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## **Appendix 4      Development of a model to rank plant populations and ecological communities threatened by bitou bush invasion**

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In Appendix 2 a model was developed to assess the native plant species at risk from bitou bush invasion. While this model can be used to assess individual species, it was not designed to assess plant populations or ecological plant communities at risk. This is in part because of the difficulties of condensing information for multiple species (i.e. for ecological communities) into a single value for each attribute (e.g. for the *Persistence* attribute, see Appendix 2), or assuming that the attributes of a species are the same for all populations (i.e. many of the threatened populations listed are unique forms such as the broad leaf form of *Glycine clandestina*, and thus may possess different characteristics). An abridged version of the species model was therefore developed to rank plant populations and ecological plant communities at risk. This was not done in the draft TAP (see DEC 2004). By using this abridged model greater transparency for selecting priorities can be achieved.

The ranking of priority plant populations and ecological plant communities in the model uses three attributes: (S) susceptibility of the habitat to bitou bush invasion; (D) distribution of the population or ecological community relative to that of bitou bush; and (I) the susceptibility of the native species of each population or ecological community to bitou bush invasion. Each attribute is scored with the highest score implying the highest priority.

The model for ranking plant populations and ecological plant communities is:

$$\text{priority rank} = (\text{habitat susceptibility [S] x 1.25}) \times \text{distribution [D] x} \\ \text{susceptibility to invasion [I]}$$

Attribute S in the model was weighted [by 1.25] to account for its importance in determining the overall risk from invasion. If the habitat is not susceptible to invasion the susceptibility of the species of each plant population or ecological plant community is of little importance. The populations and ecological communities that were modelled are listed and ranked in Appendix 5 (Tables A5.1 and A 5.2). Ecological communities that were considered to be potentially at risk from bitou invasion, but were unable to be modelled are listed in Table A5.3.

The model presented here is not definitive. It should be noted that if for any reason the value of an attribute changes then the rankings within the models could be adjusted accordingly. For example, if a fire alters the susceptibility of a habitat to invasion its ranking can be adjusted to ensure that the biodiversity at risk is protected.

### **S                      Susceptibility of the habitat to bitou bush invasion**

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As outlined in Appendix 2 some habitats are more prone to invasion by bitou bush than others. The habitat in which each plant population and ecological plant community occurred was assessed for its invasibility. The density of bitou bush present is not necessarily a reflection (or measure) of the invasibility of that habitat, as many invasive plants exhibit a distinct lag period between initial occurrence and dominance. Therefore, a site with a light infestation of bitou bush may either present a barrier to invasion, or the invasion process is in the early stages and heavier infestations may occur in the future if untreated.

<b>Score</b>	<b><i>Habitat invasibility</i></b>
0	<i>Extremely low habitat invasibility</i> – non-coastal habitats or those habitats close to the coast in which boneseed (or rarely, bitou bush) occurs but are generally not susceptible to invasion
1	<i>Low habitat invasibility</i> – habitats with dense intact vegetation (e.g. closed forests), or water logged habitats (e.g. margins of swamps)
2	<i>Medium habitat invasibility</i> – habitats with open canopies (e.g. open woodlands or shrublands), or forest margins, or damaged canopies, or where the margin is large relative the interior (i.e. littoral rainforest)
3	<i>High habitat invasibility</i> – habitats with no or low vegetation (e.g. sand dunes), or habitats with a limited shrub layer, or sites where the native vegetation is disturbed such that there is no or patchy vegetation

## **D Distribution relative to bitou bush**

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This attribute describes the potential for bitou bush to have a major impact on the entire population or an ecological community based on its distribution relative to that of the threatened population or ecological community. For ecological communities the distribution refers to the entire distribution of all patches, not that of an individual patch (e.g. littoral rainforests are distributed throughout coastal New South Wales).

<b>Score</b>	<b><i>Distribution of the population or ecological community</i></b>
0	Not known from coastal habitats
1	Distributed across a range of habitats (some of which are coastal <50%) [populations excluded as they are typically only known from one location]
2	Known predominantly from coastal habitats (>50% but <100%)
3	Known only from coastal habitats
4	Known only from coastal habitats in which all locations are within the distribution of bitou bush (and/or boneseed)

## **I Susceptibility of populations and ecological communities to bitou bush invasion**

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As described in Appendix 2, the same broad measure was also used here to encompass the general susceptibility of plant populations and ecological plant communities to bitou bush invasion.

<b>Score</b>	<b><i>Susceptibility of biodiversity to invasion</i></b>
1	Population or ecological community persists or grows in invaded areas with limited or no sign of susceptibility to invasion
2	Information about susceptibility to invasion is unknown
3	Slightly sensitive to invasion (i.e. bitou bush occurs in part but not all of the population or ecological community e.g. forest margins only)
4	Sensitive to invasion (i.e. bitou bush readily invades populations or ecological communities).