

"THE KARRI FOREST"

(In Relation to Site)

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by

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1. **Karri** (*Euc. diversicolor*) as a forest, is unique in the plant formations of Western Australia. It occupies a limited area of high rainfall in the extreme south-west and is the nearest approach in this State to temperate rain forest.

With its larger trees, denser mesophytic ground flora, and greater development of understorey trees its stands in marked contrast to the northern Jarrah forest.

Range and Distribution.—Although the Karri region would embrace more than a million acres, the main belt of Karri covers some 700,000 acres, being a long narrow belt almost parallel with the coast, and tapering from some 25 miles in width at its N.W. extremity to 10 miles or so at the Frankland River, and there after continuing eastwards past Denmark with decreasing width, to a point some 10 miles west of Albany. It is bounded on the west by the fault line of the Darling Scarp, extending southwards from Nannup; on the S.W. by the coastal plain which varies in width from five to 15 miles; and on the N.E. by a N.W.-S.E. line through Manjimup, and parallel to the coast. Two small outliers, each of a few thousand acres, occur, viz.—

(a) on a narrow coastal strip between Karridale and Margaret River on the western side of the "trough fault," and

(b) on the Porongorup Range some 25 miles north of Albany.

Within this belt, Karri does not occur as a large area of pure forest. Rather is it a series of patches, ranging in area from a few hundred to several thousand acres. Near its inland limits, it is practically confined to narrow strips along the gullies. These increase in width downstream eventually spreading well up the slopes. Usually Karri predominates on the ridges, with sometimes an admixture of Jarrah. To the south and south-east, the Karri occurs on the hills and with wide poorly timbered flats between.

2. **Physiography.**—The Karri belt occurs at the southern extremity of the laterite capped plateau, and is drained by short streams to the south coast, nearly all of which are permanent.

The Karri occurs on the true soils of the underlying rocks following the denudation and removal of the laterite capping. The underlying rock is a gneissic granite of sedimentary origin.

The topography is generally undulating, with steep falls to the main streams. The higher ridges some 25-30 miles inland, e.g., Manjimup, are rarely over 1,000 feet above sea level, decreasing to 550 feet in the vicinity of Pemberton, within 10 to 15 miles of the coast.

It would appear that the original plateau has been deeply dissected by the main watercourses, and the original laterite denuded except on the upper slopes and on the crests of ridges, more remote from the coast.

3. **Climate and Rainfall.**—The region enjoys a mild climate and an assured rainfall, the mean ranging from 43 inches inland to 60 inches nearer the coast. The inland limit of Karri, practically follows the 43 inch isohyet. The rainfall during the six driest months

usually exceeds eight inches. Heavy rains occur in the four wettest months of May, June, July and August, the average ranging from 26 inches to 32 inches.

Temperatures are mild. Winter frosts are occasional only, and summer maximum temperatures rarely exceed 95 degrees.

4. Soils and Forest Types.—The soils of the Karri forests are derived in situ from the underlying gneissic rocks, which, according to geologists, are of sedimentary origin. These soils generally determine its distribution. Towards the inland limit of its distribution, they occur in narrowing strips along the lower slopes and water-course, and Karri is replaced by Jarrah on the ridges and upper slopes on soils of lateritic origin.

On the hill slopes, there is usually an intermediate zone where Marri predominates, with an admixture of Jarrah towards the higher ground and Karri towards the lower. It is very rarely that Karri and Jarrah intermingle directly. Occasionally Marri may form pure stands over small areas. Marri is apparently a more tolerant tree as regards both soil and climate, occurring over a wide range of soil types, and in areas of rainfall down to 17 inches. On typically Karri soils, it is ousted by the faster growing Jarrah. It competes with Jarrah in all but some of the poorest of sands and laterites where Jarrah may form pure stands.

Variation in the edaphic factor gives rise to the following major forest types which are readily recognisable in the Karri zone.

1. **Karri** in pure stands.
2. **Karri-Marri** in mixture, the former usually towering above the Marri.
3. **Marri**—with varying amounts of Karri or Jarrah.
4. **Jarrah-Marri** mixture with Jarrah predominant.
5. Swamp types along the main watercourses.
6. Open non-timber area, or "plain" country.

1. Pure Karri forest in the virgin state is an imposing sight. The stand height is usually over 200 feet, reaching to 250 feet at its best development, with occasional individuals over 280 feet. Although reputed to be an open stand with a light undergrowth, and some grasses of grazing value in the early days, repeated firing by the white man has led to degradation of the crowns, and the development of a dense woody undergrowth of leguminous shrubs such as various Acacias, Bossia, Albizzia and the mesophytic Chorilaenas, Trymalium, Hovea, etc. On some areas, bracken up to eight feet or more in height, is the principal ground cover. Other patches may be predominantly Netic (*Bossia Aquifolia*), Wattle, "Hazel" (*Trymalium* or *Chorilaena*). On more restricted areas, Karri, Sheoak (*Casuarina decussata*) may occur as a scattered tree, or in close formation, growing up to 60 feet in height. The height and density of the shrubby undergrowth depends largely on the effect of past fires or trade cutting in reducing crown cover. The extreme is seen where the virgin stand has been fire-killed and dense thickets of Wattle up to 30 feet in height have taken full possession of the site. In a good seed year, dense thickets of Karri regrowth take possession after fire and eventually suppress the competing shrub species.

2. **Karri-Marri forest** carries a similar understorey to the Karri forest, but the stand height is usually somewhat less.

3. **Marri with scattered Karri**, usually has lower undergrowth and less of the soft leaved species. Height growth of Karri is from 150 feet to 200 feet.

4. **Jarrah-Marri forest**, approaches in type the Jarrah forest of the main Jarrah belt, except that the proportion of Marri in the stand is higher (30 per cent. to 50 per cent.) and both species attain large dimensions. The undergrowth is higher and denser than that occurring further north. *Podocarpus drouyniana*, and *Agonis parviceps* are very common, as well as a number of *Acacias*. Soils are sands and sandy loams with varying amounts of ironstone or lateritic gravel.

5. **Swamp types** may occur along the main watercourses, which spread over flats five, six or seven chains in width. In winter, these flats are inundated, but the stream is confined to a narrow winding bed in summer. It supports an extremely dense growth of shrubs, sedges and trees of which Warren River Cedar (*Agonis juniperina*) is perhaps the commonest. More rarely River *Banksia* (*B. verticillata*) occurs.

6. **Non-timbered areas** occur on deep poor white sands. The ground vegetation is an extremely dense growth of shrubs, including Ti-tree (*Agonis parviceps*) Emu Bush (*Podocarpus drouyniana*), Blackboys and numerous members of the *Myrtaceae* family.

These areas may range from a few acres to several hundred acres in the main belt between Nannup, Manjimup and Pemberton. Further east around Northcliffe and thence south-east to the Frankland River, quite large areas of this "plain" country occur. Outcropping from this sandy plain which is water logged in winter, are hills bearing stands of Karri, on the typical Karri soils.

Development.—Early exploitation of the Karri forests occurred during the latter part of last century, viz., by Millars Timber and Trading Co., at Torbay and Denmark, at the eastern extremity and at Karridale on the western outlier.

About 1912, four large mills were established in the main Karri belt, viz., one at Jardee (Millars), two State mills at Pemberton and one State mill four miles west of Manjimup.

Following World War I, all lands cut over by these mills were alienated for soldier and migrant settlement under the "Group" scheme, together with large areas of virgin forest. Prior to this there had been practically no agricultural settlement in Karri country although a few old families were established as graziers with cattle and horses on the Warren River. Further alienations occurred in the Walpole district in 1931.

Of an estimated 700,000 acres of land in the main Karri belt, approximately 200,000 have been alienated, with the resultant destruction of a great quantity of timber. Of the 500,000 acres remaining, the greater part is now dedicated State Forest and it is estimated that Karri predominates over some 250,000 to 300,000 acres. The remainder would be occupied by Jarrah, Marri and other non-Karri types.

Agricultural settlement, principally for dairying, has been a most costly venture, with quite inadequate returns for the vast amount of expenditure incurred. After nearly 30 years' effort, it is doubtful if 20 per cent. of the alienated land is cleared and developed, and many holdings lay abandoned for long periods. Soil deficiencies were evident and nutritional troubles encountered with stock and crops. Cobalt, copper and zinc have all yielded remarkable responses on certain limited areas, in correcting certain specific ailments.

Not until 1925 was any appreciable area of Karri dedicated as State Forest. Reforestation measures were undertaken following trade cutting at Big Brook (N.W. of Pemberton) and the oldest stand of regrowth from Departmental operations dates from 1929. Its health, vigour, and fast growth rate leave little doubt in the minds of those who see these regeneration areas, that no crop is better adapted to the site or likely to contribute more to the national welfare than that which nature so generously provides, namely, Karri.