Parthenium weed: an increasing biosecurity risk under a changing climate

A changing climate is likely to increase the risk of establishment from an incursion of parthenium in NSW. If allowed to establish, the weed threatens the state's grazing and cropping industries.

Developing industry-informed climate planning information

Climate change is altering the biosecurity risks for many agricultural commodities across NSW. Primary producers need evidence-based information about the changing climate, and the risks and opportunities it may bring.

Through its Vulnerability Assessment Project, the NSW Department of Primary Industries is increasing the resilience of our primary industries by providing information and data to help the sector better plan for, and respond to, climate change. The project has determined climate change impacts for extensive livestock, broadacre cropping, marine fisheries, forestry, horticulture and viticulture, and important cross-cutting biosecurity risks to inform sound planning, risk management and adaptation decisions.

Parthenium weed in NSW

Parthenium weed (*Parthenium hysterophorus*) is an aggressive, annual pasture and rangeland weed. It is a biosecurity threat listed in legislation as a prohibited matter, that is the weed can not be brought into NSW. The weed produces many seeds that remain dormant for a long time. Parthenium is highly adaptable to various habitats and climatic conditions. It is easily spread by machinery and vehicles, in mud and water, by wind, and through contaminated seed and grain.

Parthenium weed reduces the establishment, production and yield of pastures and crops. The weed is toxic to grazing animals and can cause dermatitis, hay fever and respiratory problems in humans.

The weed's growth is restricted to warmer and wetter conditions from spring to autumn. Although frequent incursions from Queensland occur, the weed has yet to establish long-term populations in NSW.

Figure 1. Parthenium weed has mainly been found in north eastern NSW (yellow region). Locations indicate known incursion sites.

Climate and Parthenium weed

Overall, the establishment risk of parthenium weed in NSW is projected to be greater during autumn, winter and spring and lower during summer by 2050 under a changing climate. Changes in climate suitability are likely to occur across all stages of the parthenium weed lifecycle.

Climate risks likely to increase the risk of parthenium establishment in NSW include:

Changes in rainfall and **warmer temperatures** will likely enhance the establishment and expansion of parthenium weed. Higher rainfall areas of NSW, such as the tableland and coastal areas, are particularly at risk. There is likely to be a decrease in the suitability of rangeland areas, especially during summer. However, all areas remain susceptible to parthenium establishment.

Climate impacts: what to expect

Seedling emergence and establishment

- **Decreased climate suitability** in the north-eastern region from November to March (*low to high confidence*).
- **Increased climate suitability** in the north-eastern region from May to August.
- **Maintained historical climate suitability** in the north-eastern region in April, September and October (*low to high confidence*).

Vegetative growth

- **Decreased climate suitability** is likely in the north-eastern region from December to February (*low to high confidence*).
- **Increased climate suitability** is likely in the north-eastern region from May to September.
- **Maintained historical climate suitability** in the north-eastern region in March, April, October and November (*low to high confidence*).

Reproductive growth

- **Decreased climate suitability** in the north-eastern region from November to February (*low to high confidence*).
- **Increased climate suitability** in the north-eastern region from March to November (*low to high confidence*).

Impact on key NSW primary industries

Establishment of parthenium weed can reduce the number of grazing animals that can be supported. The weed can decrease meat and wool production, cause meat and milk tainting, and severely harm animal health. Adverse effects on crop production and human health may occur if the weed establishes. Parthenium weed is also likely to decrease the number and diversity of pasture species.

Early detection and rapid response to incursions, particularly during autumn, winter and spring, are critical to eliminate the weeds and prevent future establishment. Likely changes in climate suitability in southern NSW, particularly along the Murray River, are of concern as the weed has never been found in Victoria.

Methodology and data

Climate projections were sourced from Climate Change in Australia's 'Application Ready Data'. This dataset is comprised of projections from an ensemble of 8 global climate models, each presenting a plausible future climate. The models differ in their projections, giving rise to uncertainty in our modelling. Low confidence in the projected changes due to differences between the models is noted in the text. Care should be taken when interpreting these results.

The Vulnerability Assessment Project is intended to highlight potential industry-or regional-level changes. Intermediate and high emissions scenarios were used in the assessments (RCP4.5 and RCP8.5), but these are not the only future scenarios possible. The inclusion of climate variables important to each biosecurity risk was based on published research, expert knowledge and data quality and availability.

FOR MORE INFORMATION

Please get in touch with vulnerability.assessment@dpi.nsw.gov.au

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