

## SITE-VEGETATION TYPES as noted by Havel (1979)

Associated with granitic outcrops, the **G** site-vegetation type occurs mainly on the face of the Darling Scarp and on the monadnocks further east. The depth of soil over the granitic rock determines the structure of the vegetation. It ranges from lichen on bare rock to herbfields, shrublands and open woodlands dominated by either marri, wandoo, *Eucalyptus laeliae* F.D.Podger & J.Chippendale or rock sheoak (*Allocasuarina huegeliana* (Miq.) L.Johnson).

The **R** site-vegetation type occurs on valley slopes as a fringing transition zone between granitic outcrops and laterite-mantled slopes. The soil is a relatively fertile grey to brown sandy loam to sandy clay with an admixture of gravel.

In the high rainfall zone, **Q** and **U** types occur as high quality forest on slopes of the dissected river valleys on the western edge of the Scarp. They are the best sites in terms of moisture and fertility having brown to red deep loams. The **U** type has been largely cleared for agriculture with the present vegetation occurring on the periphery of former agricultural clearings. Yarri dominates the overstorey in both types, though jarrah occurs in type **Q**.

Type **C** occurs on valley floors fringing creeks and swamps. Jarrah is not normally common in this type as the sandy loams occurring over an impeding horizon are frequently waterlogged. The chief indicators are yarri in the overstorey and dense thickets of ti-tree (*Agonis linearifolia* (DC.) Schauer). Bullich occurs in the overstorey where the **C** type extends upstream in shallow valleys into the upland areas.

Types **W** and **D** flank type **C** on valley floors and lower slopes. The yellow sandy loams of types **W** and **D** are frequently waterlogged in winter, though the soils of type **W** tend to be drier and more fertile than type **D**. Jarrah has ceased to be a major component of the overstorey in types **W** and **D** that are infected with *P. cinnamomi*.

Types **P**, **S** and **T** occur in the lateritic uplands of the high and intermediate rainfall zones. They occur along a topographic and fertility gradient. The infertile type **P** occurs as gravelly sands in mid slope positions. It is characterized by the relative absence of the zamia palm (*Macrozamia riedlei* (Fischer ex Gaudich.) C.Gardner), *Phyllanthus calycinus* Labill., *Leucopogon capitellatus* DC. and *L. propinquus* R.Br. and the frequent occurrence of *Lepidosperma angustatum* R.Br. and *Grevillea wilsonii*

Cunn. in the understorey and sheoak (*Allocasuarina fraseriana*) in the overstorey. Type **S**, flanking type **P** upslope, is the broadest and most common type on laterite-mantled uplands. Occurring on upper slopes, ridges and plateaux type **S** has higher stocking densities and the soils are more fertile than those of type **P**. The chief indicators are *Banksia grandis*, *Persoonia longifolia* with some *Allocasuarina fraseriana* in the second storey and *Adenanthos barbigerus* Lindley, *Hovea chorizemifolia* (Sweet) DC., *Lasiopetalum floribundum* Benth., *Macrozamia riedlei*, *Phyllanthus calycinus*, *Leucopogon capitellatus*, *L. propinquus*, *Acacia preissiana* (Meissner) Maslin, *Styphelia tenuiflora* Lindley and *Patersonia rudis* Endl. in the shrub stratum. The soils of type **T** are more fertile than those of type **S**, supporting high quality forest on upper slopes and ridges in strongly dissected areas of the western high rainfall zone. The incidence of type **T** tends to be greatest around Dwellingup. Type **T** shares with type **S** *Lasiopetalum floribundum*, *Macrozamia riedlei*, *Phyllanthus calycinus*, *Leucopogon capitellatus*, *L. propinquus*, and *Acacia preissiana*, but *A. barbigerus* and *S. tenuiflora* tend to be replaced by *Leucopogon verticillatus* R.Br., *Pteridium esculentum* (G.Forster) Cockayne, *Clematis pubescens* Huegel ex Endl. and *Acacia urophylla* Benth. ex Lindley. *Allocasuarina fraseriana* is largely absent from the second storey of type **T**.

Type **O** lacks the presence of the defined indicator species of other types. It most strongly corresponds to type **P**, having sandy gravel colluvium in minor valleys and depressions within lateritic uplands. However, sites of type **O** tend to be moister than those of type **P**.

With distance east of the Scarp, type **Z** tends to be the 'dry' equivalent of type **S**, type **H** the 'dry' equivalent of **P** and **E** the 'dry' equivalent of type **W**. In the eastern low rainfall zone, type **A** occurs as seasonally wet, leached grey soils over an impeding horizon on flat, poorly drained floors of valleys. Type **B** flanks type **A** with type **J** usually occurring above **B** but below **H** on gentle slopes. Type **M** occupies dissected slopes with pure wandoo or admixtures of wandoo, marri and jarrah. Wandoo is dominant in pale loamy soils of type **Y** in broad valley floors and lower slopes.

Havel Site Type **B**

Other tree species usually present *E. calophylla*, *B. grandis*

Indicator species usually present *Adenanthos obovatus*, *Conospermum stoechadis*, *Dasypogon bromeliifolius*, *Hibbertia polystachya*, *Lepidosperma angustatum*, *Leptocarpus scariosus*, *Lyginia barbata*, *Mesomelaena tetragona*, *Petrophile linearis*, *Synaphea petiolaris*

Description Concave. Upland depressions. Broad valley heads.

Soil Type Light grey sand over grey to pale yellow sand.

Havel Site Type **D**

Other tree species usually present *E. calophylla*, *E. patens*

Indicator species usually present *Acacia extensa*, *Baeckea camphorosmae*, *Dampiera alata*, *Hypocalymma angustifolium*, *Kingia australis*, *Lepidosperma angustatum*, *Leptocarpus scariosus*, *Leptospermum pericalymma*, *Mesomelaena tetragona*, *Synaphea petiolaris*

Description Concave. Lower slopes and valley floors.

Soil Type Orange-brown loam sands and sandy loams over sandy clay or secondary lateritic ironstone.

Havel Site Type **E**

Other tree species usually present *E. calophylla*

Indicator species usually present *Baeckea camphorosmae*, *Dampiera alata*, *Hypocalymma angustifolium*, *Kingia. Australis*, *Lepidosperma angustatum*, *Leptocarpus scariosus*, *Mesomelaena tetragona*, *Synaphea petiolaris*

Description Concave. Lower slopes and depressions .

Soil Type Grey, yellow or brown sands and loamy sands with admixture of lateritic gravel.

Havel Site Type **F**

Other tree species usually present *Nuytsia floribunda*

Indicator species usually present      *Caustis dioica*, *Leptocarpus scariosus*, *Stirlingia latifolia*

Description Uniform to concave. Lower slopes and broad upland depressions.

Soil Type      Coarse grey sand over yellow sand.

Havel Site Type      **H**

Other tree species usually present      --

Indicator species usually present      *Daviesia decurrens*, *Hakea ruscifolia*, *Isopogon dubius*, *Lepidosperma angustatum*, *Mesomelaena tetragona*, *Patersonia rudis*, *Sphaerolobium medium*, *Stirlingia latifolia*, *Styphelia tenuiflora*, *Synaphea petiolaris*

Description Uniform to concave. Lower and middle slope in mildly undulating landscape.

Soil Type      Yellow-grey sand or loamy sand merging into lateritic gravel at depth.

Havel Site Type      **J**

Other tree species usually present      *E. calophylla*, *Banksia attenuata*, *Nuytsia floribunda*

Indicator species usually present      *Conospermum stoechadis*, *Hibbertia polystachya*, *Lepidosperma angustatum*, *Leptocarpus scariosus*, *Lyginia barbata*, *Mesomelaena tetragona*, *Styphelia tenuiflora*

Description Uniform to concave. Lower slopes and broad upland depressions.

Soil Type      Deep, pale yellow-grey sand, frequently underlain by lateritic gravel in sandy clay matrix at depth.

Havel Site Type      **M**

Other tree species usually present      *E. calophylla*, *E. patens*, *E. wandoo*

Indicator species usually present      *Hakea lissocarpha*, *Macrozamia riedlei*

Description Uniform to concave. Valley slopes in middle and upper reaches of valley in dry eastern zone.

Soil Type      Brown sandy loam over yellow or red-brown clay loam.

#### Havel Site Type **O**

Other tree species usually present     *E. calophylla*, *B. grandis*

Indicator species usually present     *Bossiaea ornata*, *Cyathochaeta clandestina*, *Conostylis setigera*, *Dampiera linearis*,  
*Lepidosperma angustatum*, *Leucopogon propinquus*, *Scaevola striata*

Description     Uniform with lower and middle slopes in high rainfall zone.

Soil Type     Lateritic gravel with a sandy loam matrix.

#### Havel Site Type **P**

Other tree species usually present     *Allocasuarina fraseriana*, *Banksia grandis*, *E. calophylla*, *Persoonia longifolia*,

Indicator species usually present     *Acacia browniana*, *Adenanthos barbigerus*, *Grevillea wilsonii*, *Hovea chorizemifolia*,  
*Lechenaultia biloba*, *Lepidosperma angustatum*, *Patersonia rudis*, *Styphelia tenuiflora*

Description     Mostly uniform. Mild, lower and middle slopes.

Soil Type     Lateritic gravel with sand or loamy sand matrix, or sand with heavy gravel.

#### Havel Site Type **Q**

Other tree species usually present     *E. calophylla*, *E. patens*

Indicator species usually present     *Acacia extensa*, *Chorizema ilicifolium*, *Hakea lissocarpha*, *Hypocalymma angustifolium*,  
*Leucopogon capitellatus*, *Leucopogon propinquus*, *Macrozamia riedlei*, *Phyllanthus calycinus*, *Trymalium ledifolium*, *Trymalium*  
*floribundum*

Description     Uniform or convex. Lower and middle slopes.

Soil Type     Dark brown sandy or silty over red-clay loam.

#### Havel Site Type **R**

Other tree species usually present     *Eucalyptus calophylla*

Indicator species usually present      *Hakea lissocarpha*, *Leucopogon capitellatus*, *Leucopogon propinquus*, *Macrozamia riedlei*, *Phyllanthus calycinus*, *Trymalium ledifolium*

Description    Uniform to concave. Valley slopes, frequently in proximity to granite outcrops.

Soil Type      Grey to brown sandy loam to sandy clay with admixture of lateritic gravel.

#### Havel Site Type    **S**

Other tree species usually present      *Allocasuarina fraseriana*, *Banksia grandis*, *E. calophylla*, *Persoonia longifolia*

Indicator species usually present      *Acacia browniana*, *Adenanthos barbigerus*, *Hovea chorizemifolia*, *Lasiopetalum floribundum*, *Leptomeria cunninghamii*, *Leucopogon capitellatus*, *Leucopogon propinquus*, *Macrozamia riedlei*, *Patersonia rudis*, *Phyllanthus calycinus*, *Styphelia tenuiflora*

Description    Uniform or convex. Mid and upper slopes, plateaus and ridges.

Soil Type      Yellow to orange heavy lateritic gravel with loamy sand matrix.

#### Havel Site Type    **T**

Other tree species usually present      *Banksia grandis*, *E. calophylla*, *Persoonia longifolia*

Indicator species usually present      *Acacia urophylla*, *Bossiaea aquifolium*, *Clematis pubescens*, *Hovea chorizemifolia*, *Lasiopetalum floribundum*, *Leucopogon capitellatus*, *Leucopogon propinquus*, *Leucopogon verticillatus*, *Macrozamia riedlei*, *Phyllanthus calycinus*, *Pteridium esculentum*

Description    Mainly convex. Upper slopes and ridges in strongly dissected, high-rainfall western zone.

Soil Type      Orange to brown gravel with sandy loam to loam matrix.

#### Havel Site Type    **W**

Other tree species usually present      *E. calophylla*, *E. patens*

Indicator species usually present      *Acacia extensa*, *Hakea lissocarpha*, *Hypocalymma angustifolium*, *Lepidosperma angustatum*, *Mesomelaena tetragona*, *Synaphea petiolaris*

Description Concave. Lower slopes and valley floors.

Soil Type Yellow-brown or orange-brown sandy loams to loams.

Havel Site Type Z

Other tree species usually present *E. calophylla*

Indicator species usually present *Hakea lissocarpha*, *Leucopogon capitellatus*, *Leucopogon propinquus*, *Macrozamia riedlei*, *Patersonia rudis*, *Styphelia tenuiflora*

Description Mainly uniform. Mainly valley slopes.

Soil Type Grey-brown loamy sands to sandy loams with moderate to heavy admixture of laterite gravel, frequently over base of gravel in clay matrix.