# Bridal creeper at Woodman Point—its current status and recommended control strategies

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**Abstract**

**The current status of bridal creeper (*Asparagus asparagoides*) at Woodman Point is described along with historical evidence of its origin and spread. Observations of the area and densities of bridal creeper are described and illustrated. Possible methods of control are investigated and the involvement of the Friends of Woodman Point group noted. Recommendations are given on a possible control strategy.**

## Introduction

The current status of bridal creeper within the Woodman Point area is of considerable interest and concern as the area has major conservation values. It supports some of the longest unburnt coastal vegetation in the Perth metropolitan area (Powell and Emberson 1981) and some of the largest remnant Rottnest Island Pine (*Callitris preissii*) communities on the mainland (Rippey and Rowland 1995). However the vegetation communities of most importance also contain extensive infestations of bridal creeper.

Woodman Point is located approximately 10 km south of Fremantle within the City of Cockburn. The total reserved area is approximately 250 ha. This includes a 50 1193 ha nature reserve (Reserve No. 42469) vested in the National Parks and Nature Conservation Authority for the purpose of conservation of flora and fauna and managed by CALM. The remainder of the area is predominantly a recreation reserve (Reserve No. 40184) of 152 6301 ha vested in the Recreation Camps and Reserves Board for the purpose of recreation and conservation and managed by the Ministry for Sport and Recreation. The Woodman Point Recreation Camp is located towards the end of the point and is also managed by the Ministry for Sport and Recreation.

## Environmental history

The environmental history of Woodman Point is important in gaining an understanding of the vegetation of the area and its infestation by bridal creeper. European settlement of Woodman Point dates from the 1830s when settlers disembarked from immigrant ships camped in sheltered areas adjacent to the shoreline whilst awaiting the survey and granting of land (Berson 1978). It is possible that bridal creeper was introduced at this time as the majority of immigrant ships would have stopped en route at Cape Town, South Africa and settlers may have obtained plants, seeds, or tubers of bridal creeper for planting in their future gardens. The first formal settlement of the area was that of Thomas Peel who in 1830 established a settlement at Woodman Point. This however was short lived and it was abandoned within a year. The official townsite of Clarence was gazetted in 1836 over the area from Woodman Point to Lake Coogee. This too however wasn't successful with few lots being sold and even fewer developed (Berson 1978).

In 1876, 8 ha was set aside for the purpose of an quarantine station at the tip of the Woodman Point and a further 170 ha west of Cockburn Road gazetted as a quarantine ground for stock (Anon 1982). In 1904 the original quarantine station was extended and the remainder of the peninsular became an explosive storage reserve. Importantly these two facilities acted as secure reserves, effectively protecting the vegetation for the following eighty years.

Of particular importance was the protection of the vegetation within the two reserves from fire. Powell and Emberson (1981) detailed the fire history of the Woodman Point area. Major fires were recorded in 1949, 1958, 1973 and the most recent in 1991. However large areas of the current Nature Reserve do not appear to have been burnt for at least a hundred years (Powell and Emberson 1981).

## Status of bridal creeper at Woodman Point

The first records of bridal creeper at Woodman Point are from the detailed research of Powell and Emberson (1981). They recorded bridal creeper as "spreading through the tuart community". It was not noted at this time as being found in any other vegetation associations in the area.

At this time a study of the Woodman Point quarantine station area by the Environmental Studies Group at the Western Australian Institute of Technology (now Curtin University of Technology) examined the vegetation of the natural part of the quarantine station area during March to June 1980 (Fox and Majer 1980). This study found bridal creeper growing in both the tuart woodland and also the *Acacia* thickets with *Callitris* and also in places in the beach dune communities. Five 10 m × 10 m vegetation sampling plots were sampled during this study, three in coastal areas and two in tuart woodland. Bridal creeper was recorded in all of these plots at frequencies of occurrence per 1 $m^2$ subplots of between 5 and 72 per 10 m × 10 m sample plot. The total number of individual plants recorded varied between 8 and 75 per 10 m × 10 m sample plot. The total percentage cover for the whole plot was determined by summing the percentage cover for each 1 $m^2$ quadrant in which bridal creeper occurs and diving by 100. These values varied from 0.01 to 3.84 %.

Vegetation structure was assessed in four profile sections in the north-east of the study area. Bridal creeper was present in three of these vegetation profiles and was noted as common within two of them, and as having largely displaced the indigenous *Clematis microphylla* within one, a *Callitris preissii* thicket (Fox and Majer 1980).

Research compiled by Fox (1984) contains some data of interest, comparing bridal creeper at Woodman Point with the indigenous creeper old man's beard (*Clematis microphylla*). Within *Acacia rostellifera* thickets the old man's beard was much less frequent than the bridal creeper however within the tuart woodland the reverse was true. Fox (1984) speculated that bridal creeper has established itself and persisted well in areas of a more open nature and that the absence of fire in the tuart woodland for some considerable time may have restricted the opportunities for bridal creeper to spread into the denser woodland. The research also compared the germination of the two species of creeper. It was found that "a comparison of germination performance suggests that *A. asparagoides* is able to establish itself faster at the same time of the year as *C. microphylla;* that its seed is more viable and that it germinates more readily at higher temperatures than *C. microphylla*". The study concluded that it would be difficult to eradicate bridal creeper from the Woodman Point area.

Currently bridal creeper is found within all of the vegetation communities at Woodman Point. It is most dense in the Tuart woodland community followed by the *Acacia rostellifera* shrubland. It is present in places within the seaside community and the Rottnest Island Pine community. It is least common within the heath and scrub communities.

## Observations of factors influencing distribution and abundance

The distribution of bridal creeper at Woodman Point is related to physical, biological and human factors. Currently bridal creeper is not found growing closer that 20 m from the shoreline. This indicates that it does not tolerate excessive salt or exposure to strong winds. It favours shading and grows to its greatest extent in terms of density and mass of foliage among dense tuart woodland and *Acacia*

*rostilifera* shrubland. It seems to favour the long unburnt areas where it forms a dense thick mat compared to the areas burnt in 1990 where individual plants are still visible. Observations of recently burnt areas at Woodman Point, show that intense fires similar to the 1991 summer fires kill bridal creeper tubers. Keighery (1993) has also observed this phenomenon on Garden Island. The Rottnest Island Pine *Callitris preissii* appears to suppress bridal creeper were the *Callitris* is growing in dense stands. This may be due to increased competition or reduced light availability and also the effect of a dense mat of *Callitris* needles suppressing bridal creeper seedling germination.

## Mechanisms for bridal creeper dispersal and spread at Woodman Point

It has been reported that both exotic and indigenous birds play an important role in facilitating the spread of bridal creeper (CSIRO 1993). This dispersal mechanism has been indirectly observed at Woodman Point. A number of different bird species including the silvereye (*Zosterops lateralis*) and singing honeyeater (*Lichenostomus virescens*) have been observed eating the mature fruits of bridal creeper. It is presumed that these birds would defecate the undigested, hard coated seeds, thus facilitating its spread. The bird life at Woodman Point has been recognized as abundant with a high diversity of small to medium sized insectivorous/fruitorous species present (John Dell, Senior Research Scientist, WA Museum, personal communication).

Vegetative spread of bridal creeper has also been observed through the disturbance and physical spread of tubers by machinery along cultivated fire breaks.

## Control options

There are a number control and management options for dealing with bridal creeper at Woodman Point. These are briefly summarized below.

### *Do nothing*

This is obviously not a control method, however until effective long term controls or solutions, such as biological control are developed it is often the best approach rather that start programs that are ineffective, damage native vegetation or cannot be continued or followed up leading to bridal creeper re-invasion. Bridal creeper control at Woodman Point is still in this phase.

### *Bush regeneration*

This approach involves a long term commitment to address the bridal creeper problem by removing disturbance factors were possible and judicious hand weeding. The "Bush Regeneration" approach involves three key elements (after Bradley 1988):

i. Always work from areas with good condition bushland to areas with poor bushland.
ii. Create minimal disturbance when working in bushland.
iii. Only work at the rate of natural regeneration and do not over-clear.

It was decided that hand weeding of bridal creeper at Woodman Point was not feasible due to the severity and extent of infestation and the tuberous nature of the plants itself which made effective hand weeding with minimal disturbance very difficult. However hand weeding of seedlings especially newly established plants that have not developed tubers is seen as a effective method of controlling bridal creeper spread.

### *Chemical control*

This is one of the most effective control methods for bridal creeper and is the technique recommended for control of bridal creeper in the Perth Metropolitan area (Dixon and Keighery 1995). The recommended control technique involves spraying the creeper with a non-selective systemic herbicide such as Roundup/Glyphosate at a rate of 1 in 100 water has not been trialled at Woodman Point. However due to the dense infestation and general lack of remnant indigenous understorey vegetation in infested areas it should be an effective and safe technique. Care however will need to be taken if non-selective herbicides are to be used in areas with remnant native vegetation and specialized spraying techniques will have to be developed.

### *Burning*

Burning does kill bridal creeper and intense fires can effectively kill the underground tubers. However fires can also stimulated bridal creeper growth if the tubers are not killed and post fire ashbed conditions are suitable for seedling growth from seed dispersed from adjacent unburnt plants. It is not recommended that fire be used as a management tool, however, if a wildfire was to occur in the reserve then bridal creeper control should be given a high priority in the post fire management of burnt areas.

### *Grazing*

Bridal creeper is a palatable species and is not an agricultural weed due to grazing by stock. It has been reported that macropods including the tammar (*Macropus eugenii*) and the quokka (*Setonix brachyurus*) readily eat bridal creeper and this has been supported by grazing exclusion trials on nearby Garden Island. In a study which involved fencing vegetation to exclude grazing it was found that after two years the average percentage cover of bridal creeper inside the enclosure was 78.9% compared to only 1.8% outside the enclosure were it had been exposed to tammar grazing (Bell *et al.* 1987). The reintroduction of appropriate species may be an effective control technique once major infestations are removed as the indigenous grazers may be able to prevent bridal creeper seedling re-establishment. It is recommended that the re-introduction of tammars possibly from Garden Island to the Woodman Point Nature Reserve be investigated in detail. The small area of the reserve and the intense predator pressure would pose management difficulties however these may be worth the potential bridal creeper control advantages gained.

## Recommended control strategy

From the currently available control options for bridal creeper a number of methods have been selected which should form part of an integrated strategy for bridal creeper control at Woodman Point. In the initial stages of a control program it is essential the distribution of bridal creeper is accurately mapped. It is proposed that a distribution map be developed based on recent large scale aerial photography that shows the distribution of bridal creeper and its relative densities. This information should be presented along with a vegetation map of the area so that the relative levels of infestation for different vegetation communities can be assessed and used to guide the control program.

After mapping bridal creeper distribution it will be possible to commence control in those areas where control can be most efficiently achieved. Priority areas should have the best quality bushland and the least bridal creeper infestation. From these areas control can proceed into the most seriously infested areas.

Chemical control should be undertaken of the most densely invested areas. Completely invested areas should be sprayed in the late autumn to early winter when the bridal creeper has started its active growth phase and before indigenous annual or annually renewed species have become established. The recommended herbicide Roundup/glyposphate should be applied by manual spraying. Techniques to minimize the application of herbicide to indigenous vegetation such as blanketing and physically pulling the bridal creeper down from host plants should be used.

Intense chemical control after fire should be undertaken if any of the reserve is burnt, bridal creeper regrowth should be sprayed after fire when it is actively growing

Hand weeding using minimal disturbance techniques to weed out bridal creeper seedlings along a front between good bushland and bridal creeper infested areas should be undertaken. It is vital to

only weed at the rate of natural regeneration, so as to avoid unnecessary re-invasion of bridal creeper.

The re-introduction of native herbivores including the tammar and quokka should be undertaken. Active management of these species may be necessary due to small size of the reserve and intense edge effects.

The Friends of Woodman Point group are able to assist the managers of the area in undertaking bushland condition and vegetation community mapping and in assisting with monitoring the results of a control program. They can also assist with some hand removal of bridal creeper seedlings rather than established plants.

Any bridal creeper control program will require the commitment of time and money on an on-going basis if its to be successful. The resources required will need to include training, monitoring and research allocations if the program is to be of lasting benefit.

## Conclusion

Bridal creeper is a serious environmental weed which is threatening the integrity of the remnant native vegetation at Woodman Point. The vegetation of the area is the best examples of Perth's indigenous coastal vegetation remaining in the Perth Metropolitan area.

Bridal creeper occurs at greatest density in tuart woodland and '*Acacia*' shrubland areas. The bridal creeper smothers indigenous understorey species and contributes to the fire hazard in the summer months due to the high volumes of dry aerated fuel its produces. A control program for Woodman Point will need to consist of several methods integrated into one program. Herbicide spraying or hand weeding alone will not be successful in the long term.

*Postscript*

In the interval between the Bridal Creeper Symposium on October 24 1995 and the final preparation of this paper, CALM have instigated a 'Bridal Creeper Control Program' which will begin in mid 1996. It comprises a series of trials aimed at determining the best chemical control program for the nature reserve. This program will spray approximately 10 ha in 1996 and be expanded in subsequent years if determined successful (David Guille, Field Officer, Perth District, Dept. of CALM Wanneroo personal communication). The Friends group will assist with establishing monitoring quadrants and assessing bridal creeper cover.

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