EASTERN SWAMP OAK*; CASUARINA GLAUCA* (CASUARINACEAE) AROUND THE SWAN RIVER ESTUARY

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INTRODUCTION

Casuarina glauca and *Casuarina obesa* are closely related vicariad species, in that one, *Casuarina obesa*, occurs in the Western and inland parts of Australia (WA, SA, Vic and previously NSW) and the other, *Casuarina glauca*, in South Eastern Australia (Qld and NSW). These species have in the past been combined under *Casuarina glauca*, which led to the planting of *Casuarina glauca* as *C. obesa* in the rehabilitation of parts of Pelican Point local government and nature reserve.

NOTES ON THE SPECIES

CASUARINA GLAUCA

Casuarina glauca is found as a tree of mainly coastal sites from southern Queensland to southern New South Wales (Map1). A moderately variable species it is also found as a dense shrub c. 2 m high, with coarse branchlets bearing up to 20 teeth, on exposed headlands.

Hybridizes with *C. cunninghamiana* subsp*. cunninghamiana* where their ranges meet along coastal rivers

CASUARINA OBESA

Casuarina obesa is a normally small spreading tree to 5-6 metres but occasionally up to 10. Plants are able to sucker, especially after root disturbance, for example along Kargotich road in Serpentine, but it is not a feature around the Swan River Estuary. Branchlets are normally glaucous. A widespread species of coastal saline flats and estuaries from Kalbarri south to Israelite Bay and inland to Kalgoorlie. A species with little recorded variation.

KEY DIFFERENCES BETWEEN C. GLAUCA AND C. OBESA

C. glauca

1. Slender densely green foliaged tree Habit (Figure 1). Usually taller *than C. obesa* in Western Australia.
2. Base generally obscured by numerous suckers.
3. Branchlets green, slender less than 0.75 mm wide (Figure 2), often weeping and longer than C. obesa to 70 cm (taxonomic revisions give maximum length as 40 cm, but most planted material exceeds this). Scale leaves 12-20 adpressed to stem, generally with spreading tips on branchlets (Figure2).
4. New permanent major shoots with prominent spreading to long-recurved teeth (scale leaves). On branchlets 12-17 teeth, rarely to 20, erect, 0.6-1.0 mm long (Figure 3).

C. obesa

1. Open crowned tree with spreading to erect branches.
2. Base normally single trunked and with few suckers unless root disturbed.
3. Branchlets grey-green, usually 1 mm wide, to 50 cm long, but generally less, usually spreading or erect. Scale leaves 12-15 adpressed to stem.
4. New permanent major shoots with appressed teeth (scale leaves), rarely slightly erect. On branchlets 12-17 teeth, occasionally slightly spreading, 0.3-1.0 mm long.

OCCURRENCE AROUND SWAN RIVER ESTUARY

Maps 2-5 show thegeneral locations of *Casuarina glauca* around the Swan River Estuary. Occurrences of planted *Casuarina cunninghamii* and *C. equisitifolia* are also shown. These maps are general indications of the spread of *C. glauca* and other weedy *Casuarina* species, detailed mapping for management actions has occurred at Pelican Point and at Alfred Cove.

Unfortunately continual plantings of *Casuarina glauca* have occurred around the Swan River Estuary to the present, for example at Point Walter, near the boat ramp very young trees of *Casuarina glauca* were recorded apparently recently planted. Other relatively recent plantings are found around the river in East Fremantle (map5).

IMPACTS OF CASUARINA GLAUCA

HYBRIDIZATION

Both species are sexually reproducing diploids that are dioecious i.e.; have separate male and female plants, usually in a ratio of 1:1. Most mature plants of *C. glauca* around the Swan Estuary are of individuals that are male.

Members of the genus appear to readily hybridize when in contact, which has not occurred in the recent past for *C. obesa* and *C. glauca*. Along the Swan River and adjacent parklands individual male trees of *Casuarina glauca*, because of their large

size and ample pollen production will produce hybrid seed on the local *C. obesa* readily and abundantly.

At Pelican Point which was totally cleared outside of the Nature reserve in the 1950's, plantings of *Casuarina glauca* (as *Casuarina obesa*) occurred in the 1970's as a revegetation project and here most female trees appear to be hybrids with *C. obesa* (Pelican Point-collection Keighery & Keighery 2314).

A large clump of male *C. glauca* occurs just north of Milyu Nature Reserve and several putative hybrids with *C. obesa* are located on the northern boundary of the reserve. Another male clone of *C. glauca* (with very thick branchlets for this species) is located just inside the southern boundary of Milyu, but no obvious hybrids were found nearby.

There are scattered plantings of *C. cunninghamiana* and *C. equisitifolia* around the Swan River estuary. Evidence of hybrids between *C. obesa* and *C. cunninghamiana* is found along the Nedlands foreshore near Tawarri Lodge. A mixed clump of plantings and hybrids involving all three species is found in Attadale Park. Hybrids between *C. glauca* and *C. cunninghamiana* were also recorded in Alfred Cove Nature Reserve – Keighery 17807).

A stand of female *C. glauca* (Keighery 17808) was recorded in Attadale Park. This was the only confirmed female plant of this species around the Estuary, although other female clones were recorded along the south Perth foreshore in Sir James Mitchell Park, in South Perth.

COMPETITION

Although heights given in taxonomic revisions of both species indicate they are essentially the same height, at maturity around the Swan River, *Casuarina glauca* is a taller (at least to 15 metres) denser tree than *C. obesa* and can over top and shade out the latter species (Fig 1). Unfortunately because of their rampant suckering nature, this is no barrier to this species setting up a large population. Suckers have been recorded over 30 metres away from the parent tree, and can grow under major roadways, such as along Mundijong road.
The dense canopy, numerous suckers of *Casuarina glauca* soon create a local monoculture of this species. Underneath this species the shade and heavy branchlet fall creating a thick mulch soon create an area with no remaining understory (Figure 4).

OTHER NOTABLE OCCURRENCES OF CASUARINA GLAUCA

Lake Richmond TEC.
There are several individuals of Casuarina glauca in the Saline marsh at Lake Richmond.

Mundijong Road wet heaths
There is a large clump of *C. glauca* on the north side of Mundijong road past Kargotich road, suckers are invading the heath on the southern side of the road.

Leschenault Inlet
I have recorded several clumps of *C. glauca* on the eastern side of the Inlet at Australind

The use of this non-native species is a very good example of the K2 Rule for planting for restoration or rehabilitation. This rule was coined at the National Australian Plant Conservation Network Conference in Perth in 2013. It notes that one should be using local provenance material, rather than sourcing material under a name. Simply stated the rule is that "The further a seed or cutting collection is sourced from the area where it is to be planted the greater the risk that a taxonomic error will occur".

If one uses local material the potential for a future major costly weed issues declines and the need to worry about exact names or relatedness of provenance zones also declines.

RECOMMENDATIONS

1. A general management plan for *Casuarina glauca* around the Swan Estuary (and the Swan River) should be compiled and enacted.
2. The *Casuarina glauca* clone north of Milyu should be removed as soon as practicably. The *Casuarina glauca* clone on the southern boundary of Milyu should be removed as soon as practicably.
3. Removal of all *C. glauca* at Pelican Point in both DPaW and Local Government lands should commence as soon as practicable. Replanting with *C. obesa* sourced from opposite South Perth foreshore will be required.
4. As part of a longer term management plan occurrences of *C. glauca* around the South Perth Golf course along the Freeway near South Terrace and along South Terrace ideally should be removed
5. Removal of *Casuarina glauca* in Lake Richmond and Mundijong road should occur to prevent invasion or adverse effects of the TEC at these locations.
6. The Leschenault Inlet Management Authority needs to be made aware of the potential risk of this species to the foreshore vegetation of the Inlet.

Figure 1: Typical habit of *Casuarina glauca* showing dense drooping green foliage (LHS tree is a putative hybrid)

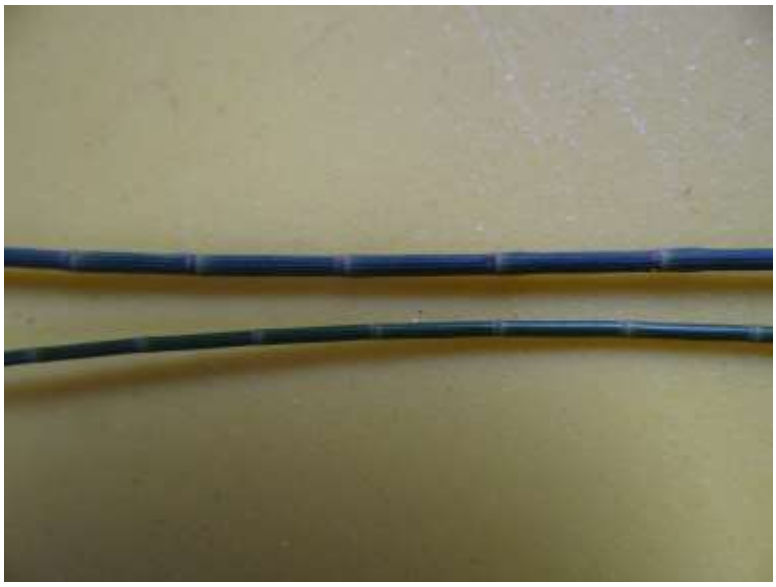
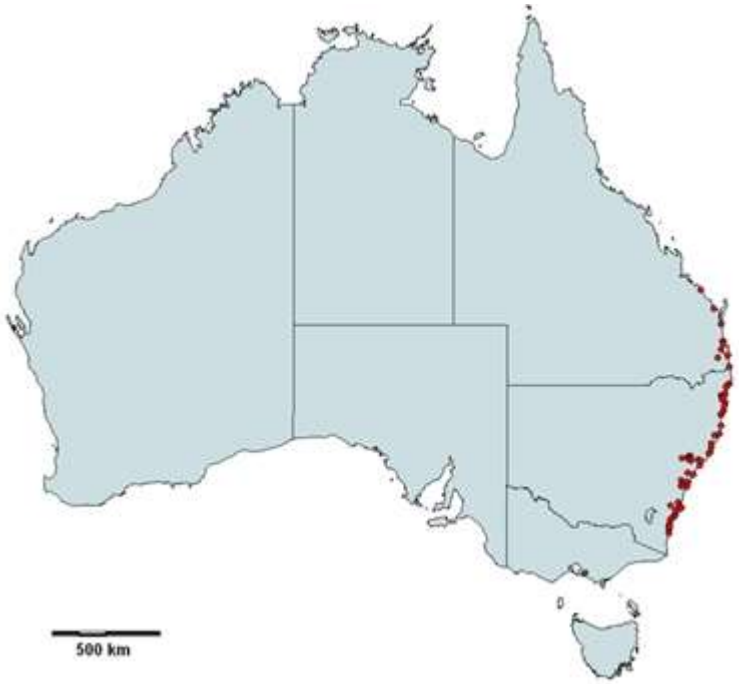


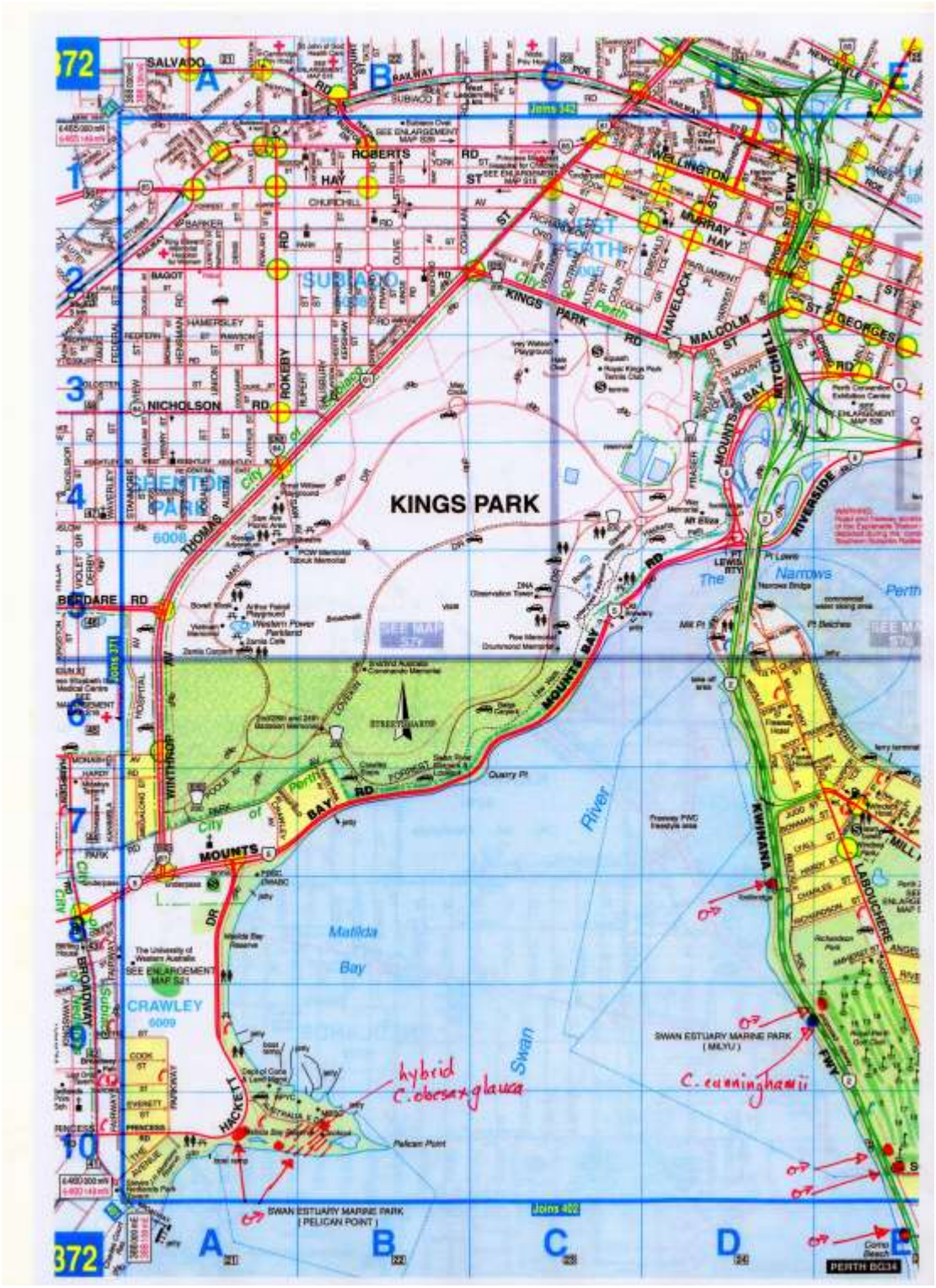
Figure 2: Branchlets of *C. obesa* (top) and *C. glauca* (below)

Figure 3 new branchlet of *Casuarina glauca* showing prominent recurved teeth

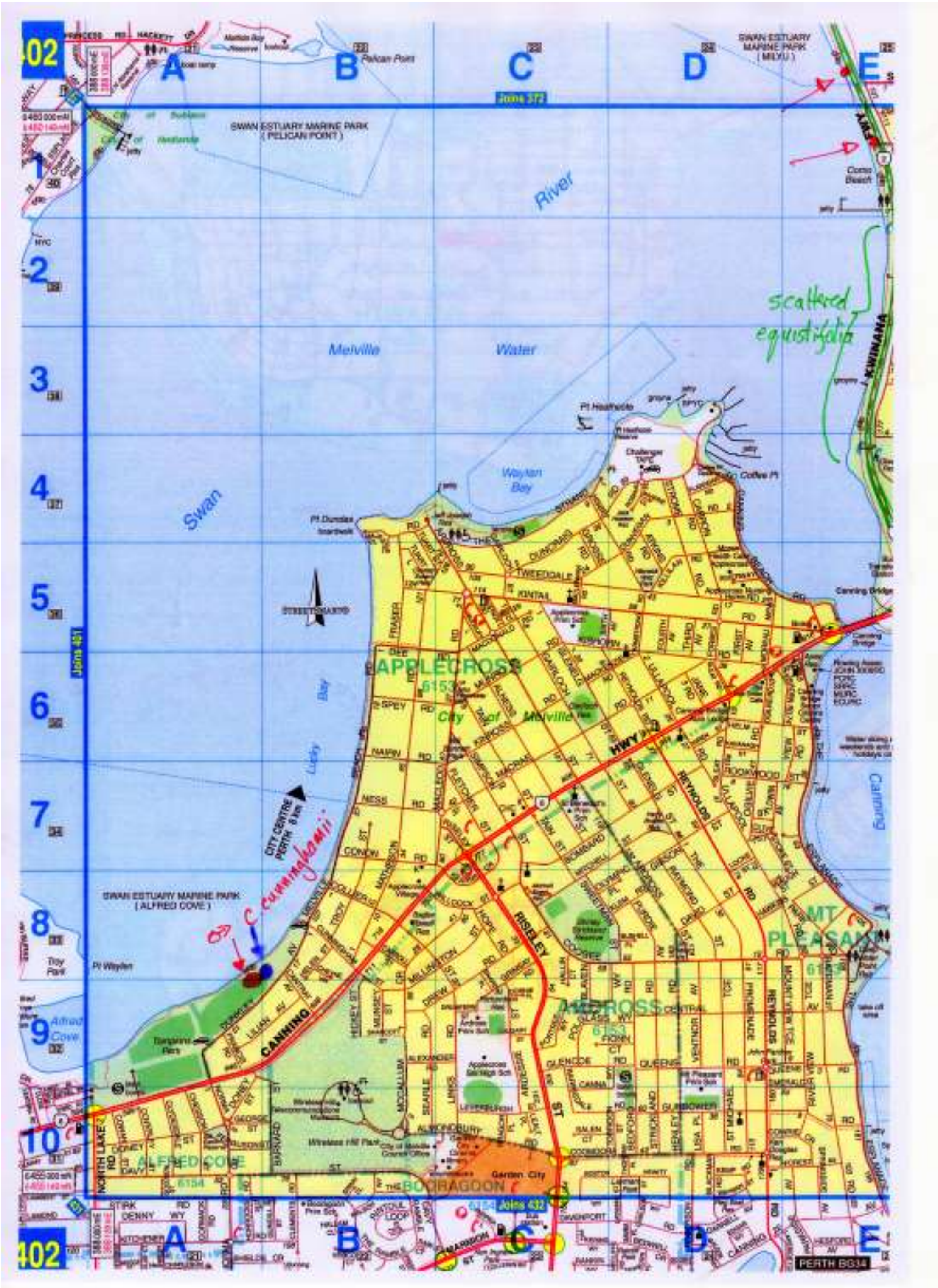
Figure 4: Effects of *Casuarina glauca* on understory at Pelican Point wetland where it has created a sterile monoculture.



Map 1 Native Range of *Casuarina glauca*



Map2 General distribution of *C. glauca* clones (Red)


402
A
B
C
D
E
1
2
3
4
5
6
7
8
9
10
Pelican Point
SWAN ESTUARY MARINE PARK (MILYU)
SWAN ESTUARY MARINE PARK (PELICAN POINT)
Joins 372
Joins 401
Joins 432
River
Melville
Water
Swan
Waylen Bay
Pt Heathcote
Coffee Pt
Como Beach
Pt Dundas boardwalk
Lucky
Bay
CITY CENTRE PERTH 8 km
KWINANA
Canning Bridge
scattered equistifolia
C cunninghamii
SWAN ESTUARY MARINE PARK (ALFRED COVE)
Pt Waylen
Troy Park
Alfred Cove
APPLECROSS
6153
City of Melville
CANNING
HWY
RISELEY
ST
REYNOLDS
ARDROSS
MT PLEASANT
ALFRED COVE
6154
BOORAGOON
Garden City
Applecross Snr High Sch
Wireless Hill Park
Tompkins Park
TWEEDDALE
KINTAIL
NORTH LAKE RD
DENNY WY
Canning
PERTH BG34

Map3

A
B
C
D
E
1
2
3
4
5
6
7
8
9
10
401
Joins 371
Joins 431
Joins 402
CLAREMONT
NEDLANDS
DALKEITH
6009
City of Nedlands
Nedlands Golf Club
Point Resolution Reserve
Pt Resolution
Melville Water
Swan River
Pt Walter
Point Walter Reserve
Point Walter Golf Course
SWAN ESTUARY MARINE PARK (ALFRED COVE)
Lucky Bay
ATTADALE
6156
BICTON
City of Melville
MELVILLE
ALFRED COVE
Alfred Cove
Troy Park
Pt Waylen
CANNING HWY
CITY CENTRE PERTH 9 km
scalled
C. glauca ♂
C. cunninghamii
C. equisetifolia
young C. glauca
♂
♂, hybrids
♀, ♂

Map4

Map5: showing recent plantings of C. glauca