

PILBARA GARDENS FOR FUNCTIONAL BEAUTY

by Wally Edgecombe

The Pilbara - vast, hot, harsh, subject to sudden torrential cyclonic rains and to extended periods of drought. To the European visitor it is a desert, yet in this environment, a variety of vegetation flourishes, perfectly adapted to the arid conditions. Here and there the land is dissected by rivers that flood overnight, creating deep gorges - the oases of the Pilbara. Or there may be billabongs and waterholes that are refuges for animals and birds, providing water for them and for the people who inhabit the area. In these oases may be found pockets of lush palms, paperbarks and other plants unique to the area and of great botanical interest. There are also the rugged ranges, such as the Hamersleys, and like Mt Whaleback, Mt Tom Price and others, they contain the world's richest deposits of iron ore.

Modern settlement of the Pilbara since the iron ore "boom" of the 1960s brought with it a new group of settlers. They arrived from overseas countries and all States of Australia bringing with them landscaping and gardening

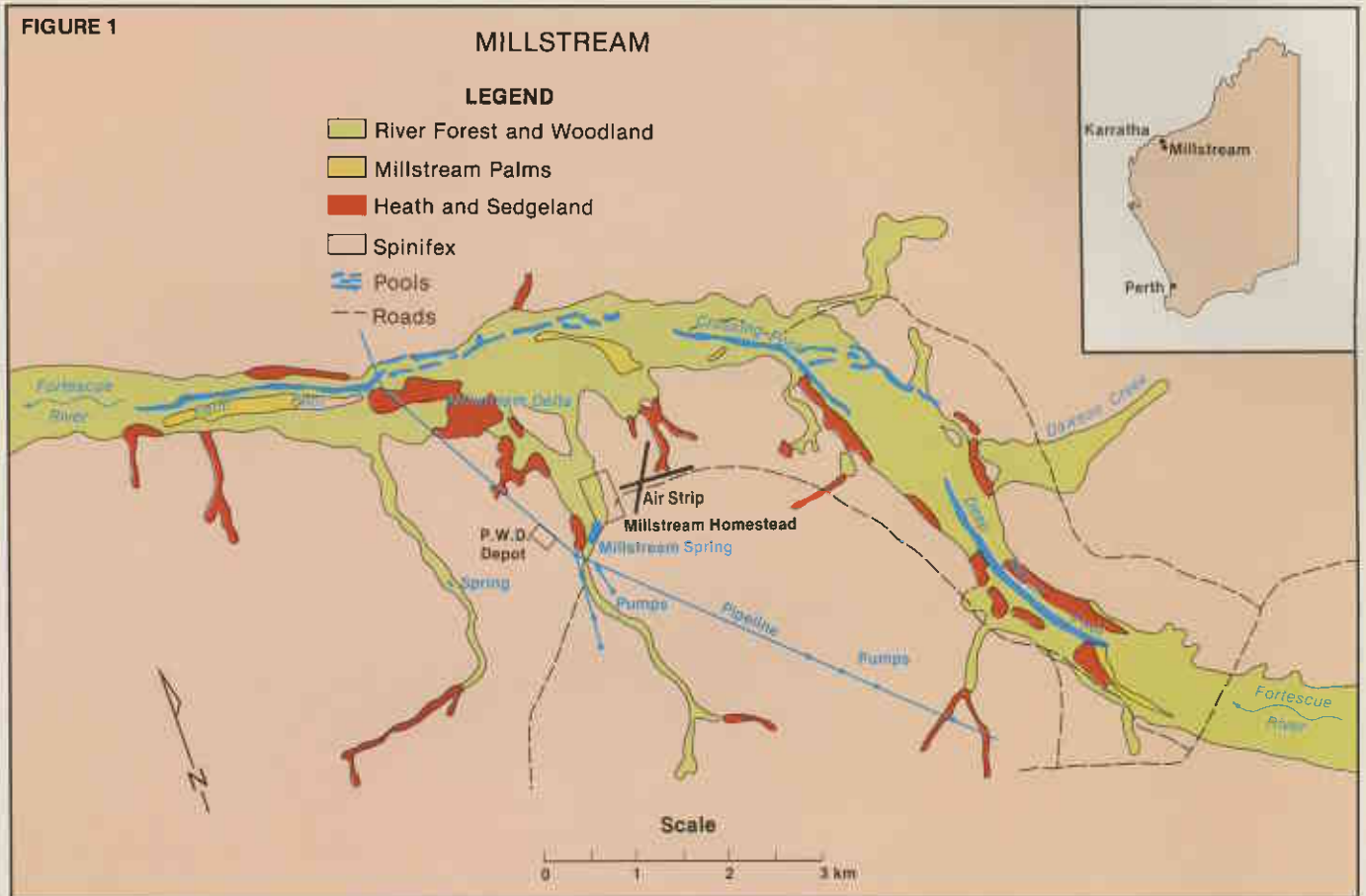
attitudes more akin to temperate high rainfall areas. Company towns have been established inland to tap the ore deposits, and along the coast, new towns of the West Pilbara, including Karratha, have developed along with the iron ore industry and in advance of the development of Woodside Petroleum's natural gas deposits offshore. Karratha is one of the fastest growing towns in the State. But the Pilbara is arid. Rainfall is unreliable, and although water is available for industries and domestic use, it is an expensive resource to develop. The major companies, such as Hamersley Iron Pty. Ltd., and Cliffs Robe River Iron Associates provide water at no charge to their workers, to attract families to the area and provide a pleasant working and living

Rainfall in the Pilbara is unreliable, being brought sporadically by tropical cyclones during the late summer. Here the clouds of cyclone 'Ian' build up near Karratha in March 1982. Note the pipeline connecting Karratha with the Millstream aquifer.

environment. A considerable volume of water, particularly at Cape Lambert and Dampier is used by industry. But in Karratha and other towns the majority of scheme water is used by domestic consumers. Green, lush gardens and lawns make Karratha's homes and streets attractive, but this luxury has its price in dollars and the cost to the environment.



FIGURE 1



The answer to the problem of water supply is constant vigilance to reduce unnecessary water use. Of special interest are landscaped areas in towns, and especially domestic supplies which account for over half of the water used in the Pilbara. Studies by the Forests Department and others demonstrate clearly that domestic consumption can be reduced to less than 700 kL/annum for an average domestic house and garden in the Pilbara. This is half the current estimated annual usage per household.

The Forests Department is promoting a programme of reduced garden water use which is based on:

- * budgeting water use to an amount that the plants can utilize effectively (preventing over watering),

- * redesigning gardens using appropriate arid area plants and eliminating water demanding species,
- * promoting water conservation technology such as the use of mulch, the use of tap timers and trickle reticulation.

Millstream Water

The Millstream area, which supplies water to the towns of Dampier, Karratha, Wickham and Point Samson, has unique qualities. It has a fascinating collection of vegetation including the unique Millstream palm (*Livistona alfredii*) and the date palm, presumably introduced by Afghan camel trains traversing the State. The vegetation and the major pools are fed by springs from the deep aquifer which lies alongside the Fortescue

River. This area includes the Crystal Pool and the delta area with its rare wetlands.

Most of the area around the Millstream pools is destined to become National Park. Prior to 1976 some of the area was a timber reserve based on the large cajuput tree (*Melaleuca leucadendron*). Millstream has become a focal point for tourism because of its outstanding natural beauty.

Water from Millstream is piped 120 km to the coastal towns of the West Pilbara. This large draw on water resources has led to concern that there could be an adverse effect on the vegetation at Millstream. Consequently the Public Works Department has constructed a special bore to supplement spring flows into Crystal Pool to ensure the existing ecosystems are maintained.

Because the Millstream system is now at the limit of its safe water yield, another source of water has become necessary and a new dam on the Harding River has been chosen as the solution. This dam and its associated facilities will cost 40 million dollars.

Low-water Gardens

In 1980 the Forests Department appointed an officer to Karratha to investigate and advise on tree establishment and maintenance in the Pilbara region. As part of this programme the feasibility and costs of establishing low-water consuming gardens is being investigated in an attempt to provide householders with a viable attractive alternative to the lush high-water consuming gardens currently planted. The first low-water garden was planted in October 1980 and has been monitored since with some very encouraging results. In the ensuing two year period, a number of demonstration gardens exhibiting a range of designs and native plants has been created.

The Forests Department has assumed control of the Government Nurseries at Karratha and Broome. Plants are being raised at Karratha for this programme. Arid area and Pilbara plants are being screened for suitability and most are flowering and growing better in gardens than in their natural habitat. Trees and plants are being dispatched for trial in all Pilbara towns.

Of paramount importance are the concepts of strict water budgeting to avoid waste, the reduction of thirsty lawn areas and the selection of appropriate plants for landscaping.

Water Conservation

Water conservation begins with appropriate designs for towns, streets, drainage, homes and recreation areas. The extreme heat

Trickle irrigation system in use at 49 Padbury Way Karratha. Wastage of water by run-off and excess watering is reduced by this method. ▶



▲ Lawns and tropical trees and shrubs are high-water consuming and are unsuited to the arid climate of the Pilbara.



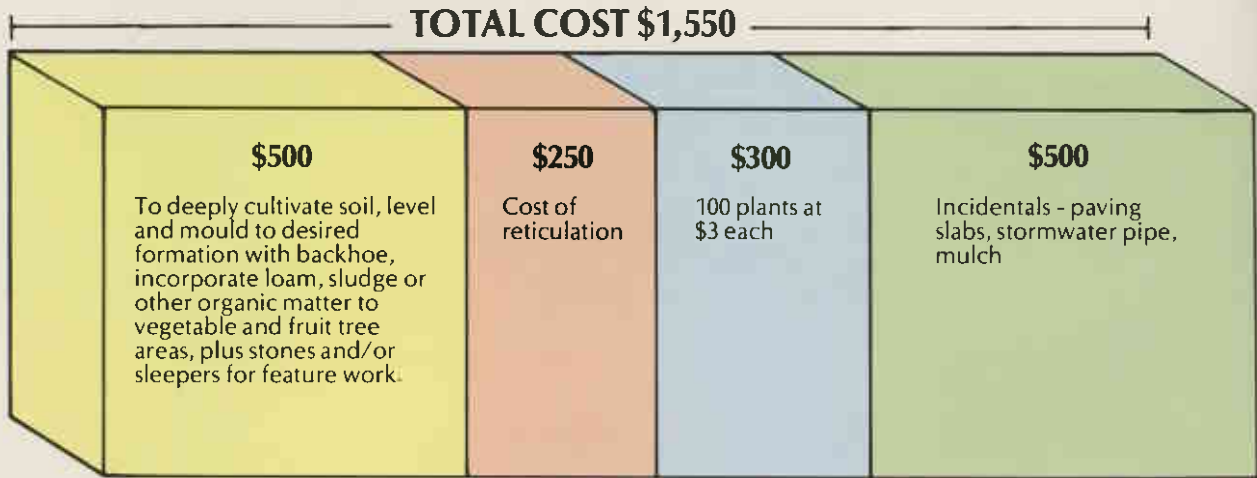
▲ Arid area plants were used to establish this low-water consuming garden at 8 Cowan Way, Karratha.



FIGURE 2

COST OF ESTABLISHING A LOW-WATER GARDEN

Based on experience in Karratha, the following could be a guide to costs once a plan is prepared. Costs are estimated at 1982 prices if the tenant is prepared to assist with landscaping.

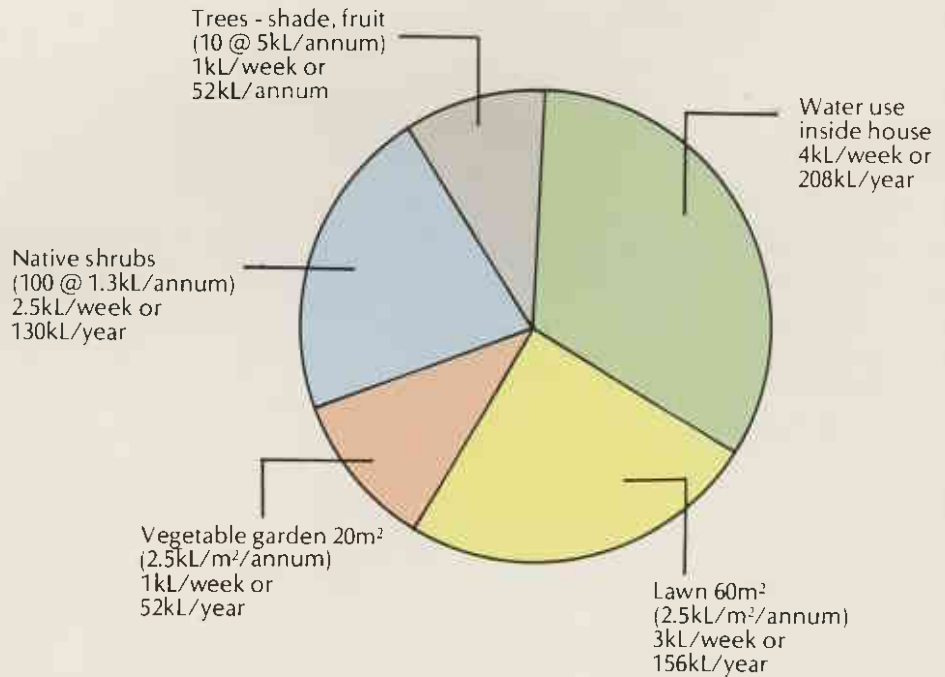


- NOTE
- Tenant to plant trees and shrubs, install reticulation and spread mulch.
 - If a simple design is required the costs would be greatly reduced.
 - Most new houses need a shady pergola in the North-west. Trees start to provide shade after about 5 years. A pergola kit plus brick paving would cost about \$1,200.

FIGURE 3

WATER USAGE IN A LOW-WATER GARDEN

The household with the first low-water garden in Karratha has two adults and four children and the garden features a lawn that is quite small, requiring 50mm/week of reticulation watering. The vegetable garden is seasonal, but is averaged out at 50mm/week also. Native shrubs, once established, are given an average weekly watering of 25 litres (1.3 kL/annum). Trees, once established, will be allocated 100 litres per week. The water directly applied may be less because tree roots will forage for water.



TOTAL USAGE 11.5kL/week or 598kL/year

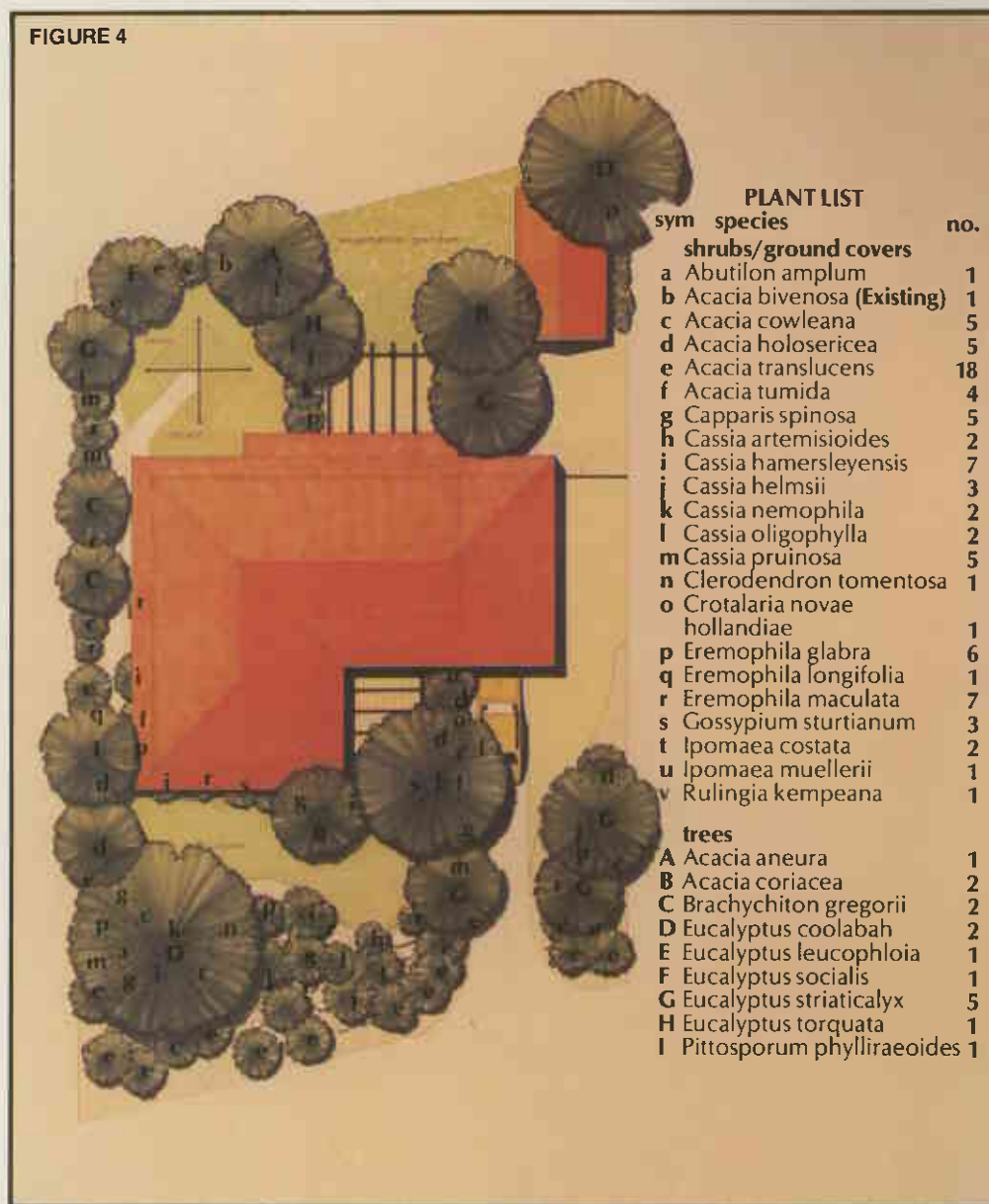
and aridity of the Pilbara can be partially ameliorated through the careful design and layout of homes and gardens. Verandahs and patios may be extended to provide outdoor living areas and initial shade while trees develop. And most importantly, water from rainfall should be collected from the roofs and directed onto the garden instead of being wasted as run-off down into the streets. Passive water harvesting could provide water for selected plants for a considerable time.

Practical gardening for the arid areas involves the selection of native shrubs and plants that consume far less water than introduced plants, but which nevertheless provide a beautiful floral display. Plants and advice about plantings are available at the Forests Department nursery. Soil structure should be improved and mulching techniques introduced to hold water. Covering the soil with stones or shredded vegetation after planting will further reduce water loss from the garden. Finally, designing the garden for a rigid water budget depends on minimum wastage. A trickle irrigation system prevents excess water loss, as does the introduction of timers on all water outlets into the garden.

Handy Hints

There are many factors involved in a successful garden but some of these are particularly important in the dry north-west. Often householders have little idea of how much water a garden needs. Over watering is as wasteful as forgetting to turn off the tap. Many trees and shrubs are best watered once a week or less. What small areas of the garden are retained for lawn should be watered only twice weekly and perhaps three times during extra hot spells. Householders should read their water meters and plan water use to keep within the low annual budget of 600kL/annum. As a guide for average north-west households the following categories can be suggested (right).

FIGURE 4



Forests Department site plan of the first low-water garden project in Karratha.

DOMESTIC WATER USE

PER WEEK (kL)	PER YEAR (kL)	CATEGORY OF WATER USE
9.6 - 14.4	500 - 750	low
14.5 - 19.2	750 - 1000	high
19.3 - 28.8	1000 - 1500	very high
28.9 plus	1500 plus	wasteful



W. Edgercombe

Low-water garden at 8 Cowan Way Karratha in 1980 and six months later (right). Native shrubs make a shady pathway in little time.



W. Edgercombe



W. Edgercombe



C. Whitfield



C. Whitfield



C. Whitfield

The striking beauty of the local flora has only recently been 'discovered' by residents of the Pilbara. Here *Grevillea wickhamii* (above left), *Eremophila maculata* (above right) and *Acacia translucens* are shown in full bloom.

◀ *E. camaldulensis*, or river gum, grows along creek beds and waterholes throughout the Pilbara. It has been planted as a street tree in Karratha and other towns in the Pilbara, but is generally unsuitable as it grows too large and is a hazard during cyclones.

A low-water garden does not mean a low-maintenance garden, neither does it mean that exotic plants should be totally excluded. Plants of similar water-consuming capacity should be grouped together. High-water consuming plants can be planted in close proximity to lawn areas where water applications are more frequent. Small areas may be included in this manner where variety is desirable. Fertilizing and pruning not only improves the growth of exotic plants and vegetables, but also improves the growth of native plants.

Investment

An investment in a low-water garden can provide just as much beauty and interest as its luxuriant water consuming counterpart, and will soon pay for itself in reduced water bills. A low-water consuming household using 700 kL/annum would cost the householder \$138 at 1982 water prices. In comparison a high-water consuming household using 2000 kL/annum costs the householder \$1008.



Millstream is an oasis and water supply for the West Pilbara. These cajeput trees (*Melaleuca leucadendron*) & Millstream Palms (*Livistona alfredii*) are part of the unique environment, worth preserving. C. Winfield.

Many trees of the Pilbara, if planted in the towns, are excellent for shade and shelter and require little water.

Eucalyptus aspera



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Acacia coriacea. Note the attractive weeping habit of this tree growing in Sampson Way, Karratha.