Species information

Forest Products Commission

Beefwood

Grevillea striata

Beefwood is a medium-sized tree to 14 m, usually with a single trunk and diameter up to 600 mm. Bark is deeply fissured, rough dark grey to the branches, while new bark is rufous red. It grows in the northern Goldfields, Murchison, eastern Gascoyne, southern Pilbara and the Kimberley.

Wood description

Heartwood is a rich red colour, and straight-grained, with distinctive rays on quartersawn timber. Sapwood is a pale yellow.

Wood density

Green density is about 1230 kg/m^3, air-dry density about 965 kg/m^3, and basic density about 820 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 3.3 and 2.0 per cent respectively.

Workability

Goldfields craftsmen rate beefwood as very poor for sanding, average for boring, screwholding, stability and finishing, good for machinability and gluing, and excellent for turning.

Strength group and properties

AS2879 rates beefwood as (S3) and (SD4), which was confirmed by the above air-dry density. The more important strength properties based on strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	73	94
Modulus of Elasticity	MPa	12400	14000
Max Crushing Strength	MPa	36	54
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Aborigines used the dark hard resin as an adhesive in tool manufacture. The timber has considerable potential for craftwork, particularly as inlays in marquetry.

Black morrel

Eucalyptus melanoxylon

Black morrel is a small to medium-sized tree scattered through the eastern Wheatbelt and central Goldfields, extending south-east of Lake King. The rough bark is dark brown to grey-black on the trunk, and smooth white, grey-white to salmon pink on the branches.

Wood description

Heartwood is dark brown with obvious growth rings.

Wood density

Green density is about 1165 kg/m^3, air-dry density about 1130 kg/m^3, and basic density about 870 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 7.2 and 6.0 per cent respectively.

Workability

Goldfields craftsmen rate black morrel as good for machinability, screwholding, stability and gluing, and excellent for turning, boring, sanding and finishing.

Strength group and properties

Green and dry strength groups are (S2) and (SD2), based on the air-dry density. Data from Melotte (1997) in the table below indicate SD2. Hardness tests were done by CALM in 1998.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	188
Modulus of Elasticity	MPa	14200	20780
Max Crushing Strength	MPa	43	70
Hardness	KN	-	15.4

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has considerable potential for woodturning and craftwork.

Brown mallet

Eucalyptus astringens

Brown mallet is a small to medium-sized tree, 10-25 m in height and with diameter at breast height (dbh) to 0.7 m, occasionally up to 30 m tall and diameter 1 m. Found in south-west Western Australia on the drier, inland side of the jarrah (E. marginata) forest, in the 300 to 400 mm rainfall zone. It occurs from north-west of York to Narrogin and Wagin, south to GMT Barker and east to near Kondinin, Lake Grace and Ravensthorpe. About 8000 ha of plantations were established near Narrogin.

Wood description

Heartwood is light red-brown to dark grey-brown, with reddish streaks, and the sapwood is up to 30 mm wide and distinctly paler.

Wood density

Green density is about 1120 kg/m^3, air-dry density about 980 kg/m^3, and basic density about 770 kg/m^3 (published figures). In comparison, CALM Timber Technology measured 1130 kg/m^3, 1090 kg/m^3 and 865 kg/m^3 for the three densities.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 7.1 and 5.5 per cent respectively, and after reconditioning 4.4 and 3.6 per cent respectively.

Workability

With workability, the timber is rather hard to work but dresses well. The grain is often interlocked and the timber is easy to dry.

Durability

The Durability Class based on the CSIRO 1996 ratings is 2/1 for <decay, and 2 for decay + termites.

Strength group and properties

Green and dry strength groups are S1 and SD2. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	113	179
Modulus of Elasticity	MPa	15000	19000
Max Crushing Strength	MPa	53	94
Hardness	KN	9.9	15

Availability

There is limited availability in Western Australia, and timber is generally marketed around the Narrogin area.

Uses

Uses have been for general construction (particularly on farms), tool handles, mining timbers and fuel. The bark has high tannin content (40 per cent or more), and this could be used for tanning leather and for adhesives manufacture.

Cleland's blackbutt

Eucalyptus clelandii

Cleland's blackbutt is a small tree or more rarely a mallee form scattered in the central Goldfields, with an outlier near Mount Gibson (north-east of Dalwallinu).

Wood description

Heartwood is a light chocolate-brown with an attractive patterned grain.

Wood density

Green density is about 1215 kg/m^3, air-dry density about 1130 kg/m^3, and basic density about 975 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 4.8 and 3.3 per cent respectively.

Workability

Goldfields craftsmen rate Cleland's blackbutt as good for turning, machinability, boring, screwholding, stability, sanding and finishing.

Durability

Although the species has not been formally assessed, anecdotal evidence indicates that it is very durable.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Possible uses are woodturning and general craftwork.

Corkwood

Hakea suberea

Corkwood is a small tree that grows to 8 m, generally with crooked trunk and branches. The thick bark grows as ridges, with a corklike appearance. The species grows in moisture-accumulating sites in overall arid areas in the Gascoyne, Murchison and Goldfields.

Wood description

Heartwood is pale red with distinctive rays on quartersawn timber.

Wood density

Green density is about 1225 kg/m^3, air-dry density about 965 kg/m^3, and basic density about 800 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 4.9 and 2.2 per cent respectively.

Workability

Goldfields craftsmen rate corkwood as average for turning, stability and sanding, and good for machinability, boring, screwholding and finishing.

Strength group and properties

Green and dry strength groups are (S3) and (SD3). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	73	110
Modulus of Elasticity	MPa	12400	16000
Max Crushing Strength	MPa	36	61
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has potential for woodturning and craftwork.

Dundas blackbutt

Eucalyptus dundasii

Dundas blackbutt is a small to medium-sized tree scattered in two separate areas. One occurrence is from north-west of Norseman east to the Fraser Range and southwards, and the other north of Coolgardie.

Wood description

Heartwood is light brown to reddish colour. Sapwood is paler. The timber has a moderate grain.

Wood density

Air-dry density is about 1100 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are estimated as about 6.0 and 4.5 per cent respectively.

Workability

Goldfields craftsmen rate Dundas blackbutt as good for turning, machinability, boring, screwholding, stability, sanding, gluing, and finishing.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	17.6

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has potential for most craft use.

Dundas mahogany

Eucalyptus brockwayi

Dundas mahogany is a small to medium-sized tree, up to 20 m tall and 0.7 m diameter, with a short bole and lightly branched crown. Its limited natural occurrence is around Norseman, extending about 100 km, with best stands around Lake Dundas to the south. It is found in open forest and woodlands, often associated with salmon gum, Dundas mahogany, Goldfields blackbutt, black morrel and merrit.

Wood description

Heartwood is brownish-red with straight grain.

Wood density

Green density is about 1260 kg/m^3, and air-dry density about 1085 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are estimated as about 5.0 and 4.0 per cent respectively.

Workability

Goldfields craftsmen rate Dundas mahogany as good for boring, screwholding, stability and gluing, and excellent for turning, machinability, sanding and finishing.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has considerable potential for woodturning and general craftwork.

Gidgee

Acacia pruinocarpa

Southern gidgee is a large spreading tree with height up to 12 m. It has rough, dark brown bark and often has fissures that fold into the wood, giving it a gnarled appearance. Distribution includes the central and northern desert areas of Western Australia, in a 700 km strip eastwards from east of Carnarvon to the north-eastern Goldfields and is prominent in summer rainfall areas in the Murchison, Goldfields and Gascoyne. It is often associated with mulga on loamy soils.

Wood description

Heartwood is dark brown, and sapwood whitish.

Wood density

Green density is about 1265 kg/m^3, air-dry density about 1150 kg/m^3, and basic density about 970 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 2.9 and 2.3 per cent respectively.

Workability

Goldfields craftsmen rank southern gidgee as average for machinability and stability, and good for turning, boring, screwholding, sanding and finishing.

Durability

Timber is presumably CSIRO Durability Class 1.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has considerable potential for craftwork.

Gimlet

Eucalyptus salubris

Gimlet is a small to medium-sized tree up to 20 m, with a distinctive fluted, copper-coloured stem with young bark. With summer, the smooth, shiny copper-coloured bark fades to grey-brown. The species has a wide distribution in the central and southern Goldfields, and in the northern Wheatbelt to Mullewa.

Wood description

Heartwood is pale brown with an orange tinge, dense and strong. The grain is very attractive.

Wood density

Green density is about 1230 kg/m^3, air-dry density about 1225 kg/m^3, and basic density about 940 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 4.9 and 3.8 per cent respectively.

Workability

Goldfields craftsmen rate gimlet as average to good for machinability, good for good for boring, stability and gluing, good to excellent for turning, and excellent for screwholding, sanding and finishing.

Strength group and properties

AS2878 gives (S2), (SD2). The provisional green and dry strength groups based on recent air-dry density data are (S1) and (SD1). The more important strength properties based on AS2878 strength groups are given in the table below. The hardness tests were organised by CALM in 1998.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	18.2

Availability

Limited availability.

Uses

Uses have included poles, fencing posts and minor building construction, as well as mining timber and fuelwood. It has potential as specialty timber for craft and furniture.

Goldfield's blackbutt

Eucalyptus lesouefii

Goldfields blackbutt is a small to medium-sized tree up to 12 m tall, often with a short trunk. The dark rough bark at the base changes to smooth white, often powdery bark.

Wood description

Heartwood is chocolate-brown, with an attractive grain.

Wood density

Green density is about 1180 kg/m^3, air-dry density about 1130 kg/m^3, and basic density about 880 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 5.5 and 4.2 per cent respectively.

Workability

Goldfields craftsmen rate blackbutt as good for turning, machinability, boring, screwholding, stability and gluing, and excellent for sanding and finishing.

Durability

The wood is durable, and presumably CSIRO Durability Class 2.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Uses during the gold rushes were for mining timber and fuelwood. The timber has potential for flooring and parquetry, general craftwork and specialty furniture.

Jarrah

Eucalyptus marginata

Jarrah is found only on lateritic soils in south-west Western Australia, in the 650 to 1250 mm rainfall zone. Under optimum conditions it is a tall tree attaining 30 to 40 m in height with diameter at breast heightup to 2 m. On poor sites the species is reduced to a mallee form.

Wood description

Heartwood of mature trees is dark-red, although regrowth is pinkish-red, while sapwood is pale yellow. The texture of the wood is relatively coarse but even, with the grain slightly interlocked and sometimes producing a fiddleback figure.

Wood density

Green density is about 1170 kg/m^3, air-dry density about 820 kg/m^3, and basic density about 670 kg/m^3.

Drying and shrinkage

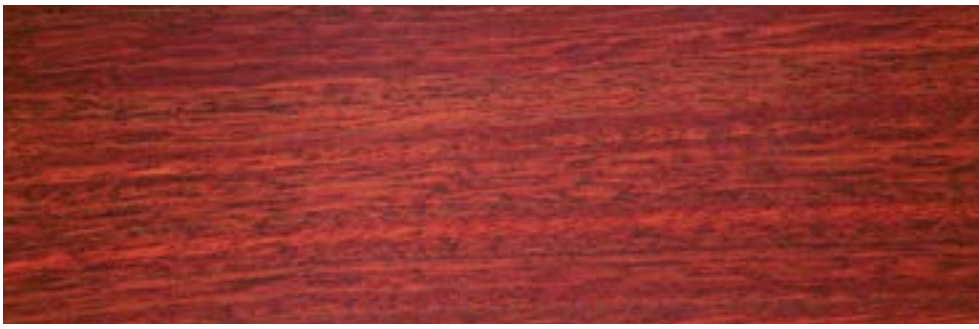
Tangential and radial shrinkage before reconditioning are 7.5 and 5.0 per cent respectively, and after reconditioning 6.7 per cent and 4.6 per cent respectively.

Workability

The timber is easy to work with sharp tools, although when dressing the planer angle may need to be reduced to 15°.

Durability

Durability Class based on the CSIRO 1996 ratings are 3/2 for decay, and 3/2 for decay + termites i.e. the wood is termite-resistant.



Strength group and properties

Green and dry strength groups are S4 and SD4 respectively. The most important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	68	112
Modulus of Elasticity	MPa	10000	13000
Max Crushing Strength	MPa	36	61
Hardness	KN	5.7	8.5

Availability

Jarrah is the major timber species in Western Australia, and readily available locally and interstate.

Uses

The major uses for jarrah are for joinery and furniture, panelling and flooring, although in the past the timber was used extensively for general construction, sleepers, poles and piles. In the 19th century it was widely used for cobbles.

Karri

Eucalyptus diversicolor

Karri is one of Australia's tallest hardwoods, with height from 45 to 70 m. It is native to south-west Western Australia on site-specific soils around Manjimup, about 300 km south of Perth. The mean annual rainfall in the area of occurrence is mainly from 900 mm to 1300 mm, and occurring in winter. Outlying forests, away from the main karri belt, occur between Karridale and Forest Grove, and other smaller ones are at Mount Many Peaks, Torbay, Rocky Gully and the Porongorup Range.

Wood description

Heartwood of timber from mature trees is pale pink to reddish brown, although regrowth heartwood is a lighter colour. The sapwood is white and usually easy to distinguish.

Wood density

Green density is about 1200 kg/m^3, air-dry density about 900 kg/m^3, and basic density about 690 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 10.0 and 4.5 per cent respectively, and after reconditioning 8.5 and 4.0 per cent respectively.

Workability

Karri is less easy to work than jarrah, even with sharp tools. When dressing the timber, the planer angle may need to be reduced to 15°. It generally requires additional sanding after moulding.

Durability

Durability Class based on the CSIRO 1996 ratings is 3/2 for decay and 4 for decay + termites. Sapwood is Lyctus-susceptible.

Strength group and properties

Green and dry strength groups are S3 and SD2. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	73	132
Modulus of Elasticity	MPa	14000	19000
Max Crushing Strength	MPa	36	72
Hardness	KN	6.0	9.0

Availability

The species has been one of the major timber species of Western Australia and available both locally and interstate. Availability will be restricted considerably with most of the resource now in conservation reserves.

Uses

Karri is now being used more extensively for flooring and panelling, and has potential for fine design furniture because of its high strength. It has been used extensively for general construction, shipbuilding, sleepers, guides or side beams in mines, structural plywood, roofing timbers and pulp and paper. Greater lengths are available than from any other Western Australian hardwood.

Karri oak

Allocasuarina decussata

Karri oak is a medium-sized understorey species in the karri (*E. diversicolor*) forest in the south-west of Western Australia. Karri oak is closely related to the rose sheoak (*Allocasuarina torulosa*) of the eastern states, and in the karri forest is commonly associated with karri wattle (*Acacia pentadenia*).

Wood description

Heartwood is a pale reddish brown, and has the distinctive rays that are best shown by quartersawing the log. Sapwood is whitish.

Wood density

Green density is about 1190 kg/m^3, air-dry density about 840 kg/m^3, and basic density about 640 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are estimated as about 8.0 and 6.5 per cent respectively.

Workability

CALM Timber Technology rated working properties such as sawing, sanding and gluing as good, and planing and routing as average.

Durability

Durability has not been assessed, but the CSIRO Durability ratings would be of limited use because specialty timber would not be used in-ground. Sapwood is Lyctus-susceptible.

Strength group and properties

The green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	94
Modulus of Elasticity	MPa	10700	14000
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Very limited availability because karri oak is an understorey species in the karri forest, most of which is in conservation reserves.

Uses

Overall use has been limited, but the species has potential for craftwork using the 'natural feature grade' specification now.

Maritime pine

Pinus pinaster

Maritime pine is a medium-sized softwood native to south-western Europe and north-western Africa, with major forestry developments on the Atlantic coast of southern France, Spain and Portugal. Extensive plantations have been established on the Swan coastal plain in Western Australia, particularly on the lower rainfall and lower nutrient soils, where radiata pine is not suitable. A major planting program has commenced in the semi-arid areas in the Wheatbelt (from 600 mm to 400 mm annual rainfall) to reduce salinity effects while providing a commercial crop.

Wood description

Heartwood is pale reddish brown, and sapwood pale yellow. The texture is rather coarse and uneven, the grain is generally straight and the timber resinous.

Wood density

Green density is about 1000 kg/m^3, air-dry density about 560 kg/m^3, and basic density about 450 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 5.0 and 3.0 per cent respectively, and after reconditioning 5.0 and 3.1 per cent respectively.

Workability

The timber is relatively easy to work, but knots and resin pockets are common.

Durability

The Durability Class is 4, based on the CSIRO provisional ratings.

Strength group and properties

Green and dry strength groups are a provisional (S6) and SD6 respectively. A provisional rating is based on mean air-dry density. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	36	83
Modulus of Elasticity	MPa	6600	11680
Max Crushing Strength	MPa	17	45
Hardness	KN	1.7	2.7

Availability

The timber is readily available in Western Australia, which has the largest area of plantations of the species. It is less available than radiata pine.

Uses

Uses include general construction, house framing, moulding architraves, doors, shelves, joinery and turnery, decorative panelling, furniture, construction plywood, sliced veneer as a facing for particleboard, pulp and paper and reconstituted products e.g. particleboard and medium density fibreboard (MDF). If preservative-treated it can be used for posts, poles, sleepers, retaining wall, decking, cooling towers and mining timber.

Marri

Corymbia calophylla

Marri is commonly referred to as 'red gum'. Marri is usually a medium sized to tall tree up to 40 m in height with flaky grey bark, widely distributed in the south-west of Western Australia in the jarrah and karri forests. It extends from north of Geraldton southwards to Cape Riche, and eastwards to beyond Narrogin in the Wheatbelt.

Wood description

Heartwood is pale yellow to light brown to reddish brown, with sapwoodbands up to 40 mm wide, usually sufficiently paler to be distinguishable from the heartwood.

Wood density

Green density is about 1200 kg/m^3, air-dry density about 850 kg/m^3, and basic density about 650 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 6.5 and 3.5 per cent respectively, and after reconditioning 5.6 and 3.4 per cent respectively.

Workability

Workability is good, with the timber being relatively easy to work, and nailing satisfactory.

Durability

Durability Class based on the CSIRO 1996 ratings is 4/3 for decay and 4/3 for combined decay + termites. Sapwood is Lyctus-susceptible.

Strength group and properties

Green and dry strength groups are S3 and SD3. The more important timber properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	78	125
Modulus of Elasticity	MPa	14000	17000
Max Crushing Strength	MPa	41	66
Hardness	KN	6.6	7.1

Availability

Although there is a large resource in native forests, timber is available in small quantities only because of the incidence of kino veins. It is limited to Western Australia.

Uses

Uses are more restricted than for many other species. Sawmill recoveries are low because of the extensive occurrence of kino or gum veins. There is an increasing market for ' feature grade' timber for furniture use. The timber has been used in general construction, case manufacture, tool handles, sporting goods and oars. Preservative treated material is useful for piles, poles and fence posts.

Merrit

Eucalyptus flocktoniae

Merrit is a small to medium-sized eucalypt growing to 12 m tall, although it can be a mallee. The whitish grey bark shed in summer reveals new brown bark. Merrit is widespread through the Wheatbelt and Goldfields south of Kalgoorlie-Boulder.

Wood description

Heartwood is a deep reddish brown with an attractive grain.

Wood density

Green density is about 1145 kg/m^3, and air-dry density about 1095 kg/m^3 (Note: different samples were assessed).

Drying and shrinkage

Tangential and radial shrinkage are estimated as about 5.5 and 4.0 per cent respectively.

Workability

Goldfields craftsmen rate merrit as average for turning and machinability, and good for boring, screwholding, stability, sanding and finishing.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength groups are listed in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has potential for wood turning and craftwork.

Miniritchie

Acacia grasbyi

Miniritchie is a small shrub-like tree up to 4 m tall with twisted stems and reddish brown bark that peels continuously in small curly flakes. It is found mainly on hardpans or rocky slopes with shallow soils, in the Pilbara Gascoyne and Murchison regions.

Wood description

Heartwood is dark brown with lighter golden streaks, with sapwood a contrasting yellow band. The wood is very hard and close-textured.

Wood density

Green density is about 1275 kg/m^3, air-dry density about 1230 kg/m^3, and basic density about 1050 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 2.9 and 1.9 per cent respectively.

Workability

Goldfields craftsmen rank miniritchie as average for machinability, good for boring, screwholding, sanding and finishing, and excellent for turning.

Durability

The wood is very durable, and presumably CSIRO Durability Class 1.

Strength group and properties

Green and dry strength groups are (S1) and (SD1). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	103	150
Modulus of Elasticity	MPa	16300	21500
Max Crushing Strength	MPa	52	80
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has potential for wood turning and craftwork.

Mulga

Acacia aneura

Mulga can be a small tree up to 9 m, with a well-defined main stem and angled branches, or a shrub 2 to 5 m tall with highly angled branches. The species has a very wide distribution, from Western Australia near Shark Bay, through central Australia to mid-west Queensland and New South Wales. It is rare in the Simpson and Great Victoria Deserts. Mulga grows in all states except Victoria and Tasmania. Mulga grows on flood and erosion plains and scattered on slopes and ridges. It is generally in low open woodland or tall shrubland, often in pure stands, but may be found with mallees, low shrubs and grasses.

Wood description

Heartwood is dark brown, with contrasting markings of golden yellow, and very hard. There is a narrow band of yellowish sapwood. The wood is very close-textured.

Wood density

Green density is about 1330 kg/m^3, air-dry density about 1200 kg/m^3, and basic density about 1025 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 2.3 and 2.0 per cent respectively.

Workability

Goldfields craftsmen rate mulga as good for turning, machinability, drilling, screwholding and gluing, and excellent for sanding and finishing.

Durability

Although the durability has not been formally assessed, general use since settlement indicates that the species would be CSIRO Durability Class 1.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties for those strength groups are listed in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Fence posts are readily available, but sawn dried timber is difficult to obtain.

Uses

Major use has been as fence posts in Goldfields pastoral areas and in farming areas on the south coast of WA. The species is important for fence posts. The wood turns well and takes a high polish. Traditional uses included spears, clubs and boomerangs. Settlers used it for fencing because of its very high durability, and it is still used today. Other current use is for small ornamental articles for the tourist industry. The tree is important for fodder over a wide area of Australia.

Native currant

Canthium latifolium

Native currant is usually a small multi-stemmed tree up to 3 m tall, with smooth light grey bark. The tree is found in most desert areas in Western Australia.

Wood description

Heartwood is light-coloured with a fine, intricate grain. The heartwood/sapwood boundary is difficult to determine because of similar colouring.

Wood density

Air-dry density is about 840 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about per cent respectively.

Workability

Very good.

Strength group and properties

Green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	94
Modulus of Elasticity	MPa	10700	14000
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The species has recently become very popular with Western Australian woodturners.

Native willow

Pittosporum phylliraeoides

Native willow is a small tree to 8 m tall, usually multi-stemmed but often single-stemmed, with light mottled grey bark. It grows on the Nullarbor, Goldfields and Murchison. It is widespread through the semi-arid and arid areas, and commonly found in small clumps in creek beds.

Wood description

Heartwood is blonde with a characteristic patterned grain resembling snakeskin.

Wood density

Green density is about 1145 kg/m^3, air-dry density about 805 kg/m^3, and basic density about 640 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 7.4 and 3.3 per cent respectively.

Workability

Goldfields craftsmen rate native willow as good for screwholding and gluing, and excellent for turning, machinability, stability, sanding and finishing.

Strength group and properties

Green and dry strength groups are (S4) and (SD5). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	78
Modulus of Elasticity	MPa	10700	12100
Max Crushing Strength	MPa	31	47
Hardness	KN	-	-

Availability

Availability is limited.

Uses

In recent times the timber was found to have considerable potential for craftwork.

Oak black

Casuarina pauper

Black oak can become a medium-sized tree up to 16 m and 0.6 m diameter, but is smaller where competition occurs. The rough dark bark covers trees to the branchlets. Black oak is widespread in the Goldfields and east to the Great Victoria Desert and the Nullarbor Plain, and is often found near the edges of salt lakes. It also grows in the other southern states.

Wood description

Heartwood is dark chocolate-brown, and sapwood whitish.

Wood density

Green density is about 1320 kg/m^3, air-dry density about 1290 kg/m^3, and basic density about 1090 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 2.6 and 2.1 per cent respectively.

Workability

Goldfields craftsmen rate black oak as average for machinability and stability, good for turning, screwholding and sanding, and excellent for boring and finishing.

Strength group and properties

Green and dry strength groups are (S1) and (SD1). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	103	150
Modulus of Elasticity	MPa	16300	21500
Max Crushing Strength	MPa	52	80
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Uses have included fencing in remote areas, but the species is becoming increasingly popular for craft purposes. It has been assessed for use in woodwind instruments.

Peppermint

Agonis flexuosa

Peppermint is generally a small tree less than 10 m tall, occasionally reaching 15 m and 0.5 m or more in diameter. The crown is rounded, dense and fine textured, with pendulous branchlets and leaves. The species can also be seen as a 2 to 3 m tall shrub. Peppermint occurs from just north of Perth in the sub-coastal strip, south to Cape Leeuwin, and east to beyond Bremer Bay. It is a common understoreytree in the wetter forests of the south-west, occurring in various forest associations. It may be the dominant species from open or low-closed forest to low open woodland, or in mixtures with Eucalyptus, Acacia or Melaleuca species in open scrub.
It is a common understorey under tuart (*E. gomphocephala*) on sands over limestone, or found on sandy loams in valleys in jarrah/marri forest.

Wood description

Heartwood is light brown with some streaking of darker brown, and the sapwood paler. A subtle yet attractive grain.

Wood density

Green density is about 990 kg/m^3, and air-dry density about 780 kg/m^3.

Workability

Sharp tools are required as this species is hard when dressing. Dressing, sanding drilling and turning is rated as good, carving is fair.

Strength group and properties

Green and dry strength groups are (S5) and (SD5). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	58	78
Modulus of Elasticity	MPa	9100	12100
Max Crushing Strength	MPa	26	47
Hardness	KN	-	-

Availability

Limited availability from private property, because the species is not harvested from state forests.

Uses

The timber has been used for craftwood and general purposes.

Pixie bush

Eremophila oldfieldii

Pixie bush is a small tree up to 4 m tall with branches developing low on the stem. The bark is rough, and dark grey-brown. The species is common in the Goldfields and northern Wheatbelt, and is found near the coast between Cervantes and Carnarvon. It extends into the Murchison and Gascoyne.

Wood description

Heartwood is brownish with distinctive grain patterns. The sapwood is yellowish.

Wood density

Green density is about 1055 kg/m^3, air-dry density about 850 kg/m^3, and basic density about 710 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 3.4 and 2.3 per cent respectively.

Workability

Goldfields craftsmen rank pixie bush as poor for machinability and stability, average for boring, screwholding,sanding and finishing, and good for turning.

Strength group and properties

Green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	94
Modulus of Elasticity	MPa	10700	14000
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Use is mainly for craftwork and woodturning.

Plumbush

Santalum lanceolatum

Wood description

Heartwood is a golden yellow and has attractive interlocking grain. Although in the sandalwood genus, this species does not have aromatic properties.

Wood density

Air-dry density is about 875 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are estimated as about 2.0 and 1.5 per cent respectively, because of plumbush's similarity to sandalwood.

Workability

Goldfields craftsmen rate plumbush as good for screwholding, stability, sanding and gluing, and excellent for turning, machinability, boring, and finishing.

Durability

Green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength groups are given in the table below.

Strength group and properties

Green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	94
Modulus of Elasticity	MPa	10700	14000
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber is excellent for woodturning and general craftwork.

Radiata pine

Pinus radiata

Radiata pine, formerly referred to as Monterey pine or insignis pine, is a large softwood native to a very limited area of the west coast of North America but planted widely in the world's south temperate zone, especially in South Africa, Chile, New Zealand and Australia. In Western Australia, major plantations have been established in the south-west on fertile soil and in rainfall areas greater than 700 mm, but preferably south of Perth because further north the thin bark makes the species susceptible to sunscald.

Wood description

Heartwood is pale yellow-brown, and sapwood pale yellow-white. The texture is fine, with the grain usually straight except for the central core of juvenile wood that often has pronounced spiral grain in the first few years.

Wood density

Green density is about 1000 kg/m^3, and air-dry density about 590 kg/m^3 in 30-40 year old and about 480 kg/m^3 in 10-20 year old trees. Basic density is about 490 kg/m^3 in 30-40 year old and about 405 kg/m^3 in 10-20 year old trees.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 5.1 and 3.4 per cent respectively, and after reconditioning 5.0 and 3.5 per cent respectively.

Workability

The wood is relatively easy to work, but knots and resin pockets are common.

Durability

Durability Classes based on the CSIRO 1996 ratings are 4 for decay, and 4 for decay + termites.

Strength group and properties

Green and dry strength groups are S6 and SD6 respectively. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	42	81
Modulus of Elasticity	MPa	8100	10000
Max Crushing Strength	MPa	19	42
Hardness	KN	2.1	3.3

Availability

The timber is readily available in Western Australia and the eastern States.

Uses

Uses are for general construction, house framing, moulding architraves, doors, shelves, joinery and turnery, decorative panelling, furniture, construction plywood, sliced veneer as a facing for particleboard, pulp and paper and reconstituted products e.g. particleboard and medium density fibreboard (MDF). If preservative treated, radiata pine can be used for posts, poles, sleepers, retaining walls, decking, cooling towers and mining timber.

Raspberry jam

Acacia acuminata

Raspberry jam is generally a small tree 10 m tall with bole length of 2.0 to 2.5 m, but commonly a bushy shrub 3 to 5 m tall with short main stem and numerous spreading branches. It occurs from Kalbarri to the South Coast, and common in the Wheatbelt area on gently undulating topography. However, most vegetation in that area has been cleared for agriculture. The best development is in low woodland and tall shrubland, associated with York gum and salmon gum, with mallee species, or with wandoo in south-westerly areas of the Wheatbelt. Associated shrubs include Acacia microbotrya.

Wood description

Heartwood is dark-reddish brown and very hard. The grain is attractive, with fiddleback a common feature. Freshly-cut timber has a sweet smell similar to raspberry jam , hence the common name.

Wood density

Green density is about 1260 kg/m^3, air-dry density about 1040 kg/m^3, and basic density about 940 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 1.8 and 1.2 per cent respectively. One sample assessed by CALM was 1.4 per cent and 1.0 per cent respectively.

Workability

Workability is good, with the timber being relatively easy to work.

Durability

Durability Class based on the CSIRO 1996 ratings is 1 for decay and 1 for combined decay + termites.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of clearing restrictions in the Wheatbelt region.

Uses

The trunks make excellent fence posts, and sawn timber strainers and rails. The wood has been used for ornamental articles, machine bearings and sheave blocks. It is being assessed for the manufacture of stringed instruments.

Red morrel

Eucalyptus longicornis

Red morrel is a medium to tall tree up to 30 m. The rough grey bark up to the branches has a stringy texture, with smooth grey bark on the branches. The species is common in the south-east Goldfields and in the Wheatbelt to Coorow.

Wood description

Heartwood is reddish with interlocking grain.

Wood density

Green density is about 1240 kg/m^3, air-dry density about 1145 kg/m^3, and basic density about 955 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 6.8 and 5.6 per cent respectively.

Workability

Goldfields craftsmen rate red morrel as poor for machinability, average for turning, stability, sanding and finishing, and good for boring, screwholding and gluing.

Strength group and properties

AS2878 gives strength groups of S3 and (SD3). However, the green and dry strength groups based on Julius (1906) are S1 and SD2. His data are given in the table below. The hardness test was done in 1998.

Property	Units	Green	Dry
Modulus of Rupture	MPa	114	139
Modulus of Elasticity	MPa	14480	17240
Max Crushing Strength	MPa	56	74
Hardness	KN	-	17.1

Availability

Limited availability because of the scattered nature of the resource.

Uses

Uses have included agricultural and wheelwright purposes, mining timber and fuelwood. The timber has considerable potential for furniture manufacture.

Red tingle

Eucalyptus jacksonii

Red tingle is one of the two largest species in the state, with heights up to 70 m and diameter of 4.5 m in large individuals, but typically up to 55 m height and 2 m diameter. The dense compact crown forms a heavy canopy. The occurrence is similar to that of yellow tingle, along the lower reaches of the Deep, Frankland and Bow Rivers west of Albany. Red tingle grow best on moderately rich, well-drained loams or sandy loams, in tall open forest associated with yellow tingle, Rate's tingle and karri.

Wood description

Heartwood is deep pink to reddish-brown, strong and tough.

Wood density

Green density is about 960 kg/m^3, and air-dry density about 770 kg/m^3.

Workability

Similar to jarrah to work with, good dressing, sanding, drilling and carving properties. A good finish can be achieved with most finishing products.

Durability

Durability Class based on the CSIRO 1996 ratings is 4/3 for decay and 4 for combined decay + termites.
Any available timber is likely to be used for specialty purposes rather than in-ground.

Strength group and properties

Green and dry strength groups are S4 and SD4. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	98
Modulus of Elasticity	MPa	10700	13450
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Although availability has always been limited, the timber is rarely commercially available because most occurrences of the species are in areas that are now in conservation reserves.

Uses

The timber was previously used for structural purposes, sleepers and furniture.

Redwood

Eucalyptus transcontinentalis

Redwood or 'boongul' by its Noongar name, is a medium to large tree up to 25 m tall. It has smooth white bark, which shed as flaky ribbon-like strips of reddish bark. It occurs from east of the Darling Scarp, east to Balladonia, and north to Mullewa. It grows in open forest and woodland, associated with other species, including salmon gum, gimlet, and mirret.

Wood description

Heartwood is red-brown, tough, hard and durable, with an attractive grain.

Wood density

Green density is about 1200 kg/m^3, air-dry density about 1080 kg/m^3, and basic density about 925 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 5.7 and 4.2 per cent respectively.

Workability

Goldfields craftsmen rate redwood as good for boring, screwholding, and gluing, good to excellent for sanding, and excellent for turning, machinability, stability and finishing.

Durability

Although formal assessments have not been done, anecdotal evidence indicates that it is durable.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The dry MOR and MOE data from Melotte (1997) suggest SD2.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	185
Modulus of Elasticity	MPa	14200	18600
Max Crushing Strength	MPa	43	70
Hardness	KN	-	15.6

Availability

Availability is limited.

Uses

Uses included mining timber and fuelwood for the goldmining industry, and aboriginal use for spears. Recent uses include flooring, panelling and fine design furniture. It has potential for use in musical instruments..

River banksia

Banksia seminuda

Wood description

Heartwood is light red coloured with an attractive grain. When cut on the quarter the wide medullary rays show an oak like figure. Sapwood is paler.

Wood density

Green density is about 945 kg/m^3 and air-dry density about 560 kg/m^3.

Workability

Sharp tools must be used on Banksias as they all have a very open grain and tend to tear when dressing. Sanding, gluing , drilling and turning are rated as good, carving is fair. Banksia will take lacquer, wax and oil well, however, having such and open grain it will require several coats to fill the grain. A wax finish is said to give a silky finish.

Strength group and properties

Green and dry strength groups are (S7) and (SD7). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	36	55
Modulus of Elasticity	MPa	6900	9100
Max Crushing Strength	MPa	18	36
Hardness	KN	-	-

River redgum

Eucalyptus camaldulensis

Its natural occurrence is the most widely distributed of all eucalypts. Although it is typically a riverine species, it is found throughout mainland Australia with the exception of southern parts of WA, the Nullabor plain, and most of the coastal fringe of Vic, NSW and Qld. It occurs along or near almost all seasonal watercourses in the arid and semi-arid areas and within proximity to many other streams and rivers in the south east of the continent, mainly on the inland side of the Great Dividing Range. It is the most common tree along the Murray River and its tributaries. River redgum grows in a wide range of climatic conditions, tolerating extremes of heat/cold and great variation in rainfall (150mm – 1250mm per year). In low rainfall areas it relies on seasonal flooding and/or the presence of a high water table.

A heavy-boled, spreading, canopied tree growing to between 20m and 40m tall. It is extensively planted throughout the world in arid and semi-arid areas. Under favourable conditions, early growth can be swift. Some provenances demonstrate salt tolerance. It does not exhibit strong apical dominance. As a consequence, the stem form is generally poor, hence has not been extensively used for sawn timber. It coppices well and has been known to coppice up to 6 times off the same stump.

Wood description

Heartwood is red to reddish-brown. Sapwood to 40mm wide and is distinct by its pale colour. Texture relatively fine and even. Grain usually interlocked and often wavy, producing an attractive ripple or 'fiddleback' pattern. Gum veins are common.

The foliage varies from green to blue-green. Leaves are frequently very long and narrow. Seedling – opposite for around 4-6 pairs, then alternate, petiolate, broad lanceolate, elliptical or ovate (7.5-15 X 2.5-7cm, green, grayish-green or bluish.

Wood density

- Green – approx' 1130kg/m-3
- Air-dry – approx' 900kg/m-3
- Basic – approx' 710 kg/m-3

Drying and shrinkage

Needs close stickering and weighted stacks when drying to minimize warping. Some collapse occurs. Shrinkage about 4% radial, 8% tangential and after reconditioning about 2.5% radial, 4.5% tangential.

Workability

Necessary to adjust cutting angles when dressing due to the interlocked grain. Unsuitable for steam bending due to difficulty in obtaining straight-grained timber. Provided the grain is relatively straight it has good resistance to surface checking when exposed to the weather.

Durability

- In-Ground – 2
- Above-Ground – 1
- Marine – 2
- Termite resistant

Strength group and properties

S5 and SD5.

The classification is low because bending-strength is affected considerably by the grain which is noticeably interlocked.

Class	Life years
1	More than 25
2	15 to 25
3	8 to 15
4	Less than 8

Availability

Mainly in Victoria and south-western New South Wales.

Uses

It is hard, durable, resistant to termites and is often used for heavy construction, flooring, framing, fencing plywood, veneer manufacture, turnery, panelling, sills and posts.

Rock oak

Allocasuarina huegeliana

Rock oak is a small to medium-sized tree that occurs associated with granite soils from east of Geraldton through the Wheatbelt and Great Southern regions to Esperance.

Wood description

Heartwood is a deep red, and the timber has the distinctive rays that are best displayed by quartersawing the log. Sapwood is pale white.

Wood density

Green density is about 1130 kg/m^3, air-dry density about 895 kg/m^3, and basic density about 720 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 6.5 per cent and 3.5 per cent respectively.

Workability

CALM Timber Technology has rated working properties such as sawing, sanding and planing as good, while gluing in one trial was rated as average.

Strength group and properties

Green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	94
Modulus of Elasticity	MPa	10700	14000
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Limited because of previous large-scale clearing in the Wheatbelt region.

Uses

The species has considerable potential as a specialty timber.

Salmon gum

Eucalyptus salmonophloia

Salmon gum is commonly a medium to tall tree up to 20 m and 0.6 m diameter, with branches spreading upwards and outwards, and a glossy green crown. Under favourable conditions the tree can reach 30 m. The smooth reddish pink bark of late summer fades to grey. The species is found from York to east and south-east of Kalgoorlie/Boulder.

Wood description

Heartwood is red to red-brown, and straight-grained.

Wood density

Green density is about 1160 kg/m^3, air-dry density about 1040 kg/m^3, and basic density about 870 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 5.8 and 4.0 per cent respectively.

Workability

Goldfields craftsmen rate salmon gum as good for turning, machinability, boring, screwholding, stability, sanding, gluing and finishing.

Durability

The wood is very durable, and would be classified in CSIRO Durability Class 1.

Strength group and properties

Green and dry strength groups are (S2) and (SD3). The brackets indicate conservative provisional ratings based on the air-dry density. The strength properties in the table below are from Julius (1906).

Property	Units	Green	Dry
Modulus of Rupture	MPa	108	117
Modulus of Elasticity	MPa	14830	16550
Max Crushing Strength	MPa	54	77
Hardness	KN	-	15.5

Availability

Availability is limited.

Uses

The wood was extensively used for round and sawn mining timber, firewood and second class railway sleepers. The timber has now been used for flooring and panelling, and assessed for use in musical instruments as flute headjoints and for furniture manufacturing.

Salt gum

Eucalyptus salicola

Salt gum is a small to medium-sized tree widespread in the Wheatbelt, but scattered distribution, extending from Newdegate to the Great Victoria Desert. It is always found near salt lakes. Appearance is similar to that of salmon gum, but the latter would not be found in saline conditions.

Wood description

Heartwood is brownish-red with a moderate grain.

Wood density

Limited sampling indicated that green density is about 1215 kg/m^3, air-dry density about 1165 kg/m^3, and basic density about 940 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 5.3 and 3.8 per cent respectively.

Workability

Goldfields craftsmen rate salt gum as good for screwholding, and excellent for turning, machinability, boring, stability, sanding and finishing.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the limited occurrence and scattered nature of the resource.

Uses

Recommended for woodturning and general craftwork.

Sandalwood

Santalum spicatum

Sandalwood is a parasitic small tree that establishes on the roots of host trees such as raspberry jam. It is commonly 2 to 3 m tall, growing occasionally to 8 m, and the bark is rough, dark brown to black. It grows in the Pilbara, Gascoyne, Murchison and Goldfields, and is widely distributed from Shark Bay through the Wheatbelt and Goldfields to the South Coast. It also grows in South Australia.

Wood description

Heartwood is yellow-brown with a distinctive fragrance.

Wood density

Green density is about 960 kg/m^3, air-dry density about 900 kg/m^3, and basic density about 785 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 1.6 and 1.4 per cent respectively.

Workability

Goldfields craftsmen rate sandalwood as good for turning, carving and finishing.

Strength group and properties

AS2878 gives sandalwood as provisional (S3) and (SD4), and the air-dry density data confirm this rating. The more important strength properties based on the strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	73	94
Modulus of Elasticity	MPa	12400	14000
Max Crushing Strength	MPa	36	54
Hardness	KN	-	-

Availability

Sandalwood is currently available through Wescorp Ltd, based in Perth, which is the sole licensee in Western Australia.

Uses

The major use has been for joss (incense) sticks in south-east Asian countries, and the wood commands a very high price. Sandalwood was the major export from Western Australia until the gold discoveries of the 1890s. The timber makes very attractive inlays in marquetry, as well as being used for other craft items. The shavings are used for potpourri.

Snakewood

Acacia xiphophylla

Snakewood is a large bush, or a small tree with numerous spreading branches growing to about 5 m tall and 7 m wide. It often has two or three twisted trunks with dark grey, rough bark. Commonly found in the southern Pilbara, Gascoyne and Murchison, in the drainage areas of the Gascoyne and Ashburton catchments.

Wood description

Heartwood is a very dark brown with some darker grain and golden flecks, and sapwood is yellow. Timber is very hard and close-textured.

Wood density

Air-dry density is about 1200 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are estimated as about 3.0 and 2.0 per cent respectively.

Strength group and properties

Green and dry strength groups are (S2) and (SD2). The brackets indicate conservative provisional ratings based on the air-dry density.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	130
Modulus of Elasticity	MPa	14200	18500
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Previous use was mainly as firewood in remote areas. The species is becoming increasingly popular for craft purposes because of its attractive appearance.

Spotted gum

Corymbia maculata

Spotted gum is a species that grows well on favourable sites, usually attaining 35-45 m in height and 1-1.3 m diameter at breast height (dbh), with exceptionally large trees reaching 70 m and exceeding 3 m dbh. On poorer sites it may be 20-35 m in height and 0.7-1.2 m diameter. This species naturally occurs in open-forest to tall open-forest formation on the east coast of Australia from the Victoria-New South Wales border to the Maryborough District in Queensland. Trial plantings have been established in the south-west of Western Australia for pole timber.

Wood description

Heartwood is light brown to dark brown, and sapwood is pale and up to 8 cm wide. The texture is moderately coarse, with an interlocked grain, and the frequent presence of wavy grain produces an attractive ' fiddleback' grain. The wood is slightly greasy and gum veins are common.

Wood density

Green density is about 1150 kg/m^3, the air-dry density about 970 kg/m^3, and basic density about 790 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 6.1 and 4.3 per cent respectively, and after reconditioning 5.0 and 3.7 per cent respectively.

Workability

The timber is not difficult to work. Unseasoned wood is somewhat corrosive to aluminium nails and screws, and the high extractives content can be a problem when gluing phenolic-type adhesives. For good bonding a pressure of about 1000 kPa and temperatures above 200 C are usually needed. A low moisture content, preferably between 8 and 10 per cent, is also desirable.

Durability

Durability Class based on the 1996 CSIRO assessment is 2 for decay, and 2 for decay + termites combined. Sapwood is Lyctus-susceptible.

Strength group and properties

Green and dry strength groups are S2 and SD2 respectively. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	99	150
Modulus of Elasticity	MPa	18000	23000
Max Crushing Strength	MPa	50	75
Hardness	KN	8.0	11.0

Availability

The timber is not readily available in Western Australia, although common in New South Wales and southern Queensland.

Uses

The uses are as heavy engineering construction and mining timbers, where shock resistance is important, house framing, flooring, tool handles, piles and poles, shipbuilding, agricultural machinery and plywood.

Sugar gum
Eucalyptus cladocalyx

Sugar gum is a large eucalypt originally from a limited distribution in South Australia.

Wood description

Heartwood is pale yellow-brown, with fine uniform texture, grain commonly interlocked, hard and heavy.

Wood density

Air-dry density is about 1105 kg/m^3, and basic density about 755 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 10.5 and 6.0 per cent respectively.

Durability

Durability is described as 'moderate' and would therefore be CSIRO Durability Class 3 for decay.

Strength group and properties

Green and dry strength groups are S3 and SD3. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	73	110
Modulus of Elasticity	MPa	12400	16000
Max Crushing Strength	MPa	36	36
Hardness	KN	-	-

Availability

Limited availability.

Uses

Previously used for poles, posts, general construction and railway sleepers. The timber has considerable potential for use as furniture.

Tasmanian blue gum

Eucalyptus globulus

Tasmanian blue gum is referred to as 'Western blue gum' when genetically-improved material is used for plantations in the State. The Standard Trade Name is 'Southern blue gum'. In the native forest, blue gum varies from a medium-sized woodland tree 15-20 m in height with branches retained to below one-third of total height, to an impressive forest tree of excellent form, to 70 m in height and 2 m diameter. On very harsh, exposed sites such as Flinders and King Islands it may be reduced to a mallee-like shrub. Occurs naturally in south-east Tasmania, the Bass Strait Islands and south-east Victoria. Its low level of frost tolerance restricts distribution to low altitudes and near coastal locations. Extensive plantations have been established in the south-west of Western Australia on ex-pastured land.

Wood description

Heartwood is a light yellowish brown, sometimes with a pinkish tinge. Sapwood is paler, not always distinguishable from heartwood, and up to 50 mm wide. The texture is medium and grain often interlocked, and growth rings are distinct, particularly on end grain.

Wood density

Green density of young Western Australian-grown timber is about 1040 kg/m^3, air-dry density about 740 kg/m^3, and basic density about 540 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage of 17-23-year-old material before reconditioning are about 14.5 and 7.0 per cent respectively, and after reconditioning about 9.5 and 4.6 per cent respectively.

Workability

With workability, the timber needs care in drying to minimise checking of the tangential surface. Quartersawing (at right angles to the growth rings) is recommended because of surface checking. Considerable collapse can occur, but this can be recovered by steam reconditioning.

Durability

The Durability Class based on the 1996 CSIRO assessment is 3 for decay, and 4 for decay + termites combined. Sapwood is Lyctus-susceptible.

Strength group and properties

Green and dry strength groups for timber from mature trees are S3 and SD2 respectively. There are no data for plantation-grown trees, but the more important strength properties for mature wood are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	78	146
Modulus of Elasticity	MPa	11000	20000
Max Crushing Strength	MPa	40	83
Hardness	KN	7.3	12

Availability

There is slowly increasing availability from plantations in Western Australia, but most resource is managed for use as woodchips.

Uses

The uses are mainly for pulp and paper, rayon, general structural timber, flooring and furniture timber. If preservative-treated, round timber can be used for posts, poles, sleepers and fence posts.

Tuart

Eucalyptus gomphocephala

Tuart is a large hardwood occurring in a narrow strip between the coast and the Darling Range in south-west Western Australia. The best example of the species is probably the stand at Ludlow, near Busselton. Tuart occurs in woodland or open forest, and peppermint (Agonis flexuosa) is a common understorey species. The trees are up to 25 to 40 m tall and 1 to 2 m diameter in the southern occurrence, but only 10 to 15 m in the northern. The trunk is often between one-third and one-half of total height, with the crown well developed with large spreading branches. Tuart grows on shallow siliceous sands or on soils derived from limestone.

Wood description

Heartwood is pale yellow-brown. The grain is very interlocked and the timber is fine-textured and even.

Wood density

Green density is about 1250 kg/m^3, air-dry density about 1030 kg/m^3, and basic density about 840 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 7.0 and 3.0 per cent respectively, and after reconditioning 5.8 and 2.6 per cent respectively.

Workability

With regard to workability, the very interlocked grain makes it difficult to dress smoothly.

Durability

Durability Class based on the CSIRO 1996 ratings is 1 for decay, and 3 for decay + termites. Sapwood is Lyctus-susceptible.

Strength group and properties

Green and dry strength groups are S3 and SD3. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	81	125
Modulus of Elasticity	MPa	12000	16000
Max Crushing Strength	MPa	46	72
Hardness	KN	9.4	11

Availability

Timber is generally not commercially available from state forest, although occasional logs may be supplied from private property.

Uses

Uses have been for general building purposes and flooring. Tuart was once used for keels, stern posts, bridge supports, shafts and wheelwright work where great strength, solidity and durability were required, as well as railway carriage construction.

Turpentine bush

Eremophila fraseri

Turpentine bush is a bright green shrub that grows up to 3 m tall, with very rough, scaly grey-black bark. It grows in the Goldfields, Murchison, Gascoyne and Pilbara.

Wood description

Heartwood is a golden-orange colour with a distinct dark brown grain. Freshly cut timber may be oily. Sapwood is a contrasting whitish-cream.

Wood density

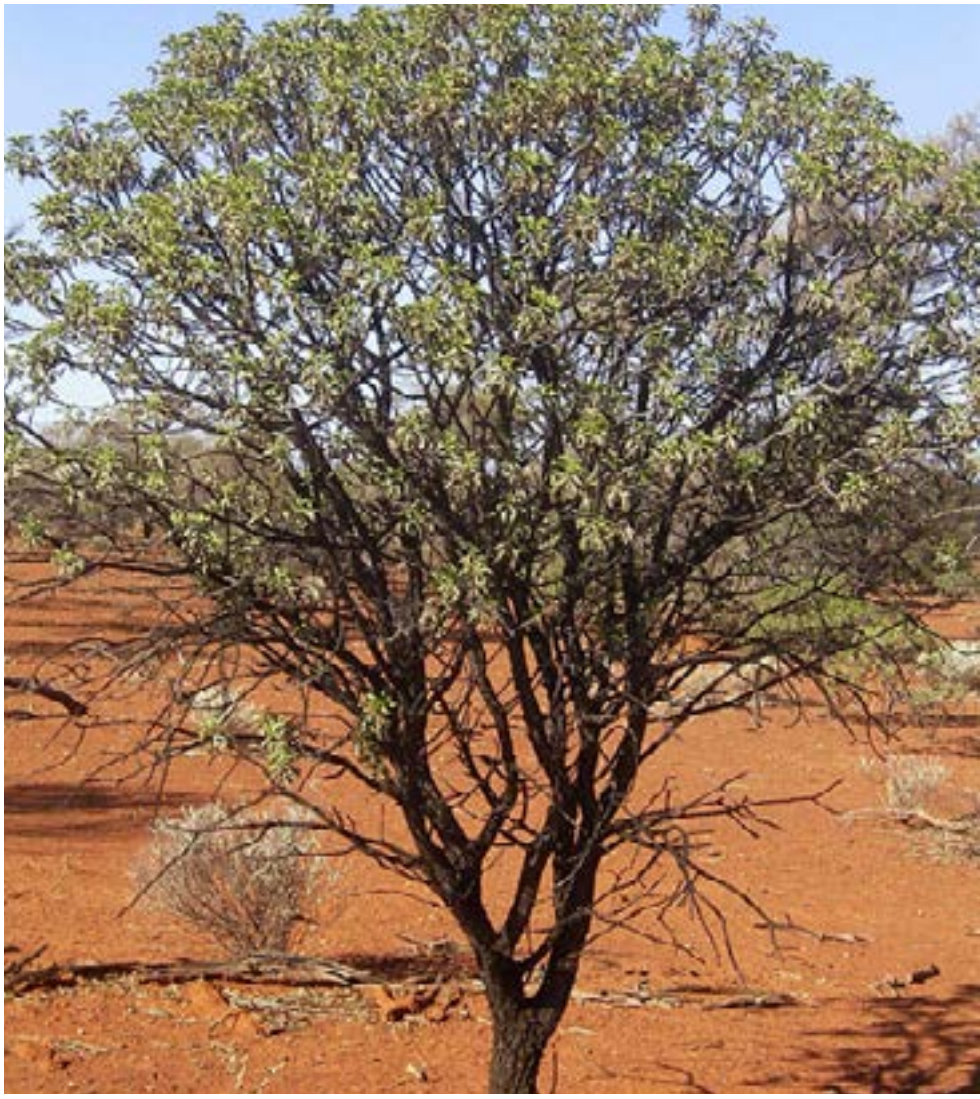
Green density is about 955 kg/m^3, air-dry density about 850 kg/m^3, and basic density about 715 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 2.9 and 2.5 per cent respectively.

Workability

Goldfields craftsmen rank turpentine bush as poor for machinability, sanding and gluing, average for boring, screwholding and stability, good for finishing, and excellent for turning.



Strength group and properties

Green and dry strength groups are (S4) and (SD4). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on the strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	62	94
Modulus of Elasticity	MPa	10700	14000
Max Crushing Strength	MPa	31	54
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

The timber has considerable potential for woodturning.

WA blackbutt

Eucalyptus patens

WA blackbutt has the common name 'yarri'. WA blackbutt is usually a tall tree up to 45 m in height, with diameter at breast height to 1.8 m and a relatively large straight bole. On less favourable, particularly swampy sites, it is a smaller tree of poor form. It has a natural distribution that coincides closely with that of jarrah (*E. marginata*), from near Perth in the north to Albany on the south coast.

Wood description

Heartwood is pale yellowish-brown, and the sapwood is sufficiently paler to be distinguishable.

Wood density

Green density is about 1120 kg/m^3, air-dry density about 850 kg/m^3, and basic density about 690 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 10.0 and 5.0 per cent respectively, and after reconditioning 7.0 and 3.5 per cent respectively.

Workability

The timber is relatively easy to work, although interlocked grain can make it difficult.

Durability

Durability Class based on the CSIRO 1996 ratings is 2 for decay, and 4 for decay + termites. Sapwood is Lyctus-susceptible.

Strength group and properties

Green and dry strength groups are S4 and SD5. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	66	99
Modulus of Elasticity	MPa	12000	13000
Max Crushing Strength	MPa	37	65
Hardness	KN	5.5	6.9

Availability

Availability is limited, because a large part of the resource is now conserved in stream reserves. The timber is available in small quantities in Western Australia.

Uses

Blackbutt's main use has been in flooring, although in the past it was used for general construction, case manufacture, sleepers, flooring and panelling.

WA flooded gum

Eucalyptus rudis

WA flooded gum is a medium-sized tree with height 10 to 20 m and diameter up to 1 m. The trunk is usually short with poor form, and the crown wide-spreading. The species occurs near the coast and adjacent ranges from north of Geraldton to the south coast. It occurs mainly on river flats and creek banks, in similar occurrences to those of river red gum (*E. camaldulensis*) further north. Flooded gum occurs typically in open forest or woodland, associated with wandoo, marri and jarrah. For decades the flooded gum has been heavily attacked each spring by insects, with attacks by leaf miners, leaf blister sawflies and lerps. The crowns regenerate in late spring.

Wood description

Heartwood is a yellow to light reddish brown, hard and cross-grained.

Wood density

Green density is about kg/m^3, and air-dry density about 775 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are estimated as about per cent respectively.

Workability

Dressing, sanding, drilling, turning and finishing are rated as good, carving is fair.

Durability

The species has not been formally assessed, but is recorded as having low durability.

Strength group and properties

Green and dry strength groups are (S5) and (SD5). The brackets indicate conservative provisional ratings based on the wood density.

Property	Units	Green	Dry
Modulus of Rupture	MPa	52	78
Modulus of Elasticity	MPa	9100	12100
Max Crushing Strength	MPa	26	47
Hardness	KN	-	-

Availability

Very limited availability from private property.

Uses

The only documented use is as firewood, although it could be used as a specialty timber.

WA sheoak

Allocasuarina fraseriana

WA Sheoak is a medium-sized tree up to 15 m tall and 0.5 to 1 m in diameter at breast height. It occurs in south-west Western Australia in the coastal and hinterland region from Perth in the north to near Albany in the east, where it is an understorey species in the jarrah (*E.marginata*) forest. There is a small isolated population between Moora and Jurien Bay.

Wood description

Heartwood is dark-red to brown, and the sapwood pale yellow. The texture is moderately fine and even, and the medullary rays are prominent as in other members of the genus.

Wood density

Green density is about 1000 kg/m^3, the air-dry density about 730 kg/m^3, and the basic density about 620 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 4.5 and 1.2 per cent respectively, and after reconditioning 1.7 and 1.0 per cent respectively.

Workability

As regards workability, the timber is relatively easy to work.

Durability

Durability Class remains a tentative 2, because the species was not included in the CSIRO 1996 revised ratings list. The species provides specialty timber that would not be used in-ground. Sapwood is Lyctus-susceptible.

Strength group and properties

The green and dry strength groups are (S5) and SD6. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	52	98
Modulus of Elasticity	MPa	9100	9356
Max Crushing Strength	MPa	26	41
Hardness	KN	-	-

Availability

Limited quantities are available in Western Australia.

Uses

Uses include furniture (both indoor and outdoor), decorative woodwork and turnery, roofing shingles, flooring and panelling. Until the advent of the aluminium cask it was a favoured species for beer barrels.

Wandoo

Eucalyptus wandoo

Wandoo is commonly called 'white gum', and is usually a medium to large tree up to 25 m height and with diameter at breast height (dbh) to 0.8 m, but is occasionally found up to 30 m tall and 1m dbh. Wandoo grows in the 380 to 500 mm rainfall zone of south-west Western Australia, either in broad shallow valleys or on low ridges, with the best wandoo forests occurring between Darkan and Quindanning and up to Toodyay.

Wood description

Heartwood is yellow to light reddish brown, and the sapwood band is very narrow.

Wood density

Green density is about 1280 kg/m^3, air-dry density about 1100 kg/m^3, and basic density about 920 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 4.0 and 2.5 per cent respectively, and after reconditioning 2.6 and 2.3 per cent respectively.

Workability

The timber is difficult to work because of its high density but machines to a smooth surface. The grain is interlocked or wavy and careful drying is required to avoid checks and end splits.

Durability

Durability Class based on the CSIRO 1996 ratings is 1 for decay, and 1 for decay + termites.

Strength group and properties

Green and dry strength groups are S2 and SD3. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	100	142
Modulus of Elasticity	MPa	14000	17000
Max Crushing Strength	MPa	55	82
Hardness	KN	9.9	15.0

Availability

Limited quantities of flooring, decking and posts are available in Western Australia.

Uses

Uses of wandoo have been mainly for heavy and light construction, poles, sleepers, and flooring. The bark and wood were harvested in the past because they contain commercial quantities of tannins, the extraction of which was once a medium-sized industry in the wandoo area.

Western myall

Acacia papyrocarpa

Western myall is a small tree up to 7 m tall with dark grey bark and a dense crown. It grows in the Goldfields and adjacent Nullarbor area, on deeper sandy soils and clays in the Goldfields, and on calcareous soils on the Nullarbor.

Wood description

Heartwood is chocolate-coloured to golden-brown, often with a golden fleck and pronounced ripple grain.

Wood density

Green density is about 1295 kg/m^3, air-dry density about 1235 kg/m^3, and basic density about 1080 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage are about 1.5 and 1.0 per cent respectively.

Workability

Goldfields craftsmen rank western myall as good for machinability, screwholding and gluing, and excellent for turning, boring, stability, sanding and finishing.

Durability

The wood is very durable, and presumably CSIRO Durability Class 1 when used for fencing.

Strength group and properties

Green and dry strength groups are (S1) and (SD1). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength groups are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	103	150
Modulus of Elasticity	MPa	16300	21500
Max Crushing Strength	MPa	52	80
Hardness	KN	-	-

Availability

Limited availability because of the scattered nature of the resource.

Uses

Previous uses include fencing and firewood, but the species has considerable potential for use as specialty timber, including musical instruments.

White cypress pine

Callitris glaucophylla

White cypress pine is a softwood widely distributed in inland areas of Australia with moderate rainfall. Today it forms extensive forests only in the Tambo-Dalby-Inglewood region of southern Queensland and the Baradine-Narrabri and Cobar districts of northern New South Wales. White cypress pine is a small to medium-sized tree, usually growing to about 18 m tall and 0.45 m in diameter at breast height, but occasionally reaching 30 m by 0.9 m.

Wood description

Heartwood is light-yellow to dark-brown and has frequent dark-brown knots, and sapwood is pale yellow and wide. The texture is very fine and even and grain is straight. The wood has a characteristic resinous odour and has a slightly greasy feel.

Wood density

Green density is about 770 kg/m^3, air-dry density about 680 kg/m^3, and basic density about 580 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage of mature wood before reconditioning are 2.8 % and 2.1 % respectively, and after reconditioning both are 2.1 %. For immature wood, tangential and radial shrinkage before reconditioning are 3.6 % and 2.9 % respectively, and after reconditioning 3.2 % and 2.9 % respectively.

Workability

With workability, the timber is brittle and care is needed when working. Knots and resin are common, which can affect workability. It is inadvisable to dress timber at low moisture contents because of its brittleness, and it tends to split when nailed and pre-drilling is recommended. Owing to its susceptibility to fine surface checking, white cypress pine is one timber which gives a better painting performance when coated in the unseasoned condition, and by slowing the initial drying rate the coating inhibits the formation of checks. The timber is unusual in that both sapwood and heartwood are very difficult to impregnate with preservatives, even when high pressures are applied.

Durability

Durability Class based on the CSIRO 1996 ratings is 2 for decay, and 2 for decay + termites combined. The sapwood is resistant to Lyctus borer attack because the insects do not attack softwoods, only pored species.

Strength group and properties

Green and seasoned strength groups are S5 and SD6 respectively. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	71	79
Modulus of Elasticity	MPa	7700	9000
Max Crushing Strength	MPa	40	53
Hardness	KN	5.6	6.5

Availability

There is very limited availability in Western Australia, although other species are readily available in other States.

Uses

Uses are flooring and lining boards, building framework, posts and small poles. The wood is not favoured for paper manufacture owing to frequent knots and high extractives content.

Woody pear

Xylomelum occidentale

Woody pear is generally a small tree growing to 5 to 8 m tall, with a short bole that can occasionally reach 30 cm in diameter. Individuals in open spaces can develop a broad canopy of spreading limbs. Trees often have an untidy form, bark is fibrous and flaky. The elliptical or oblong foliage is bright green and has serrate margins. The large woody fruit is pear-shape, hence the common name. Woody pear mostly occurs on sandy soils between the Darling Scarp and the ocean coast. Other populations are found on sandy gravels in the Jarrah / Marri forest east of the scarp's western edge. Although it has a wide distribution, it is a minor species in any of its habitats, large populations are rarely found.

Wood description

Heartwood is a dark reddish colour with a decorative figure. Sapwood is a contrasting pale cream colour. Timber treated with wax can produce a silk finish.

Wood density

Air-dry density is about 620 kg/m^3.

Workability

Very easy to dress, however, care must be taken when sanding as timber tends to develop high and low points similar to cedar. Quarter or back sawing will both provide an attractive grain pattern. Gluing, turning and finishing are rated as good. Drilling is rated as fair, a heavy hand is not required. Carving is rated as fair.

Strength group and properties

Green and dry strength groups are (S6) and (SD6). The brackets indicate conservative provisional ratings based on the air-dry density. The more important strength properties based on strength group are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	43	65
Modulus of Elasticity	MPa	7900	10500
Max Crushing Strength	MPa	22	41
Hardness	KN	-	-

Availability

Limited availability from private property, because the species is not harvested from state forests.

Uses

Timber is recognised as a specialty timber by wood craftsmen. Small pieces of furniture and ornamental trinkets are the major product from this timber, but it is also used for decorative turnery.

Yellow stringy bark

Eucalyptus muellerana

Yellow stringybark in its natural occurrence is commonly a tall tree 25-40 m in height and up to 1 m diameter (dbh). On favourable sites, it may be 50 m in height and 3 m dbh. This species occurs on coastal plains and adjacent ranges in southeastern Australia from near Wollongong, New South Wales, in the north to Wilson's Promontory in Victoria. Yellow stringybark typically occurs in tall open-forest formation. Trial plantings have been established in south-west Western Australia for use as power poles.

Wood description

Heartwood is a light yellowish brown with a pinkest tinge. Sapwood is very pale brown, to 2.5 cm thick, and the texture is medium and even with grain interlocked.

Wood density

Green density is about 1100 kg/m^3, air-dry density about 870 kg/m^3, and basic density about 695 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are 7.5 and 4.3 per cent respectively, and after reconditioning 5.5 and 3.2 per cent respectively.

Workability

With workability, the timber needs care in drying to minimise checking and splitting. It is a hard and heavy timber to work.

Durability

Durability Class based on the 1996 CSIRO assessment is 3 for decay, and 4 for decay + termites combined.

Strength group and properties

Green and dry strength groups are S3 and SD3 respectively. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	90	132
Modulus of Elasticity	MPa	14000	17000
Max Crushing Strength	MPa	44	72
Hardness	KN	6.3	8.5

Availability

The timber is not readily available in Western Australia, but is common on the south coast of New South Wales.

Uses

Use as power poles was the original objective of planting the species in Western Australia, but flooring has great potential. Previous uses in the eastern states include general construction, posts, poles, bridge timber, sleepers and cross arms.

Yellow tingle

Eucalyptus guilfoylei

Yellow tingle is a medium to tall eucalypt, with height up to 35 m and diameter 1 m. It is generally smaller than red tingle (*E. jacksonii*) and Rate's tingle (*E. brevistylis*). Yellow tingle has a limited natural occurrence around the Deep and Frankland Rivers west of Albany, growing on slopes and ridges of undulating to hilly country. It occurs as scattered trees associated with other eucalypts, such as karri (*E. diversicolor*), marri (*Corymbia calophylla*) or the less common red tingle. The best growth of yellow tingle is on deep red loamy soils originating from basalts and dolerites. The species will grow on lighter loams from granites and schists.

Wood description

Heartwood is an oak-like yellow colour, hard and straight-grained.

Wood density

Green density is about 1185 kg/m^3, air-dry density about 990 kg/m^3.

Drying and shrinkage

The timber relatively easy to work, dressing, sanding, drilling and carving are rated as good. Lacquer, wax or oils provides a good finish.

Workability

Durability Class based on the CSIRO 1996 ratings is 2 for decay and 3 for combined decay + termites.

Durability

Green and dry strength groups are S2 and SD 2. The more important strength properties are given in the table below.

Strength group and properties

Green and dry strength groups are S2 and SD 2. The more important strength properties are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	86	138
Modulus of Elasticity	MPa	14200	19450
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Timber is rarely commercially available, because the species generally occurs in areas that are now in conservation reserves.

Uses

Previous uses have been for sleepers, poles and bridge timbers. It has also been used for structural timber and flooring.

York gum
Eucalyptus loxophleba

York gum is a small tree of reasonable form, from 5 to 15 m tall with diameter up to 0.6 m, or a low straggly mallee. The species is widespread in the Wheatbelt and Goldfields areas, and the typical York gum is found in the Toodyay, York and Kellerberrin areas. Poorer trees are found as far north as Shark Bay, and east of Kalgoorlie. It is found in woodland formations, in association with wandoo, salmon gum, gimlet, powderbark wandoo (*E. accedens*), as well as raspberry jam. Further east, it occurs with mallee eucalypts.

Wood description

Heartwood is yellow-brown, hard and tough with an interlocked grain.

Wood density

Green density is about 1185 kg/m^3, air-dry density about 1060 kg/m^3, and basic density about 885 kg/m^3.

Drying and shrinkage

Tangential and radial shrinkage before reconditioning are about 5 and 2.5 per cent respectively.

Strength group and properties

Green and dry strength groups are S2 and (SD2). The brackets indicate a conservative provisional rating based on the air-dry density. Data from Julius (1906) are given in the table below.

Property	Units	Green	Dry
Modulus of Rupture	MPa	84	100
Modulus of Elasticity	MPa	10340	12410
Max Crushing Strength	MPa	43	70
Hardness	KN	-	-

Availability

Limited occurrence because of the scattered nature of the resource.

Uses

York gum was previously used for wheelwright and similar work, but commercial supplies are rarely available.