NP. (NSW National Parks and Wildlife Service: Bathurst); Norris, E.H. & Thomas, J. (1991) Vegetation on rocky outcrops and ranges in central and south-western New South Wales. Cunninghamia 2(3): 411-442; NSW National Parks and Wildlife Service (1987b) Ingalba Nature Reserve existing vegetation information. File note RN 37. (NSW National Parks and Wildlife Service: Griffith); NSW National Parks and Wildlife Service (undated a) The Rock Nature Reserve information leaflet. File note RN 38. (NSW National Parks and Wildlife Service: Griffith); Whiting, E. (1997) Vegetation survey of Cocoparra National Park and Cocoparra Nature Reserve. Unpublished report (NSW National Parks and Wildlife Service: Griffith District); Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; Whiting, E. (2006) Vegetation survey of the Rock Nature Reserve.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 217

Common Name: **Mugga Ironbark - Western Grey Box - cypress pine tall woodland on footslopes of low hills in the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus sideroxylon - Eucalyptus microcarpa - Callitris endlicheri / Acacia deanei subsp. deanei - Acacia hakeoides - Dodonaea viscosa subsp. spatulata - Lissanthe strigosa subsp. strigosa / Austrodanthonia setacea - Austrostipa densiflora - Stypandra glauca - Cheilanthes sieberi subsp. Sieberi*

Veg. Comm. ID.: **217** ***Original Entry:*** John Benson 31/12/2005

Photo 1: ID217a_img146pc.jpg Eucalyptus sideroxylon - E. microcarpa woodland, The Charcoal Tank Nature Reserve, [AGD66 33°59'05.6"S 147°09'17.7"E], 19/4/02, Jaime Plaza.

Photo 2: ID217b_SWS0507536.jpg Mugga Ironbark (Eucalyptus sideroxylon) - Western Grey Box (Eucalyptus microcarpa) shrubby tall woodland near Reefton on the Temora to Wyalong Road, [AGD66 34°16.579'S 147°26.929'E], 30/5/2007, Jaime Plaza.

Photo 3: ID217c_img300pc.jpg Eucalyptus sideroxylon - E.microcarpa woodland, Big Bush Nature Reserve, [AGD66 34°21'19"S 147°25'24"E], 13/10/02, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus sideroxylon; Eucalyptus microcarpa; Callitris endlicheri; Callitris glaucophylla; Eucalyptus dwyeri; Allocasuarina luehmannii; Eucalyptus viridis; Acacia doratoxylon; Brachychiton populneus subsp. populneus; Eucalyptus polyanthemos subsp. polyanthemos.*

Shrubs/Vines/Epiphytes: *Acacia deanei subsp. deanei; Acacia hakeoides; Dodonaea viscosa subsp. spatulata; Lissanthe strigosa subsp. strigosa; Acacia paradoxa; Acacia genistifolia; Dodonaea viscosa subsp. cuneata; Ozothamnus diosmifolius; Santalum acuminatum; Olearia ramulosa; Bertya cunninghamii; Melichrus urceolatus; Acacia buxifolia subsp. buxifolia; Leptospermum divaricatum; Cassinia laevis; Cassinia aculeata; Cassinia uncata; Calytrix tetragona; Exocarpos cupressiformis; Olearia muelleri; Dodonaea heteromorpha; Gompholobium huegelii; Melaleuca lanceolata subsp. lanceolata; Grevillea floribunda; Acacia difformis; Hibbertia obtusifolia.*

Ground Cover: *Austrodanthonia setacea; Austrostipa densiflora; Einadia hastata; Stypandra glauca; Cheilanthes sieberi subsp. sieberi; Calotis cuneifolia; Dianella revoluta var. revoluta; Xerochrysum viscosum; Goodenia hederacea subsp. hederacea; Austrostipa scabra subsp. scabra; Eragrostis lacunaria; Austrodanthonia fulva; Austrodanthonia monticola; Astroloma humifusum; Einadia nutans subsp. nutans; Oxalis perennans; Solanum ferocissimum; Brachyloma daphnoides subsp. daphnoides; Poa sieberiana var. hirtella; Lomandra filiformis subsp. filiformis; Xerochrysum bracteatum; Hydrocotyle laxiflora; Luzula densiflora; Hypericum gramineum; Elymus scaber var. scaber; Chrysocephalum semipapposum; Dichondra repens; Echinopogon ovatus.*

Weed Species: *Hypochaeris glabra; Hypochaeris radicata; Trifolium arvense; Trifolium campestre; Briza maxima; Aira cupaniana; Anagallis arvensis.*

Weediness: Low (<5%) with 10-30% cover.

Threatened Plants: Grevillea wiradjuri; Pterostylis setifera; Pultenaea largiflorens.

Threatened Fauna: Not assessed.

Mean Species Richness: 30±1 (Lewer et al. 2003 in 20x50 m plots); 28 +/- 3 (Porteners 2001b in 20 x 20 m plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest; Woodland.

Height Class (WH): Tall; Very Tall.

Vegetation Description: Tall to Very Tall open forest to woodland to 25m high dominated by Mugga Ironbark (Eucalyptus sideroxylon) and Western Grey Box (Eucalyptus microcarpa) with either White Cypress Pine (Callitris glaucophylla) or Black Cypress Pine (Callitris endlicheri). Mugga Ironbark may dominate some sites. Other trees may include Dwyer's Red Gum (Eucalyptus dwyeri), Kurrajong (Brachychiton populneus subsp. populneus) and Green Mallee (Eucalyptus viridis). Small trees include narrow-leaved quandong (Santalum acuminatum), Native Cherry (Exocarpos cupressiformis) or Currawong (Acacia doratoxylon). The shrub layer is generally sparse but thickets may occur and species composition depends on grazing and burning history. It includes hop bushes (Dodonaea viscosa subsp. spatulata, Dodonaea heterodmorpha), cough bushes (Cassinia uncata, Cassinia laevis), wattles (Acacia deanei, Acacia hakeoides, Acacia buxifolia), daisy bushes (Ozothamnus diosmifolius, Olearia ramulosa, Olearia ramulosa), Bertya cunninghamii, Grevillea floribunda and Leptospermum divaricatum. The ground cover is sparse to mid-dense with a scattering of small shrubs such as Melichrus urceolatus and Lissanthe strigosa. Grass species include Eragrostis lacunaria, Austrostipa scabra, Austrostipa densiflora, Austrodanthonia setacea and Austrodanthonia fulva. Forbs include Calotis cuneifolia, Dianella revoluta var. revoluta, Xerochrysum viscosum, Einadia hastata and Goodenia hederacea subsp. hederacea. Occurs on red-brown clay or clay-loam soil derived from sedimentary or metamorphic rocks on footslopes and hillslopes of low hills and rises in the undulating central western slopes of NSW. Mostly confined to the Lower Slopes sub-region of the NSW South-Western Slopes Bioregion with a temperate (hot summer) climate with 450-600 mm annual rainfall. Mostly cleared for grazing. Small remnants occur in state forests and nature reserves.

Level of Classification: Association. ***Classification Confidence Level:*** High.

Formation Group: Eucalyptus Ironbark Woodlands and Forests of the Inland Slopes, Plains and Peneplains.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 204 - Ironbark-Western Box (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Described as the E. sideroxylon - E. woollsiana association in Moore (1953a). Includes floristic Group 26 in Lewer et al. (2003). Described by Porteners (2001b). Probably community C4 in Bos & Lockwood (1996). Probably includes Biolandscapes LacM53a, HerS53d and part of LacM53c in Priday (2006). Sub-communities 4.1-4.5 in Lilley & Tidemann (1994) for Budigower Nature Reserve. Similar to Box - Ironbark forest in Priday (2004) for Wagga Wagga Shire. Includes Biolandscape WyaG53 in Priday (2006) near Wyalong. Community 49 in Austin et al. (2000) for Lachlan River catchment. Has some similarities with footslopes community F2 in Sivertsen & Metcalfe (1995) (ID73) which occurs to the west. Part of BVT 13 in DEC (2006, 2006a). Field checked for several reserves on NSW SW Slopes by Benson (1999-2009). A footslope community dominated by Western Grey Box with Mugga Ironbark.

Interstate Equivalent(s): Victoria: similar to EVC 61 Box-Ironbark Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Adequate.

Mapping Info: Mapping requires detailed survey but tends to occur on footslopes. Mapped as part of a broader map unit for central NSW in Lewer et al. (2003). Mapped in some reserves elsewhere. Not mapped over range but site data in Lewer et al. (2003) and Bos & Lockwood (1996). Areas mapped in ADS-40 mapping on south westen slopes by DECCW south (DECCW 2010b).

Climate Zone: Temperate: no dry season (hot summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%); Riverina (1-30%).

IBRA Sub-Region: Lower Slopes (>70%); Murrumbidgee (1-30%).

Botanical Division: Central Western Slopes (CWS) (30-70%); South Western Slopes (SWS) (1-30%).

Local Govt. Areas: Bland (1-30%); Forbes (1-30%); Lachlan (1-30%); Parkes (1-30%); Weddin (1-30%); Wagga Wagga (1-30%); Junee (1-30%); Coolamon (1-30%); Temora (1-30%).

CMAs: Central West (1-30%); Lachlan (30-70%); Murrumbidgee (1-30%).

MD Basin: Yes.

Substrate Mass: Colluvium; Sedimentary rocks.

Lithology: Colluvial sediments; Sandstone; Shale; Siltstone.

Great Soil Group: Red clay; Red podzolic soil.

Soil Texture: Loam; Sandy clay loam; Sandy loam.

Landform Patterns: Low hills; Rises.

Landform Elements: Footslope; Hillcrest; Hillslope.

Land Use: Cropping and Horticulture; Grazing; Timber Production.

Impacts of European Settlement: Medium reduction (30-70%) in extent and/or range.

Pre-European Extent: 80000 ha ±50%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: The hills on which this community mainly occur have been mainly cleared for grazing but some remnants remain.

Current Extent: 25000 ha ±50% or 31% ± 80% of pre-European extent remaining.

Current Extent Comments: (Estimated from broadly classified current extant vegetation map). Estimated to be 40% of the broad 38000 ha map unit HFS1 mapped by Lewer et al. (2003) in central NSW with additional areas added because this community occurs to the east and south of this mapping and is documented in some forests and reserves there. Small areas occur on hilltops and slopes.

Conservation Reserves: Big Bush NR 450 (M); Blue Mallee FR 10 (E3); Buddigower NR 120 (E2); Ingalba NR 3600 (E1; Pucawan NR 225 (M); The Charcoal Tank NR 42 (E2); Jindalee NP 230 (E1).

Reserves Total Area: 4677 ha. ***No. Representatives in Reserves:*** 7

Protected Area Explanation: Buddigower NR estimate from NSW NPWS (1987b). Charcoal Tank NR estimated from NSW NPWS (1987c) (note: Sivertsen & Metcalfe (1995) do not map it here but covers half the reserve. Blue Mallee Flora Reserve from notes in Forestry Commission (1989a). Big Bush NR, Pucawan NR and Ingalba NR from Porteners (2001b). Jindalee NP from DECCW (2010b). VCA008 measurement from overlaying Lewer et al. (2003). PA9902, PA9903 and WE9904 estimates from DNR GIS canopy list but this may be inaccurate.

Secure Property Agreements: PA9902 PA 248 (E1); VCA008 VCA 31 (M); PA9903 PA 62 (E2); WE9904 PA 40 (E2).

Secure PAs Total Area: 381 ha. ***No. Representatives in Secure Property Agreements:*** 4

Protected Current Extent: 20.23% 5058 ha ± 10%. ***No. Representatives in Protected Areas:*** 11

Protected Pre-European Extent: 6.32% which is inadequately protected across distribution.

Common in 1750: Code 3a: 5-15% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Some further areas could be protected on the footslopes of sedimentary hills on lower south-western slopes for example in Weddin State Forest. A stand in good condition occurs near Reefton south of Barmedman.

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: This community often occurs between ridge communities dominated by Mugga Ironbark, Green Mallee or Dwyer's Red Gum and the Western Grey Box woodlands on flats and plains. Its understorey varies depending on disturbance history - fire and grazing and differs somewhat across range with some areas being shrubby others with few shrubs due to heavy grazing. An ungrazed and rarely burnt sample is in the Charcoal Tank NR. This contains a rich array of understorey shrubs.

Fire Regime: Not known. The presence of an array of shrubs that require time between fiores for growth and reproduction indicates this community probably requires inter-fire periods greater than 10-20 years.

Adjoining Communites: Grades into Green Mallee or Mugga Ironbark communities upslope and Western Grey Box down slope on flatter country. Grades into ID82 to the north-west or on lower slopes. Grades into White Box woodland on the upper NSW South-western slopes. A similar community occurs on the upper sloipes to the east between Cowra and Boorowa (ID342).

Threatening Processes: Clearing of remnants and long term loss of species due to fragmentation are the main threats. Weeds are relatively minor problem in most areas. Hobby Farm clearing and cutting firewood are localised concerns about come towns. Some sheet erosion where ground cover has been over-grazed.

Threatening Process List: Clearing for agriculture; Clearing on small lots (hobby farms); Firewood collection; Forestry activities including logging; Soil erosion, water: sheet erosion.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/3a ***Threat Criteria:*** 5; 4; 1.

Planning Controls:

Planning and Management: Reasonably represented in protected areas but other remnants require protection from clearing and fencing off. Link patches through corridor plantings and regrowth.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (308; 177; 150; 152; 293; 167; 292; 183; 316; 166; 356; 372; 373; 634). Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Fleetwood, R. (1987a) Buddigower Nature Reserve Vegetation Map. Unpublished file note RN 34. (NSW National Parks and Wildlife Service: Griffith); Fleetwood, R. (1987b) The Charcoal Tank NR vegetation abundance and distribution ratings. File note RN 58. (NSW National Parks and Wildlife Service: Griffith); Lewer, S., Ismay, K., Grounds, S., Gibson, R., Harris, M., Armstrong, R., Deluca, S. & Ryan, C. (2003) Native vegetation map report Bogan Gate, Boona Mount, Condobolin, Dandaloo, Tottenham and Tullamore 1:100 000 map sheets. (NSW Department of Infrastructure, Planning and Natural Resources). Submitted to Cunninghamia; Lilley, D.M. & Tidemann, C.R. (1994) Flora and fauna of Buddigower Nature Reserve NSW. Report to NSW National Parks and Wildlife Service (School of Resources and Environmental Management Aust. National University: Canberra); Porteners, M.F. (2001b) Vegetation survey of Ingalba, Big Bush and Pucawan Nature Reserves. Report for NSW National Parks and Wildlife Service: Riverina Region; Austin, M.P., Cawsey, E.M., Baker, B.L., Yialeloglou, M.M., Grice, D.J. & Briggs, S.V. (2000) Predicted vegetation cover in the central Lachlan region. National Heritage Trust Project AA 1368.97. (CSIRO Division of Wildlife and Ecology: Canberra); Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan); Moore, C.W.E. (1953a) The vegetation of the south-eastern Riverina, New South Wales 1: the climax communities. Aust. J. Botany 1: 485-547; Priday, S. (in prep. 2006) The native vegetation of the New South Wales South-western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; DEC (2006) Reconstructed and extant distribution of native vegetation in the Central West Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); DECCW (2010b) Vegetation Mapping by 3-D Digital Image Interpretation - DECCW South Branch Report Series

Report No. 3: Vegetation of the Cootamundra and Junee 1:100,000 mapsheets. Technical Report DECCW 2010/70. NSW Department of Environment, Climate Chang.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 243

Common Name: **Mugga Ironbark - White Cypress Pine woodland on low rises mainly in the Cobar Peneplain Bioregion**

Scientific Name: *Eucalyptus sideroxylon - Callitris glaucophylla / Acacia deanei subsp. deanei - Dodonaea viscosa subsp. cuneata - Cassinia laevis / Austrostipa scabra subsp. scabra - Thysanotus patersonii - Tricoryne elatior - Austrodanthonia caespitosa*

Veg. Comm. ID.: **243** ***Original Entry:*** John Benson 31/12/2005

Photo 1: ID243a_img178pc.jpg Eucalyptus sideroxylon - Austrostipa scabra Woodland, Tottenham-Albert Rd, [AGD66 32°21'53.6"S 147°24'56.2"E], 27/10/01, Jaime Plaza.

Photo 2: ID243b_img179pc.jpg Eucalyptus sideroxylon - Austrostipa scabra Woodland, Tottenham-Albert Rd, [AGD66 32°21'53.6"S 147°24'56.2"E], 27/10/01, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus sideroxylon; Callitris glaucophylla; Eucalyptus dwyeri; Eucalyptus dumosa; Allocasuarina luehmannii.*

Shrubs/Vines/Epiphytes: *Acacia deanei subsp. deanei; Dodonaea viscosa subsp. cuneata; Cassinia laevis; Acacia decora; Melichrus urceolatus.*

Ground Cover: *Austrostipa scabra subsp. scabra; Thysanotus patersonii; Cheilanthes sieberi subsp. sieberi; Calotis cuneifolia; Austrodanthonia caespitosa; Tricoryne elatior; Ophioglossum lusitanicum; Goodenia cycloptera; Daucus glochidiatus; Lomandra filiformis subsp. filiformis; Oxalis perennans; Stypandra glauca; Calotis scabiosifolia var. integrifolia.*

Weed Species: *Vulpia myuros; Vulpia muralis; Hypochaeris glabra; Sonchus oleraceus; Lolium perenne; Lolium rigidum; Bromus diandrus.*

Weediness: Medium (5-15%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: 27±4 (floristic group 40 in Lewer et al. 2002 in 20x20 m plots).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland.

Height Class (WH): Tall.

Vegetation Description: Tall woodland averaging 17 m high dominated by Mugga Ironbark (Eucalyptus sideroxylon) sometimes with White Cypress Pine (Callitris glaucophylla), Congoo Mallee (Eucalyptus dumosa) of Buloke (Allocasuarina luehmannii). A mid-dense to sparse shrub may be present that includes Deane's Wattle (Acacia deanei subsp. deanei), hopbush (Dodonaea viscosa subsp. cuneata), cough bush (Cassinia laevis) and Western Golden Wattle (Acacia decora). This shrub layer may be absent from some sites. The ground cover is

generally sparse and includes grasses such as Austrostipa scabra subsp. scabra and Austrodanthonia caespitosa, forbs such as Thysanotus patersonii, Tricoryne elatior, Ophioglossum lusitanicum, Goodenia cycloptera and Calotis cuneifolia and the rock fern Cheilanthes sieberi subsp. sieberi. Occurs on brown-red sandy loam to loam soils on low rises and hillsides composed of sedimentary and metamorphic substrates. Distributed mainly west of Temora and Grenfell to Condobolin mainly in the NSW South-western Slopes Bioregion with some outliers to the west. Many areas are degraded by stock and feral animal grazing but otherwise this community has been less cleared than communities on flats or alluvial plains. Poorly represented in protected areas as of 2005.

Level of Classification: Association. ***Classification Confidence Level:*** High.

Formation Group: Eucalyptus Ironbark Woodlands and Forests of the Inland Slopes, Plains and Peneplains.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 206 - Red Ironbark (P).

Authority(s): (Quantitative Data). Includes floristic group 40 being part of map unit HFS1 in Lewer et al. (2003) in central NSW. Noted as part of map unit H1 in Sivertsen & Metcalfe (1995). Part of the Mugga Ironbark woodlands described in Mid-Lachlan Regional Vegetation Committee (1999). Part of BVT 13 in DEC (2006, 2006a). Inland-most occurrence of Mugga Ironbark (Eucalyptus sideroxylon) that grades into other Mugga Ironbark - cypress pine communities on the central and northern western slopes to the east.

Interstate Equivalent(s): None: may be included under the Box-Ironbark EVC in Victoria.

Mapped/Modelled: Current extent and pre-European extent mapped or modelled as part of a broader complex. ***Plot Sampling:*** Adequate.

Mapping Info: Areas near Condobolin mapped as part of map unit HFS1 in Lewer et al. (2003). Part of map unit H1 in Sivertsen & Metcalfe (1995) covering the Cargelligo region. Also sampled in Bos & Lockwood (1996).

Climate Zone: Temperate: no dry season (hot summer).

IBRA Bioregion (v6): Cobar Peneplain (30-70%); NSW South-western Slopes (1-30%); Riverina (1-30%).

IBRA Sub-Region: Lachlan Plains (1-30%); Lower Slopes (30-70%); Murrumbidgee (1-30%).

Botanical Division: Central Western Slopes (CWS) (>70%); South Western Plains (SWP) (1-30%); South Western Slopes (SWS) (1-30%).

Local Govt. Areas: Bland (1-30%); Lachlan (30-70%).

CMAs: Lachlan (30-70%); Murrumbidgee (1-30%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks; Sedimentary rocks.

Lithology: Conglomerate; Metamorphic rock (unidentified); Quartzite; Sandstone.

Great Soil Group: Brown earth; Red earth.

Soil Texture: Loam; Sandy loam.

Landform Patterns: Rises.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Major alteration of species composition; Minor reduction (<30%) in extent and/or range.

Pre-European Extent: 40000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Estimate only.

Current Extent: 25000 ha ±30% or 62% ± 60% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Sivertsen & Metcalfe (1995) map 79000 ha of the broad H1 map unit that in part contains this. It is estimated that this association may comprise one third of that with other areas out side that mapping area. Mostly intact with limited clearing but most areas affected by grazing.

Conservation Reserves: None.

Reserves Total Area: 0 ha. ***No. Representatives in Reserves:*** 0

Protected Area Explanation: Property agreements CD9907 and CD9911 from Lewer et al. (2003) and descriptions in DIPNR Property Agreement database.

Secure Property Agreements: CD9907 PA 182 (M); CD9911 PA 128 (M).

Secure PAs Total Area: 310 ha. ***No. Representatives in Secure Property Agreements:*** 2

Protected Current Extent: 1.24% 310 ha ± 10%. ***No. Representatives in Protected Areas:*** 2

Protected Pre-European Extent: 0.77% which is inadequately protected across distribution.

Common in 1750: Code 4a: 1-5% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Manna Range south of Condoblin. Combaning and Warraderry State forests to the east. Other hills in central NSW.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Various in ground cover composition from east to west.

Fire Regime: Unknown but now rarely burns. Occasional fire period may be in the order of 15-40 years.

Adjoining Communites: Grades into Dwyer's Red Gum (ID185) and Green Mallee (ID176) communities on stony ridge tops. Grades into Western Grey Box - Pine (ID80, 82) communities on flats. Similar and may grade into ID258 that is dominated by Eucalyptus intertexta.

Threatening Processes: While not a threatened community it is considered to be Near Threatened due to overgrazing by stock or goats and lack of protection in reserves. Other threats may include over-logging, fire-wood collection and small area clearing.

Threatening Process List: Clearing on small lots (hobby farms); Firewood collection; Forestry activities including logging; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Unsustainable grazing by introduced animals.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/4a ***Threat Criteria:*** 4.

Planning Controls:

Planning and Management: Prevent further clearing, overgrazing of ground cover and over-cutting of Mugga Ironbark.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (177; 293; 67; 34; 372). Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Lewer, S., Ismay, K., Grounds, S., Gibson, R., Harris, M., Armstrong, R., Deluca, S. & Ryan, C. (2003) Native vegetation map report Bogan Gate, Boona Mount, Condobolin, Dandaloo, Tottenham and Tullamore 1:100 000 map sheets. (NSW Department of Infrastructure, Planning and Natural Resources). Submitted to Cunninghamia; Mid-Lachlan Regional Vegetation Committee (1999) Plan Draft Mid-Lachlan Regional Vegetation Management Plan for Public Exhibition. (Mid-Lachlan RVC: Forbes); Sivertsen, D. & Metcalfe, L. (1995) Natural vegetation of the southern wheat-belt (Forbes and Cargelligo 1:250 000 map sheets). Cunninghamia 4(1): 103-128; DEC (2006) Reconstructed and extant distribution of native vegetation in the Central West Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 287

Common Name: **Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus goniocalyx - Eucalyptus macrorhyncha - Eucalyptus polyanthemos subsp. polyanthemos / Brachyloma daphnoides subsp. daphnoides - Cassinia arcuata - Dillwynia sericea / Austrodanthonia racemosa var. racemosa - Poa sieberiana - Hypericum gramineum -Gonocarpus tetragynus*

Veg. Comm. ID.: **287** ***Original Entry:*** J.S. Benson 6/02/2006

Photo 1: ID287a_SWS0507106.jpg Red Box (Eucalyptus polyanthemos) - Long-leaved Box (Eucalyptus goniocalyx) and Red Stringybark (Eucalyptus macrorhyncha) open forest on brown clay derived from phyllite, 10 km south-east of Rye Park, [AGD66 34°33.418'S 148°59.025'E], 29/5/2007, Jaime Plaza.

Photo 2: ID287b_PC175-3.jpg Eucalyptus polyanthemos - Eucalyptus macrorhyncha shrub grass woodland, Conimbla National Park, [AGD66 33°48'38"S 148°20'55"E], 11/10/02, Jaime Plaza.

Photo 3: ID287c_PC192-13.jpg Eucalyptus macrorhyncha - E.goniocalyx - E.polyanthemos woodland, Minjary National Park, [AGD66 35°13'20"S 148°07'14"E], 16/10/02, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus goniocalyx; Eucalyptus macrorhyncha; Eucalyptus polyanthemos subsp. polyanthemos; Eucalyptus melliodora; Callitris endlicheri; Eucalyptus sideroxylon.*

Shrubs/Vines/Epiphytes: *Brachyloma daphnoides subsp. daphnoides; Acacia paradoxa; Cassinia aculeata; Acacia buxifolia subsp. buxifolia; Lissanthe strigosa subsp. strigosa; Persoonia sericea; Leptospermum continentale; Dillwynia sericea; Hibbertia obtusifolia; Indigofera australis; Melichrus urceolatus; Acacia dealbata; Acacia implexa; Daviesia latifolia; Pultenaea foliolosa; Pultenaea pedunculata; Pultenaea cunninghamii; Cassinia laevis; Bursaria spinosa subsp. spinosa.*

Ground Cover: *Austrodanthonia racemosa var. racemosa; Hypericum gramineum; Gonocarpus tetragynus; Aristida ramosa; Themeda australis; Poa sieberiana subsp. sieberiana; Joycea pallida; Cymbonotus preissianus; Dichopogon strictus; Galium gaudichaudii; Drosera peltata; Hydrocotyle laxiflora; Cheilanthes austrotenuifolia; Cheilanthes sieberi; Microseris lanceolata; Ajuga australis; Luzula densiflora; Lomandra multiflora subsp. multiflora; Lomandra filiformis subsp. coriacea; Austrodanthonia pilosa; Epilobium billardiereanum subsp. cinereum; Hardenbergia violacea; Wahlenbergia stricta subsp. stricta; Senecio prenanthoides; Senecio lautus subsp. dissectifolius; Acaena novae-zelandiae; Bulbine bulbosa; Scutellaria humilis; Lepidosperma laterale; Stypandra glauca; Goodenia hederacea subsp. hederacea; Echinopogon ovatus; Dichelachne micrantha; Chrysocephalum semipapposum; Chrysocephalum apiculatum.*

Weed Species: *Briza minor; Hypochaeris glabra; Hypochaeris radicata; Centaurium erythraea; Hypericum perforatum.*

Weediness: Medium (5-15%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: 35 +/- 10 (20 x 20 m plots, Vegetation Group 32 Gellie & Fanning 2004).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest; Woodland.

Height Class (WH): Mid-High;Tall.

Vegetation Description: Mid-high to tall open forest or woodland to 25 m high dominated by Long-leaved Box (Eucalyptus goniocalyx), Red Box (Eucalyptus polyanthemos) and Red Stringybark (Eucalyptus macroryncha). Other tree species include Yellow Box (Eucalyptus melliodora) and White Box (Eucalyptus albens). A lower tree layer of Black Cypress Pine (Callitris endlicheri) is present at some locations. The shrub layer is sparse and includes Brachyloma daphnoides subsp. daphnoides, Phyllanthus hirtellus, Persoonia sericea, Lissanthe strigosa, Indigofera australis, Acacia genistifolia, Acacia buxifolia, Leptospermum continentale, Dillwynia sericea, Melichrus urceolatus, Pultenaea spp., Cassinia spp. and Hibbertia obtusifolia. The ground layer is mid-dense and includes grasses such as Themeda australis, Aristida ramosa, Poa sieberiana, Joycea pallida and various species of Austrodanthonia. Forbs include Senecio spp. Gonocarpus tetragynus, Cymbonotus preissianus, Dichopogon strictus, Galium gaudichaudii, Hypericum gramineum, Drosera peltata and Hydrocotyle laxiflora. The rock ferns Cheilanthes austrotenuifolia of Cheilanthes sieberi are common along with the mat-rushes Lomandra multiflora subsp. multiflora and Lomandra filiformis subsp. coriacea. Occurs clayey soils derived from a range of substrates including granite, metamorphic rocks, fine-grained sedimentary and volcanic rocks on hillslopes in hill landorm patterns mainly in the NSW South-western Slopes Bioregion extending onto the South Eastern Highlands Bioregion. While a vulnerable community, it is less threatened than grassy box woodlands on flats and is sampled in a number of reserves as of 2007.

Level of Classification: Alliance / Sub-formation. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus (Mostly Grassy) Box Woodlands of the Tablelands and Western Slopes.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 104 - Longleaved Box (P); 124 - Red Stringybark (P).

Authority(s): (Quantitative Data). A broadly classified community. Probably includes Vegetation Group 122 in Gellie (2005). Includes Red Stringybark - Long-leaved Box map unit in Priday (2004). Includes Vegetation Group 32 in Gellie & Fanning (2004). Community 3 in Lembit & Skelton (1998). Community vi in Nangar National Park ER Mitchell McCotter (1996). Probably most of community 7.5 in Bos & Lockwood (1996). Possibly part of floristic groups 36, 37 and 38 in Austin et al. (2000). Possibly includes much of the Biolandscape UlaV39a in Priday (2006). Probably part of BVT 41 in DEC (2006, 2006a).

Interstate Equivalent(s): Victoria: similar to EVC 22 Grassy Dry Forest or EVC 20 Heathy Dry Forest.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Adequate.

Mapping Info: As of 2007, mapped and sampled in Wagga Wagga Shire by Priday (2004) and in some reserves east of there by Gellie & Fanning (2004) and to the north Lembit & Skelton (1998). Difficult to distinquish using API from similar open forest types.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%); South Eastern Highlands (1-30%).

IBRA Sub-Region: Upper Slopes (>70%); Bondo (1-30%); Crookwell (1-30%); Murrumbateman (1-30%).

Botanical Division: South Western Slopes (SWS) (30-70%); Central Western Slopes (CWS) (1-30%); Central Tablelands (CT) (1-30%); Southern Tablelands (ST) (1-30%).

Local Govt. Areas: Tumut (30-70%); Wagga Wagga (30-70%); Tumbarumba (1-30%); Greater Hume (1-30%); Gundagai (1-30%); Harden (1-30%); Cootamundra (1-30%); Junee (1-30%); Temora (1-30%); Cabonne (1-30%).

CMAs: Murray (1-30%); Murrumbidgee (30-70%); Lachlan (1-30%); Central West (1-30%).

MD Basin: Yes.

Substrate Mass: Igneous rocks; Metamorphic rocks; Sedimentary rocks; Plutonic rocks; Volcanic rocks.

Lithology: Conglomerate; Gneiss; Granite; Phyllite; Shale; Slate; Sandstone; Rhyolite.

Great Soil Group: Brown clay; Yellow podzolic soil.

Soil Texture: Light clay; Medium clay.

Landform Patterns: Hills; Low hills.

Landform Elements: Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Medium reduction (30-70%) in extent and/or range.

Pre-European Extent: 60000 ha ±50%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Widespread on hills in the central to southern portion of the upper slope sub-region of the NSW South-

western Slopes Bioregion.

Current Extent: 20000 ha ±50% or 33% ± 70% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). While mostly cleared areas remain in remote hilly country.

Conservation Reserves: Murraguldrie FR 1280 (E2); Tumblong SCA 180 (E1); Ellerslie NR 600 (E2); Benambra NP 114 (E1); Minjary NP 42 (E1); Mudjarn NR 197 (E1); Barton NR 122 (E1); Nangar NP 200 (E2); Conimbla NP 200 (E3).

Reserves Total Area: 2936 ha. ***No. Representatives in Reserves:*** 9

Protected Area Explanation: Murraguldrie FR estimate from Priday (2004). Benambra NP, Ellerslie NR (including area in 2006 addition), Minjary NP, Mudjarn NR areas from Gellie & Fanning (2004). Tumblong SCA from ADS-40 DECCW South mapping 2010. Barton NR from Lembit & Skelton (1998). Esimates for Conimbla NP from community ii. For Nangar NP a minor part of community iv in ERM Mitchell McCotter (1996).

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 14.68% 2936 ha ± 30%. ***No. Representatives in Protected Areas:*** 9

Protected Pre-European Extent: 4.89% which is inadequately protected across distribution.

Common in 1750: Code 4a: 1-5% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Reasonably well reserved but extra sites warrant protection especially on the central western slopes

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: This community covers a wide range and therefore there is substantial varition in the understorey with shrub species such as Acacia for example. The shrub density varies with different fire regimes.

Fire Regime: Unknown. Occasional subject to widlfire or control burning.

Adjoining Communites: Grades into Blakely's Red Gum in valleys and White Box on rich-nutrient soils. Less shrubby but similar in dominant tree species to the more restricted Long-leaved Box community ID288 in Woomargama National Park. Grades into Callitris endlicheri and Eucalyptus dealbata dominated communities on rocky ridges. Similar to the Red Stringybark - Long-leaved Box open forest (ID348) on the upper slopes and tablelands near Boorowa.

Threatening Processes: Mostly cleared over its range even on hillslopes where this community occurs. Grazing has affected the understorey at many locations.

Threatening Process List: Clearing for agriculture; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Unsustainable grazing by introduced animals.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/4a ***Threat Criteria:*** 5; 1; 4.

Planning Controls:

Planning and Management: Manage fire regimes to prevent too-frequent burning.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (344; 177; 340; 316; 336; 179; 263; 356; 353; 372; 373). Australian Bush Heritage Fund (2001) Tarcutta Hills Reserve Management Plan (Australian Bush Heritage Fund: Melbourne); Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan); NSW National Parks and Wildlife Service (2002a) The native vegetation of Boorowa Shire (NSW National Parks and Wildlife Service: Hurstville); Lembit, R. & Skelton, N. (1998) Vegetation survey of Copperhannia, Barton, Dapper and Boginderra Hills Nature Reserves. Report to the NSW National Parks and Wildlife Service: Central West; ERM Mitchell McCotter Pty. Ltd. (1996) Bathurst vegetation survey for NSW National Parks and Wildlife Service: Bathurst District covering Winburndale NR, Nangar NP, Conimbla NP and Weddin Mountains NP. (NSW National Parks and Wildlife Service: Bathurst); Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254; DEC (2006) Reconstructed and extant distribution of native vegetation in the Central West Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 291

Common Name: **Inland Scribbly Gum - Black Cypress Pine - Mugga Ironbark - Daphne Heath low woodland of the Wagga Wagga region in the southern NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus rossii - Callitris endlicheri - Eucalyptus sideroxylon / Brachyloma daphnoides subsp. daphnoides - Hibbertia obtusifolia / Joycea pallida - Stypandra glauca - Poa sieberiana*

Veg. Comm. ID.: **291** ***Original Entry:*** J.S. Benson 15/02/2006

Photo 1: ID291a_PC188-3.jpg Eucalyptus macrorhyncha - Eucalyptus rossii - E. sideroxylon woodland, Livingstone National Park, [AGD66 35°20'50"S 147°20'44"E], 15/10/02, Jaime Plaza.

Photo 2: ID291b_PC187-19.jpg Eucalyptus macrorhyncha - Eucalyptus rossii - E.sideroxylon woodland, Livingstone National Park, [AGD66 35°20'50"S 147°20'44"E], 15/10/02, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus rossii; Callitris endlicheri; Eucalyptus sideroxylon; Eucalyptus macrorhyncha; Eucalyptus goniocalyx.*

Shrubs/Vines/Epiphytes: *Brachyloma daphnoides subsp. daphnoides; Hibbertia obtusifolia; Xanthorrhoea glauca subsp. angustifolia; Acacia buxifolia subsp. buxifolia; Leptospermum multicaule; Grevillea floribunda; Phyllanthus hirtellus; Styphelia triflora; Calytrix tetragona.*

Ground Cover: *Joycea pallida; Stypandra glauca; Poa sieberiana; Gonocarpus tetragynus; Goodenia hederacea subsp. hederacea; Drosera auriculata; Austrodanthonia eriantha; Goodenia hederacea subsp. hederacea; Laxmannia gracilis.*

Weed Species: *Not assessed.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: 20 +/- 5 (20 x 20 m plots in Gellie & Fanning 2004).

Rainforest Structure (Webb): Not applicable.

Structure (WH): .

Height Class (WH): Low; Mid-High.

Vegetation Description: Low to mid-high woodland dominated by Inland Scribbly Gum (Eucalyptus rossii), Black Cypress Pine (Callitris endlicheri) and often with Mugga Ironbark (Eucalyptus sideroxylon). The shrub layer is sparse and is dominated by Daphne Heath (Bachyloma daphnoides). Other shrub species include Hibbertia obtusifolia, Acacia buxifolia subsp. buxifolia, Phyllanthus hirtellus, Styphelia triflora and Calytrix tetragona. The ground cover is sparse and includes the tussock grass Joycea pallida along with Austrodanthonia eriantha and Poa sieberiana. Forbs include Stypandra glauca, Gonocarpus tetragynus, Laxmannia gracilis and Goodenia

hederacea subsp. hederacea. Occurs on shallow yellow light clay or loam soils derived from silicieous lithologies such as arkose and quartzite on hillcrests in hills in the Wagga Wagga to Albury region of the NSW South-western Slopes Bioregion.

Level of Classification: Sub-association. ***Classification Confidence Level:*** High.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a shrubby understorey.

Forest Type (RN 17): 117 - Scribbly Gum (P); 184 - Black Cypress Pine-Scribbly Gum (P).

Authority(s): (Quantitative Data). Includes vegetation group 40 in Gellie & Fanning (2004). Includes Biolandscape WagM53b in Priday (2006). Includes community C9 in Bos & Lockwood (1996). Similar to the Inland Scribbly Gum - Black Cypress Pine community to the north in Mid-Lachlan RVC (1999).

Interstate Equivalent(s): .

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped in some reserves but poorly sampled and mapped over its range as of 2007.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%).

IBRA Sub-Region: Upper Slopes (>70%).

Botanical Division: South Western Slopes (SWS) (30-70%).

Local Govt. Areas: Wagga Wagga (1-30%); Greater Hume (1-30%); Lockhart (1-30%).

CMAs: Murrumbidgee (30-70%); Murray (1-30%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks.

Lithology: Arkose; Quartz sandstone; Quartzite.

Great Soil Group: Yellow podzolic soil.

Soil Texture: Light clay; Sandy clay loam.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: No significant impacts known.

Pre-European Extent: 6000 ha ±10%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Restricted to ridges in the Wagga Wagga to Albury region in the southern NSW SW Slopes Bioregion

Current Extent: 4000 ha ±10% or 67% ± 30% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Partly cleared with remnants on hills.

Conservation Reserves: Livingstone NP 465 (E1); Livingstone SCA 350 (E1); Tumblong SCA 50 (E1).

Reserves Total Area: 865 ha. ***No. Representatives in Reserves:*** 3

Protected Area Explanation: Livingstone NP and Livingston SCA from vegetation group 40 in Gellie & Fanning (2004). Tumblong SCA from ADS-40 mapping by DECCW South 2010.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 21.62% 865 ha ± 10%. ***No. Representatives in Protected Areas:*** 3

Protected Pre-European Extent: 14.41% which is inadequately protected across distribution.

Restricted in 1750: Code 4b: 5-15% of pre-European extent in protected areas (1,000<area<10,000 ha).

Key Sites for Protection: Requires survey to identify key sites.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Understorey species vary with grazing and fire regimes.

Fire Regime: Unknown. Probably subject to occasional wildfire 10-30 years and more frequent burning on some private lands.

Adjoining Communites: Grades into Red Box and White Box communities on lower slopes and into Dwyer's Red Gum - Black Cypress Pine on other hillcrests. Similar ground cover as ID290.

Threatening Processes: Main threats are unsustainable grazing by stock and goats and inapproprtiate fire regimes. Some clearing has occurred, even on ridges.

Threatening Process List: Inappropriate fire regimes; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Unsustainable grazing by introduced animals.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/4b ***Threat Criteria:*** 1; 4; 5.

Planning Controls:

Planning and Management: Control feral animals and protect from too-frequent fire.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (177; 340; 67; 356). Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; Mid-Lachlan Regional Vegetation Committee (1999) Plan Draft Mid-Lachlan Regional Vegetation Management Plan for Public Exhibition. (Mid-Lachlan RVC: Forbes); Priday, S. (in prep. 2006) The native vegetation of the New South Wales South-western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 309

Common Name: **Black Cypress Pine - Red Stringybark - red gum - box low open forest on siliceous rocky outcrops in the NSW South-western Slopes Bioregion**

Scientific Name: *Callitris endlicheri - Eucalyptus macrorhyncha - Eucalyptus dwyeri - Eucalyptus goniocalyx / Calytrix tetragona - Acacia paradoxa - Brachyloma daphnoides subsp. daphnoides - Melicherus urceolaris / Stypandra glauca - Cheilanthes sieberi subsp. sieberi - Lepidosperma laterale - Joycea pallida*

Veg. Comm. ID.: **309** ***Original Entry:*** J.S. Benson 8/09/2006

Photo 1: ID309a_DX28816.jpg Black Cypress Pine (Callitris endlicheri) low open forest with Dwyer's Red Gum (Eucalyptus dwyeri) and Red Stringybark (Eucalyptus macrorhyncha) with a ground cover of Cheilanthes sieberi and Stypandra glauca on quartz-rich adamellite in Mudjarn Nature Reserve (Pine Mountain) north of Tumut, [AGD66 35°10.920'S 148°13.942'E], 7/5/2006, Jaime Plaza.

Photo 2: ID309b_DX28175.jpg Black Cypress Pine (Callitris endlicheri) - Long-leaved Box (Eucalyptus goniocalyx) - Red Stringybark (Eucalyptus macrorhyncha) low open forest on a granite ridge in Woomargama National Park, [AGD66 35°52.583'S 147°18.894'E], 2/5/2006, Jaime Plaza.

Photo 3: ID309c_img301pc.jpg Callitris endlicheri dominated woodland, Livingstone National Park, [AGD66 35°21'22"S 147°20'46"E], 15/10/02, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Callitris endlicheri; Eucalyptus macrorhyncha; Eucalyptus dwyeri; Eucalyptus goniocalyx; Eucalyptus rossii; Eucalyptus nortonii; Allocasuarina verticillata; Eucalyptus blakelyi.*

Shrubs/Vines/Epiphytes: *Calytrix tetragona; Acacia paradoxa; Brachyloma daphnoides subsp. daphnoides; Melichrus urceolatus; Kunzea ericoides; Kunzea parvifolia; Dodonaea viscosa subsp. spatulata; Dodonaea viscosa subsp. angustifolia; Leucopogon virgatus; Leucopogon fletcheri subsp. fletcheri; Xanthorrhoea glauca subsp. angustifolia; Hibbertia obtusifolia; Acacia implexa; Acacia dealbata; Hovea linearis; Mirbelia oxylobioides; Grevillea arenaria subsp. arenaria; Acacia penninervis var. penninervis; Cassinia longifolia; Cassinia uncata; Phyllanthus hirtellus; Cryptandra amara var. amara; Dillwynia pylicoides; Dillwynia sericea; Grevillea floribunda; Monotoca scoparia.*

Ground Cover: *Stypandra glauca; Cheilanthes sieberi subsp. sieberi; Lepidosperma laterale; Joycea pallida; Senecio bathurstianus; Gonocarpus elatus; Xerochrysum viscosum; Acrotriche serrulata; Wurmbea dioica subsp. dioica; Burchardia umbellata; Galium gaudichaudii; Wahlenbergia gracilenta; Crassula sieberiana subsp. sieberiana; Stackhousia monogyna; Austrostipa densiflora; Austrostipa mollis; Poa sieberiana; Dichelachne micrantha; Elymus scaber var. scaber; Microlaena stipoides var. stipoides; Austrodanthonia racemosa var. racemosa; Geranium solanderi var. solanderi; Gonocarpus tetragynus; Lomandra filiformis subsp. coriacea; Luzula densiflora; Goodenia hederacea subsp. hederacea; Opercularia aspera.*

Weed Species: *Briza maxima; Centaurium erythraea; Conyza albida; Hypochaeris glabra; Avena barbata.*

Weediness: Medium (5-15%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Low; Mid-High.

Vegetation Description: Low to mid-high open forest dominated by Black Cypress Pine (Callitris endlicheri) often with Red Stringybark (Eucalyptus macrorhyncha), Inland Scribbly gum (Eucalyptus rossii) or Long-leaved Box (Eucalyptus goniocalyx). Dwyer's Red Gum (Eucalyptus dwyeri) may also be present. Shrubs are sparse and include Calytrix tetragona, Acacia paradoxa, Brachyloma daphnoides subsp. daphnoides, Melichrus urceolatus, Dodonaea viscosa subsp. spatulata and Dodonaea viscosa subsp. angustifolia, Phyllanthus hirtellus, Leucopogon spp., Kunzea spp., Hibbertia obtusifolia, Acacia paradoxa, Acacia implexa and Cassinia spp.. The grass tree Xanthorrhoea glauca subsp. angustifolia may be present. The ground cover is very sparse with rock often covering >50% of the area. Ground cover species include grasses such as Joycea pallida, Austrostipa densiflora, Austrostipa mollis, Austrodanthonia spp., Poa sieberiana and Dichelachne micrantha and forbs such as Stypandra glauca, Xerochrysum viscosum, Gonocarpus elatus and Senecio bathurstianus. The rock fern Cheilanthes sieberi subsp. sieberi is usually common along with the sedge Lepidosperma laterale. Mostly restricted to skeletal lithosol brown loamy sand soils derived from coarse-grained igneous or sedimentary rocks on ridges, rock flats or upper steep slopes in hill landform patterns with northern or western aspects in the upper slopes sub-region of the NSW South-western Slopes Bioregion in the adjoining South East Highlands Bioregion. Generally, not threatened due to its occurrence on steep hills and poor soils however sheep and goat grazing has affected the ground cover composition in some locations and too-frequent fire could eliminate some shrub species.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Cypress Pine (Callitris) Woodlands Mainly of the Inland.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Callitris forests and woodlands.

Forest Type (RN 17): 180 - Black Cypress Pine (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Includes vegetation group 27 in EcoGIS (2005). Includes vegetation group 37 and perhaps 39 in Gellie & Fanning (2004). Community C6.2 in Bos & Lockwood (1996). Possibly some of floristic group 32 in Austin et al. (2000). Recorded in Benson (1999-2009). ID309 is dominated by Callitris endlicheri and tends to occur in the higher altitude regions of the NSW SW Slopes Bioregion and mostly lacks Currawang (Acacia doratoxylon).

Interstate Equivalent(s): Victoria: Victoria: similar to EVC 72: Grantie Hills Woodland; ACT similar to Black Pine - Red Stringybark woodland (Sharp 2006).

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped in some reserves by Gellie & Fanning (2004) and EcoGIS (2005). Some mapping Boorowa Shire (NPWS 2000a).

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (30-70%); South Eastern Highlands (1-30%).

IBRA Sub-Region: Upper Slopes (30-70%); Bondo (1-30%).

Botanical Division: Southern Tablelands (ST) (1-30%); South Western Slopes (SWS) (30-70%); Central Tablelands (CT) (1-30%); Central Western Slopes (CWS) (1-30%).

Local Govt. Areas: Tumbarumba (1-30%); Tumut (1-30%); Yass Valley (1-30%);Gundagai (1-30%); Bathurst Regional (1-30%); Blayney (1-30%); Cowra (1-30%); Boorowa (1-30%); Harden (1-30%).

CMAs: Murray (1-30%); Murrumbidgee (30-70%); Lachlan (1-30%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Sedimentary rocks.

Lithology: Adamellite; Conglomerate; Granite; Quartz porphyry; Quartz sandstone; Sandstone.

Great Soil Group: Lithosol.

Soil Texture: Loamy sand.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope; Rock flat.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: No significant impacts known.

Pre-European Extent: 20000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Restricted in extent to steep rocky siliceous rocky ridges. 2400 ha predicted for Boorowa Shire (NPWS 2002a)

Current Extent: 17000 ha ±30% or 85% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Very little has been cleared due to topographic position and poor soils. 38% cleared in Boorowa Shire (NPWS 2002a)

Conservation Reserves: Bogandyera NR 123 (E1); Minjary NP 358 (E1); Mudjarn NR 332 (M); Ulandra NR 270 (E4); Winburndale NR 29 (M); Conimbla NP 3340 (E1); Dananbilla NR 100 (E3); Livingstone NP 80 (E3); Woomargama NP 3600 (E2).

Reserves Total Area: 8232 ha. ***No. Representatives in Reserves:*** 9

Protected Area Explanation: Part of vegetation groups 37 and 39 in Gellie & Fanning (2004) for Minjary, Mudjarn, Ulandra Nature Reserves and Woomargama National Park. Vegetation groups 11 and 27 in EcoGIS (2005) for Bogandyera NR. Conimbla NP and Windburndale NR areas from ERM McCotter (1996). Dananbilla NR estimate from descriptions in NSW NPWS (undated f). Livingston NP estimate from J. Benson (pers. obs.).

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 48.42% 8232 ha ± 30%. ***No. Representatives in Protected Areas:*** 9

Protected Pre-European Extent: 41.16% which is adequately protected across distribution.

Common in 1750: Code 1a: >25% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Well protected in reserves as of 2007.

Degree of Fragmentation: Naturally fragmented stands of variable patch sizes with >50% extent remaining.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Due to its distibution over a large range the floristic variation is considerable. Associated Eucalyptus species vary across range with Eucalyptus rossii more common in the north. Grazing and browsing may alter the ground and shrub compositions. While Callitris endlicheri is often dominant, sometimes on rock flats red gums such as Eucalyptus dwyeri may be more common. Dense stands of Black Cypress Pine dominates areas for several decades after intense fires.

Fire Regime: Unknown but occasional intense fires result in dense regrowth of Black Cypress Pine. Appropriate inter-fire period may be in the order of 30-50 years.

Adjoining Communites: Grades into various box woodlands in valleys on rihcer and deeper soils including Long-leaved Box - Red Stringybark (ID321), in the south various Norton's Box communities and White Box - Blakely's Red Gum woodland on better soils. Grades into the broadly classified and very closely allied Dwyer's Red Gum - Currawang Black - Cypress Pine low woodland (ID186) in similar rocky ridge habitat.

Threatening Processes: Grazing by goats threatens the vegetation at some locations. Too frequent fire may eliminate some shrub species.

Threatening Process List: Inappropriate fire regimes; Unsustainable grazing and trampling by stock; Unsustainable grazing by introduced animals.

Threat Category: Least Concern. ***Threat/Protected Area Code:*** LC/1a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Manage appropriate fire frequency and protect remnants from goat grazing.Dense post-fire regrowth stands of Black Cypress Pine may take decades to self-thin.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (350; 308; 177; 340; 263; 183). EcoGIS (2005) Vegetation of the Upper Murray reserves: Report to NSW Department of Environment and Conservation (DEC Upper Murray Area, Snowy Mountains Region: Khancoban); Benson, J.S. (1999-2006) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); Gellie, N. & Fanning, M. (2004) Final report of vegetation ecosystems in new and existing conservation reserves, south west slopes region 2002-2004, version 3. Report to NSW Department of Environment and Conservation: Queanbeyan; ERM Mitchell McCotter Pty. Ltd. (1996) Bathurst vegetation survey for NSW National Parks and Wildlife Service: Bathurst District covering Winburndale NR, Nangar NP, Conimbla NP and Weddin Mountains NP. (NSW National Parks and Wildlife Service: Bathurst); Austin, M.P., Cawsey, E.M., Baker, B.L., Yialeloglou, M.M., Grice, D.J. & Briggs, S.V. (2000) Predicted vegetation cover in the central Lachlan region. National Heritage Trust Project AA 1368.97. (CSIRO Division of Wildlife and Ecology: Canberra).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 321

Common Name: **Red Stringybark - Long-leaved Box - Black Cypress Pine shrub/grass woodland on siliceous sedimentary ranges in the upper NSW South-western Slopes and South Eastern Highlands Bioregions**

Scientific Name: *Eucalyptus macrorhyncha - Eucalyptus goniocalyx - Callitris endlicheri / Brachyloma daphnoides subsp. daphnoides - Acacia decora - Hibbertia obtusifolia - Lissanthe strigosa subsp. strigosa / Poa sieberiana var. sieberiana - Cheilanthes sieberi subsp. sieberi - Lomandra filiformis subsp. coriacea - Goodenia hederacea subsp. hederacea*

Veg. Comm. ID.: **321** ***Original Entry:*** J.S. Benson 27/11/2006

Photo 1: ID321a_PC243-21.jpg Callitris endlicheri - Eucalyptus goniocalyx - E. macrorhyncha dry woodland, Barton NR, [AGD66 33°18'21.9"S 148°53'42.3"E], 03/05/2005, Jaime Plaza.

Photo 2: ID321b_SWS0507271.jpg Red Stringybark (Eucalyptus macrorhyncha) - Long-leaved Box (Eucalyptus goniocalyx) - Black Cypress Pine (Callitris endlicheri) open forest with a shrub/grass ground cover on a quartz sandstone ridge of the Douglas Range near Young, [AGD66 34°27.790'S 148°33.112'E], 30/5/07, Jaime Plaza.

Photo 3: ID321c_benson.jpg Cleared Red Stringybark (Eucalytpus macrorhyncha) and Long-leaved Box (Eucalyptus goniocalyx) woodland in heavily grazed land added to Dananbilla Nature Reserve, [AGD66 34°10.670'S 148°32.486'E], 13/2/2007, J.S. Benson.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus macrorhyncha; Eucalyptus goniocalyx; Callitris endlicheri; Eucalyptus blakelyi; Eucalyptus polyanthemos subsp. polyanthemos.*

Shrubs/Vines/Epiphytes: *Brachyloma daphnoides subsp. daphnoides; Acacia decora; Hibbertia obtusifolia; Lissanthe strigosa subsp. strigosa; Acacia buxifolia subsp. buxifolia; Acacia verniciflua; Styphelia triflora; Phyllanthus hirtellus; Dodonaea viscosa subsp. spatulata; Pomaderris angustifolia; Pultenaea pedunculata; Melichrus urceolatus; Acacia vestita; Monotoca scoparia; Bursaria spinosa subsp. spinosa; Cassinia laevis.*

Ground Cover: *Poa sieberiana var. sieberiana; Gonocarpus tetragynus; Goodenia hederacea subsp. hederacea; Cheilanthes sieberi subsp. sieberi; Joycea pallida; Lomandra filiformis subsp. coriacea; Stypandra glauca; Dichelachne micrantha; Echinopogon ovatus; Lepidosperma laterale; Austrodanthonia racemosa var. racemosa; Senecio prenanthoides; Einadia hastata; Panicum simile; Lomandra multiflora subsp. multiflora; Lomandra confertifolia subsp. pallida; Pomax umbellata; Gonocarpus elatus; Triodia scariosa subsp. scariosa; Dianella revoluta var. revoluta; Poranthera microphylla; Luzula densiflora; Isotoma axillaris; Plantago cunninghamii; Xanthorrhoea glauca subsp. angustifolia; Laxmannia gracilis; Tricoryne elatior; Platysace ericoides; Bulbine bulbosa; Wahlenbergia stricta subsp. stricta; Burchardia umbellata; Cyperus lucidus; Caustis flexuosa; Gahnia aspera; Veronica perfoliata; Chrysocephalum semipapposum.*

Weed Species: *Aira cupaniana; Hypochaeris glabra; Vulpia bromoides; Anagallis arvensis; Hypochaeris radicata; Conyza albida; Sonchus oleraceus; Trifolium campestre.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Hovea rosmarinifolia (restricted).

Threatened Fauna: Not assessed.

Mean Species Richness: 38 +/- 9 (Community 4b in Porteners 1997a).

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland; Open Forest.

Height Class (WH): Mid-High.

Vegetation Description: Mid high woodland or open forest dominated by Red Stringybark (Eucalyptus macrorhyncha), Long-leaved Box (Eucalyptus goniocalyx) usually with Black Cypress Pine (Callitris endlicheri). Blakely's Red Gum (Eucalyptus blakelyi) may be present. The shrub layer is sparse and contains Brachyloma daphnoides subsp. daphnoides, Acacia buxifolia subsp. buxifolia, Acacia decora, Dodonaea viscosa subsp. spatulata, Lissanthe strigosa subsp. strigosa and Hibbertia obtusifolia. The ground cover is often very sparse with rocks or leaf litter. It includes grass species such as Dichelachne micrantha, Aristida ramosa, Joycea pallida, Poa sieberiana var. sieberiana, Echinopogon ovatus and Austrodanthonia racemosa var. racemosa. The mat-rushes Lomandra multiflora subsp. multiflora and Lomandra filiformis subsp. coriacea may occur in some regions. Forbs include Gonocarpus tetragynus, Stypandra glauca and Goodenia hederacea subsp. hederacea. The rock fern Cheilanthes sieberi subsp. sieberi is often abundant. Occurs on shallow, loamy sand soils mainly derived from siliceous sedimentary substrates such as quartz sandstone or sandstone in the central-north part of the NSW South-western Slopes Bioregion and in the north-western part of the NSW South Eastern Highlands Bioregion. Heavy grazing has altered the understorey in most locations but the extent of clearing has been relatively restricted due to the topographic position and poor soils.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 124 - Red Stringybark (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Community 2 (sites BAR001, 002 & 005) Dry Woodland in Lembit & Skelton (1998) for Barton Nature Reserve. Possibly includes part of C7.2 in Bos & Lockwood (1996). Probably most of Biolandscape HerS53a in Friday (2006). Part of BVT 41 in DEC (2006, 2006a). Notes in Benson (1999-2009).

Interstate Equivalent(s): None.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Mapped in some conservation reserves but not over full range as of 2007. Difficult to distinquish on aerial photos from other stringybark communities.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): South Eastern Highlands (1-30%); NSW South-western Slopes (>70%).

IBRA Sub-Region: Orange (1-30%); Bathurst (1-30%); Hill End (1-30%); Upper Slopes (30-70%).

Botanical Division: Central Tablelands (CT) (1-30%); Central Western Slopes (CWS) (30-70%).

Local Govt. Areas: Blayney (1-30%); Boorowa (1-30%); Cabonne (1-30%); Cowra (1-30%); Young (1-30%);Cootamundra (1-30%).

CMAs: Central West (30-70%); Lachlan (30-70%).

MD Basin: Yes.

Substrate Mass: Sedimentary rocks.

Lithology: Quartz sandstone; Sandstone.

Great Soil Group: Grey-brown podzolic soil; Yellow podzolic soil.

Soil Texture: Loamy sand; Sandy loam.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing; Nature Conservation.

Impacts of European Settlement: Medium reduction (30-70%) in extent and/or range.

Pre-European Extent: 23000 ha ±50%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Restricted to siliceous ranges in the central western slopes of NSW.

Current Extent: 15000 ha ±50% or 65% ± 70% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). Due to the topographic position of this community large remnants remain but grazing has affected the condition of the vegetation in most locations.

Conservation Reserves: Barton NR 340 (E1); Conimbla NP 1400 (E2); Dananbilla NR 200 (E1); Gungewalla NR 70 (E1).

Reserves Total Area: 2010 ha. ***No. Representatives in Reserves:*** 4

Protected Area Explanation: Barton NR from community 2 Dry Woodland in Lembit & Skelton (1998). Conimbla NP estimate from mosaic mapped in ERM Mitchell McCotter pty Ltd (1996). Gunewalla NR estimate from community 4a in Porteners (2007). Observed in Dananbilla NR by Benson (1999-2009) but not mapped there by Porteners (2007). VCA081 from notes in VCA agreement.

Secure Property Agreements: VCA081 VCA 200 (E2).

Secure PAs Total Area: 200 ha. ***No. Representatives in Secure Property Agreements:*** 1

Protected Current Extent: 14.73% 2210 ha ± 10%. ***No. Representatives in Protected Areas:*** 5

Protected Pre-European Extent: 9.6% which is adequately protected across distribution.

Common in 1750: Code 3a: 5-15% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Some areas are sampled in reserves on ranges in the central western tablelands and central western slopes of NSW. The Douglas Range near Young contains a large area of this community.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Understorey species varies considerably its across geographic range from west to east and with differing fire regimes, grazing impacts and substrate. Similar to ID354 that occurs to the west.

Fire Regime: Unknown. Occasionally burns due to either wildfires or deliberate burns by landholders. To ensure the survival of shrub species fire frequency should be relatively infrequent, e.g. 10-25 years.

Adjoining Communites: Some similarities with Black Cypress Pine woodland (ID309) and other Red Stringybark communities in the NSW SW Slopes and South East Highlands Bioregions. Grades into ID280 in the Cootamundra region and into ID352 at higher altitudes. Has some similarities to widespread ID287.

Threatening Processes: Some areas have been cleared. Remaining stands are mainly affected by domestic stock and goats. Inappropriate fire regimes may threaten some areas of this community.

Threatening Process List: Clearing for agriculture; Inappropriate fire regimes; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Unsustainable grazing by introduced animals.

Threat Category: Near Threatened. ***Threat/Protected Area Code:*** NT/3a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Manage grazing regimes including goat populations and avoid too-frequent burning of less than 10 year fire intervals.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (179; 263; 177; 373; 372; 308; 356; 379). Lembit, R. & Skelton, N. (1998) Vegetation survey of Copperhannia, Barton, Dapper and Boginderra Hills Nature Reserves. Report to the NSW National Parks and Wildlife Service: Central West; ERM Mitchell McCotter Pty. Ltd. (1996) Bathurst vegetation survey for NSW National Parks and Wildlife Service: Bathurst District covering Winburndale NR, Nangar NP, Conimbla NP and Weddin Mountains NP. (NSW National Parks and Wildlife Service: Bathurst); Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); DEC (2006) Reconstructed and extant distribution of native vegetation in the Central West Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; Porteners, M.F. (2007) Vegetation survey and mapping of Koorawatha, Dananbilla, Gungewalla and Illunie Nature Reserves. Report to Department of Environment and Climate Change NSW.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 341

Common Name: **Blakely's Red Gum - Red Box - Black Cypress Pine grass/shrub woodland on hills in the upper slopes sub-region of the NSW South-western Slopes and western South Eastern Highlands Bioregions**

Scientific Name: *Eucalyptus blakelyi - Eucalyptus polyanthemos subsp. polyanthemos - Callitris endlicheri / Cassinia arcuata - Dillwynia sericea - Acacia dealbata - Hibbertia obtusifolia / Austrodanthonia racemosa var. racemosa - Austrostipa scabra subsp. falcata - Lomandra filiformis subsp. coriacea - Goodenia heterophylla subsp. heterophylla*

Veg. Comm. ID.: **341** ***Original Entry:*** J.S. Benson 26/03/2007

No Photo Available

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus blakelyi; Eucalyptus polyanthemos subsp. polyanthemos; Callitris endlicheri.*

Shrubs/Vines/Epiphytes: *Cassinia arcuata; Acacia dealbata; Dillwynia sericea; Hibbertia obtusifolia; Brachyloma daphnoides subsp. daphnoides.*

Ground Cover: *Austrodanthonia racemosa var. racemosa; Goodenia hederacea subsp. hederacea; Austrostipa scabra subsp. falcata; Lomandra filiformis subsp. coriacea; Dichelachne micrantha; Gonocarpus tetragynus; Cheilanthes sieberi subsp. sieberi.*

Weed Species: *Not assessed but weeds would be common.*

Weediness: Medium (5-15%) with 10-30% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland.

Height Class (WH): Mid-High.

Vegetation Description: Mid-high woodland dominated by Blakely's Red Gum (Eucalyptus blakelyi) often with Red Box (Eucalyptus polyanthemos subsp. polyanthemos) and occasionally with Black Cypress Pine (Callitris endlicheri). The shrub layer is sparse and includes Cassinia arcuata, Acacia dealbata, Dillwynia sericea, Hibbertia obtusifolia and Brachyloma daphnoides subsp. daphnoides. The ground cover may be dense after rain but otherwise mid-dense to sparse. It includes grasses such as Austrodanthonia racemosa var. racemosa, Austrostipa scabra subsp. falcata and Dichelachne micrantha; the mat-rush Lomandra filiformis subsp. coriacea is common. Forb species include Goodenia hederacea subsp. hederacea and Gonocarpus tetragynus and the rock fern Cheilanthes sieberi subsp. sieberi is often common. Grades into Blakely's Red Gum - Yellow Box grassy woodland (ID277) or White Box - Blakely's Red gum - Yellow Box (ID282) on better soils and less steep slopes. Occurs on clay to loam soils derived from mainly fine-grained sedimentary or metamorphic substrates in the upper slope sub-region of the NSW South-western Slopes Bioregion and the adjoining South Eastern Highlands Bioregion. Mostly cleared and heavily grazed. An endangered community.

Level of Classification: Association. ***Classification Confidence Level:*** Low.

Formation Group: Eucalyptus (Mostly Grassy) Box Woodlands of the Tablelands and Western Slopes.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a grassy understorey.

Forest Type (RN 17): 172 - Yellow Box-Blakely's Red Gum (P).

Authority(s): (Quantitative Data). Includes Vegetation Group 163 in Gellie (2005) for south western slopes. Part of biolandscape IIIV39 (Ilunie Volcanics) in Priday (2006). Low confidence level as of 2007 due to lack of data and description. Part of BVT 40 in DEC (2006a). Probably mainly occurs on the tablelands.

Interstate Equivalent(s): None.

Mapped/Modelled: Current extent and pre-European extent mapped or modelled as part of a broader complex.

Mapping Info: modelled as part of a broader group in Gellie (2005). Needs more plot data and analysis to define with more confidence.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (30-70%); South Eastern Highlands (30-70%).

IBRA Sub-Region: Upper Slopes (30-70%); Crookwell (1-30%); Murrumbateman (1-30%); Orange (1-30%); Bondo (1-30%).

Botanical Division: Central Western Slopes (CWS) (30-70%); Central Tablelands (CT) (1-30%); Southern Tablelands (ST) (1-30%); South Western Slopes (SWS) (1-30%).

Local Govt. Areas: Cowra (1-30%); Bathurst Regional (1-30%); Blayney (1-30%); Boorowa (1-30%); Gundagai (1-30%); Harden (1-30%); Upper Lachlan (1-30%); Yass Valley (1-30%).

CMAs: *Lachlan (30-70%); Murrumbidgee (30-70%).*

MD Basin: *Yes.*

Substrate Mass: *Metamorphic rocks; Sedimentary rocks.*

Lithology: *Metamorphic rock (unidentified); Sedimentary rock (unidentified).*

Great Soil Group: Brown podzolic soil.

Soil Texture: Clay loam.

Landform Patterns: Hills; Plateau.

Landform Elements: Gully; Hillcrest; Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Major reduction (>70%) in extent and/or range.

Pre-European Extent: 7000 ha ±30%. Modelled from sound site or polygon data.

Pre-European Extent Comments: Gellie (2005) modelled 7400 ha over most of the range of this community. This may expand with assessment of tablelands.

Current Extent: 1500 ha ±30% or 21% ± 50% of pre-European extent remaining.

Current Extent Comments: (Modelled from sound site data over unclassified map of extant vegetation). Gellie (2005) mapped only 260 ha (or 20% remaining) but it is considered larger areas occur. This current area may expand with assessment of tablelands.

Conservation Reserves: Illunie NR 210 (E1).

Reserves Total Area: 210 ha. ***No. Representatives in Reserves:*** 1

Protected Area Explanation: Illunie NR estimate from community 4b in Porteners (2007) and Benson (1999-2009). VCA033 estimate from NSW DECC file notes.

Secure Property Agreements: VCA033 VCA 50 (E3).

Secure PAs Total Area: 50 ha. ***No. Representatives in Secure Property Agreements:*** 1

Protected Current Extent: 17.33% 260 ha ± %. ***No. Representatives in Protected Areas:*** 2

Protected Pre-European Extent: 3.71% which is inadequately protected across distribution.

Common in 1750: Code 4a: 1-5% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Mainly on private land and mainly cleared.

Degree of Fragmentation: Human induced highly fragmented small stands with <30% extent remaining and high edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Unknown. Requires more survey work over range.

Fire Regime: Unknown but the presence of some shrub species indicates fires should not be as frequent as in true grassy woodlands such as ID277. Possibly a 10-30 year fire frequency would be appropriate.

Adjoining Communites: Grades into ID282 Blakely's Red Gum - White Box - Yellow Box and ID277 - Yellow Box - Blakely's Gum grassy woodland on deeper and richer soils. Grades into ID342 Mugga Ironbark woodland on hillcrests. Has some similarities to ID280 that occurs to the west and south.

Threatening Processes: Less cleared than Blakely's Red Gum - Yellow Box grassy woodland (ID277) but still mainly cleared and impacted by heavy grazing and weed invasion.

Threatening Process List: Acid soils due to fertilizer use; Age class of woody vegetation; Clearing for agriculture; Clearing on small lots (hobby farms); Climate change; Disease and/or dieback (abnormal); Firewood collection; Nutrient changes through fertilizers or runoff; Salinity; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Endangered. ***Threat/Protected Area Code:*** E/4a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Protect some remnants in reserves and others under secure property agreements. Regeneration is required over the range of the community. Probably listed as part of the broad White Box - Blakely's Red Gum grassy woodland EEC listing.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (353; 356; 373; 308; 379). Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254; Priday, S. (in prep. 2006) The native vegetation of the New South Wales South-western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Porteners, M.F. (2007) Vegetation survey and mapping of Koorawatha, Dananbilla, Gungewalla and Illunie Nature Reserves. Report to Department of Environment and Climate Change NSW.

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 343

Common Name: **Mugga Ironbark - Red Box - Red Stringybark - Western Grey Box grass/shrub woodland on metamophic substrates in the Tarcutta - Gundagai region, NSW SWS Bioregion**

Scientific Name: *Eucalyptus sideroxylon - Eucalyptus polyanthemos subsp. vestita - Eucalyptus macrorhyncha - Eucalyptus microcarpa / Daviesia leptophylla - Acacia pycnantha - Cassinia laevis - Dillwynia sericea / Austrodanthonia eriantha - Poa sieberiana - Dianella longifolia var. longifolia - Stypandra glauca*

Veg. Comm. ID.: **343** ***Original Entry:*** J.S. Benson 11/04/2007

Photo 1: ID343a_capararo.jpg Mugga Ironbark (Eucalyptus sideroxylon) tall wooodland in Mates Gully TSR near Tarcutta, April 2007, S. Capararo.

Photo 2: ID343b_capararo.jpg Mugga Ironbark (Eucalyptus sideroxylon) - Red Stringybark (Eucalyptus macrorhyncha) tall wooodland on hillslope in Mates Gully TSR near Tarcutta, April 2007, S. Capararo.

Photo 3: ID343c_capararo.jpg Mugga Ironbark (Eucalyptus sideroxylon) with Red Stringybark (Eucalyptus macrorhyncha) and Red Box (Eucalyptus polyanthemos) roadside remnant on Keujura Road near Tarcutta, April 2007, S. Capararo.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus sideroxylon; Eucalyptus polyanthemos; Eucalyptus macrorhyncha; Eucalyptus microcarpa; Eucalyptus albens; Eucalyptus blakelyi.*

Shrubs/Vines/Epiphytes: *Daviesia leptophylla; Acacia pycnantha; Cassinia laevis; Dillwynia sericea; Melichrus urceolatus; Acacia genistifolia; Cassinia arcuata; Einadia hastata; Acacia paradoxa; Leucopogon rufus; Hibbertia obtusifolia; Pultenaea foliolosa; Pultenaea altissima; Pultenaea procumbens; Brachyloma daphnoides subsp. daphnoides; Amyema pendulum subsp. pendulum; Grevillea lanigera.*

Ground Cover: *Austrodanthonia eriantha; Poa sieberiana; Dianella longifolia var. longifolia; Stypandra glauca; Austrodanthonia fulva; Opercularia hispida; Juncus subsecundus; Gonocarpus tetragynus; Geranium solanderi var. solanderi; Hydrocotyle laxiflora; Xerochrysum viscosum; Wahlenbergia stricta subsp. stricta; Thysanotus patersonii; Goodenia hederacea subsp. hederacea; Dichopogon strictus; Daucus glochidiatus; Chrysocephalum apiculatum; Cheiranthera cyanea var. cyanea; Austrostipa scabra subsp. falcata; Austrostipa mollis; Carex appressa; Lomandra filiformis subsp. coriacea; Lomandra multiflora subsp. multiflora; Luzula flaccida form A; Senecio prenanthoides; Wurmbea dioica subsp. dioica; Thelymitra pauciflora; Microtis unifolia; Pterostylis sp. B sensu Harden (1993); Dichelachne crinita; Hardenbergia violacea.*

Weed Species: *Vulpia bromoides; Vulpia myuros f. megalura; Briza maxima; Trifolium angustifolium; Hypochaeris glabra; Briza minor; Aira elegantissima.*

Weediness: Medium (5-15%) with 10-30% cover.

Threatened Plants: Acacia aspera (regionally rare); Pultenaea spinosa (regionally rare).

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland; Open Forest.

Height Class (WH): Tall; Mid-High.

Vegetation Description: Tall to mid-high woodland to open forest dominated by Mugga Ironbark (Eucalyptus sideroxylon), Red Box (Eucalyptus polyanthemos) and Red Stringybark (Eucalyptus macrorhyncha) with Western Grey Box (Eucalyptus microcarpa). Other trees may include White Box (Eucalyptus albens) and Blakely's Red Gum (Eucalyptus blakelyi). The shrub layer is very sparse and includes Daviesia leptophylla, Acacia pycnantha, Cassinia laevis, Dillwynia sericea, Acacia genistifolia, Cassinia arcuata, Einadia hastata, Acacia paradoxa, Leucopogon rufus, Grevillea lanigera, Melichrus urceolatus, Hibbertia obtusifolia and Pultenaea foliolosa. The ground cover is sparse to mid-dense but may be dense after rain. It is dominated by tussock grass species such as Austrodanthonia eriantha, Austrodanthonia fulva, Poa sieberiana, Austrostipa scabra subsp. falcata, Austrostipa mollis and Dichelachne crinita. The mat-rushes Lomandra filiformis subsp. coriacea and Lomandra multiflora are often present along with the sedge Carex appressa in moister depressions. Forb species include Stypandra glauca, Opercularia hispida, Geranium solanderi var. solanderi, Hydrocotyle laxiflora, Xerochrysum viscosum, Gonocarpus tetragynus, Wahlenbergia stricta subsp. stricta, Thysanotus patersonii, Goodenia hederacea subsp. hederacea, Dichopogon strictus, Daucus glochidiatus and Chrysocephalum apiculatum. Weeds may be abundant. Occurs on clay soils derived from metamorphic rocks in the Tarcutta region and in the Brothers Mountain region between Nangus and Gundagai in the southern part of the NSW South-western Slopes Bioregion. Mainly cleared with remnants degraded by grazing. A threatened plant community with the best remaining patches along roadsides and in travelling stock reserves.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Ironbark Woodlands and Forests of the Inland Slopes, Plains and Peneplains.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Adrah Hills and Ranges; .

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 204 - Ironbark-Western Box (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Includes parts of Biolandscapes WagM39a and WagM53a in Priday (2006). Includes most of Box-ironbark forest map unit in Priday (2004) for Wagga shire. Include sites RH31, RH32 and SZ32240R in NSW YETI database.

Interstate Equivalent(s): Victoria: similar to Box-Ironbark Forest EVC 61.

Mapped/Modelled: Current extent and pre-European extent mapped or modelled as part of a broader complex. ***Plot Sampling:*** Inadequate.

Mapping Info: Broadly mapped by Priday (in prep. 2006). Some sample sites in DECC YETI database.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%).

IBRA Sub-Region: Upper Slopes (>70%).

Botanical Division: South Western Slopes (SWS) (>70%).

Local Govt. Areas: Gundagai (1-30%); Tumut (1-30%); Wagga Wagga (30-70%).

CMAs: Murrumbidgee (>70%).

MD Basin: Yes.

Substrate Mass: Metamorphic rocks.

Lithology: Gneiss; Metamorphic rock (unidentified); Phyllite; Schist; Slate.

Great Soil Group: Red podzolic soil.

Soil Texture: Light clay.

Landform Patterns: Low hills.

Landform Elements: Footslope; Hillcrest; Hillslope.

Land Use: Cropping and Horticulture; Grazing.

Impacts of European Settlement: Major reduction (>70%) in extent and/or range.

Pre-European Extent: 4000 ha ±30%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Restricted in extent and distribution to the Tarcutta - Gundagai region.

Current Extent: 500 ha ±30% or 12% ± 40% of pre-European extent remaining.

Current Extent Comments: (Expert estimate). Mostly cleared and restricted in extent.

Conservation Reserves: None.

Reserves Total Area: 0 ha. ***No. Representatives in Reserves:*** 0

Protected Area Explanation: Close to Tarcutta ABH reserve that contains the Mugga Ironbark community ID289.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: Not known to be protected. ***No. Representatives in Protected Areas:*** 0

Protected Pre-European Extent: 0% which is inadequately protected across distribution.

Restricted in 1750: Code 5b: <5% of pre-European extent in protected areas (1,000<area<10,000 ha).

Key Sites for Protection: Remnants occur on roadsides and travelling stock reserves around Tarcutta including Mates Gully TSR, along Mates Gully Road, in Racecourse TSR, in Windmill TSR, along Comatawa Road 4 km south of Tarcutta. Also, occurs along Keajura Road west of the Hume Highway 9 km south of Tarcutta (M. Sheahan and S. Carararo pers. comm.).

Degree of Fragmentation: Human induced highly fragmented small stands with <30% extent remaining and high edge to area ratio.

Recoverability: Poor health as structure and/or composition significantly altered. But sufficient biota remain for natural regeneration if causal factors and their secondary impacts removed and dynamic processes reinstated.

Variation & Disturbance: Red Stringybark occurs on hillslopes whereas White Box and Western Grey Box occurs on flats. Shrubs vary across range with locaised dominance of some species such as

Fire Regime: Rarely burns due to clearing and fragmentation. Too-frequent burning could eliminate some shrub species.

Adjoining Communites: Grades into grassy Blakely's Red Gum woodland along creeks or on flats and with White Box woodland on better soils on hillslopes. Grades into a similar Mugga Ironbark - Red Stringybark - Scribbly community (ID289) on siliceous hillslopes and ridges. Similar in some repstects with ID217 that occurs mainly in the Lower Slopes sub-region to the west.

Threatening Processes: Overcleared in the past with small remnants in a few locations. Weed infestation affects most sites. Lack of regrowth of trees and shrubs due to grazing pressure.

Threatening Process List: Age class of woody vegetation; Clearing for agriculture; Firewood collection; Chemical pollution (incl. herbicides, pesticides); Nutrient changes through fertilizers or runoff; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock; Weed (exotic) invasion.

Threat Category: Endangered. ***Threat/Protected Area Code:*** E/5b ***Threat Criteria:*** 1; 3; 4.

Planning Controls:

Planning and Management: Areas on public lands such as TSRs and roadsides need to be protected under caveates. Areas on private land require protection though property agreements with landholders.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist, but required.

Reference List: (356; 316). Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 346

Common Name: **White Box - Blakely's Red Gum - White Cypress Pine shrubby woodland on hills in the Wagga Wagga - Cootamundra region of the NSW South-western Slopes Bioregion**

Scientific Name: *Eucalyptus albens - Eucalyptus blakelyi - Callitris glaucophylla - Eucalyptus microcarpa / Dillwynia sericea - Acacia pycnantha - Acacia decora - Acacia verniciflua / Gonocarpus elatus - Cheilanthes sieberi subsp. sieberi - Austrostipa densiflora - Xerochrysum viscosum*

Veg. Comm. ID.: **346** ***Original Entry:*** J.S. Benson 27/04/2007 ***Last Modified:*** J.S. Benson 15/11/2010

Photo 1: ID346a_benson.jpg White Box (Eucalyptus albens) woodland with a shrubby understorey of Dillwynia sericea and Acacia spp. on shallow soil on a metamorphic substrate on hills west of Wagga Wagga, [AGD66 35°07.563'S 147°17.989'E], 14/2/2007, J.S. Benson.

Photo 2: ID346b_benson.jpg Blakely's Red Gum (Eucalytpus blakelyi) with White Cypress Pine (Callitris glaucophylla) on hills on the Old Narranderra Road west of Wagga Wagga, [AGD66 35°04.126'E 147 16.307'S, 14/2/2007, J.S. Benson.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus albens; Eucalyptus blakelyi; Callitris glaucophylla; Eucalyptus microcarpa; Eucalyptus dwyeri; Callitris endlicheri.*

Shrubs/Vines/Epiphytes: *Dillwynia sericea; Acacia decora; Acacia pycnantha; Acacia verniciflua; Acacia paradoxa; Brachyloma daphnoides subsp. daphnoides; Melichrus urceolatus; Acacia implexa; Allocasuarina verticillata; Pultenaea foliolosa.*

Ground Cover: *Gonocarpus elatus; Xerochrysum viscosum; Cheilanthes sieberi subsp. sieberi; Austrostipa densiflora; Lomandra multiflora subsp. multiflora; Stypandra glauca; Chrysocephalum semipapposum; Gonocarpus tetragynus; Dianella revoluta var. revoluta; Dianella longifolia; Austrodanthonia eriantha; Digitaria divaricatissima; Elymus scaber var. scaber; Einadia nutans subsp. nutans; Erodium crinitum; Hydrocotyle laxiflora; Lomandra filiformis subsp. coriacea; Oxalis perennans; Panicum effusum; Poa sieberiana; Austrostipa scabra subsp. scabra; Wahlenbergia stricta subsp. stricta; Wahlenbergia communis.*

Weed Species: *Briza major; Hypochaeris radicata; Aira elegantissima; Arctotheca calendula; Cirsium vulgare; Hypericum perforatum; Petrorhagia nanteuilii; Trifolium glomeratum.*

Weediness: Medium (5-15%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Woodland; Open Forest.

Height Class (WH): Mid-High.

Vegetation Description: Mid-high woodland or open forest dominated White Box (Eucalyptus albens), Blakely's Red Gum (Eucalyptus blakelyi) and White Cypress Pine (Callitris glaucophyall). Western Grey Box (Eucalyptus microcarpa) may be present on lower slopes and patches of Eucalyptus dwyeri and Black Cypress Pine (Callitris endlicheri) occur on rocky ridges. A sparse to mid-dense shrub layer is usually present containing Dillwynia sericea and a number of species of wattles including Acacia decora, Acacia pycnantha, Acacia verniciflua and Acacia paradoxa. This shrub layer may be eliminated with heavy grazing. The ground cover is very sparse due to shallow, gravelley soils. Ground cover grass species include Austrostipa densiflora, Austrodanthonia eriantha, Digitaria divaricatissima, Poa sieberiana and Austrostipa scabra subsp. scabra. The mat-rush Lomandra multiflora subsp. multiflora may be common. Forb species include Gonocarpus elatus, Xerochrysum viscosum, Stypandra glauca, Chrysocephalum semipapposum, Dianella revoluta var. revoluta and Wahlenbergia stricta subsp. stricta. The rock fern Cheilanthes sieberi subsp. sieberi may be abundant. Occurs on shallow or skeletal clay soils derived from fine-grained metamorhic substrates on hillcrests and hillslopes mainly in the Wagga Wagga to Cootamundra region in the southern - central part of the NSW South-western Slopes Bioregion. Grades into White Box - Pine on parna soils to the west (ID267) and into grassy white box woodland (ID266) on better soils on hillslopes. A restricted community that is poorly represented in formal protected areas as of 2010.

Level of Classification: Association. ***Classification Confidence Level:*** Medium.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus woodlands with a shrubby understorey.

Forest Type (RN 17): 176 - White Box-Stringybark (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Part of the "Eucalyptus albens - Callitris glauca" association in Moore (1953a). Includes most of the Wagga Hills Open Forest map unit in Priday (2004) and species based on floristic sites GB003, GB004, GB08, GB021 and GB023. May be part of Biolandscape WagM39b in Priday (2006). Field checked in Benson (1999-2009).

Interstate Equivalent(s): None.

Mapped/Modelled: Current extent and pre-European extent not mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Some areas are mapped in reserves. Most of Wagga Hills Open Forest map unit in Priday (2004). Also occurs to the east. Sampled in this survey.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%).

IBRA Sub-Region: Upper Slopes (30-70%); Lower Slopes (1-30%).

Botanical Division: South Western Slopes (SWS) (30-70%); Central Western Slopes (CWS) (30-70%).

Local Govt. Areas: Junee (1-30%); Gundagai (1-30%); Wagga Wagga (1-30%); Lockhart (1-30%); Cootamundra (1-30%).

CMAs: Murrumbidgee (>70%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Metamorphic rocks.

Lithology: Granite; Metamorphic rock (unidentified); Phyllite.

Great Soil Group: Red clay; Red podzolic soil.

Soil Texture: Light clay; Light medium clay.

Landform Patterns: Hills.

Landform Elements: Gully; Hillcrest; Hillslope.

Land Use: Grazing; Urban.

Impacts of European Settlement: Medium reduction (30-70%) in extent and/or range.

Pre-European Extent: 6000 ha ±50%. Expert estimate not based on any mapped vegetation.

Pre-European Extent Comments: Estimate based on Wagga Hills Open Forest map unit in Priday (2004). Restricted to shallow soils mainly on hills around Wagga Wagga and nearby regions comprised of metamorphic substrates.

Current Extent: 2500 ha ±50% or 42% ± 80% of pre-European extent remaining.

Current Extent Comments: (Expert estimate). Based on mapping in Priday (2004).

Conservation Reserves: None.

Reserves Total Area: 0 ha. ***No. Representatives in Reserves:*** 0

Protected Area Explanation: Not in formal conservation reserves as of 2010 but sampled in other types of local "reserves".

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: Not known to be protected. ***No. Representatives in Protected Areas:*** 0

Protected Pre-European Extent: 0% which is inadequately protected across distribution.

Restricted in 1750: Code 5b: <5% of pre-European extent in protected areas (1,000<area<10,000 ha).

Key Sites for Protection: The metamorphic hills in the vicinity Wagga Wagga City and on hills near Cootamundra. While not sampled in formal protected areas as of 2010 it is sampled in some "unofficial" reserves such as the local government reserve at Red Hill on the Kapooka Road. It also occurs in the Kapooka Military Area, in Pomingalarna Park and on Willans Hill (Priday 2004).

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Soil depth influences species composition in this community. Frequency of fire may also affect density of shrubs.

Fire Regime: An appropriate fire frequency for this shrubby community may be 20-40 years.

Adjoining Communites: Grades into grassy White Box woodland (ID266) on better soils on lower slopes, into Tumbledown Red Gum on hills and into White Box - White Cypress Pine woodland (ID267) on parna soils to the west. Grades into a more grassy White Box - Blakely's Red Gum woodland to the east (ID347).

Threatening Processes: While about half of this community remains uncleared much is regrowth from previous clearing and most has been affected by grazing, soil erosion, recreational vehicles and tree cutting. For these reasons it is a moderaley threatened community.

Threatening Process List: Clearing for agriculture; Clearing on small lots (hobby farms); Firewood collection; Recreation over-use; Road construction; Soil erosion, water: gully, tunnel, landslips; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/5b ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Protect hill remnants from small-scale clearing, excessive grazing, too-frequent fire, tree cutting and recreational vehicles. Enter into conservation agreements over currently informally protected areas such as local reserves.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (308; 166; 356; 316). Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney); Moore, C.W.E. (1953a) The vegetation of the south-eastern Riverina, New South Wales 1: the climax communities. Aust. J. Botany 1: 485-547; Priday, S. (in prep. 2006) The native vegetation of the New South Wales South Western Slopes Bioregion (Lachlan, Murrumbidgee and Murray Catchments). Unpublished report to DEC Southern Office Queanbeyan; Priday, S. (2004) The native vegetation and threatened species of the City of Wagga Wagga. Unpublished report. (NSW National Parks and Wildlife Service, Southern Region: Queanbeyan).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 348

Common Name: **Red Stringybark - Long-leaved Box - Joycea pallida grassy open forest in the upper Lachlan catchment, NSWSWS and South Eastern Highlands Bioregions**

Scientific Name: *Eucalyptus macrorhyncha - Eucalyptus goniocalyx / Brachyloma daphnoides subsp. daphnoides - Cassinia arcuata - Dillwynia sericea / Joycea pallida - Austrodanthonia racemosa var. racemosa - Stellaria pungens - Lomandra filiformis subsp. coriacea*

Veg. Comm. ID.: **348** ***Original Entry:*** J.S. Benson 4/05/2007

Photo 1: ID348a_SWS0507029.jpg Red Stringybark (Eucalyptus macrorhyncha) - Long-leaved Box (Eucalyptus goniocalyx) open forest with Joycea pallida tussock grass ground cover, southern aspect, Mundoonen Nature Reserve, Yass, [AGD66 34°50.335'S 149°02.504'E], 28/5/2007, Jaime Plaza.

Photo 2: ID348b_SWS0507423.jpg Red Stringybark - Long-leaved Box - Broad-leaved Peppermint (Eucalyptus dives) open forest with Joycea pallida - snow grass tussock grass ground cover, Roseberg State Forest, Lyndhurst, South Eastern Highland Boregion, [AGD66 33°47.993'S 149°01.749'E], 1/06/2007, Jaime Plaza.

Characteristic Vegetation: (Combination of Quantitative Data and Qualitative Estimate)

Trees: *Eucalyptus macrorhyncha; Eucalyptus goniocalyx; Eucalyptus dives; Eucalyptus blakelyi.*

Shrubs/Vines/Epiphytes: *Brachyloma daphnoides subsp. daphnoides; Cassinia arcuata; Cassinia aculeata; Dillwynia sericea; Leptospermum multicaule; Phyllanthus hirtellus; Indigofera australis; Platylobium formosum subsp. formosum; Melichrus urceolatus; Xanthorrhoea glauca subsp. angustifolia; Acacia dealbata; Styphelia triflora; Hibbertia obtusifolia.*

Ground Cover: *Joycea pallida; Austrodanthonia racemosa var. racemosa; Stellaria pungens; Lomandra filiformis subsp. filiformis; Poa sieberiana var. sieberiana; Dichondra repens; Dichelachne micrantha; Aristida ramosa var. ramosa; Microlaena stipoides var. stipoides; Austrostipa mollis; Austrostipa scabra subsp. falcata; Austrodanthonia eriantha; Echinopogon caespitosus var. caespitosus; Hovea linearis; Lomandra multiflora subsp. multiflora; Juncus subsecundus; Cheilanthes sieberi subsp. sieberi; Cheilanthes austrotenuifolia; Lepidosperma laterale; Goodenia hederacea subsp. hederacea; Stypandra glauca; Gonocarpus elatus; Gonocarpus tetragynus; Euchiton gymnocephalus; Chrysocephalum apiculatum; Oxalis perennans; Scutellaria humilis; Cymbonotus lawsonianus; Senecio bathurstianus; Hydrocotyle laxiflora; Geranium solanderi var. solanderi; Hypericum gramineum; Hydrocotyle laxiflora; Oxalis perennans; Pteridium esculentum.*

Weed Species: *Briza maxima; Hypochaeris radicata.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Not assessed.

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable.

Structure (WH): Open Forest.

Height Class (WH): Mid-High; Tall.

Vegetation Description: Mid-high to tall open forest dominated by Red Stringybark (Eucalyptus macrorhyncha) sometimes with Long-leaved Box (Eucalyptus goniocalyx) but Inland Scribbly Gum (Eucalyptus rossii) is absent. The shrub layer is very sparse or absent depending on fire and grazing history. Shrub species include Brachyloma daphnoides subsp. daphnoides, Cassinia arcuata, Cassinia aculeata, Dillwynia sericea and Leptospermum multicaule. The ground cover is dense in wet seasons or sparse when dry. It is dominated by tussock grasses such as Joycea pallida, Austrodanthonia racemosa var. racemosa, Poa sieberiana var. sieberiana, Dichelachne micrantha, Aristida ramosa var. ramosa, Austrostipa mollis and Austrostipa scabra subsp. falcata. The mat-rushes Lomandra filiformis subsp. filiformis and Lomandra multiflora subsp. multiflora may occur. Forb species include Stellaria pungens, Dichondra repens and Hydrocotyle laxiflora. The rock fern Cheilanthes sieberi may be common. Occurs on shallow loam to clay soils derived from siliceous metamorphic, sedimentary and granitic substrates on protected (often southern aspects) hillslopes and gullies in hill or plateau landform patterns the Upper Slopes sub-region of the NSW South-western Slopes Bioregion but mainly on the western side of the South Eastern highlands bioregion for example in the Boorowa and Yass regions. Floristically similar to Inland Scribbly Gum - Red Stringybark open forest that occurs on more exposed aspects. Sampled in some reserves but overall mostly cleared.

Level of Classification: Sub-association. ***Classification Confidence Level:*** Low.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): Western Slopes Dry Sclerophyll Forests.

State Landscape (Mitchell 2002): Not Assessed.

NVIS Major Veg Sub-Groups: Eucalyptus forests with a grassy understorey.

Forest Type (RN 17): 124 - Red Stringybark (P).

Authority(s): (Combination of Expert Opinion and Quantitative Data). Part of the Tablelands Red Stringybark - Long-leaved Box and part of the Red Stringybark - Joycea tussock grass map units in the vegetation map of Boorowa Shire (NSWNPWS 2002a) including sites brwa5429 and 6212. Possibly part of Vegetation Group 122 in Gellie (2005). Sub-association of the widespread Inland Scribbly Gum - Red Stringybark community I(ID350) but lacking Inland Scribbly Gum. Requires more data to improve definition as of 2007.

Interstate Equivalent(s): None.

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Inadequate.

Mapping Info: Often mapped as a broader Red Stringybark Complex e.g. NSWNPWS (2002a). Not mapped elsewhere as of 2007. Limited plot sampling as of 2007.

Climate Zone: Temperate: no dry season (warm summer).

IBRA Bioregion (v6): NSW South-western Slopes (30-70%); South Eastern Highlands (30-70%).

IBRA Sub-Region: Upper Slopes (30-70%); Murrumbateman (1-30%); Crookwell (1-30%).

Botanical Division: Central Western Slopes (CWS) (1-30%); Southern Tablelands (ST) (30-70%); South Western Slopes (SWS) (1-30%).

Local Govt. Areas: Boorowa (1-30%); Upper Lachlan (1-30%); Yass Valley (1-30%); Young (1-30%).

CMAs: Lachlan (>70%).

MD Basin: Yes.

Substrate Mass: Plutonic rocks; Metamorphic rocks; Sedimentary rocks.

Lithology: Greywacke; Granite; Metamorphic rock (unidentified); Quartzite; Rhyolite; Sandstone.

Great Soil Group: Brown podzolic soil; Red podzolic soil; Yellow podzolic soil.

Soil Texture: Light clay; Light medium clay; Sandy clay loam.

Landform Patterns: Hills; Plateau.

Landform Elements: Gully; Hillcrest; Hillslope.

Land Use: Grazing.

Impacts of European Settlement: Medium reduction (30-70%) in extent and/or range.

Pre-European Extent: 30000 ha ±30%. Modelled from sound site or polygon data.

Pre-European Extent Comments: Part of Red Stringybark - Joycea community in NSW NPWS (2002a) and modelled extent of Vegetation Group 122 in Gellie (2005).

Current Extent: 12000 ha ±30% or 40% ± 50% of pre-European extent remaining.

Current Extent Comments: (Modelled from sound site data over unclassified map of extant vegetation). About 60% is estimated to have been cleared in the Boorowa Shire (NSW NPWS 2002a) so this may be indicate of full range.

Conservation Reserves: Mundoonen NR 400 (E2).

Reserves Total Area: 400 ha. ***No. Representatives in Reserves:*** 1

Protected Area Explanation: Mundoonen NR estimated by spliting community 1 in Doherty (1997a) based on observation in Benson (1999-2009). Also present in other reserves in the SHE bioregion to be assessed in the future.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 3.33% 400 ha ± 30%. ***No. Representatives in Protected Areas:*** 1

Protected Pre-European Extent: 1.33% which is inadequately protected across distribution.

Common in 1750: Code 4a: 1-5% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Hills in the western central tabllands and upper south-western slopes.

Degree of Fragmentation: Human induced fragmented stands with <60% >30% extent remaining and moderate edge to area ratio.

Recoverability: Moderate health as structure and/or composition altered. Likely to recover considerably if causal factors and secondary impacts removed.

Variation & Disturbance: Unknown. Composition alters with grazing and fire history.

Fire Regime: Unknown. Now rare due to fragmentation.

Adjoining Communites: Grades into a Mugga Ironbark - Blakely's Red Gum woodland (ID342) on hills, into a similar Red Stringybark - Long-leaved Box - Black Cypress Pine shrub/grass open forest (ID321) on mainly sandstones and rhyolite to the north and into a shrubby Red Stringybark - Tumbledown Red Gum - Kunzea open forest ID340) on granite from Reids Flat to Wyangala.

Threatening Processes: Extensively cleared in the past. The main threats to this community include hobby farm clearing, over-grazing, localised salinity and timber-cutting for fire wood and too-frequent fire.

Threatening Process List: Clearing for agriculture; Clearing on small lots (hobby farms); Firewood collection; Inappropriate fire regimes; Salinity; Soil erosion, water: sheet erosion; Unsustainable grazing and trampling by stock.

Threat Category: Vulnerable. ***Threat/Protected Area Code:*** V/4a ***Threat Criteria:*** 1; 4.

Planning Controls:

Planning and Management: Protect hill remnants from clearing and over-grazing.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (177; 336; 353; 308). Bos, D. & Lockwood, M. (1996) Flora, fauna and other features of the south west slopes biogeographic region, NSW. Report No. 59, Johnson Centre of Parks, Recreation and Heritage. (Charles Sturt University: Albury); NSW National Parks and Wildlife Service (2002a) The native vegetation of Boorowa Shire (NSW National Parks and Wildlife Service: Hurstville); Gellie, N.J.H. (2005) Native vegetation of the Southern Forests: South-east Highlands, Australian Alps, South-west Slopes and SE Corner bioregions. Cunninghamia 9(2): 219-254; Benson, J.S. (1999-2009) Unpublished field note books recording species at various locations in western NSW. (Royal Botanic Gardens and Domain Trust: Sydney).

NSW Vegetation Classification - Vegetation ID

Vegetation Community ID 354

Common Name: **Red Stringybark - Long-leaved Box - Black Cypress Pine - hummock grass - shrubby low woodland on siliceous volcanic and sedimentary ranges in the Peak Hill region, central west NSW**

Scientific Name: *Eucalyptus macrorhyncha - Eucalyptus goniocalyx - Callitris endlicheri / Grevillea floribunda - Acrotriche rigida - Persoonia rigida - Acacia mollifolia / Joycea pallida - Goodenia hederacea subsp. hederacea - Pomax umbellata - Gonocarpus elatus*

Veg. Comm. ID.: **354** ***Original Entry:*** J.S Benson 22/06/2007

Photo 1: ID354a_PC245-20.jpg Eucalyptus macrorhycha - E. goniocalyx low woodland with Triodia scariosa ground cover on ridge on the Bunberry Ridge in Goobang National Park, [AGD66 33°10'23.8"S 148°24'0.5"E], 03/05/2005, Jaime Plaza.

Characteristic Vegetation: (Quantitative Data)

Trees: *Eucalyptus goniocalyx; Eucalyptus macrorhyncha; Callitris endlicheri.*

Shrubs/Vines/Epiphytes: *Grevillea floribunda; Acrotriche rigida; Persoonia rigida; Melichrus urceolatus; Styphelia triflora; Calytrix tetragona; Brachyloma daphnoides subsp. daphnoides; Hibbertia obtusifolia; Persoonia curvifolia; Persoonia sericea; Correa reflexa var. reflexa; Philotheca salsolifolia subsp. salsolifolia; Ozothamnus diosmifolius; Allocasuarina diminuta subsp. diminuta; Leptospermum divaricatum; Acacia lanigera var. lanigera; Harmogia densifolia; Pultenaea microphylla; Acacia mollifolia; Hibbertia riparia; Indigofera coronillifolia; Acacia buxifolia subsp. buxifolia; Monotoca scoparia; Dillwynia sericea; Leucopogon attenuatus; Cassinia quinquefaria; Cassinia longifolia; Grevillea ramosissima subsp. ramosissima; Hakea decurrens subsp. decurrens; Isopogon petiolaris; Dodonaea viscosa subsp. spatulata; Macrozamia secunda.*

Ground Cover: *Joycea pallida; Goodenia hederacea subsp. hederacea; Gonocarpus elatus; Pomax umbellata; Poranthera microphylla; Cheilanthes sieberi subsp. sieberi; Aristida calycina; Poa sieberiana; Triodia scariosa subsp. scariosa; Stypandra glauca; Rhytidosporum procumbens; Dianella revoluta var. revoluta; Lomandra filiformis subsp. coriacea; Lomandra multiflora subsp. multiflora; Cyperus lucidus; Gahnia aspera; Caustis flexuosa; Lepidosperma laterale; Solenogyne bellioides; Euchiton sphaericus; Xerochrysum viscosum; Bulbine bulbosa; Laxmannia gracilis; Hydrocotyle laxiflora; Actinotus helianthi; Daucus glochidiatus form D; Oxalis perennans; Opercularia aspera; Stylidium graminifolium; Xanthorrhoea glauca subsp. angustifolia.*

Weed Species: *Aira cupaniana; Hypochaeris glabra; Cerastium glomeratum; Stellaria media; Conyza albida; Briza minor.*

Weediness: Low (<5%) with <10% cover.

Threatened Plants: Indigofera coronillifolia (southern limit); Choretrum candollei (western limit).

Threatened Fauna: Not assessed.

Mean Species Richness: Not assessed.

Rainforest Structure (Webb): Not applicable..

Structure (WH): Woodland; Open Woodland.

Height Class (WH): Low; Mid-High.

Vegetation Description: Low to Mid high woodland dominated by Red Stringybark (Eucalyptus macrorhyncha), Long-leaved Box (Eucalyptus goniocalyx) and Black Cypress Pine (Callitris endlicheri). The shrub layer is generally mid-dense but may be dense in places long unburnt and it contains a diverse range of species including Grevillea floribunda, Acrotriche rigida, Persoonia rigida, Melichrus urceolatus, Styphelia triflora, Calytrix tetragona, Brachyloma daphnoides subsp. daphnoides, Hibbertia obtusifolia, Persoonia curvifolia, Persoonia sericea, Correa reflexa var. reflexa, Philotheca salsolifolia subsp. salsolifolia, Ozothamnus diosmifolius, Cassinia quinquefaria, Allocasuarina diminuta subsp. diminuta, Leptospermum divaricatum, Acacia lanigera var. lanigera, Harmogia densifolia, Pultenaea microphylla, Acacia mollifolia, Hibbertia riparia, Indigofera coronillifolia, Acacia buxifolia subsp. buxifolia, Monotoca scoparia, Dillwynia sericea and Leucopogon attenuatus. The ground cover is often very sparse. It includes grass species such as Aristida calycina, Joycea pallida and Poa sieberiana var. sieberiana. On exposed sites the hummock grass Triodia scariosa subsp. scariosa occurs. The low shrub Rhytidosporum procumbens may also be present. Forb species include Goodenia hederacea subsp. hederacea, Gonocarpus elatus, Pomax umbellata, Poranthera microphylla, Stypandra glauca and Dianella revoluta var. revoluta. The mat-rushes Lomandra filiformis subsp. coriacea and Lomandra multiflora subsp. multiflora are commonly present. Occurs on shallow, loamy sand soils mainly derived from siliceous volcanic substrates including rhyolite but occurs on Devonian sandstone in the varous ranges east of the town of Peak Hill including areas in Goobang National Park in the central-western slopes of NSW in the NSW South-western Slopes Bioregion. Relatively well represented in reserves and not threatened.

Level of Classification: Sub-association.

Classification Confidence Level: Medium.

Formation Group: Eucalyptus Corymbia (Mostly Shrubby) Woodlands and Forests on Low Fertility Soils on the Western Slopes.

State Veg Map (Keith 2004): *Western Slopes Dry Sclerophyll Forests.*

State Landscape (Mitchell 2002): *Not Assessed.*

NVIS Major Veg Sub-Groups: *Eucalyptus woodlands with a shrubby understorey.*

Forest Type (RN 17): *124 - Red Stringybark (P).*

Authority(s): (Combination of Expert Opinion and Quantitative Data). Based on community 4b in Goobang National Park in Porteners (1997a). Part of BVT 41 in DEC (2006, 2006a). A sub-association of the more widespread ID321 that occurs to east and south.

Interstate Equivalent(s): None..

Mapped/Modelled: Current extent partly mapped or modelled. ***Plot Sampling:*** Adequate.

Mapping Info: Mapped in Goobang National Park by Porteners (1997a).

Climate Zone: Temperate: no dry season (hot summer).

IBRA Bioregion (v6): NSW South-western Slopes (>70%).

IBRA Sub-Region: Upper Slopes (30-70%); Lower Slopes (30-70%).

Botanical Division: Central Western Slopes (CWS) (>70%).

Local Govt. Areas: Parkes (30-70%); Forbes (1-30%); Cabonne (30-70%); Narromine (1-30%).

CMAs: Central West (30-70%); Lachlan (1-30%).

MD Basin: Yes.

Substrate Mass: Sedimentary rocks; Volcanic rocks.

Lithology: Quartz sandstone; Rhyolite; Sandstone.

Great Soil Group: Brown podzolic soil; Grey-brown podzolic soil.

Soil Texture: Loamy sand; Sandy loam.

Landform Patterns: Hills.

Landform Elements: Hillcrest; Hillslope.

Land Use: Grazing; Nature Conservation; Timber Production.

Impacts of European Settlement: Minor reduction (<30%) in extent and/or range.

Pre-European Extent: 15000 ha ±30%. Estimated from extant vegetation maps: part range.

Pre-European Extent Comments: Mainly restricted to the rhyolite ranges east of Peak Hill including the Curumbeynya Range.

Current Extent: 12000 ha ±30% or 80% ± 50% of pre-European extent remaining.

Current Extent Comments: (Estimated from mapped extant vegetation: part range). There has been limited clearing due to rugged topography and poor soils.

Conservation Reserves: Goobang NP 7000 (E2).

Reserves Total Area: 7000 ha. ***No. Representatives in Reserves:*** 1

Protected Area Explanation: Goobang National Park from community 4b in Porteners (1997a) including estimates for mosaics.

Secure Property Agreements: None.

Secure PAs Total Area: 0 ha. ***No. Representatives in Secure Property Agreements:*** 0

Protected Current Extent: 58.33% 7000 ha ± 30%. ***No. Representatives in Protected Areas:*** 1

Protected Pre-European Extent: 46.66% which is adequately protected across distribution.

Common in 1750: Code 1a: >25% of pre-European extent in protected areas (>10,000 ha).

Key Sites for Protection: Well protected in Goobang National Park.

Degree of Fragmentation: Contiguous stands with high connectivity with >60% extent remaining and low edge to area ratio.

Recoverability: Healthy, structure and composition intact. Insignificant indicators of degradation. Likely to continue in good health if maintained.

Variation & Disturbance: Shrub species vary over range. The hummock grass Triodia scariosa subsp. scariosa is restricted to more exposed sites.

Fire Regime: Unknown. Occasionally burns due to either wildfires or deliberate burns by landholders. To ensure the survival of many of the shrub species present in this community, fire frequency should be relatively infrequent, e.g. perhaps 15-35 years.

Adjoining Communites: Grades into several communities confined to this region including Red Ironbark woodland (ID328), Red Stringybark woodland (ID331) and Inland Scribbly Gum woodland (ID327).

Threatening Processes: Inappropriate fire regimes could eliminate some shrub species.

Threatening Process List: Firewood collection; Inappropriate fire regimes.

Threat Category: Least Concern. ***Threat/Protected Area Code:*** LC/1a ***Threat Criteria:*** 1; 4; 5.

Planning Controls:

Planning and Management: Prevent too-frequent fire.

Listed Under Legislation: None.

Recovery Plan: Doesn't exist and not required.

Reference List: (372; 373; 69). DEC (2006) Reconstructed and extant distribution of native vegetation in the Central West Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); DEC (2006a) Reconstructed and extant distribution of native vegetation in the Lachlan Catchment. Unpublished report (NSW Department of Environment and Conservation: Dubbo); Porteners, M.F. (1997a) Vegetation communities of Goobang National Park and adjoining areas. Unpublished report and vegetation map to NSW National Parks and Wildlife Service: Bathurst.