

# Between a rock and a hard place

## Conservation of the Broad Headed Snake

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Suburban rock garden

### Methods

This study was conducted in Royal National Park, an area of 17,000 ha that forms the southern boundary of the Sydney metropolitan area. We selected 22 sites across the reserve. The sites were stratified on the basis of the distance to walking tracks or roads (11 near ( $\leq 250$  m) and 11 far ( $> 400$  m)). Ten rocks were carefully placed at each site to mimic snake habitat and these were photographed and mapped at the time of establishment. Sites were visited periodically over a four-year period and checked for signs of disturbance and the presence of reptiles. If disturbance occurred, sites were restored to gain insights into the frequency of disturbance.

### Results

Twelve (3 near, 9 far) of the 22 experimental rock outcrops showed evidence of human disturbance. Disturbance was dependent on distance category ( $G=6.99$ ,  $DF=1$ ,  $P=<.01$ ) with a greater incidence of disturbance at the near sites (Fig 1). Multiple disturbance events only occurred at sites in the near category (4 sites). No disturbance occurred at sites that were greater than 450 metres from a road or track. The types of disturbance detected ranged from rocks being turned, to rocks being smashed, or thrown from the platform. All of the outcrops were colonized by velvet geckos (*Oedura lesueurii*), the primary prey of the broad-headed snake. Eight broad-headed snakes were detected at seven of our experimental sites (Fig 2).

### Introduction

It is commonly assumed that endangered species contained within protected areas will require minimal management, because the factors responsible for their decline are unlikely to extend into these areas. The broad-headed snake (*Hoplocephalus bungaroides*) is endemic to the sandstone habitats within a 150-km radius of Sydney, Australia. It has been listed as endangered since 1974 but has only been the subject of detailed research in the last few years, possibly because venomous snakes attract little public sympathy. The primary cause of the decline of the broad-headed snake is believed to be the removal / disturbance of the loose rock that provides vital shelter for the species during winter. Sandstone rocks are highly valued for garden ornamentation around Sydney.



Experimental outcrop

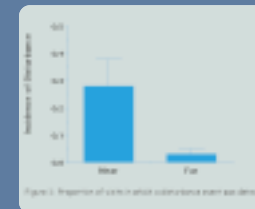


Figure 1. Proportion of sites where disturbance was detected

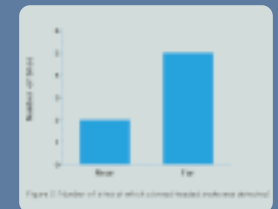


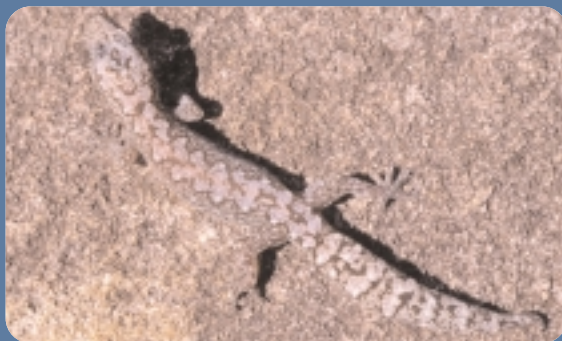
Figure 2. Number of sites where broad-headed snakes were detected



### Discussion

Our study suggests protected areas may provide inadequate protection for endangered species that require specialized habitat components. Disturbance is an ongoing process within this reserve and similar types of disturbance to rock outcrops have been observed in seven other reserves around Sydney (DAN & RLG, unpublished data).

This is consistent with the prediction that disturbance events are more likely to occur at sites located close to roads and walking tracks. We found that many sites  $< 250$ m from tracks had rocks smashed, turned or removed and whilst disturbance was more frequent at these sites, it was not restricted to these areas. This study provides important insights for restoring the habitat of the broad-headed snake and the placement of access tracks.



The velvet gecko (*Oedura lesueurii*)



Habitat disturbance



Stencils left after rocks removed at experimental outcrop