The *Phytophthora cinnamomi* infestation at Cape Arid

Background & Options for Management

Russell Smith & Malcom Grant

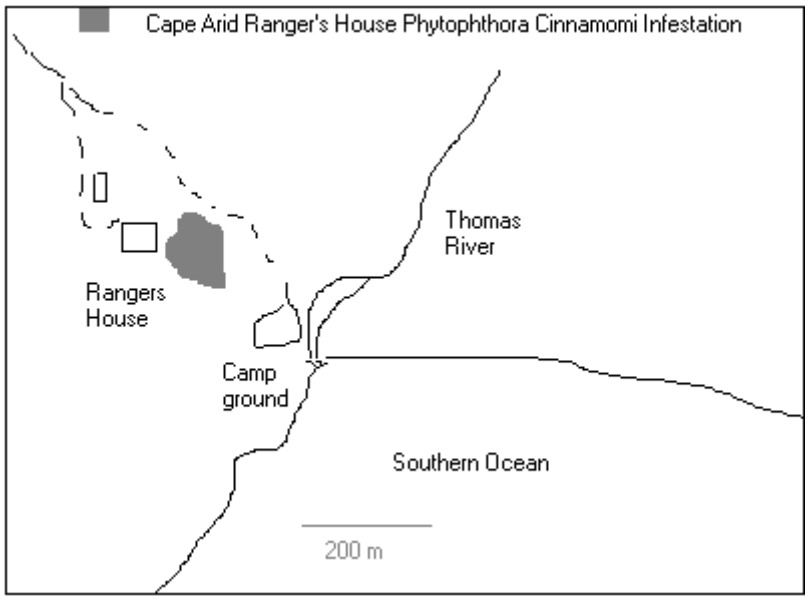
July 2000

Background

Phytophthora cinnamomi infestations have been established in Cape Arid NP for 20-30 years and as long ago as 1984 had become quite widespread within near-coastal areas (Brandis *et al*, n.d[1]). The 'aprons' of vegetation bordering granite outcrops are affected. The pathogen appears to be only able to establish and kill susceptible plants in areas situated within about 5 km of the coast and has infected about 50% of the near–coastal area with susceptible vegetation (M. Grant, pers. observ.).

The ranger's house and associated buildings at Cape Arid are situated on a hillslope approximately 300 meters above the camp ground which is in turn 50 meters from the beach. Most visitors to the park stay at the campground for one ot two nights. The buildings are in a mallee shrubland on a stony clay loam that merges into a moderately deep, leached sand on the lower slope adjacent to the beach and river. A mature *B. speciosa* woodland occurs on the leached sand. Camp sites and picnic tables are scattered through the Banksia woodland, that hasn't been burnt for about 80 years.

A *P. cinnamomi* infestation, that originated from the washdown ramp established adjacent to the ranger's house for vehicle maintenance and cleaning prior to awareness being raised for the need for containing effluent tthat may be infested with *P. cinnamomi*, has spread downslope towards the campground through the mallee shrubland, causing a scattering of isolated deaths of susceptible species.



[1] *Dieback in the Cape Arid National Park and other areas of concern.* A. Brandis, T. Hill, G. Keighery and J. Tippett, unpublished report, Department of Conservation and Land Management.

Past Management

Fifty five hectares of the *B. speciosa* woodland and mallee shrubland upslope were aerially sprayed with phosphite on 1st May 1998 and again on 15th June that year with the objective of slowing the rate of movement of disease caused by *P. cinnamomi* towards the *Banksia* woodland and the campground within it.

A total of 60 litres per hectare or was applied in two applications. The main area of infestation, which covers no more than 5 hectares, plus an area of 50 hectares around it that had isolated plant deaths scattered throughout it, was sprayed.

In the normal course of events it would be expected that the plants would have translocated and metabolised the phosphite within about two years resulting in the need to retreat the area next autum at the latest. However spraying 55 hectares of vegetation where declared rare flora is not threatened is beyond the current resources of the phosphite program. Also, whilst it is known that applying phosphite to susceptible plants will reduce mortality in the presence of *P. cinnamomi* there are doubts as to whether or not the rate of spread of the pathogen is slowed by applying the chemical.

An inspection of the site was carried out on the 20th June 2000 with the Cape Arid ranger Alan Rose to ascertain what options there were for the management of this infestation of *Phytophthora cinnamomi*.

Results to date

It appears that many if not all of the previously observed scattered deaths away from the diseased area immediately downslope of the ranger's house were caused by drought or other, non-*Phytophthora* related, disease. Disease symptoms consistent with the pathogen *P. cinnamomi* occur over no more than 5 hectares and at its closest is about 100 meters from the start of the *B. speciosa* woodland.

It was not clear whether or not the rate of spread had slowed.

Options for Management

<u>Aerial application of phosphite to maintain the visual amenity and shelter characteristics of the campground.</u>

Treatment of the infested area plus the *Banksia* woodland around the campground, about 10 hectares in total, would cost about $4,500. The site would need to be resprayed in perpetuity at approximately two-year intervals to ensure sufficient levels of phosphite in the plants to protect the mature *Banksia* trees from being eventually killed by *P.cinnamomi*.

There are currently few *Banksia* seedings establishing due to the competition from the mature adults. It is reasonable to assume that if the mature trees die from old age or are killed by wildfire sufficient seed is stored in the ground or in the fruiting bodies on the adults to enable the species to persist on the site, provided both the adult plants and recruits are not eliminated by *P. cinnamomi*.

The rate of encroachment of the pathogen downslope into the Banksia woodland may not be slowed, simply masked by the treatment keeping the majority of susceptible plants alive in the presence of the pathogen.

Trunk injection of phosphite

The size of this task would depend on whether just the *Banksia* close to the campground were treated, or whether all those upslope of it were included. Based on the operation at the Dwellingup Forest Heritage Centre treating 5 ha of *Banksia* around the campground would take about 15-20 man/days of labour costing approximately $4,000-5,000 for labour and chemicals. The advantage over aerial application of phosphite is that around 5 - 7 years of protection could be expected. However, only the treated plants would be protected. Unlike aerial spraying no protection would be afforded to any susceptible ground cover species present.

Doing nothing

Eventually the pathogen will reach the campsite, though if its movement is restricted mainly to root-root spread this could take 50-100 years. If a number of major rainfall events were to occur in a sequence that promoted the production of zoospores and surface and sub-surface waterflows to transport them the time period could be much less.

Once the area is infested it is likely that the mature *Banksia* will be eliminated and it is unlikely that seedlings will re-establish at the site. The site would have very little utility as a campground unless the area was rehabilitated using resistant species.

Engineering Works

A bank designed to prevent surface and sub-surface waterflow that may carrying zoospores downslope could be constructed below the infested area. In addition a plant free zone some meters wide would need to be estabilshed around the infested area to attempt prevent root to root transmission of the pathogen beyond it.

Recommendation

Continue to monitor the annual rate of spread of disease caused by *P. cinnamomi*.

Investigate the feasibility of implementing the proposed engineering works and estimate initial and ongoing costs.

Seek approval in principle and if approved the necessary supporting funds to implement the works.

View of mature *Banksia speciosa* woodland around camp ground at Cape Arid

Phytophthora cinnamomi caused plant deaths in mallee shrubland upslope of camp ground

Phytophthora cinnamomi caused plant death, *Banksia speciosa* at rear

Banksia speciosa woodland from camp ground looking upslope