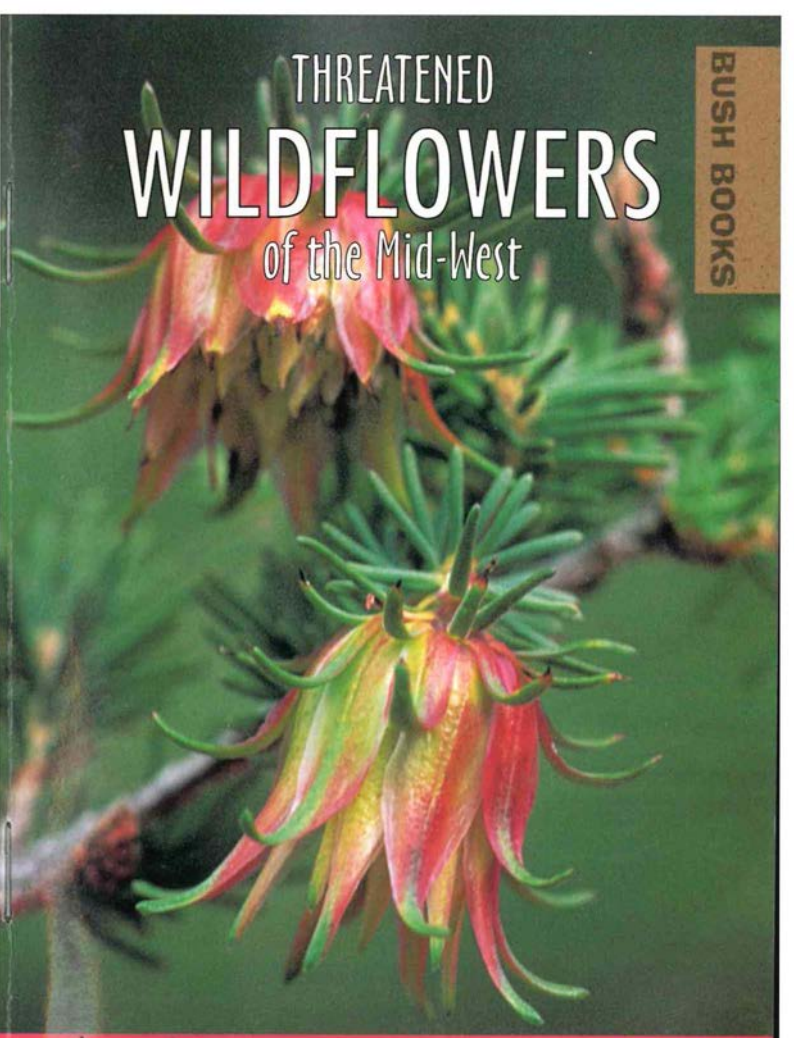
THREATENED WILDFLOWERS of the Mid-West

BUSH BOOKS



What plant is that?

Bush Books are a series of practical field guides to help you learn about and discover WA's unique plants, animals and special features, region by region.

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Managing Editor: Ron Kawalilak.

Editor: Carolyn Thomson-Dans.

Design and Production: Tiffany Aberin.

Contributing authors: Alex Agafonoff, Ken Atkins, Andrew Brown, Paul Brown, Robert Buehrig, Andrew Burbidge, David Coates, Gillian Craig, Gregory Durell, Elizabeth George, Mal Graham, Roger Hearn, Stephen Hopper, Greg Keighery, Ann Kelly, Stephen van Leeuwen, Neville Marchant, Murray Mitchell, Frans Mollemans, Mike O'Donoghue, Susan Patrick, Christopher Robinson.

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Ilustrations: Sue Patrick.

Editorial Assistance: Verna Costello.

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THREATENED
WILDFLOWERS
of the Mid-West

by Alanna Chant

DEPARTMENT OF
Conservation
AND LAND MANAGEMENT
Conserving the nature of WA

INTRODUCTION

Western Australia is renowned for its diverse and spectacular wildflowers, and is one of the premier flora centres in the world. Unfortunately, this floral richness is matched by a high number of plants that are threatened with extinction.

There are many reasons why it is very important to conserve Western Australia's wildflowers and associated areas of natural bushland. The incredible species richness of our flora has been recognised internationally, and the Mid-West is within one of only 19 areas of world 'megadiversity hotspots' because of the large number of plant species, subspecies and varieties.

In the Mid-West this species-richness often coincides with a landscape that is highly cleared and modified for other land uses, which has resulted in a large number of threatened plants.

We don't know what effect the loss of particular species will have on the environment, on the natural processes on which plants, animals and people depend. Any extinction or decline of species may also rob us of new medicines, as the chemical compounds produced by plants are still a major source of pharmaceuticals, as well as veterinary and agricultural chemicals.

The Department of Conservation and Land Management is the government agency responsible for conservation in Western Australia, through its responsibility for the Conservation and Land Management Act 1984 and the Wildlife Conservation Act 1950. Public support and understanding of flora conservation is also important and the department works closely with many other government agencies, business and industry, research institutes, conservation groups, private landowners and volunteers. Western Australia's threatened flora can only be conserved and brought to recovery if we all work together to meet conservation objectives.

Photo – Greg Keighery

Above: *Flora survey*

Below: *Translocation of silky eremophila*

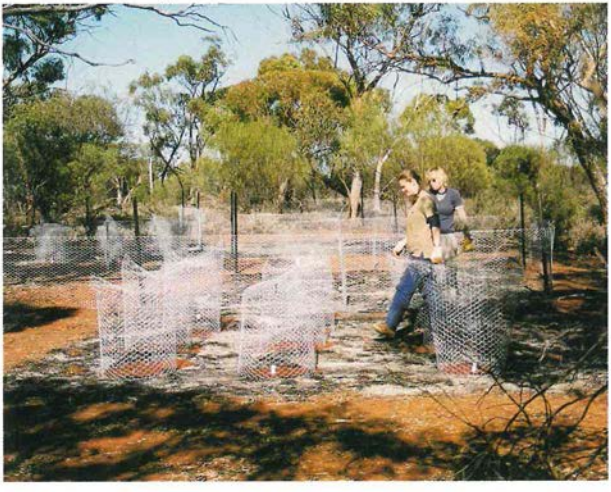

Photo – Alanna Chant

RECOVERING THREATENED FLORA

The causes of rarity, and the threatening processes affecting Western Australia's flora are numerous and often quite complex. Threats include continued clearing and accidental destruction during firebreak and road maintenance, weed invasion, salinity, disease such as *Phytophthora*, grazing by feral herbivores, indiscriminate herbicide application, lack of suitable pollinators resulting in poor or no seed set and inappropriate fire regimes.

Land clearing has undoubtedly been the major threatening process in the past. Today clearing is of concern only in specific areas, such as around population centres or where important remnants of bushland are located on farmland. Accidental destruction is a continuing problem and often occurs along road reserves during road maintenance or in remnant bushland during firebreak maintenance. The placement of rare flora markers on road reserves alerts road maintenance crews to the presence of the plants, and the need for conservation of the site.

Weeds are the greatest single current threat and are often the result of habitat degradation following partial clearing, fire, increased nutrients through agricultural fertilisers and damage from grazing. Without weed control, many populations of threatened flora would gradually die out and not be replaced, as germinating seedlings cannot compete with weeds for nutrients and light.

Many areas of remnant vegetation in lower catchment areas are becoming increasingly saline, resulting in vegetation decline and death of many native plants, including some threatened species.

Introduced herbivores, such as rabbits, sheep, cattle, goats and pigs are a major cause of land degradation and plant species and community decline. Fencing of threatened plants has protected many populations from grazing. Some fenced areas are also being actively rehabilitated.

Photo – Alanna Chant

Local primary schoolchildren help with rehabilitation

Many threatened plants are now restricted to small degraded areas where they will not survive in the long term. In some cases, plants are propagated to be planted out under controlled conditions, to supplement declining populations or to establish new populations in areas that have greater long term security.

Flora conservation is being achieved through the recovery process led by the Department of Conservation and Land Management and with the cooperation of other agencies and individuals who are willing to help. However, the diversity of our flora highlights the size of the task. There is the ongoing need for further resources and, even more importantly, the need for continued public support and participation.

SMALL-PETALLED BEYERIA

(Beyeria lepidopetala)

Until Ray Cranfield discovered the small-petalled beyeria in Kalbarri National Park in 1994, it had not been seen since it was first collected near the Murchison River by Augustus Oldfield prior to 1859. Unfortunately, it has not been possible to relocate the species since Cranfield's collection in 1994. There are currently no known plants of this species. A draft interim recovery plan has been prepared and actions are being implemented.

DESCRIPTION: This erect, open shrub is about 25 centimetres tall. Star-shaped hairs cover the branches. Narrow, oblong leaves, up to 1.5 centimetres long, are hairless above with white hairs beneath. They are held on a short stalk and their margins are rolled under. The green flowers have broad, rather large petals. These are fringed, hairy inside and shorter than the calyx lobes. Solitary male and female flowers were on separate plants in the known population, but on the same plant in the type collection. They are on slender stalks, about 1.2 centimetres long. The stalk of the female flower thickens upwards after flowering. The male calyx has five almost circular segments which overlap. Those of the female flower are narrower and more rigid. There are numerous stamens. The stigma has three lobes. The fruit is an oval capsule with three compartments, each holding a seed about six millimetres long.

FLOWERING: August.

DISTRIBUTION AND HABITAT: Small-petalled beyeria grew in a location south of Kalbarri. Here, it was found in yellow sandy clay over limestone, in a gully, in open mallee woodland over low heath regenerating after fire. It is probably a disturbance opportunist, appearing after fire.

STATUS: Presumed extinct. The area of the last known population has been marked by the Department of Conservation and Land Management to avoid accidental damage and will be

Illustration – Sue Patrick

monitored regularly, particularly after fire, when plants may regenerate from soil-stored seed. There is a lack of biological knowledge on factors such as its recovery. Departmental staff are continuing to monitor the area and search for more populations in likely habitat. Volunteers who live in Kalbarri have an exceptional knowledge of their local flora and are continuing to try to relocate the species in the park. Future management actions may include smoke disturbance trials.

SMALL DRAGON ORCHID

(Caladenia barbarella ms*)*

Alex George first discovered the small dragon orchid in 1969, at Eurardy Station north of the Murchison River.

DESCRIPTION: Small dragon orchid grows eight to 25 centimetres high, and has a single, narrow leaf, three to six millimetres wide and three to eight centimetres long, lying fairly close to the ground. The single flower is about two centimetres long and two centimetres broad. The green labellum has shining purple calli (glands) at its base and is covered with long purple hairs.

DISTINCTIVE FEATURES: This species has smaller flowers than all other members of the genus, a shorter, stiffly-hinged labellum and a more northerly range of distribution.

FLOWERING: Late August to September.

DISTRIBUTION AND HABITAT: Small dragon orchid is known from one population in Kalbarri National Park, five on pastoral leases north of the Murchison River and another on a nature reserve further north. In these areas, it often grows in small clumps of two or three plants in shallow, wet depressions or alongside seasonal creeklines, in sandy loam or clay loam soil. The species inhabits areas of dense heath or tall scrub of broom bush (*Melaleuca uncinata*) or wattles (*Acacia*), growing with leafless brachysema (*Brachysema aphylla*), York gum (*Eucalyptus loxophleba*), needle tree (*Hakea preissii*) and one-sided bottlebrush (*Calothamnus*).

STATUS: Endangered. It is important to monitor populations outside Kalbarri National Park regularly, especially in relation to grazing pressure and weed infestation, and to maintain liaison with pastoralists. The populations should be protected from fire, where possible, during the vegetative and flowering phase.

Photo – Andrew Brown

NORTHERN DWARF SPIDER ORCHID

***(Caladenia bryceana* subsp. *cracens* ms)**

The northern dwarf spider orchid is one of the smallest spider orchids in WA, with plants rarely reaching more than five centimetres high. First discovered in 1967 near Northampton, northern dwarf spider orchid grows in scattered populations hundreds of kilometres north of the typical subspecies.

DESCRIPTION: The plant, three to eight centimetres high, produces a broad, single hairy leaf, sometimes as long as the hairy flowering stem. The greenish flower, about 1.4 centimetres wide, has a dark red tip on the labellum (lip) and dark red calli (glands). The labellum is hinged at the base and the basal calli have fused to form a large clubbed projection with two lobes.

DISTINCTIVE FEATURES: This subspecies differs from dwarf spider orchid (*Caladenia bryceana* subsp. *bryceana*) in its paler flowers, curled petals and sepals and less globular calli, which are often absent from the centre of the labellum. It grows in a much more northerly area.

FLOWERING: August to early September.

DISTRIBUTION AND HABITAT: Northern dwarf spider orchid extends from Horrocks Beach to Nerren Nerren Station, north of the Murchison River. In the southern part of its range, it is scattered through low heath in shallow soil on coastal limestone. Further north, it forms colonies on winter-wet flats or in swales beneath thickets of broom bush (*Melaleuca uncinata*), over open herbs in pale red-brown sandy loam or brown sandy clay.

STATUS: Endangered. The species was previously classed as critically endangered and a draft interim recovery plan was prepared. New populations have been located in recent years, resulting in a slightly more secure conservation status for the species. Future management actions will include surveys in suitable habitat for this orchid.

Photo – Stephen Hopper

ELEGANT SPIDER ORCHID

(Caladenia elegans)

Elegant spider orchid forms clumps of up to seven or more plants, with each plant having up to three lemon yellow flowers, streaked with maroon. It often grows near the cream-flowered common spider orchid (*Caladenia vulgata* ms), and the two species are sometimes confused.

DESCRIPTION: Growing to about 30 centimetres tall, elegant spider orchid has a narrow, hairy leaf, six to 12 centimetres long and three to five millimetres wide. The lemon yellow flowers, five to eight centimetres across, have dark maroon hairs on the tips of the slender, filamentous petals and sepals. A pale yellow labellum (lip) is striped with dark red. The edge of the labellum has irregular teeth and the calli (glands) are in two rows.

DISTINCTIVE FEATURES: Elegant spider orchid is similar to the white-flowered common spider orchid, but differs in having lemon yellow flowers, glossy calli, a wet clay habitat (common spider orchid grows in better drained soils further upslope), and a marginally earlier flowering period.

FLOWERING: Late July to August.

DISTRIBUTION AND HABITAT: The species extends over a geographic range of about 60 kilometres around Northampton. It grows in clay loam on winter-wet flats in open areas amongst otherwise dense shrubs and annuals, with broom bush (*Melaleuca uncinata*), rock thryptomene (*Thryptomene saxicola*), pine grevillea (*Grevillea pinaster*), wattles (*Acacia*) and bottlebrushes (*Melaleuca radula*).

STATUS: Critically endangered. An interim recovery plan for this species is being implemented. Elegant spider orchid probably benefits from occasional summer fires, which temporarily reduce competition from associated shrubs and provides a source of nutrients for associated fungal mycorrhiza. Adult plants are, however, vulnerable to fire during their vegetative and flowering

Photo – Andrew Brown

stages between May and September. Most populations of this species are in vulnerable roadside locations and are continuing to decline due to weeds, erosion, habitat destruction due to feral pigs and road maintenance. Recent survey with the assistance of the Northampton Herbarium Group has located new populations, however, the species still requires substantial recovery efforts.

HOFFMAN'S SPIDER ORCHID

(Caladenia hoffmanii **subsp.** *hoffmanii)*

There are two subspecies of Hoffman's spider orchid. The typical subspecies grows between Geraldton and Kalbarri, while the subspecies *graniticola* occurs some 600 kilometres to the south-east, near Pingaring. The species is named after orchid enthusiast Noel Hoffman, a co-author of *Orchids of South-West Australia*.

DESCRIPTION: Hoffman's spider orchid grows up to 30 centimetres tall, with a leaf eight to 15 centimetres long and 0.5 to one centimetre wide. The tapering labellum (lip) has a deep red apex and is curled only at the very tip. It has a long, red fringe and dark red calli (glands).

DISTINCTIVE FEATURES: The petals and sepals are shorter than those of other species in the *Caladenia longiclavata* complex, to which it is related. It differs from the subspecies *graniticola* in its slightly smaller, more colourful flowers and shorter column.

FLOWERING: August to early September.

DISTRIBUTION AND HABITAT: Hoffman's spider orchid is found between Geraldton and the Murchison River. Preferred habitat is clay, sandy clay or clay loam with laterite on rocky hillsides and ridges, or in winter-wet flats. The plants are found beneath tall shrubs with low heath. Associated species include jam (*Acacia acuminata*), large-flowered melaleuca (*Melaleuca megacephala*), pine grevillea (*Grevillea pinaster*) and thryptomenes (*Thryptomene* species).

STATUS: Endangered. The Department of Conservation and Land Management is monitoring populations regularly and, where possible, is protecting them from fire during the plant's vegetative and flowering phase. Further surveys are required, particularly in Kalbarri National Park, where the species was reported in 1992. Recent survey has been successful in locating new populations with assistance from Geraldton Regional College

Photo – Andrew Brown

of TAFE Land Management students. However, the species is in very low numbers at all locations. Feral pig activity appears to be the most significant threat to the species and requires urgent management action if decline of this species is to be prevented.

KALBARRI SPIDER ORCHID

(Caladenia wanosa)

Only scattered individuals of this small orchid, which has one or two attractive red-striped flowers, are usually seen. The name *wanosa* is taken from the initials of the Western Australian Native Orchid Study and Conservation Group, whose members have contributed greatly to the knowledge of orchids in this State.

DESCRIPTION: The plant is up to 20 centimetres tall, with an erect linear leaf, three to six centimetres long and about three millimetres wide, with hairs mainly on the lower surface. Flowers are cream, with deep maroon markings. The erect upper sepal and spreading lateral sepals all have prominent clubs. The attractive labellum (lip) is broad, with bold red stripes, and a curved tip. It has two rows of dark red calli (glands).

DISTINCTIVE FEATURES: Kalbarri spider orchid is related to the drooping spider orchid (*Caladenia radialis*), which has a drooping upper sepal, tapering lateral sepal tips and a band of crowded calli on the labellum.

FLOWERING: August to September.

DISTRIBUTION AND HABITAT: The species is mainly found between Kalbarri and Eurardy Station, with disjunct populations further south-east near Mullewa, including two within roadside remnant vegetation. This orchid has also been reported from a nature reserve near Mullewa by local wildflower group members, however, this population has not been relocated in recent years. Near Kalbarri, the orchid grows in sandy soil under tall shrubs amongst sandstone outcrops, often along the upper edges of gorges. Near Mullewa, it inhabits deep, yellow loamy sand beneath tall shrubs of jam (*Acacia acuminata*) and hakeas, with emergent mallees.

STATUS: Endangered. Management in the Mullewa area will include further survey in nature reserves and other areas, liaison

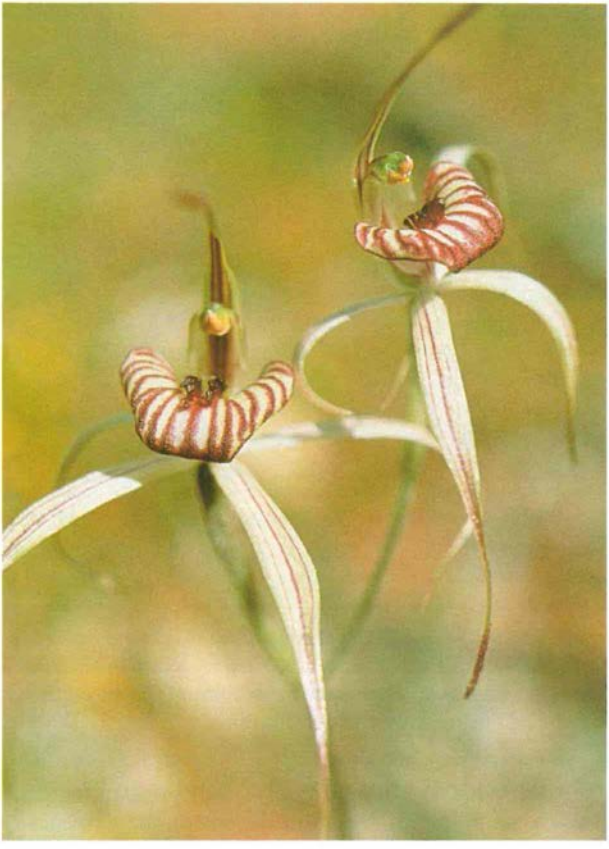

Photo – Andrew Brown

with local government and adjoining property owners, and monitoring the level of rabbit activity in cooperation with property owners. Further surveys are also required in Kalbarri National Park, as it is possible that this species occurs in other less accessible areas of the Murchison River gorges.

PROSTRATE FLAME PEA

(Chorizema humile)

Prostrate flame pea is a small, ground-hugging plant about 60 centimetres in diameter. It was found east of Geraldton in 1967 and east of Dongara in 1970. The species has not been found at any of these localities more recently. It is now known only from the Carnamah - Coorow area.

DESCRIPTION: The leaves, four to 16 millimetres long and 2.5 to five millimetres wide, are arranged alternately along the stem, and have a short awn-like projection at the apex. They taper at the base into a short stalk, which has a pair of persistent outgrowths (stipules) about a millimetre long. Clusters of pea flowers, up to 18 centimetres long, are held on the ends of the branchlets. Each is composed of up to 30 flowers, on stalks up to 2.5 millimetres long. The two upper lobes of the calyx join to form a lip with free tips. The calyx is hairy and tapered at the base. The yellow petals have reddish-brown markings. The standard petal is up to nine millimetres long, the wing petals, up to eight millimetres long, are gently curved, and the keel tapers to a protracted point and is almost as long as the wings. The style curves gently inwards.

DISTINCTIVE FEATURES: This species is similar to small-flowered flame pea (*Chorizema parviflorum*), which has narrow to linear leaves, and to spiny flame pea (*C. racemosum*), which has spines and linear leaves with downward-rolled margins.

FLOWERING: July to September.

DISTRIBUTION AND HABITAT: Until recently, prostrate flame pea was known from only three populations in the Carnamah - Coorow area. Successful survey during 2000 has increased the number of locations to nine. It grows in red loam, brown sandy clay with decomposing granite or in clay soils, on plains in scrub or open tree mallee.

Photo – Diana Papenfus

STATUS: Critically endangered. An interim recovery plan has been prepared for this species and its implementation has resulted in several new locations being found.

IRWIN'S CONOSTYLIS

(Conostylis dielsii **subsp.** *teres)*

Three populations of Irwin's conostylis grow on road verges north-east of Dongara, and have been declining due to their vulnerable location. Fortunately, more secure populations have been found on a nature reserve about 30 kilometres further north. Like other members of the genus, Irwin's conostylis probably regenerates following fire, from underground buds that emerge from horizontal rhizomes and from germination of soil-stored seed.

DESCRIPTION: This tufted perennial herb, which grows to about 20 centimetres tall, has leaves 13 to 33 centimetres long and less than a millimetre wide. The leaf bases are densely hairy, while the upper part of the leaf is less hairy. Irwin's conostylis has a dense inflorescence composed of many flowers, held on a four to 10 centimetre long stem. The individual flower stalks are short and each cream flower, 7.5 to 10 millimetres long, is tubular for a third to half of its length then divides into six lobes. The flowers are covered with short, densely matted hairs. The petal lobes remain on the fruit and become claw-like, touching at the apex with gaps at the bases.

DISTINCTIVE FEATURES: The leaves of Irwin's conostylis are circular in cross-section, unlike the flat, and slightly longer leaves of Diels's cottonhead (*Conostylis dielsii*). It is also similar to round-leaved coneflower (*C. teretiuscula*), which has silvery, long soft hairs on the leaves.

FLOWERING: July to August.

DISTRIBUTION AND HABITAT: Irwin's conostylis is found in a restricted area north-east of Dongara. It grows in white, pale yellow or grey sand with lateritic gravel, in heath, open scrub, low open heath and low open woodland, in upland areas.

STATUS: Vulnerable. All populations are monitored regularly. Rabbits and weeds, which are threatening roadside populations,

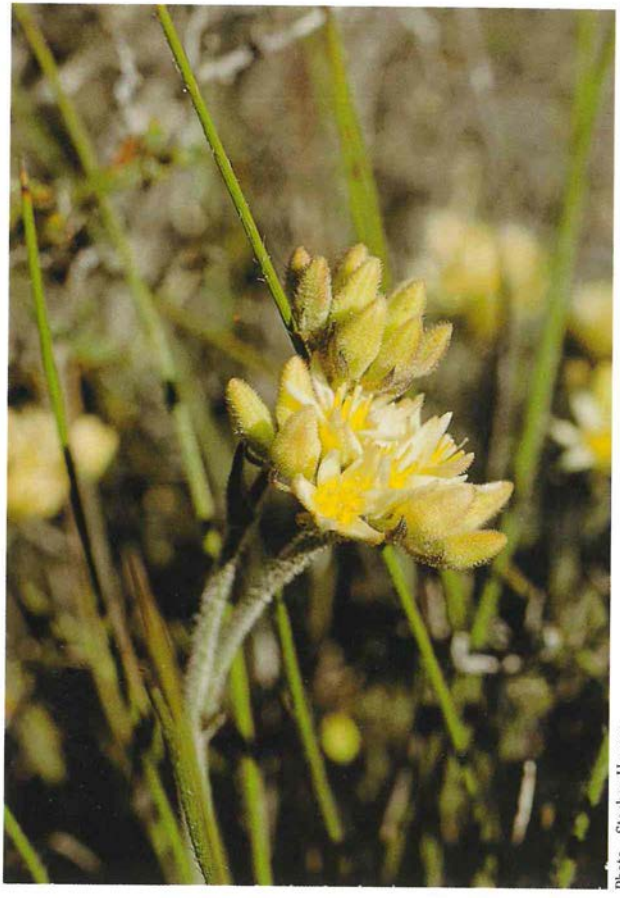

Photo – Stephen Hopper

have been subject to management action and are likely to require ongoing control. Further surveys are needed in nature reserves and elsewhere.

SMALL-FLOWERED CONOSTYLIS

(Conostylis micrantha)

Small-flowered conostylis has pale yellowish-cream flowers, which age to a distinctive brick red. Flowers are divided into two clumps of flattened heads. An interim recovery plan was prepared for this species due to its extreme rarity and recovery actions have resulted in a more secure conservation status for this species.

DESCRIPTION: This perennial herb forms tufts up to 30 centimetres in diameter. The leaves, 24 to 31 centimetres long, are circular in cross-section, with a few spreading white hairs, three to nine millimetres long, on the lower margins. The flowers are on stems, five to 13 centimetres long, with a hairy papery bract, three to eight millimetres long, halfway up the stem. The tubular flower, five to 7.5 millimetres long, divides into six lobes that are cream inside, and golden yellow outside.

DISTINCTIVE FEATURES: Small-flowered conostylis has longer leaf hairs than terete-leaved conostylis (*Conostylis teretifolia*). It flowers earlier and its smaller flowers are arranged in a flattened head, with many flowers that divide into two clumps, rather than a simple head with few flowers.

FLOWERING: July to August.

DISTRIBUTION AND HABITAT: This species grows north-east of Dongara over a range of about 30 kilometres. One population is on a railway reserve. It inhabits white or grey sand, usually high in the landscape in heath.

STATUS: Vulnerable. Like other members of the genus, small-flowered conostylis is thought to regenerate following fire from subterranean buds emerging from horizontal rhizomes. Populations are monitored annually, particularly in relation to grazing by rabbits. Cooperation between the Department of Conservation and Land Management, local government and adjacent landowners is critical. Weed control is being implemented where appropriate.

Photo – Rebecca Evans

MASON'S DARWINIA

(Darwinia masonii)

Charles Gardner described Mason's darwinia in 1964, from specimens collected by D Mason of Whitewells Station in about 1960. Unlike some other darwinias, the reddish bracts do not hide the heads of the numerous tubular flowers.

DESCRIPTION: This erect shrub, 1.5 to 2.5 metres tall, has narrow leaves, about a centimetre long, which are almost triangular in cross-section. They are densely crowded towards the ends of the branchlets. Flower heads, about three centimetres across and surrounded by numerous spreading reddish bracts, droop from the ends of short branchlets. The bracts are broad at the base, but narrow to a pointed apex and have a distinct midrib. They are about two centimetres long and five millimetres wide. Each tubular flower is about five millimetres long, with minute sepal lobes. The styles are hairy below the stigma and are about 1.5 centimetres long.

DISTINCTIVE FEATURES: The leaves of Mason's darwinia are narrower and triangular in cross-section and the flower heads are smaller than those of common mountain bell (*Darwinia lejostyla*). Fine-leaved darwinia has shorter styles, less than five millimetres long, and green bracts with purplish-red margins.

FLOWERING: April to November.

DISTRIBUTION AND HABITAT: Mason's darwinia is found over a range of about six kilometres on the summits of a ridge of banded ironstone hills south-west of Paynes Find. Plants grow in tall shrubland in yellow-brown clay loams, and are most common on the south-western sides of the ridges. Mason's darwinia has also been reported from a range of hills north of the known populations, but there are no herbarium specimens from that area and the plant has not been found there recently.

STATUS: Endangered. Mason's darwinia is thought to regenerate from rootstock and seed after fire or disturbance.

Photo – Stephen Hopper

There is a need to monitor the populations regularly, particularly in relation to mining, and maintain liaison with pastoralists and mining operators. Unfortunately, recent survey in ironstone hills near the known location has been unsuccessful in locating new populations. There is a need to identify and survey further suitable habitat.

BEAUTIFUL DAVIESIA

(Daviesia speciosa)

Beautiful daviesia was first collected by Charles Gardner in 1958 from a population near Mingenew (since cleared for agriculture). Charles Chapman found another population sometime prior to 1969 and further populations have since been found north-east of Eneabba. After 20 years of study, Chapman noted that the species flowered every year but did not produce any seed. Hand pollination trials indicate that pollen infertility is the most likely cause. No birds have been seen pollinating flowers, so lack of suitable pollinators is another possible reason for lack of seed production. The species takes advantage of disturbance, colonising road verges and gravel pits. It will resprout from a suckering rootstock.

DESCRIPTION: This powdery, blue leafless shrub, about one metre high by two metres wide, has stiff, erect, prickly stems. It has a thick, spreading rootstock, from which new plants are produced following disturbance. The leaf-like phyllodes (flattened leaf stalks that resemble leaves) are erect, and have small scale-like leaves at the base. Large, nodding, red pea-shaped flowers, up to 2.5 centimetres long and on a long stalk, grow on the stems, in clusters of one or two flowers. Pods have never been recorded.

DISTINCTIVE FEATURES: Staghorn bush (*Daviesia epiphylla*) has similar flowers, but differs by having flattened stems.

FLOWERING: March to June.

DISTRIBUTION AND HABITAT: Beautiful daviesia is currently known from five populations north-east of Eneabba, over a range of about 40 kilometres. The species is confined to dense low shrubland in lateritic loams, usually high in the landscape.

STATUS: Endangered. The Department of Conservation and Land Management is implementing strict dieback hygiene at all populations, liaising closely with private landowners and the shire, monitoring populations regularly, and protecting plants

Photo – Andrew Brown

from road works, gravel extraction and frequent fire through discussions with the shire and landowners. Research on the biology and ecology of this species has been carried out as part of a Masters degree. Research should continue, particularly in relation to the reasons for lack of seed production.

KNEELING HAMMER ORCHID

(Drakaea concolor ms*)*

Kneeling hammer orchid has been found in a few sandy areas along the Murchison River, and recently in several similar areas further south towards Port Gregory. A disjunct population has been found further south in the Watheroo area by Bill Jackson, an orchid enthusiast from Walpole. It grows in open clearings amongst dense, low shrubs. It is related to the glossy-leaved hammer orchid, but is found some 500 kilometres further north.

DESCRIPTION: This erect, tuberous herb, which grows up to 30 centimetres tall, has a small, heart-shaped leaf two to three centimetres across. The plant usually has a single flower, which is three to four centimetres long with a 'hammer-like' labellum (lip) on a hinged claw. Glands on the labellum give off a scent which attracts male flower wasps. These try to mate with the labellum and, in the process, pick up or deposit pollen.

DISTINCTIVE FEATURES: The dull, dark green leaf distinguishes this species from glossy-leaved hammer orchid, which has a shiny, light green leaf.

FLOWERING: August to September.

DISTRIBUTION AND HABITAT: This species is known from four populations in Kalbarri National Park, and four further south towards Port Gregory and Watheroo. It grows in sandy soil over sandstone, in clearings amongst thick scrub of *Acacia*, *Calothamnus* and *Melaleuca* or in open areas in otherwise low, dense heath with species of *Melaleuca*, *Isopogon*, *Verticordia*, *Hakea*, *Calothamnus* and *Callitris*. It has also been recorded growing amongst sedges in a damp depression.

STATUS: Endangered. Populations are being monitored regularly and the species is being protected from fire where possible. Feral pigs have been active in some areas of its habitat and appear to be the most imminent threat requiring management

Photo – Andrew Brown

action at present. Further survey is required, particularly in the Kalbarri area.

MORESBY RANGE DRUMMONDITA

(Drummondita ericoides)

Moresby Range drummondita was first collected by James Drummond and described by Harvey in 1855. It was found again by Charles Gardner in 1926, but was then thought to be extinct until its rediscovery in 1980.

DESCRIPTION: This erect, heath-like shrub grows to about a metre tall. The small, hairless leaves, which are crowded on the branches, are narrow, about eight millimetres long, and covered in glandular dots. The yellowish flowers are greenish at the tips, and have five short, hairless sepals and five concave, erect petals. The 10 staminal filaments unite to form a narrow hairy tube, white to violet in colour, which projects beyond the petals. Five longer filaments lack anthers, and have long hairs, while the five shorter filaments have anthers, which are hairy on the back. A crimson style projects beyond the stamens. Following fertilisation five free carpels will form, splitting when ripe to release kidney-shaped seeds.

FLOWERING: August to October.

DISTRIBUTION AND HABITAT: The species is found in two locations in the Moresby Range, north of Geraldton, within a range of about 10 kilometres. It grows amongst low heath on slopes, ridges and gullies, in brown loam, and in sandy loam and clay amongst sandstone and laterite. It associates with large-flowered melaleuca (*Melaleuca megacephala*), tangling melaleuca (*M. cardiophylla*), Blakely's wattle (*Acacia blakelyi*), dense-nerved hakea (*Hakea pycnoneura*) and prickly poison (*Gastrolobium spinosum*).

STATUS: Endangered. For 20 years, this species was known from only one location, until a second population was found during recent survey, with assistance and information from a nearby property owner. Further survey is required in other suitable areas of remnant vegetation in the Moresby Range.

Photo – Andrew Brown

Populations are being monitored regularly, particularly in relation to damage by water erosion and rock slides. Liaison with adjacent landowners is playing an important part in ensuring that this species is protected from threats such as frequent fire and other habitat disturbance. Research on population biology and fire response is also needed.

SILKY EREMOPHILA

(Eremophila nivea)

Silky eremophila was described in 1986 from plants collected from a road verge south-west of Morawa. This population is now extinct, but seven more populations have since been found. Nurseries have often cultivated silky eremophila under the name *Eremophila margarethiae*.

DESCRIPTION: This erect, compact shrub reaches up to two metres tall. Its branches, leaves, flower stalks and sepals are densely covered with whitish, woolly hairs. The margins of the pointed, linear leaves are turned back slightly. Leaves are stalkless, up to 18 millimetres long, and arranged alternately along the stems. One or two flowers are borne in the leaf axils, on stalks two to 5.5 millimetres long. The tubular, lilac flowers, about 2.3 centimetres long, have pointed sepals, up to 11 millimetres long and 2.5 millimetres wide. The flowers are hairless outside and whitish inside. They have two lips, with lilac to brown spots on the lower lip. Four stamens are held within the flower tube. The beaked, oval-shaped fruit is enclosed in a papery, buff-coloured coat, which splits at the apex.

DISTINCTIVE FEATURES: The denser covering of hairs, hairless corolla, open corolla throat, shorter flower stalk and shorter sepals distinguish this species from grey poverty bush (*E. margaretiae*).

FLOWERING: August to October.

DISTRIBUTION AND HABITAT: There are six populations of silky eremophila north of Three Springs, over a range of less than five kilometres, and a seventh population south-east of Morawa. The species grows in red-brown sandy loam and lateritic gravel, or clayey loam, usually near the edge of seasonal creeks, in open York gum woodland and open scrub.

STATUS: Critically endangered. An interim recovery plan has been prepared and recovery actions are being coordinated by the Department of Conservation and Land Management in

Photo – Andrew Brown

cooperation with property owners, local government and the local community. Property owners are protecting the plants from grazing and fire. Future management will include weed control and further survey, particularly in suitable habitat near Morawa and Perenjori. The species is thought to be relatively short-lived, surviving in low numbers once associated vegetation has reached maturity. The seed is thought to germinate in disturbed sites, possibly after fire.

VARNISH BUSH

(Eremophila viscida)

Varnish bush has leaves with a distinctly shiny, sticky surface. The plant has been found in 15 locations, however, some locations now no longer contain live plants and most have only a few individuals. There are less than 500 known plants in total. Unfortunately, the last plants of a population in the Pindar area recently died. Recent survey with assistance from the Mullewa Department of Conservation and Land Management Bushrangers has located a new roadside population and another in more secure remnant vegetation south of Mullewa.

DESCRIPTION: This erect shrub, two to six metres tall, has sticky, shiny brown, hairless branches. Its narrow leaves, five to 10 centimetres long and up to one centimetre wide, are hairless to finely glandular and hairy. Tubular flowers, about two centimetres long, in the leaf axils are usually solitary or sometimes in twos. Each flower is on a one centimetre long stalk, which is enlarged beneath the flower. The seven millimetre long, greyish-blue or reddish calyx lobes are strongly veined. The corolla is white to pale yellow, with purple spots in the throat. Stamens project beyond the tube. The ovary is hairy. Egg-shaped fruits, five to seven millimetres long and about four millimetres wide, are hairy on the upper part.

DISTINCTIVE FEATURES: The long linear to lanceolate leaves distinguish this species, which has prominently spotted flowers and large double bluish-purple sepals, from shining poverty bush (*Eremophila lucida* ms).

FLOWERING: August to October.

DISTRIBUTION AND HABITAT: Varnish bush has been collected from Latham, Koorda, Carnamah, Ballidu, Pindar and west-south-west of Merredin, a range of 290 kilometres. It grows in brown sandy loam or red-brown clay loam soils, in open woodland in association with York gum (*Eucalyptus loxophleba*) and scrub vegetation.

Photo – Andrew Brown

STATUS: Critically endangered. Surveys for previously recorded populations are being undertaken and all populations are being monitored regularly. Flora enthusiasts in the Mullewa area are familiar with the species and have been actively searching for it in likely habitat. Recent management has included surveys and a disturbance trial project undertaken by the Mullewa Bushrangers. A translocation is also intended for the near future.

BEARD'S MALLEE

(Eucalyptus beardiana)

Beard's mallee is a tall, spreading multi-stemmed tree, up to five metres tall, with smooth, pinkish-grey to cream bark.

DESCRIPTION: This tree has narrow, light greyish-green leaves up to 12.5 centimetres long and 1.5 centimetres wide. The inflorescences, held on downward curving stalks, have up to 11 flowers. The pendulous buds, up to 2.1 centimetres long and six millimetres wide, are cup-shaped, with a beaked cap. Flowers are creamy white, with the lower half of the stamens united. Pendulous, thick-rimmed, urn-shaped fruits have four or five protruding valves.

DISTINCTIVE FEATURES: Tammin mallee (*Eucalyptus leptopoda*) also has joined stamens, but has narrower leaves, smaller buds, fewer flowers (seven to nine in each inflorescence) and smaller fruit with a level to raised disc. Jyngymia mallee has smaller buds, fewer flowers (up to seven in each inflorescence) and fruits with a steeply ascending disc.

FLOWERING: August to September.

DISTRIBUTION AND HABITAT: Beard's mallee is known from nine populations between the Murchison River and Shark Bay. It inhabits red or yellow sand ridges in tree heath or tall open shrubland with various eucalypts, including Yuna mallee (*E. jucunda*), malallie (*E. eudesmioides*) and northern sandplain mallee (*E. gittinsii*).

STATUS: Endangered. Populations are being monitored regularly and liaison with pastoralists is being maintained. Future management will include further surveys, as this is likely to result in new populations being discovered.

Photo – Andrew Brown

HOWATHARRA MALLEE

(Eucalyptus blaxellii)

Howatharra mallee is a multi-stemmed tree, up to three metres tall, with smooth, pinkish-brown or grey over coppery bark.

DESCRIPTION: The glossy green leaves are narrow, with irregular lateral veins at an angle of 20 to 40 degrees to the midrib. Up to seven small buds are grouped in simple inflorescences in the leaf axils. They are up to six millimetres long and three millimetres wide and have a hemispherical cap. Cup-shaped fruits have a thin rim, a descending disc and three enclosed valves.

DISTINCTIVE FEATURES: This species is related to the York gum (*Eucalyptus loxophleba*) group whose members differ because of their oval to orbicular, dull bluish juvenile leaves, very irregular veins in the adult leaves, and inflorescences which are often clustered at the leafless ends of small branches.

FLOWERING: May to November.

DISTRIBUTION AND HABITAT: Howatharra mallee grows in scattered populations in the Moresby Range, north-east of Geraldton. It inhabits sand over laterite, or brown, clayey sand on sandstone hills or creek flats. It is an emergent mallee over heath and associates with York gum, fluted horn-mallee (*E. stowardii*), small fluted mallee (*E. diminuta*), sandplain mallee (*E. ebbanoensis*), tamma (*Allocasuarina campestris*), large-flowered melaleuca (*Melaleuca megacephala*), prickly poison (*Gastrolobium spinosum*) and various wattles.

STATUS: Endangered. Further survey has located new populations in the Moresby Ranges and further north towards Port Gregory. However, the species is in low numbers at most locations and the condition of populations requires regular monitoring. Liaison with landowners and local government has aided in protection of populations. Further surveys in other areas of remnant vegetation in the Moresby Ranges may uncover new populations.

Photo – Andrew Brown

PAYNES FIND MALLEE

(Eucalyptus crucis subsp. *praecipua)*

Paynes Find mallee, which was described in 1993, is an even rarer subspecies than silver mallee (*Eucalyptus crucis* subsp. *crucis*). The name *praecipua* means 'special' in Latin, and alludes to its distinct morphology.

DESCRIPTION: This mallee can reach 10 metres tall. The multiple stems have thick bark at the base, and reddish bark that is shed in narrow, curled strips above. The narrow stalked leaves, up to 15 centimetres long and 2.5 centimetres wide, are bluish-green to light green. Inflorescences of up to seven buds are held in the leaf axils. The bud cap is shaped like a flattish cone, and is long with a whitish powder. Hemispherical fruits, up to 1.3 centimetres long and two centimetres wide, have a thick rim and a broad disc, which is level to slightly ascending.

DISTINCTIVE FEATURES: Paynes Find mallee has larger adult leaves, buds and fruits than narrow-leaved silver mallee (*E. crucis* subsp. *lanceolata*).

FLOWERING: December to March.

DISTRIBUTION AND HABITAT: This subspecies is known only from south-west of Paynes Find, where it occurs in five groups over a two kilometre range. It inhabits brown sandy loam on and around granite hills, and grows in low, open woodland and scrub with silver wattle (*Acacia lasiocalyx*), woolly sheoak (*Allocasuarina eriochlamys*) and granite broombush (*Calycoppeplus paucifolius*).

STATUS: Endangered. Paynes Find mallee is thought to resprout after fire. Populations are being monitored regularly by the Department of Conservation and Land Management in cooperation with pastoralists, who are protecting the species from threats such as grazing pressure and fire. Future management will include further survey of other granite rocks in the area, due to the very restricted known range of this species.

Photo – Sue Patrick

MALLEE BOX

(Eucalyptus cuprea)

Mallee box was previously known from four small, isolated populations over an 80 kilometre range, until assistance from property owners uncovered more populations on private property. An interim recovery plan has been prepared and recovery actions are being implemented. Recent survey has also uncovered a small population in a nearby nature reserve, and the future for this species has been significantly improved.

DESCRIPTION: This erect mallee, up to five metres tall, has a stocking of thin, grey, flaky, fibrous bark. Above the stocking, the bark is smooth and coppery or grey. Narrow adult leaves, 11 centimetres long and 2.3 centimetres wide, are glossy dark green. Club-shaped buds have inflexed stamens. They are six millimetres long and four millimetres wide, and arranged in inflorescences at the ends of branchlets. The valves of the stalked cup-shaped fruits, up to five millimetres long and four millimetres wide, are below the rim, and hold greyish-brown seeds.

DISTINCTIVE FEATURES: Mallee box has light green, oval juvenile leaves and a less prominent disc than Badgingarra box. Granite rock box (*Eucalyptus petraea*) has larger buds and fruits, which are split open by a five-sided disc that often remains attached.

FLOWERING: October.

DISTRIBUTION AND HABITAT: The species extends from north of Galena to south of Northampton. It is generally found on rises in brown sandy loam with sandstone or sometimes with granite, and in red-brown clayey loam with laterite. However, it has also been recorded on a clay flat. It grows above low heath with other emergents species.

STATUS: Critically endangered. Despite recent success in the recovery of this species, it is still in low numbers. Populations are being monitored regularly and property owners are protecting

Photo – Andrew Brown

them from threats such as frequent fire and grazing. Further surveys are required, in areas between Northampton and Galena.

JINGYMIA MALLEE

(Eucalyptus synandra)

Jingymia mallee is an attractive multi-stemmed tree, up to six metres tall, with smooth, powdery white bark that sheds in ribbons, over pink and brown bark. The species is being grown at the Botanic Gardens and Parks Authority and is likely to have ornamental value. Populations should be monitored regularly to watch for illegal seed collection.

DESCRIPTION: Juvenile leaves are narrow, up to nine centimetres long and 1.5 centimetres wide, dull and greyish-green. The branches are often pendulous, and the crown is thin with narrow, pendulous leaves, which are dull, greyish-green, up to 20 centimetres long and 16 millimetres wide. Simple inflorescences of seven flowers are held in the leaf axils. The stalked buds have a hemispherical floral tube and a conical to beaked cap. The lower half of the stamens unite to form a tube. The creamy flowers turn pink as they age. The stalked, hemispherical fruits have a thick rim, a steeply ascending disc, and four or five protruding valves. They are six to 14 millimetres long.

DISTINCTIVE FEATURES: Tammin mallee (*Eucalyptus leptopoda*) does not have united stamens, and has more upright branches and a denser canopy. Beard's mallee (see pages 36–37) has an elongated, cup-shaped floral tube and longer fruits up to 11 millimetres long. Rose-flowered mallee (*E. rosacea*), which was recently split from *E. synandra*, has erect, non-glaucous branches and grows on sand much further to the east.

FLOWERING: December to March.

DISTRIBUTION AND HABITAT: Jingymia mallee grows in scattered populations in the northern Wheatbelt, from north of Morawa to the Koorda area, over a geographic range of 300 kilometres. The species inhabits sand or sandy loam over laterite, in undulating or flat country with heath and scrub.

Photo – Phil Roberts

STATUS: Vulnerable. No plants have regenerated in a population that was burnt, suggesting that the species may be fire sensitive. Soil disturbance, weed invasion and grazing are likely to affect recruitment. Protective measures to abate these threats need to be determined and implemented to prevent a decline in this species. Further survey may also discover new populations.

DRUMMOND'S GLYCERIA

(Glyceria drummondii)

James Drummond first collected this native grass before 1854, and one more collection was made prior to 1934, when the species was described. Drummond's glyceria was then presumed to be extinct until Andrew Mitchell, from Agriculture WA, rediscovered it north of Mingenew in 1995.

DESCRIPTION: Drummond's glyceria is an erect, hairless grass with creeping stems that root at the nodes. The leaves are flat, rough on the upper surface and have an oblong ligule (small, tongue-shaped appendage). The flowers are in a narrow, loose panicle (compound raceme), with stiff branches, each bearing one to four spikelets. The internodes between the flowering glumes (bracts at the base of each spikelet) are up to four millimetres long. The lower glume is 0.5 to one millimetre long, and the upper glume is 1.5 to 2.5 millimetres long. The lemmas taper upwards and the paleae have rough keels and are eight to nine millimetres long, longer than the lemmas.

DISTINCTIVE FEATURES: This species is similar to manna grass (*Glyceria fluitans*). However, Drummond's glyceria has longer internodes between the spikelets and smaller glumes, tapering lemmas and rough paleae, which are longer than the lemmas.

FLOWERING: October.

DISTRIBUTION AND HABITAT: There are two known populations of this species north of Mingenew. One is in a paddock on private property and the other is on a road verge. The species grows in claypan depressions surrounded by saltbush scrubland.

STATUS: Endangered. Populations are being monitored regularly and further surveys are required. It is possible that the species occurs in other areas near Three Springs, Mingenew and Morawa.

Photo – Alanna Chant

CHRISTINE'S GREVILLEA

(Grevillea christineae)

The population biology of Christine's grevillea has been researched by Paul Armstrong as part of a PhD thesis.

DESCRIPTION: This rounded shrub, up to one metre tall, has wiry, zig-zagging branches, and narrow leaves, up to six centimetres long and six millimetres wide, with margins loosely rolled back and a pointed tip. Creamy white flowers, about three millimetres long, are hairy on the outside. They are held in short clusters, about 1.5 centimetres long, either at the ends of the branchlets or in the axils of the leaves. The reddish style, about seven millimetres long, is hairless except for the strongly curved apex. Oblong fruits, about 1.5 centimetres long, have faint longitudinal ribs.

DISTINCTIVE FEATURES: Christine's grevillea is similar to rib-fruited grevillea (*Grevillea costata*), which has strongly ribbed fruit, leaves which are hairy on the lower surface and larger white flowers.

FLOWERING: July to early September.

DISTRIBUTION AND HABITAT: Christine's grevillea is known from a relatively healthy population just north of Northampton and several smaller populations near Watheroo and Goomalling. It grows in open low woodland of York gum and wandoo over open tall shrubs including tamma (*Allocasuarina campestris*), graceful honeymyrtle (*Melaleuca radula*) and jam (*Acacia acuminata*). It grows in grey or red-brown sandy clay loams with granite or laterite, usually in moist areas near drainage lines or outcropping granite.

STATUS: Endangered. Most plants occur on narrow, weed-infested road verges, which in many places are almost the only surviving representatives of natural vegetation in the area. Populations are monitored regularly to enable abatement of threats. The population near Northampton extends into remnant

Photo – Sue Patrick

vegetation on private property and the property owners are helping to protect and fence the area. Further surveys are being undertaken on reserves containing suitable habitat, and in remnant vegetation in the northern part of its range.

SHELL-FRUITED GREVILLEA

(Grevillea murex)

First collected in 1975, shell-fruited grevillea has a very restricted range, and most existing populations are on narrow road verges. Loss of habitat due to clearing and grazing is likely to have contributed to its rarity, and the species is vulnerable to the threats associated with small populations.

DESCRIPTION: This upright shrub, between one and two metres tall, has many somewhat hairy branches. The leaves, on stalks up to 1.5 millimetres long, have four or five blunt-tipped lobes. The dome-shaped flower heads are at the ends of the branchlets and contain individual cream to yellow flowers about three centimetres long. Oblong to ellipsoid fruits, nine to 13 millimetres long, have a thick coat and are covered with irregular shiny protuberances, up to 2.5 millimetres high.

DISTINCTIVE FEATURES: Shell-fruited grevillea is related to rough-fruited grevillea (*Grevillea crithmifolia*), but has hairy branchlets, smaller leaves and hard-coated seed pods with irregular projections.

FLOWERING: August to September.

DISTRIBUTION AND HABITAT: Shell-fruited grevillea is known from nine populations, over a 25 kilometre range in the northern Wheatbelt. It appears to be restricted to reddish sandy clay soils associated with limestone.

STATUS: Endangered. Given the extensive clearing in the region, the increasing degradation of road verges and the small areas of remnant vegetation within the known range of this species, it is unlikely that any more significant populations will be located.

Photo – Phil Roberts

VEINED-LEAF GREVILLEA

(Grevillea pherophlebia)

There are few collections of this species. A solitary plant at Mingenew was thought to be the only surviving individual of this species in the wild. It was found by Anne Carr, a member of the Mingenew LCDC Herbarium Group. Several more plants were recently located nearby, however, all adult plants have recently died due to an exceptional dry season.

DESCRIPTION: This spreading shrub up to 1.5 metres high has angular branchlets. Branchlets are covered loosely with flat-lying hairs, but often also have hairless patches. Leaves are erect or occasionally spreading, stalkless to almost stalkless and fan-shaped in outline. They are 2.5 to 4.5 centimetres long and three to five centimetres wide, and deeply divided into extremely sharp lobes. Inflorescences form on stalks in the axil between the branch and the leaf. They are dome-shaped and between 1.3 centimetres long and 1.6 centimetres wide. Flowers are white.

DISTINCTIVE FEATURES: There are prominent veins on both sides of the leaf. This feature distinguishes the species from other grevilleas. The scientific name is derived from the Greek *phaneros* (visible) and *phlebos* (a vein).

FLOWERING: August to September.

DISTRIBUTION AND HABITAT: The species is currently known from two seedlings near Mingenew, growing in heath on sandplain with jam (*Acacia acuminata*), tammar (*Allocasuarina campestris*) and other grevillea species. A second population near Eradu has not been located recently and is likely to have been cleared during track maintenance.

STATUS: Critically endangered. The current known seedlings are being protected through the cooperative efforts of the Department of Conservation and Land Management, the Mingenew Shire and the local community. The area has been fenced and is being rehabilitated. Seed has been collected for

Photo – Alanna Chant

storage at the Department of Conservation and Land Management's Threatened Flora Seed Centre. It is intended that extensive survey will be carried out during the plant's next flowering season.

LARGE-ARTICLED SAMPHIRE

(Halosarcia bulbosa)

Large-articled samphire has similar fruits to hoary samphire (*Halosarcia pruinosa*) and wavy-bract samphire (*H. undulata*), but is easily recognised by its large articles (joints). It has been suggested that these may be a response to the particular soil type at the known location, as the species developed narrower articles when transplanted in non-saline sandy loam. However, the other species of *Halosarcia* growing there were of normal size.

DESCRIPTION: This low, sprawling shrub, up to one metre tall and two to three metres in diameter, has spreading branches. The barrel-shaped articles, about 15 millimetres long and 12 millimetres wide, are hairless and pale blue or pink. Lateral flowering spikes are stalkless, 15 to 20 millimetres long, with opposite bracts that are united, have wavy edges, and shrivel at the fruiting stage. The hermaphroditic flowers are in groups of three. The outer floral whorl is united and has succulent side walls but is otherwise thin, hard and brittle. It is flattened at the tip and divided into two lateral lobes. The dark brown fruiting spike is persistent. Cup-shaped leathery bracts enclose the fruitlets, which are partially spiny and eventually become free from one another and from the bracts. Smooth, pale brown seeds are released only after the bracts and flower have decayed.

DISTINCTIVE FEATURES: This species is distinguished by its large bluish-green articles, which have a thick, waxy, powdery coating.

FLOWERING: April.

DISTRIBUTION AND HABITAT: Large-articled samphire is known from a single population east of Morawa. It grows in saline flats along a drainage line on yellow brown sandy clay in low, open heath with very open wattle (*Acacia* species) and melaleuca scrub, in association with other samphire and saltbush species.

Photo – Sue Patrick

STATUS: Vulnerable. The only known population has been fenced to prevent grazing by livestock and is being monitored regularly. It is intended that further surveys will be carried out in suitable habitat in the area.

FEW-FLOWERED HYDATELLA

(Hydatella leptogyne)

Few-flowered hydatella was first collected from the Hutt River area by Ludwig Diels in 1901. The species was not seen again and was presumed to be extinct until it was relocated in 1998 during a survey in the Mundaring District by Greg Keighery. The species has not been relocated in the Geraldton District.

DESCRIPTION: This tufted aquatic annual has male and female flowers on the same plant. Its thread-like leaves, up to five centimetres long, are circular in cross-section. The flowers grow on stalks which are shorter than the leaves. Male and female heads are each enclosed in two loosely sheathing bracts, less than five millimetres long. The male flower has one oblong purple anther and the female flowers are loosely grouped, each with a narrowly pear-shaped ovary (attached at the broader end) and several unequal stigmatic hairs.

DISTINCTIVE FEATURES: Few-flowered hydatella is closely related to Australian hydatella (*Hydatella australis*), which differs in its egg-shaped ovary. The species is possibly an extreme northern variant of a single variable species, as Australian hydatella is also poorly collected, being known from Perth and the Hamersley River in the South-West.

FLOWERING: November.

DISTRIBUTION AND HABITAT: The original collection was made from the Hutt River, where the species was found growing in a waterhole on a granite platform. In the Mundaring area, the species grows in winter-wet claypans in shallow fresh water. The vegetation is low robin redbreast bush (*Melaleuca lateritia*) shrubland over sedges and aquatic herbs.

STATUS: Critically endangered.

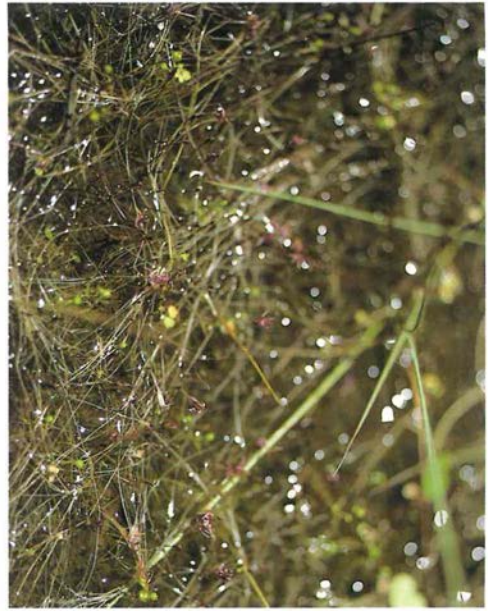

Photo – Greg Keighery

LONG-LEAVED MYRTLE

(Hypocalymma longifolium)

Famous botanist Ferdinand von Mueller described long-leaved myrtle in 1860, from a collection made by English botanist Augustus Oldfield near the Murchison River.

DESCRIPTION: This low, hairless shrub, up to 20 centimetres tall, has rigid, erect branches and attractive pale pink to white flowers. The leaves, which are held in opposite pairs, are four to six centimetres long, linear and triangular in cross-section, and taper to a slightly recurved point. The stalkless flowers are in pairs and are held on a short, thick inflorescence stalk. There are five pale pink to white petals. The ovary has two cells, with ovules in each cell. The capsule is very convex.

DISTINCTIVE FEATURES: Long-leaved myrtle is related to white myrtle (*Hypocalymma angustifolium*) but has much longer leaves and a more northerly occurrence. A pink-flowered, long-leaved species, cultivated for many years as *H. longifolium*, has been found to be a close relative of summer myrtle (*H. strictum*), which has leaves less than two centimetres long, and which are circular in cross-section or grooved.

FLOWERING: August to September.

DISTRIBUTION AND HABITAT: Long-leaved myrtle is found between Yerina Springs and the Murchison River. Near the Murchison River it occurs in damp areas on the west-facing slopes of breakaways, amongst open, low scrub on white sand with sandstone. Further south, the species grows in a permanently damp spring and in surrounding swamp, with low heath and sedges.

STATUS: Endangered. Populations that have been burnt regenerate well from rootstock. An interim recovery plan is being prepared for this species as it could be at risk from increasing salinity. Future management will include further surveys in Kalbarri National Park.

Photo – Sue Patrick

KALBARRI LESCHENAULTIA

(Lechenaultia chlorantha)

Kalbarri leschenaultia was described from a specimen thought to have been collected by Augustus Oldfield, from 'rocky gully, Murchison River'.

DESCRIPTION: This low, diffuse shrub, up to 30 centimetres tall, has many branches. The stems have rough bark except on the new growth. Soft, fleshy and fine leaves, 6.5 to 13.5 millimetres long, are crowded on the stems. Solitary flowers are held on the ends of branchlets. The sepals are 7.5 to nine millimetres long. The pale bluish-green corolla, 21 to 25 millimetres long, is hairy inside and the five winged lobes are almost equal. The two upper, converging lobes enclose the pollen presenter and are more or less recurved.

DISTINCTIVE FEATURES: Kalbarri leschenaultia is distinguished from yellow leschenaultia (*Lechenaultia linarioides*) and red leschenaultia (*L. formosa*) by its green corolla. The leaves are also longer and thinner than those of red leschenaultia, with a more wrinkled surface. The bracts and bracteoles are also longer and thinner and the flowers are usually larger. The style appears to be hairless and the stamen filaments are thinner and longer.

FLOWERING: July to September.

DISTRIBUTION AND HABITAT: This restricted species occurs in a few populations near Kalbarri, where it inhabits rocky gullies, ridges, breakaways and ledges of red sandstone. It grows in pockets of shallow, yellow-brown sand either in rock crevices or amongst open, low scrub with tangling melaleuca (*Melaleuca cardiophylla*), graceful honey-myrtle (*M. radula*), large-flowered melaleuca (*M. megacephala*) and various other species.

STATUS: Endangered. One population had been burnt several years before its discovery in 1992. However, the species often grows in rock crevices in open areas and is therefore little affected by fire. It has a woody rootstock from which it is thought to

Photo – Andrew Brown

sucker. Populations are monitored regularly by local wildflower group members and Department of Conservation and Land Management staff.

THICK-MARGINED LEUCOPOGON

(Leucopogon marginatus)

Prior to recent survey work, thick-margined leucopogon had only been seen on three previous occasions. It was first collected from the Arrino sandplains in 1903 by W V Fitzgerald and was not collected again until 1978 and then in the mid-1980s. It was rediscovered at one of the previous collection sites north-east of Dongara in August 2000 and then three further populations were located in a nearby nature reserve.

DESCRIPTION: This is an erect shrub 45 to 60 centimetres tall with erect leaves that are arranged alternately along the stem. The margins of the leaves are often curled around the stem, with crisped, membranous margins and a sharply pointed tip. The leaves, four to six millimetres long, are concave, with longitudinal ridges in the lower half, and have a very short stalk. The flowers are in groups of one to three in the axils of the upper leaves. Each flower has bracteoles at the base a third as long as the sepals, rounded with membranous margins. There are five sepals. The white flower forms a tube a little longer than the calyx. The five free lobes are bearded inside, and have pointed, hairless tips. Oblong anthers are attached near the top of the tube, and lack sterile tips. The style is barely longer than the petal tube.

DISTINCTIVE FEATURES: Thick-margined leucopogon differs from hidden beard heath (*Leucopogon obtectus*) in the foliage, which does not have a mucronate tip, and from thick-leaved leucopogon (*L. crassiflorus*), in which the inflorescence stalks have one or two flowers. It is also similar to clasping leucopogon (*L. amplectans*), which has sterile tips to the anthers.

FLOWERING: July to September.

DISTRIBUTION: Thick-margined leucopogon grows only in a restricted area north-east of Dongara. It inhabits shrubland and heath on grey brown sand and occurs with two other endangered flora species—small-flowered conostylis (*Conostylis micrantha*)

Photo – Alanna Chant

and Irwin's conostylis (*Conostylis dielsii* subsp. *teres*)—at several sites.

STATUS: Endangered. Further survey is required, particularly in the Arrino area and in sandplains north-east of Dongara.

NORTHAMPTON MIDGET GREENHOOD

(Pterostylis **sp. Northampton***)*

Northampton midget greenhood was discovered in 1978 by Stan and Norma Fink, orchid enthusiasts visiting Western Australia from Victoria, and was declared as threatened flora in 1989.

DESCRIPTION: This small tuberous herb, five to 10 centimetres tall, has a basal rosette of light green wavy-edged leaves. The leaves, one to two centimetres long and five to 10 millimetres across, are broadly elliptic. It produces a flowering spike that holds two to 20 tiny flowers, each of which is about five millimetres long and five millimetres wide, and has a labellum (lip) appendage that projects forward.

DISTINCTIVE FEATURES: This species is related to midget greenhood (*Pterostylis mutica*), which is a darker green colour, has a labellum appendage which bends backwards into the flower and has leaves with smooth edges.

FLOWERING: August.

DISTRIBUTION AND HABITAT: Northampton midget greenhood is known from four populations north-west of Northampton. All are found in winter-wet areas, where plants grow in open areas amongst open low scrub heath in brown clay loam over laterite. The species grows with broom bush (*Melaleuca uncinata*), djarnokmurd (*Hakea recurva*) and other orchids.

STATUS: Critically endangered. The Department of Conservation and Land Management has prepared an interim recovery plan for the species, which is being implemented with assistance from the community. Populations are monitored regularly, and control of feral pigs and weeds, which were threatening several populations, is being carried out. Within a reserve where this and another critically endangered orchid, elegant spider orchid (*Caladenia elegans*), occur together, degraded areas will be replanted with endemic species by groups of

Photo – Andrew Brown

schoolchildren. Research on the population biology and fire response of the species is required and it is intended that seed will be collected in the coming seasons.

WONGAN TRIGGERPLANT

(Stylidium coroniforme)

Wongan triggerplant was discovered in 1963 in the Wongan Hills. By 1980 the only known population had declined to a single plant. Fortunately, more populations have since been found in that area, and in 1989 two populations were discovered near Maya. A recovery plan has been implemented for this species. Genetic research indicates that the Wongan Hills and Maya populations may be different taxa. However, there appear to be few morphological differences.

DESCRIPTION: This perennial plant has a dense, flattened cluster of greyish-green leaves, up to three centimetres long, at its base. These have conspicuous white margins and a white rib on the underside. They are narrow at the base and widen to about five millimetres towards the apex, ending in a long, narrow point. A flowering stem, 10 to 15 centimetres tall, arises from each rosette. Each stem has many short-stalked flowers, in a pyramidal raceme up to 12 centimetres long. Each flower has three small bracts at the base. The flowers are about a centimetre across, yellow at first becoming creamy white, with four oval petals that have red spots at the throat and dark red lines on the outer surface. There are two narrow, hair-like throat appendages and finger-like projections on the end of the trigger.

DISTINCTIVE FEATURES: The very long ovary, the racemose flower spike and the white-margined leaves are distinctive. Fringed-leaved triggerplant (*Stylidium limbatum*) has similar leaves but a short ovary. Pins and needles (*S. dichotomum*) has a similar flower, but the throat in that species has no appendages and the end of the trigger is cushion-like.

FLOWERING: September to November.

DISTRIBUTION AND HABITAT: The species is known from three populations over about eight kilometres at Wongan Hills and two populations at Maya, about 140 kilometres to the north. It grows

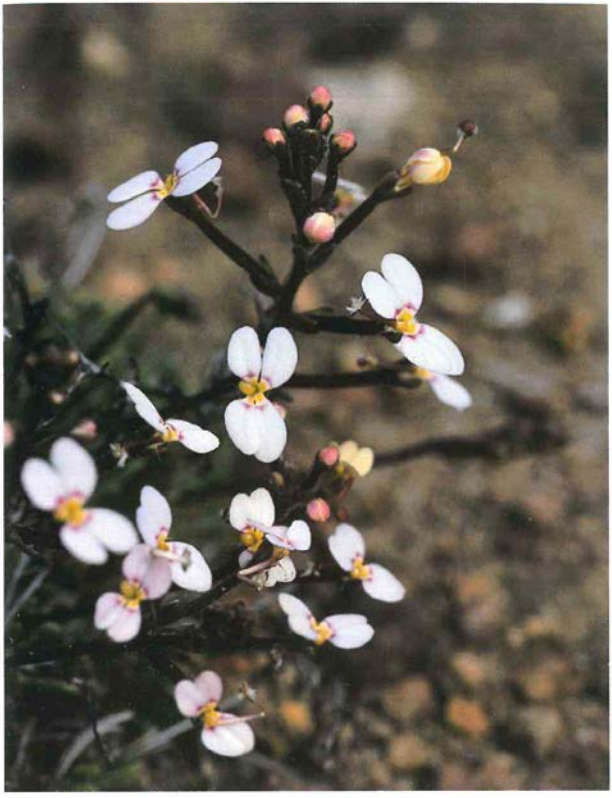

Photo – Stephen Hopper

in shallow yellow sand over laterite on open areas in low scrub and heath.

STATUS: Endangered. Wongan triggerplant is thought to take advantage of disturbance. Plants are relatively short-lived and populations decline after several years. Populations need regular monitoring and further surveys should be undertaken.

SCALY-LEAVED FEATHERFLOWER

(Verticordia spicata subsp. *squamosa)*

Scaly-leaved featherflower is the subject of an interim recovery plan.

DESCRIPTION: This shrub reaches up to 80 centimetres tall and one metre wide. The rounded to elliptic leaves are no more than two millimetres long, with prominent oil glands. They are pressed to the stem and closely overlap. Their margins are irregularly toothed or fringed with hairs less than 0.5 millimetres long. Closely packed flowers form dense spikes on the ends of the branches. They are initially mauve pink, but fade to white and are stalkless or have short stalks. The floral tube is honeycombed with obscure ribs and has five green reflexed appendages nearly as long as the tube. The sepals are three to four millimetres long, fringed and have small ear-shaped appendages (auricles) at their base. The petals, three millimetres long, are fringed with fine segments more than one millimetre long. The stamens and staminodes (infertile stamens) are hairless and the staminodes are linear. The style is four millimetres long and bearded below the apex.

DISTINCTIVE FEATURES: Scaly-leaved featherflower has smaller leaves and flowers than spiked featherflower *(Verticordia spicata* subsp. *spicata*). In the Moora district, scaly-leaved featherflower grows with hairy featherflower (*V. comosa*) and appears to hybridise with it. The presumed hybrid has spreading leaves, two to three millimetres long, a floral tube with shorter appendages, sepals with prominent auricles and a style five millimetres long with a denser beard. Another presumed hybrid has off-white flowers, with larger sepal auricles and a style beard with longer hairs.

FLOWERING: October to December.

DISTRIBUTION AND HABITAT: There are seven populations, some consisting of only one plant, between Three Springs and Morawa, over a 17 kilometre range. They grow in tall shrubland, over low

Photo – Anne Cochrane

scrub, sometimes with mallees, in deep yellow sand.

STATUS: Critically Endangered. Scaly-leaved featherflower is thought to be killed by fire, regenerating from seed. All populations are monitored regularly and an interim recovery plan is being implemented. Weed control and smoke treatment trials have been carried out at several populations. New seedlings have been produced and rabbit proof enclosures have been put in place to protect them from grazing. A translocation is being undertaken to establish a new population of the scaly-leaved featherflower in a secure area of remnant vegetation.

LONG-FLOWERED NANCY

(Wurmbea tubulosa)

Long-flowered nancy was described in 1878 by George Bentham from material collected at Champion Bay, which is now part of Geraldton. The number of plants at a particular population varies greatly from one year to another, possibly depending on good rainfall.

DESCRIPTION: This small plant is one to five centimetres tall, and has three leaves. The lower two are very broad, 10 to 22 millimetres wide, and held flat to the ground, without a distinct section of stem between their bases. The smaller, erect upper leaf emerges from the two lower leaves or is attached to the stem just above them. White to pale pink male or female flowers are on separate plants, with one to 16 flowers per inflorescence. The male flowers form an open inflorescence, taller than the uppermost leaf. The female flowers are in a dense inflorescence that is almost concealed between the two basal leaves at ground level. Male flowers are six to seven millimetres long and have six stamens, whereas female flowers are nine to 12 millimetres long and possess a superior ovary with three styles. There are six equal petal lobes, each with a single nectary, which forms a narrow, curved mauve pink band. The fruit is a capsule with spherical, smooth, brown seeds.

DISTINCTIVE FEATURES: Unlike all other Western Australian members of the genus, the flower is tubular for up to half of its length. York gum nancy (*Wurmbea drummondii*) has smaller flowers, which are tubular for up to a quarter of their length, and has fewer flowers in each head.

FLOWERING: June to early July.

DISTRIBUTION AND HABITAT: Long-flowered nancy occurs between Dongara and Mullewa and at Yandanooka and north of Three Springs. Its geographic range is about 100 kilometres, but the type location at Champion Bay is about 35 kilometres further

Photo – Phil Roberts

north. The species grows in woodland of York gum (*Eucalyptus loxophleba*) in clay and sandy clay, clay loam or brown loam, under shrubs on riverbanks, along drainage lines and in seasonally wet places.

STATUS: Vulnerable. Recent survey and assistance from the community has resulted in several new populations being located. Further survey is required for this small and inconspicuous species.

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ABOUT THE AUTHOR

Alanna Chant is a Conservation Officer based at the Department of Conservation and Land Management's Geraldton Work Centre. Alanna's current work involves protection and recovery actions for threatened flora in the Geraldton District. She has more than seven years experience working for the Department in various roles and has a particular interest in wildflowers of the Mid-West.

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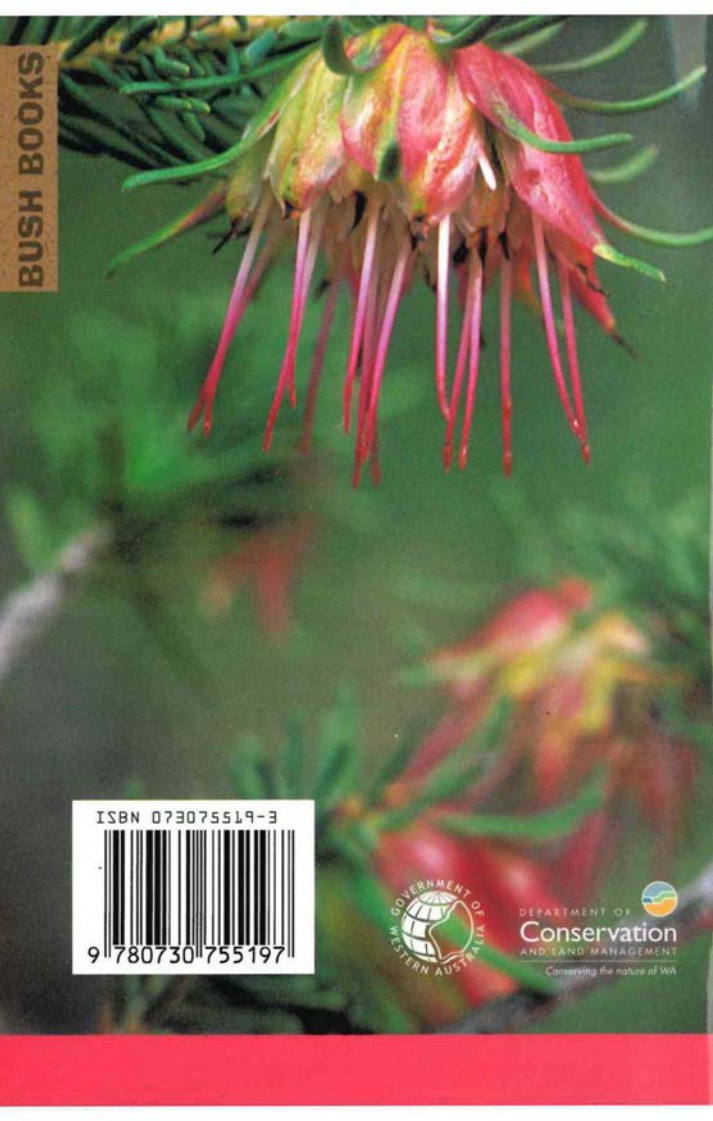

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