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CESU Final Report Summary for
Developing an Aquatic Weed Risk Assessment tool for Florida and the U.S. –
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Purpose: Modify the Australian Weed Risk Assessment (AWRA) tool for aquatic plant risk assessment at national or sub-national scales.

- Use existing data on known aquatic plant invaders and non-invaders to develop a screening tool that differentiates between these groups with a goal of over 80% accuracy.
- Evaluate whether modification of the tool is necessary to maintain accuracy levels in temperate versus sub-tropical regions, or whether a single tool might be used for the full U.S.
- Evaluate thresholds for distinguishing between minor and major invaders in addition to that for distinguishing between invaders and non-invaders.
- Validate the proposed screening tool using available diagnostic approaches on a separate suite of species.

Location: Three geographic regions: sub-tropical Florida, the temperate Great Lakes Basin, and the large and climatically heterogeneous U.S.

Methods: The model used for the U.S. (henceforth "AqWRA"), is modified from the aquatic plant risk assessment currently in regulatory use in New Zealand. Began with the New Zealand assessment, making basic modifications to the temperature tolerance question and the question about invasiveness elsewhere for relevance to both the full U.S. and to the specific regions of Florida and the Great Lakes. Additionally, included three questions (tolerance of flooding/drought; establishment in disturbed areas; establishment in intact vegetation) that had been added to the New Zealand model when it was implemented in eastern Australia. Aquatic plant species were defined as attached-floating, erect emergent, free-floating, sprawling, emergent, or submerged freshwater macrophytes. Included a total of 130 species divided into 60 non-invaders, 31 minor invaders, and 39 major invaders for the full U.S. test. Twenty additional species (10 major invaders and 10 non-invaders) were selected to test the AqWRA accuracy at the U.S. level.

Results: The AqWRA modified from the New Zealand system distinguished between non-invaders and major invaders with equally high accuracy: 97%. This tool is clearly more sensitive and accurate for freshwater macrophytes than is the AWRA. Not only was accuracy high for these groups and all growth forms, but only 1-3% of the species required further evaluation (> 4 unanswered questions). Thus, the tool substantially exceeds the accuracy standard of 80% set

in Objective 1 for this research. Using the U.S. dataset and including scores from all the questions, species with scores of 32 and below are predicted to have a low probability of invading 97% of the time. Species with scores above 60 are all major invaders; additionally the data suggest that most minor invaders will have scores ranging from 33 to 39, while most major invaders will have scores of 40 and above. Those minor invaders with higher scores may have a higher probability of becoming more invasive over time, and should be watched. The AqWRA was generally more accurate at the national level than at the regional level. Additionally, the accuracy was lower for the Florida test than the Great Lakes test. At the regional level, the AqWRA could be used to identify species that should be regulated by states to prevent spread and impacts.

Management recommendations include: Any species with a score of 60 or higher is worth managing unless its distribution and management potential suggest that control efforts would either be unsuccessful or so costly that the resources would better be allocated to another species. Proactively control species with scores above 32 that have been introduced recently, perhaps defining recent as within the last 30 years as aquatic species may express their invasiveness rapidly on average relative to terrestrial species. Also prioritize species that are currently minor invaders in the U.S. but are highly invasive in other countries for management, regardless of how long they have been in the U.S. When selecting among species for control, look also at the climate tolerances and potential for spread. If a species survives in a wide range of U.S. Department of Agriculture Hardiness Zones (e.g., 1-11) but is currently present in only a few of those zones, control priority should be high. Lastly, where possible, prioritize any species that is naturalized with a score above 32 that can be controlled easily and inexpensively.

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