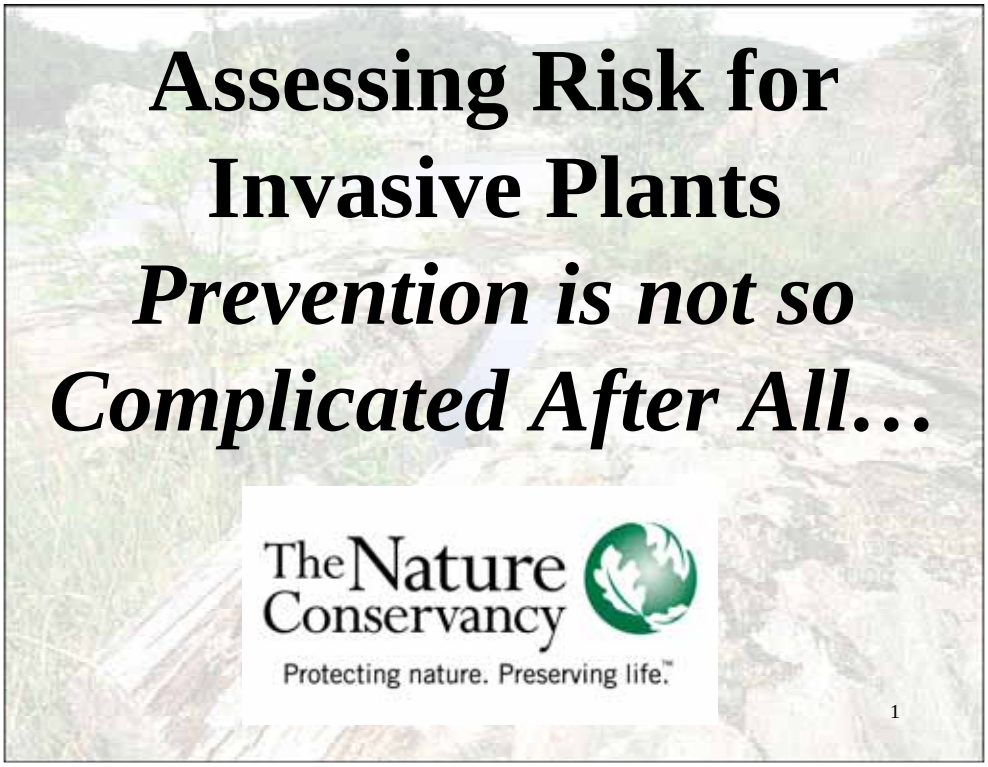
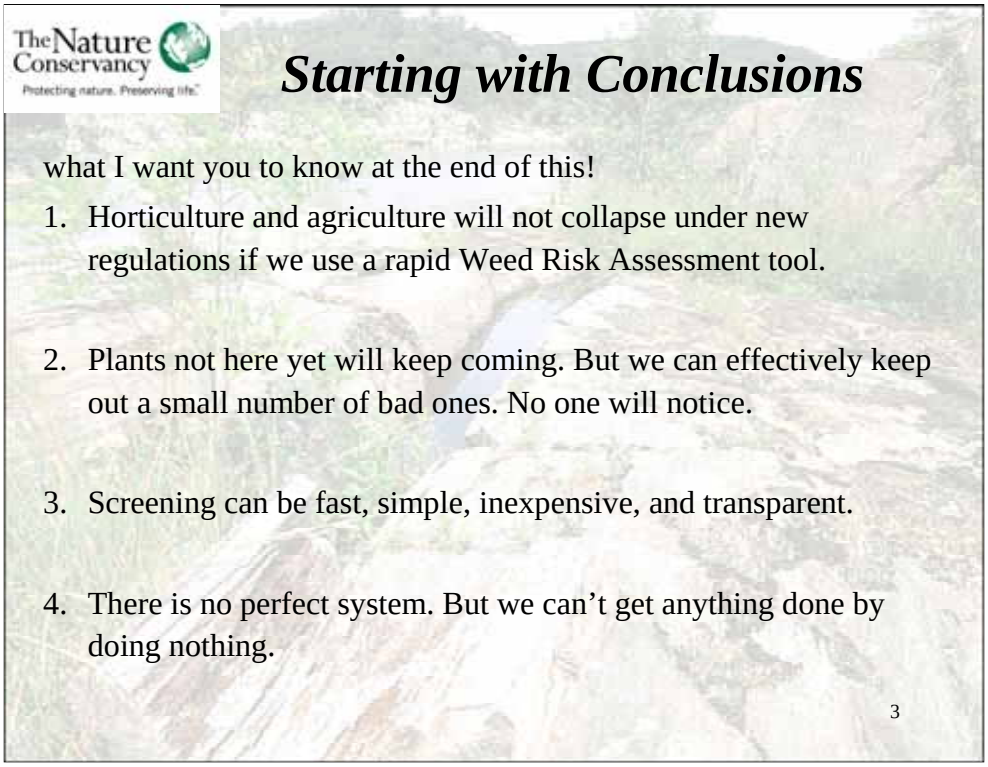
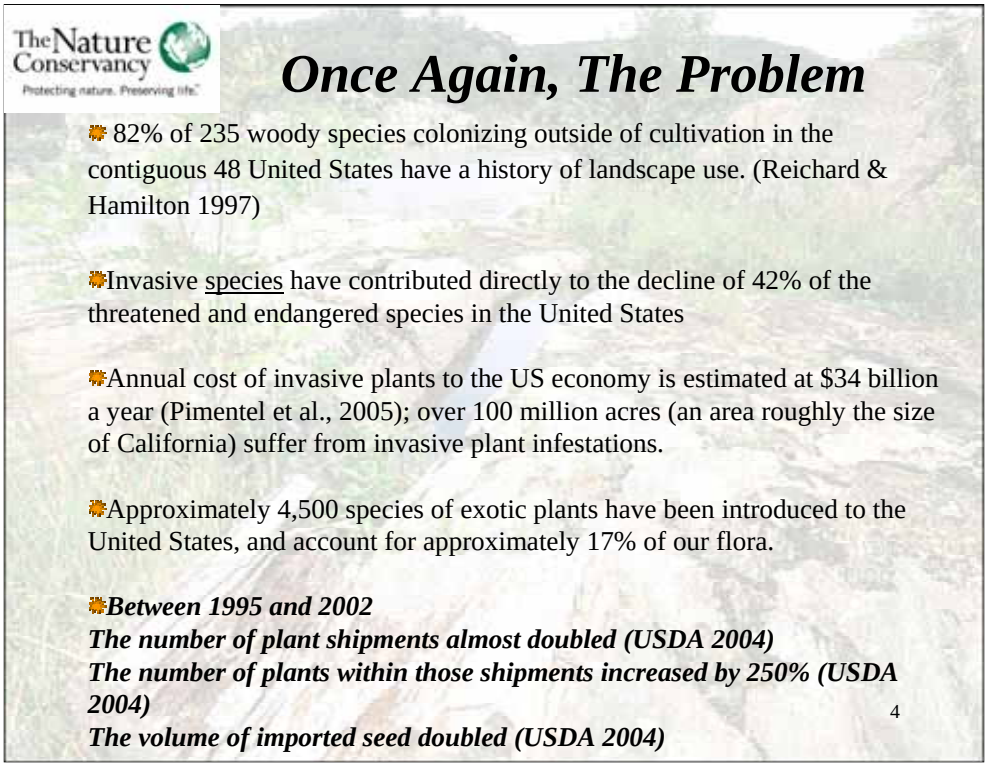


a brief overview of opportunities to improve weed prevention standards in the U.S. Systems have been developed, and used successfully in a regulatory fashion now for over 10 years in Australia and New Zealand, and I did a little research into those systems. I personally had little knowledge of the systems, but had heard from my colleagues at The Nature Conservancy that there was an efficient, rapid assessment system worth pursuing in the US. It turns out this system really is not so complicated, and I feel the more of us than can become educated and aware, the more united a front we can take in precautionary measures towards the prevention of new invasive introductions.

Special thanks to Doria Gordon, at The Nature Conservancy's Florida chapter for her help and guidance on developing this presentation. Doria is on of the country's leading experts on the Weed Risk Assessment system, and helped walk me through the details and shared her research on testing this system.



Because this information was new to me, and because I have too many words in my presentation and not enough pictures, (and therefore you may fall asleep) I want to start with the conclusions, or what I hope to have you all walk away with after this talk.



review some of the facts, to keep this in context

Stemming the Tide

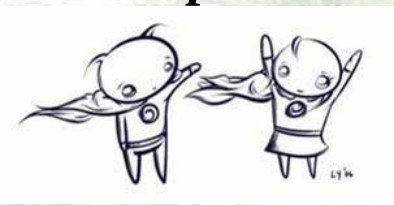
To date, the U.S. lacks an objective, transparent, rapid assessment system for pre-border screening. .

The U.S. is good at keeping out major, known invaders, but we still allow in any species that is not on the extremely limited US noxious seed or weed lists, or is likely to have a known commodity/country/pest link for a pest the USDA is working to exclude.

We should "reject until proven innocent", but in the U.S. we "accept until proven guilty". A little too late?

I'll make an assumption, that many of you recognize we lack a unified, rapid screening approach, to keep things from crossing our borders. We're good at keeping out major known invaders, like Johnsongrass pictured here, but we still allow nearly every plant species not known as an invader yet, through our ports. Johnsongrass, pictured here, was cultivated as forage and is now one of the costliest weeds in the world. Had it been screened for invasiveness and rejected, we may not have had this problem in the US. The USDA, to their credit, has recognized the need for a rapid assessment tool, as the process for screening new imports is burdensome, as is our quarantine process. As I spoke with Doria Gordon, she pointed out that we should have an attitude of "reject until proven innocent", but rather, we have an "accept until proven guilty".

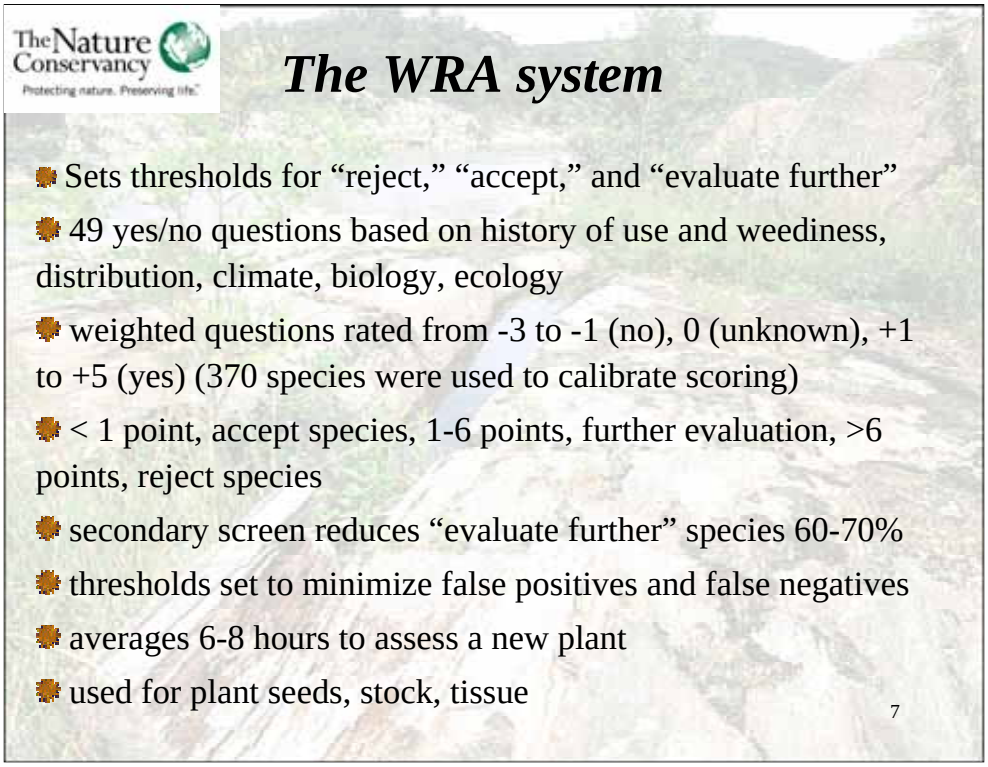
Learning from Others (the superpowers of invasive prevention)



- Australia—Weed Risk Assessment (WRA) tool, in use since 1997
- 2800 plants screened over 10 years
- 27% (756) rejected for import, 53% (1,484) accepted, 20% (560) required further evaluation
- Reduced economic damage up to US $1.67 billion in savings over 50 years
- Australia, New Zealand: used for regulation
- Tested in Hawaii, Bonin Islands, Czech Republic, Florida, Japan

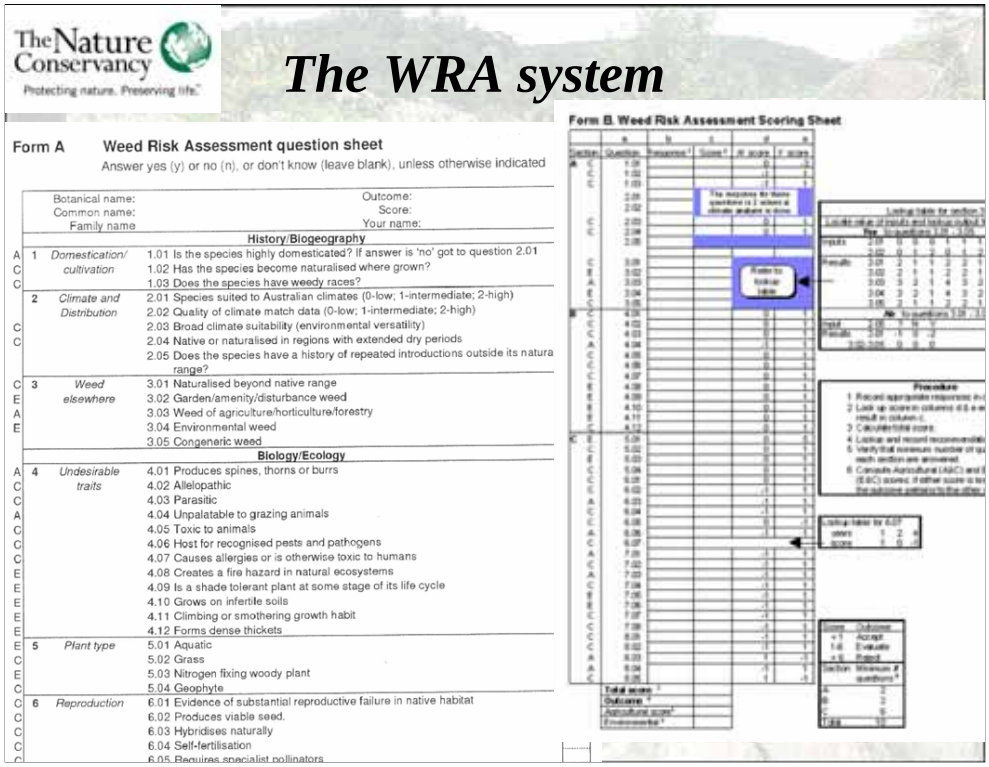
6

So let's get down to talking about Weed Risk Assessment. Apparently the United States is not only far behind the curve, but we are not the leaders in this field, and it is time we turn to our global neighbors for expertise. Australia began working on a system in 1994, and has been using the system as a regulatory tool since 1997. They have screened 2800 new species proposed for import in 10 years. Only about a quarter were rejected for import, over half were accepted, and a 20% required further evaluation after being run through their weed risk assessment tool. The result is over US1.67 billion dollars saved in economic damages from invasive plants over the next 50 years. New Zealand is now also using this tool for regulation, and the tool has been tested extensively in the Bonin Islands, Hawaii, Czech Republic, Florida, and now on mainland Japan.



The WRA tool is surprisingly simple to utilize. There are 49 yes/no questions based on the history of use, plant weediness, distribution, biology, ecology, and climate matching. The questions result in scored from -3 to -1 based on a No answer, receive no score if the answer is unknown, and receive a 1 to 5 score for a Yes answer. Each question is weighted and these weights were calibrated off of 370 plant species, and the number of questions prevents assessor subjectivity. Scores below 1 point assign an “accept plant” rating, 1-6 requires further evaluation, and over 6 points puts a plant in the “reject” category. Thresholds were set by tool designers to reduce false positives or false negatives. A secondary screen reduces the evaluate further plants by 60-70%, increasing the effectiveness of the tool. The tool takes about 6-8 hours to assess a new plant, and can be used for proposed plant seeds, tissue, or plant stock.

The WRA system



Form A **Weed Risk Assessment question sheet**

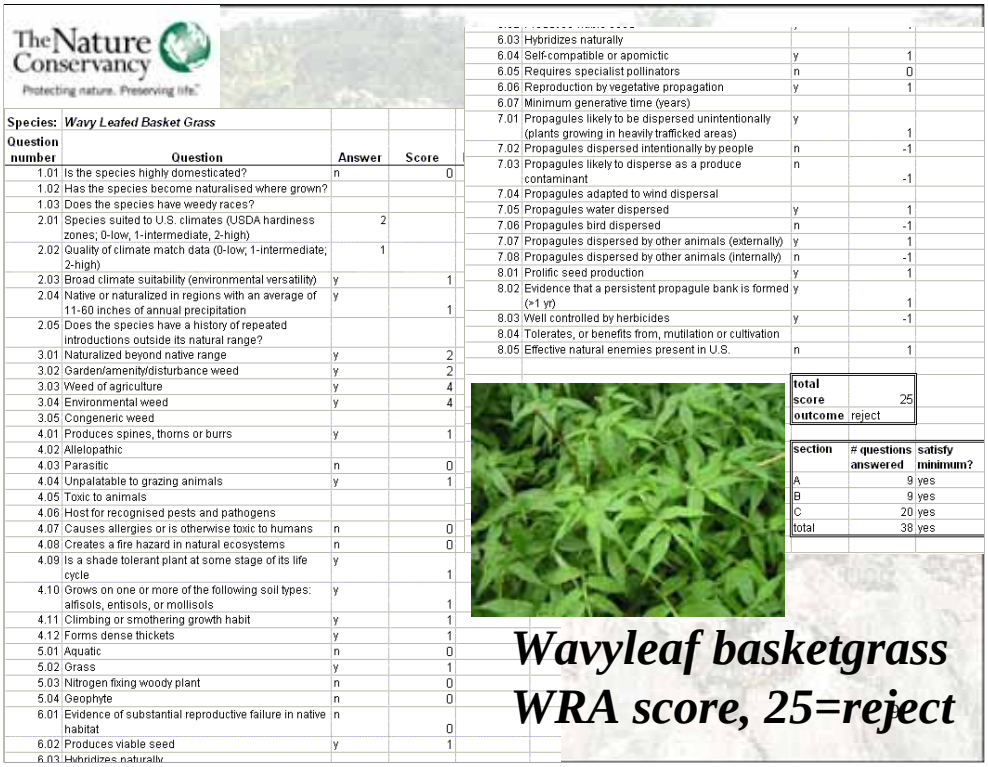
Answer yes (y) or no (n), or don't know (leave blank), unless otherwise indicated

Botanical name: Outcome:
Common name: Score:
Family name Your name:

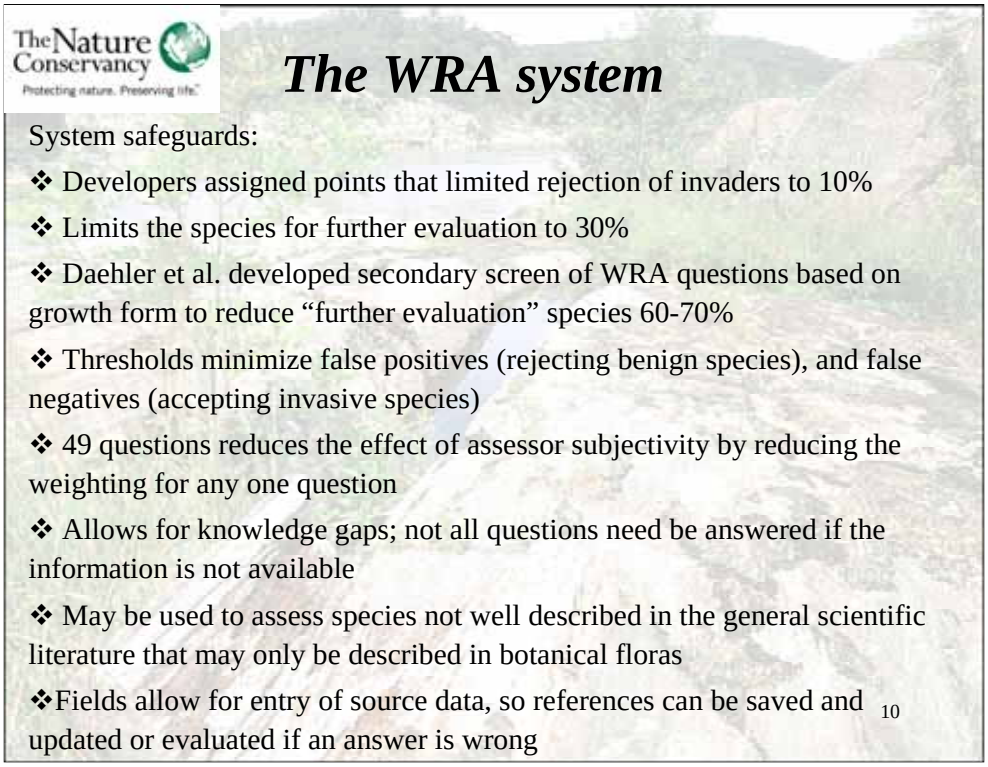
			History/Biogeography
A C C	1	*Domestication/ cultivation*	1.01 Is the species highly domesticated? If answer is 'no' got to question 2.01 1.02 Has the species become naturalised where grown? 1.03 Does the species have weedy races?
C C	2	*Climate and Distribution*	2.01 Species suited to Australian climates (0-low; 1-intermediate; 2-high) 2.02 Quality of climate match data (0-low; 1-intermediate; 2-high) 2.03 Broad climate suitability (environmental versatility) 2.04 Native or naturalised in regions with extended dry periods 2.05 Does the species have a history of repeated introductions outside its natura range?
C E A E	3	*Weed elsewhere*	3.01 Naturalised beyond native range 3.02 Garden/amenity/disturbance weed 3.03 Weed of agriculture/horticulture/forestry 3.04 Environmental weed 3.05 Congeneric weed
			Biology/Ecology
A C C A C C C E E E E E	4	*Undesirable traits*	4.01 Produces spines, thorns or burrs 4.02 Allelopathic 4.03 Parasitic 4.04 Unpalatable to grazing animals 4.05 Toxic to animals 4.06 Host for recognised pests and pathogens 4.07 Causes allergies or is otherwise toxic to humans 4.08 Creates a fire hazard in natural ecosystems 4.09 Is a shade tolerant plant at some stage of its life cycle 4.10 Grows on infertile soils 4.11 Climbing or smothering growth habit 4.12 Forms dense thickets
E C E C	5	*Plant type*	5.01 Aquatic 5.02 Grass 5.03 Nitrogen fixing woody plant 5.04 Geophyte
C C C C C	6	*Reproduction*	6.01 Evidence of substantial reproductive failure in native habitat 6.02 Produces viable seed. 6.03 Hybridises naturally 6.04 Self-fertilisation 6.05 Requires specialist pollinators

Form B. Weed Risk Assessment Scoring Sheet

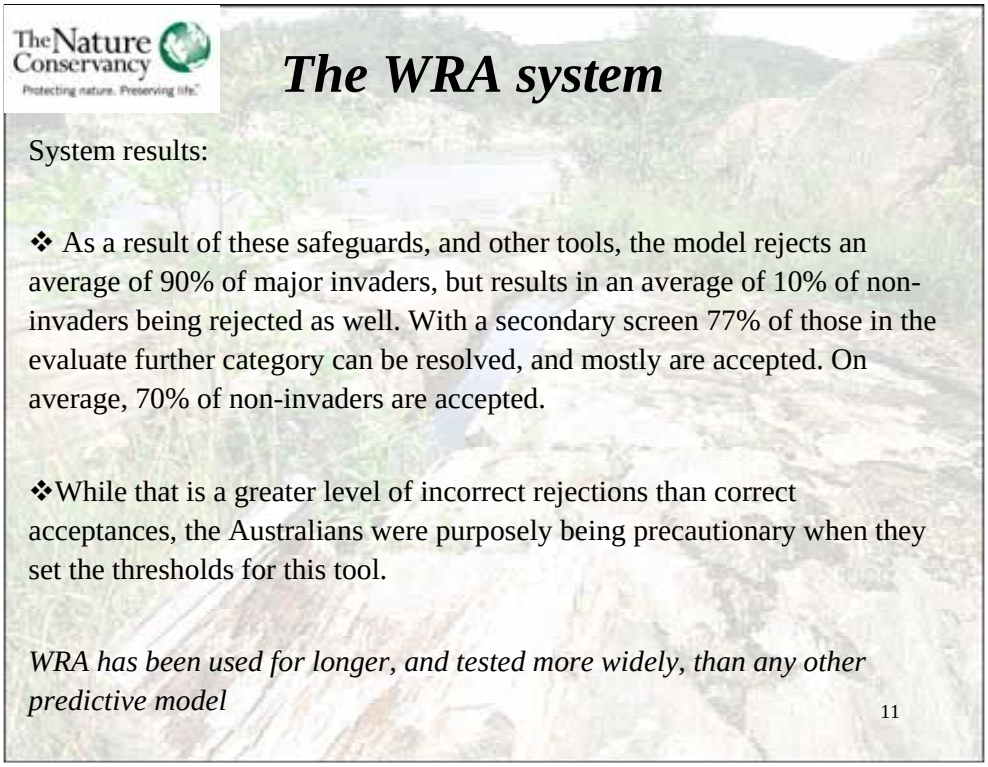
This is an image of the WRA question sheet, and the attached scoring page. It is an excel document, and easy to use.



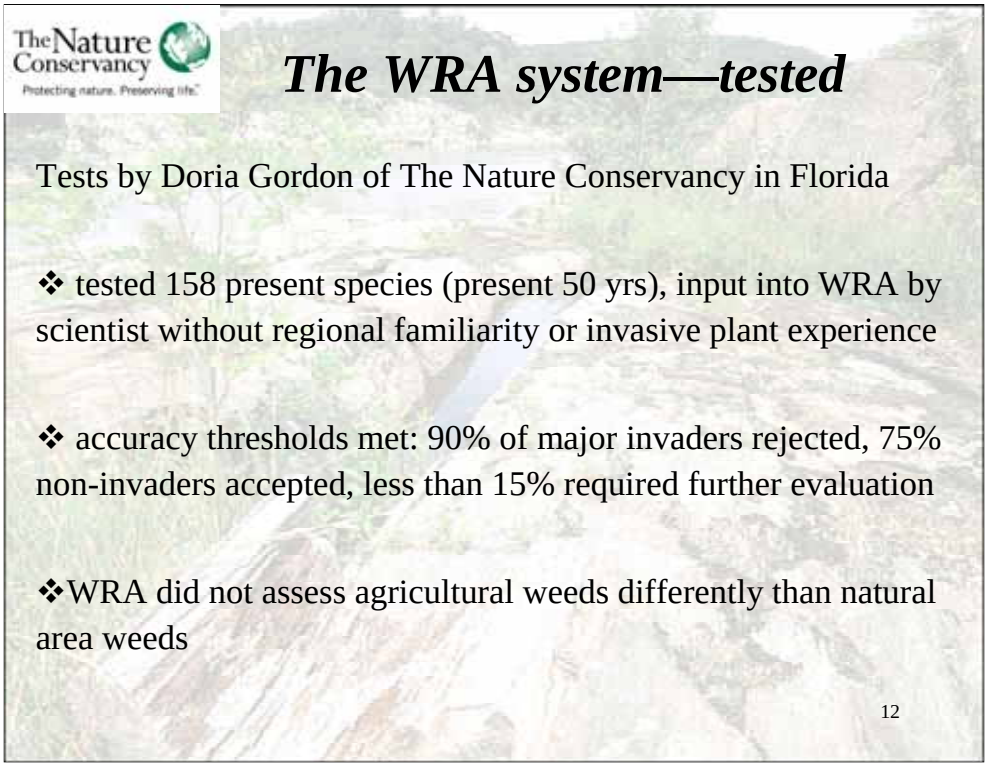
I want to show you the results of a test I did using the WRA system. I decided to enter Wavyleaf Basketgrass, an exotic grass that has become a model Early Detection Rapid Response plant for the State of Maryland. I theorized that by entering the plant into the WRA system would yield a "reject" score. Keeping in mind that reject scores begin at 6, though, and increase in number, I did not have any idea of where it would fall on the scale. Out of 49 questions, only 10 could not be answered, between myself and Kerrie Kyde, the State's expert on this species. After the questions were answered, and the system calculation finished, Wavyleaf Basketgrass not only fell into the "reject" for import category, but it scored a 25. For anyone familiar with invasive plants in Florida, as a comparison, of 158 exotic species present in Florida, and tested by Doria Gordon in the WRA, only 7 plants scored a 25 or above. Those included such plants as Cogongrass, Japanese Climbing Fern, and Catclaw Mimosa. (note that the higher the score does not correlate with increased "invasiveness," but means that more information is unlikely to alter the conclusion of the test). We have yet to be able to sort out if the Wavyleaf Basketgrass that has escaped in Maryland is the same genetic stock as the Wavyleaf Basketgrass used in horticultural trade, but a look at the WRA score is an indication that we should reconsider allowing import of any variety of this species until those varieties are run through the WRA system and yield negative numbers. The WRA can be used for cultivars if they have persistent traits that differentiate them from the full species and we have the information. Without the information, cultivars are likely to be given the same conclusion as the parent species. If this US had adopted this system, as Australia did, over 10 years ago, perhaps we would not have Wavyleaf Basketgrass, or a host of other plants plaguing land managers, across the US. If we were to adopt this now, 10 years, 50 years, and 100 years from now, we could better protect agricultural crops and natural areas from invasives, while maintaining a healthy and robust horticultural industry.



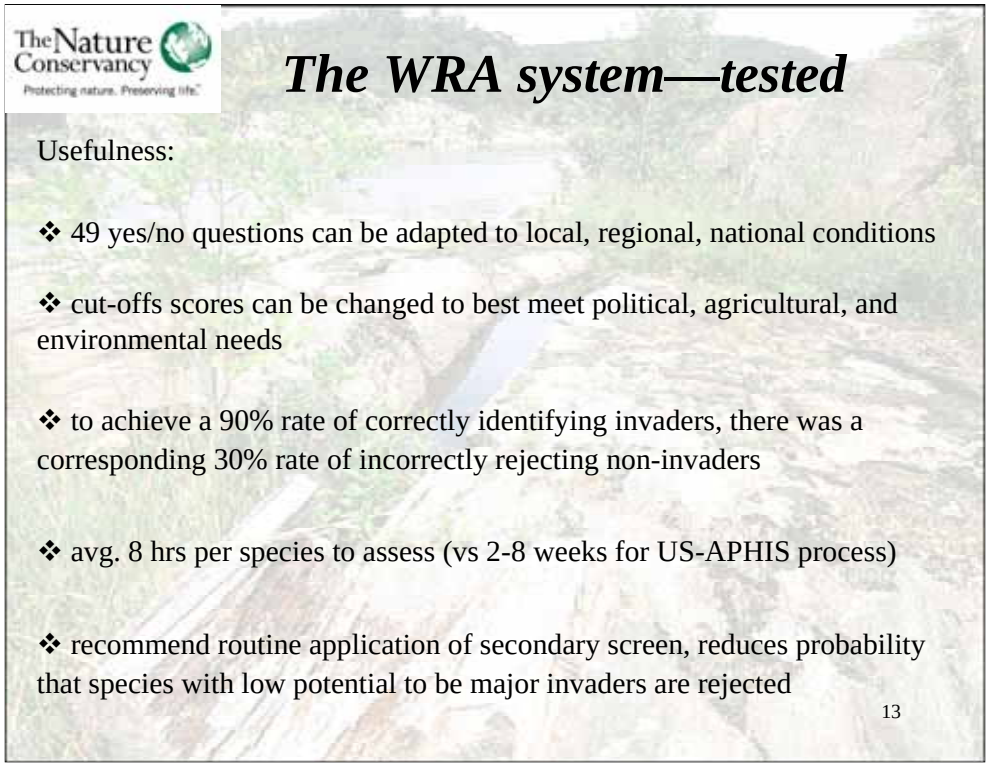
Getting back to some details on the system, I wanted to mention more details on how the system works. There are safeguards built into the system—this was not a system hatched in the night by a person who couldn't sleep. The designers of the model adapted the system as they developed it to maximize effectiveness and practicality, while basing the test on science. The intent of the score thresholds are to minimize acceptance of major invaders so that over 90% are correctly rejected, while minimizing rejection of non-invaders. The WRA developers were satisfied if the number of species requiring further evaluation was not more than about 30%. A secondary screen of questions reduces this number further. The points thresholds also minimize false positives and false negatives, and the number of questions ensures that weighting for any one question is reduced in the case of assessor subjectivity (for instance, if the person entering the data in the WRA is more likely to lean towards a yes or no, when they should leave the question unanswered). Not all 49 questions need to be answered, which is particularly helpful if a species is not well described in general scientific literature, preventing the assessor from filling in answers to all questions.



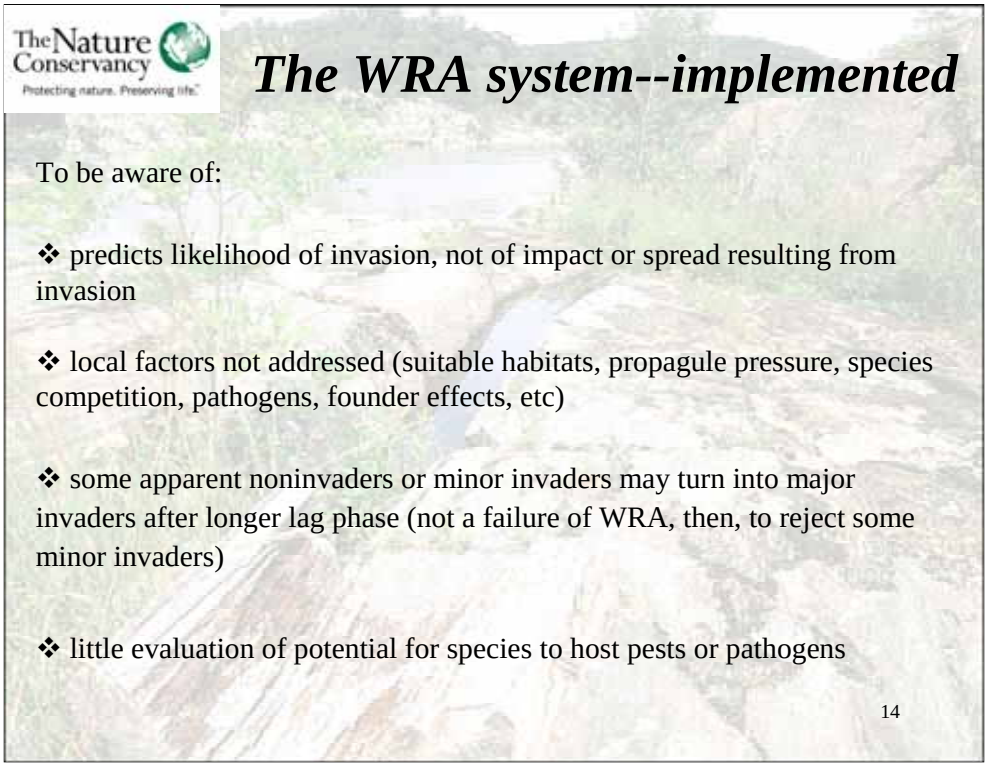
While that is a greater level of incorrect rejections than correct acceptances, the Australians were purposely being precautionary when they set the thresholds for this tool.



As I did my research into this model, to see if I was a believer, and to learn how it could be used in the US, I called my colleague Doria Gordon, who is a leading expert on the model and has tested it in Florida, using 158 exotic species that have been present in Florida for 50 years or more. Doria knew in advance if these were major invaders, minor invaders, or non-invaders, but had the species input into the WRA by a scientist without invasive species experience and no familiarity with regional botany, to reduce any assessor bias in answering the question. After running the species through the test, the accuracy thresholds were met, where 90% of the major invaders were rejected, 75% of the non-invaders were accepted, and less than 15% required further evaluation, showing that the WRA model is effective in Florida (and therefore should be effective in the US). As a note, both ag weeds and natural area weeds were tested by Doria Gordon were not assessed differently, showing this is a universal tool that can be applied across all import sectors.



The system is quite useful, for adoption in any country, when keeping in mind the following.



What a user should keep in mind to be aware of are the following, when promoting or using the WRA.

Concluding what we started with

1. Nurseries and agriculture will not collapse under new regulations if we use a rapid WRA tool.
   - *Prevention efforts are worthwhile—costs for Australia associated with importing an invader were 15x greater than lost opportunity costs resulting from prohibiting import of a non-invader.*
2. Plants not here yet will keep coming. But we can effectively keep out a small number of bad ones. No one will notice.
   - *Since history shows that roughly 10% of introduced plants naturalize, and 1% become invasive, the WRA shouldn't preclude too many species. Doria Gordon's most recent work rejected none out of 101 plants that have been introduced to the US since 1995. There are 300,000 vascular species globally, and many more cultivars.*
3. Screening can be fast, simple, inexpensive, and transparent.
   - *Only 8 hours per species to assess. Can start with "is it invasive elsewhere?" for an even faster pre-screen.*
4. There is no perfect system. But we can't get anything done by doing nothing.

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So here is where I wrap back around to the conclusions that we started with at the beginning of the presentation.


The Nature Conservancy
Protecting nature. Preserving life.
Our goal would be to have a rapid, objective process for screening all new plant species proposed for introduction to the U.S.
Thank you!
Mary Travaglini
The Nature Conservancy
mtravaglini@tnc.org
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