

Form A – Interpreting the questions in the Weed Risk Assessment system

Question	WRA GUIDELINES
1	Domestication / cultivation
	Is the species highly domesticated? If answer is `no" go to Question 2.01
01	The taxon must have been cultivated and subjected to substantial human selection for at least 20 generations. Domestication generally reduces the weediness of a species by breeding out noxious characteristics.
	Has the species become naturalised where grown?
1.02	Is a domesticated plant, which has introduced from another region, growing, reproducing and maintaining itself in the area in which it is growing. A `yes' answer to question 1.01 will be modified by the response to this question.
	Does the species have weedy races?
1.03	Only answer this question if the species you are assessing is a sub-species, cultivar or registered variety of a domesticated species. If the taxon is a less weedy subspecies, variety or cultivar, then there must be good evidence that it does not retain the capacity to revert to a weedy form. A `yes' answer to question 1.01 will be modified by the response to this question.
2	Climate and distribution
	Species suited to Australian climates (0-low; 1-intermediate; 2-high)
2.01	This question applies to any one Australian climate type, or more than one. Ideally, base the climate matching on an approved computer prediction system such as CLIMEX , BIOCLIM or Climate. If no computer analysis is carried out then assign the maximum score (2).
	Quality of climate match data (0-low; 1-intermediate; 2-high)
2.02	The score for this question is an indication of the quality of the data used to generate the climate analysis. Reliable specific data scores 2, general climate references scores 1, broad climate or distribution data scores 0. If a computer analysis was not carried out assign the maximum score of 2.
	Broad climate suitability (environmental versatility)
2.03	Score `yes' for this question if the species is found to grow in a broad range of climate types. Output from the climate matching program may be used for this question. Otherwise base the response on the natural occurrence of the species in 3 or more distinct climate categories. Use the map of climatic regions provided or one available in a comprehensive atlas.
	Native or naturalised in regions with extended dry periods
2.04	The species is able to grow in areas with rainfall in the driest quarter less than 25 mm. Plants from this group may potentially grow and survive in arid Australian conditions.
	Does the species have a history of repeated introductions outside its natural range?
2.05	This history should be well documented. A potential weed must have opportunities to show its potential. A score for Question 2.05 will modify the score for a `no' answer to Question 3.01. Species with repeated introductions that have not established are a lower risk.
3	Weed elsewhere
	Naturalised beyond native range
3.01	A naturalised species will be cited in floras of localities which are clearly outside of the native range. If the native range is uncertain and the known extent of the naturally growing plants is within the area of uncertainty then the answer is `don't know.'
3.02	Garden/amenity/disturbance weed

The plant is generally an intrusive weed of gardens, parklands, roadsides, quarries, etc. This question carries less weight than 3.03 or 3.04. If a plant is listed as a weed in relevant references but the type of weed is uncertain or it is a minor weed - score `yes' for 3.02.

Weed of agriculture/horticulture/forestry

- 3.03 The plant is generally a weed of agriculture/horticulture/forestry and causes productivity losses and/or costs due to control. This question carries more weight than 3.02. If a plant is listed as a weed in relevant references but the type of weed is uncertain or it is a minor weed - score `yes' for 3.02.

Environmental weed

- 3.04 The plant is documented to alter the structure or normal activity of a natural ecosystem. This question carries more weight than 3.02. If a plant is listed as a weed in relevant references but the type of weed is uncertain or it is a minor weed - score `yes' for 3.02.

Congeneric weed

- 3.05 Documented evidence that one or more species, with similar biology, within the genus of the species being evaluated are weeds.

4 Undesirable traits

Produces spines, thorns or burrs

- 4.01 The plant possesses a structure on the plant known to cause fouling, discomfort or pain to animals or man. If the taxon is a thornless subspecies, variety or cultivar, then there must be good evidence that it does not retain the capacity to revert to a thorny form.

Allelopathic

- 4.02 The plant is well documented as a potential suppressor of the growth of other species by chemical (eg. hormonal) means. Such evidence is rare throughout the whole plant kingdom.

Parasitic

- 4.03 The parasite must have a detrimental effect on the host and the potential hosts must be present in Australia. This question includes wholly and semi-parasitic plants. Such plants are rare.

Unpalatable to grazing animals

- 4.04 Consider the plant with respect to where the plant has the potential to grow and if the herbivores present could keep it under control. This trait may be found at any stage during the lifecycle of the plant and/or over periods of the growing season.

Toxic to animals

- 4.05 There must be a reasonable likelihood that the toxic agent will reach the animal, by grazing or contact. Some species are mildly toxic but very palatable and could cause problems if heavily grazed.

Host for recognised pests and pathogens

- 4.06 The main concerns are plants that are hosts of toxic pathogens and alternate or alternative hosts of crop pests and diseases. Where suitable alternative or alternate hosts are already widespread in cropping or natural systems the answer should be `no' unless the species will affect the current control strategies for the pathogen or pest. Apply a reasonable level of specificity; a pathogen of an entire family, such as takeall, should not be the basis for answering `yes' for an individual species.

Causes allergies or is otherwise toxic to humans

- 4.07 This condition must be well documented and likely to occur under normal circumstances. For example by physical contact or inhalation of pollen from the species.

Creates a fire hazard in natural ecosystems

- 4.08 This question applies to species that have a documented growth habit that

leads to the rapid accumulation of fuel for fires when growing in natural or unmanaged ecosystems.

- 4.09 **Is a shade tolerant plant at some stage of its life cycle**
Shade tolerance can enhance the invasive potential of a species.

- 4.10 **Grows on infertile soils**
Australian soils are generally very infertile. Species that tolerate low nutrient levels could potentially grow well here. Legumes, tolerant of low soil phosphorus, are a particular concern since they would also modify the soil environment.

- 4.11 **Climbing or smothering growth habit**
This trait includes fast growing vines and ivy's that cover and kill or suppress the growth of the supporting vegetation. Plants that rapidly produce large rosettes could also score for this question.

- 4.12 **Forms dense thickets**
The thickets produced should obstruct passage or access, or exclude other species. Woody perennials are the most likely candidates, but this question may include densely growing grasses.

5 Plant type

- 5.01 **Aquatic**
The question includes any plants normally found growing on rivers, lakes and ponds. These species have the potential to choke waterways and starve the system of light, oxygen and nutrients. Consequently, the score is high (5).

- 5.02 **Grass**
A large proportion of the grass family (Poaceae/Gramineae) are weeds in some context. As with congeneric weed species, there is a high probability that a species from this family will be a weed.

- 5.03 **Nitrogen fixing woody plant**
A large proportion of woody legumes (Family Leguminosae/Fabaceae) are weeds, particularly of conservation areas. As with congeneric weed species, there is a high probability that a species from this family will be a weed.

- 5.04 **Geophyte**
Perennial plants with tubers, corms or bulbs. This question is specifically to deal with plants that have specialised organs and should not include plants merely with rhizomes/stolons (see 6.06). Plants from this group can be particularly difficult to eradicate from a site.

6 Reproduction

- 6.01 **Evidence of substantial reproductive failure in native habitat**
Predators and other factors present (eg. disease) in the native habitat can cause substantial reductions in reproductive capacity. The reproductive output of a species may greatly increase when the plant grows in areas without these factors.

- 6.02 **Produces viable seed**
If the taxon is a subspecies, variety or cultivar, it must be indisputably sterile. The male plants of a dioecious species are regarded as seed producers.

- 6.03 **Hybridises naturally**
A 'yes' answer for this question requires documented evidence of interspecific hybrids occurring, without assistance, under natural conditions.

- 6.04 **Self-fertilisation**
Species capable of self seeding, can spread from seed produced by an isolated plant.

- 6.05 **Requires specialist pollinators**
The invasive potential of the plant is reduced if the species requires specialist

pollinating agents that are not present or rare in Australia.

Reproduction by vegetative propagation

- 6.06 The plant must be capable of increasing its numbers by vegetative means. This may include reproduction by: rhizomes, stolons or root fragments, suckers or division.

Minimum generative time (years)

- 6.07 This is the time from germination to production of viable seed, or the time taken for a vegetatively reproduced plant to duplicate itself. The shorter the timespan, the more weedy a plant is likely to be. The score for this trait uses the correlation factor (1 year score 1, 2-3 years score 0, greater than or equal to 4 years score -1).

7 Dispersal mechanisms

Propagules likely to be dispersed unintentionally

- 7.01 Propagules (any structure, sexual or asexual, which serves as a means of reproduction), unintentionally dispersed resulting from human activity. An example is plants growing in heavily trafficked areas such as farm paddocks or roadsides.

Propagules dispersed intentionally by people

- 7.02 The plant has properties that make it attractive or desirable, such as an edible fruit, an ornamental or curiosity. The species is readily collected as a cutting or seed. This group includes most horticultural plants.

Propagules likely to disperse as contaminants of produce

- 7.03 Produce is the economic output from any agricultural, forestry or horticultural activity. An example is grain shipments that contain seeds of weed species.

Propagules adapted to wind dispersal

- 7.04 Documented evidence that wind significantly increases the dispersal range of the propagule. An example is an achene with a pappus. This group includes tumbling plants.

Propagules buoyant

- 7.05 This question includes any structure containing the propagule that typically becomes detached from the plant and is buoyant. An example is a pod of a legume. This is a limited method of distribution of land plants.

Propagules bird dispersed

- 7.06 Any propagule that may be transported and/or consumed by birds, and will grow after defecation. An example is small red berries with indigestible seeds.

Propagules dispersed by other animals (externally)

- 7.07 The plant has adaptations, such as burrs, and/or grows in situations that make it likely that propagules become temporarily attached to the animal. This can include the spread of plants parts on clothing. This dispersal group includes seeds with an oily or fat-rich outgrowth that aids in ant seed dispersal.

Propagules dispersed by other animals (internally)

- 7.08 The propagules are eaten by animals, dispersed and will grow after defecation.

8 Persistence attributes

Prolific seed production

- 8.01 The level of seed production must be met under natural conditions and applies only to viable seed. For grasses and annual species this rate should be (>5000-10000/m²/yr), for woody annual a rate of (>500/m²/yr) would be considered high. Specific data on this attribute may be unavailable, however, an estimate can be made from the seed/plant and the average size of the plant.

Evidence that a persistent propagule bank is formed (>1 yr)

- 8.02 Greater than 1% of the seed should remain viable after more than one year in the soil. This bank may include both canopy and soil seed banks. Long seed viability increases a plants invasive potential.

Well controlled by herbicides

- 8.03 Documented evidence is required for good chemical control of the plant. This control must be acceptable in the situations in which it is likely to be found. The chemical management should be safe for other desirable plants that are likely to be present. This information will be poorly documented for most non-agricultural plants.
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Tolerates or benefits from mutilation, cultivation or fire

- 8.04 Plants that tolerate or benefit from such disturbance may out-compete other species. This question does not apply to seed banks.
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Effective natural enemies present in Australia

- 8.05 A known, effective, natural enemy of the plant may or may not be present in Australia. The answer is 'don't know' unless a specific enemy/enemies are known.
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