

Description:

The Wyoming Weed Risk Assessment (WWRA) is designed to give a quantitative assessment from qualitative yes/no questions. This is intended to create a scientific foundation for the listing and delisting of designated species. The model is an adapted version of the Australian Weed Risk Assessment (AWRA), the most studied risk assessment that currently exists, that intends to make it more relevant to Wyoming's needs. This was done by using the previous version of the WWRA as a guide to the types of questions. This model intends to give numeric "risk scores" for each species to give a sense of how impactful it currently is, but also how impactful it is *likely* to be in the future.

The WWRA is a simplified version of the AWRA; however, unlike the AWRA, the WWRA includes an element of uncertainty to help in the decision making process. This uncertainty is adopted from the USDA-PPQ risk assessment model. The WWRA also more heavily weighs the current invasion status of the species than is normal for "pro-border" risk assessments.

The model produces a "risk score" but these scores are only helpful in comparison. There are not specific thresholds in which a species is low risk or high risk. Therefore, this model will become more helpful as more species are analyzed.

Directions:

This model is designed to be easy to use. The foundation of the model is based on simple yes or no questions:

1. For each question, answer either yes, no, or unknown
 - Submitters **must** use Y, N, or ? as responses. Any other responses will result in error in the model.
2. Fill in the level of certainty for each response
 - High (H) certainty means there is **NO** uncertainty in the answer. Good examples are responses supported by peer reviewed evidence, multiple expert responses, or when direct evidence is supplied.
 - Medium (M) certainty means anecdotal evidence exists but some uncertainty may still remain. Alternatively, if supporting evidence contradicts, this answer may be appropriate.
 - Low (L) certainty means there is a sense of the answer but little to no evidence exists. In these cases, it may be alright to not supply any additional evidence although an explanation may be helpful.
 - **Please Note:** For questions answered "?" **DO NOT** fill in the certainty level; leave it blank.
 - **Please Note:** Reference the explanations (below) for detailed descriptions of how to answer certain questions.
3. Fill in any additional comments and supply any resources supporting your answer for reviewers to access.
4. Interpretation of results:
 - The final result (Total) can range from 0 to 69. Species with a higher score are more likely a greater risk to imposing impact.

- Lower and Upper Bounds in calculated based on the certainty with which questions are answered. Multiple questions answered with “high” uncertainty will result in a greater range. This is intended to give a sense of where the answer likely falls.
- The confidence level report is based on the number of questions answered. If too few questions are answered the confidence in the score is low.
- A visualization of the score and range is included below the results to give a sense of where on the potential spectrum the species exists.

Question Details:

#	Question	Explanation
1.1	Broad climate suitability (environmental versatility)	The species is capable of existing in various climatic conditions (generalist). Broad global or national distribution would be evidence of broad climate suitability.
1.2	Native or naturalized in regions with extended dry periods	Surviving in dry and drought conditions (such as those in Wyoming) is sufficient for this question.
1.3	Current invasion status within Wyoming	If the invader currently exists in Wyoming this is a “yes”. If it has not yet invaded this is a “no”. If uncertain, please use Wyoming’s current distribution data from the W&P Council.
1.4	Invader of surrounding states	If this species has established populations in any bordering state answer “yes”.
2.1	Naturalized beyond native range	If the species exists beyond what is considered its native range this question is answered “yes”. Please consider that native ranges are not always agreed upon.
2.2	Garden/amenity/disturbance weed	Impact horticulture, establishing in bare ground scenarios, or acting a garden weed is sufficient for this question.
2.3	Weed of agriculture	Acting as a weed or negatively impacting any agriculture production would constitute a “yes” for this question.
2.4	Environmental weed	Negatively impacting any function of a natural system would constitute a “yes” for this question.
2.5	Congeneric weed	Species that have weedy relations at the genus level are congeneric.
3.1	Aquatic	The species must require a fully aquatic environment to reproduce to be considered aquatic. Riparian species <i>are not</i> considered aquatic.
3.2	Grass	Must exist within the Poaceae family to be considered a grass.
4.1	Produces spines, thorns or burrs	
4.2	Unpalatable to grazing animals	Selection against the species and for surrounding vegetation would constitute a “yes”. Alternatively, evidence of the production of unpalatable compounds would also constitute a “yes”.
4.3	Toxic to animals	Evidence of wildlife or livestock death directly due to the species would constitute a “yes”.
4.4	Host for recognized pests and pathogens	Pests or pathogen must be shown to have a negative ecological or economic impact.
4.5	Causes allergies or is otherwise toxic to humans	Any level of allergic response is adequate to answer “yes”. Species that can induce hay fever are included.
4.6	Creates a fire hazard in natural ecosystems	Species that act as a fuel load are adequate for this response.

4.7	Grows on infertile soils	The species must grow in conditions where others are unsuccessful due to nutrient limitations.
4.8	Forms dense thickets	Forming a monoculture is sufficient to answer “yes”.
5.1	Produces viable seed	Any viable seed production is acceptable for this question.
5.2	Hybridizes naturally	Hybridization is difficult to prove and will likely require scientific evidence to confidently answer “yes”.
5.3	Self-compatible or apomictic	If a single plant is able to produce any seed without the assistance of another (e.g., pollen) then answer “yes”.
5.4	Requires specialist pollinators	If a limited amount of pollinators are able to pollinate the species then answer “yes”.
5.5	Reproduction by vegetative fragmentation	Perennial roots, rhizomes, “runners”, are all possibly vegetative reproduction.
6.1	Prolific seed production (>2000/m ²)	Personal counts are acceptable; however, scientific literature is most confident.
6.2	Evidence that a persistent propagule bank is formed (>1 yr)	Seed dormancy greater than one year constitutes seed dormancy.
6.3	Well controlled by herbicides	Evidence of effective control from a labeled herbicide product will suffice to answer “yes”.
6.4	Tolerates, or benefits from, mutilation or cultivation	In range this is often referred to as “increasers”. Evidence of regrowth post disturbance constitutes a “yes”.
6.5	Effective natural enemies present in Wyoming	Either introduced biocontrol agents or naturally occurring enemies constitute a “yes”.
7.1	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	Evidence of roadside or urban growth constitute a “yes”.
7.2	Propagules dispersed intentionally by people	If the species is sold or commonly traded it is considered intentional. Unintentional dispersal such as contamination does not constitute a “yes”.
7.3	Propagules likely to disperse as a produce contaminant	Contamination of any agricultural product is appropriate.
7.4	Propagules adapted to wind dispersal	Visual evidence of structures such as a papus or membrane are sufficient to answer “yes”.
7.5	Propagules water dispersed	Evidence of establishing long distance along riparian areas is sufficient for a “yes”.
7.6	Propagules bird dispersed	Seeds must be viable upon transport to be considered dispersed.
7.7	Propagules dispersed by other animals (externally)	
7.8	Propagules survive passage through the gut	