Overview of Listing and Ranking Approaches for New and Emerging Invasive Plants

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FICMNEW

Overview of Listing and Ranking Systems

- Regulatory Listing Systems
  - Prohibited Listing System (APHIS)
  - Permitted Listing System (AUS, NZ)
  - Mandatory Prohibited Listing System (Proposed)
- Non-Regulatory Weed Ranking Systems for Land Managers
  - NZ Weed Ranking System
  - NatureServe Weed Ranking System
- Invasive Species – Code of Conduct for Nursery Professionals and the Gardening Public

APHIS Pest Risk Assessment

- **Stage 1** - Initiate the PRA
- **Stage 2** - Determine Economic and Environmental Importance
- **Stage 3** - Determine Likelihood of Introduction into the U.S.
- **Stage 4** - Determine Pest Risk Potential

Stage 1 - Initiate the PRA Process
(Eight Steps)

- Step 1 - **Document Initiating Events for the PRA**
- Step 2 - **Identify Previous Assessments**
- Step 3 - **Establish Identify of the Weed**
- Step 4 - **Gather General Information**
  - BV - Cultivated in Asia as sand binder
  - Reproduces by seeds and vegetative fragments
  - Used as medicinal herb in Japan, China, Korea
  - Viable seeds and stem fragments spread by ocean currents in Japan
- Step 5 - **Determine Preferred Habitat and Climatic Zones**
  - Forms low thickets on dunes in S. Japan
  - Occurs on 48% of coastal dunes in Korea
  - Coastal dry grasslands on sandy coastlines in HI

Beach Vitex (*Vitex rotundifolia*)

Stage 1 - Initiate the PRA Process

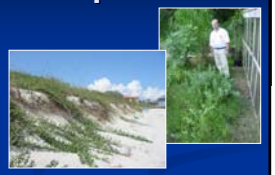
- Step 6 - **Determine the Native Range**
  - China, Korea, Japan, Taiwan, Vietnam, Sri Lanka, Mauritius (Indian Ocean)
  - Malaysia, Philippines, Polynesia, Australia, Pacific Islands, Hawaii
- Step 7 - **Determine Introduced Range**
  - South Carolina (71 Sites), North Carolina, Alabama (2 Sites)
- **Step 8 - Determine Quarantine Status**
  - Introduction – (1980s)
  - Regulatory Status (Not Currently Regulated)
  - Percentage of Ecological Range Occupied (Low)
  - Ongoing Official Control Efforts (SC/NC Beach Vitex Task Force)

Stage 2 - Determine Economic and Environmental Importance

- **Step 1 - Determine Habitat Suitability in Protected Area**
  - Occurs North to Japan and Korea (40º N)
  - Occurs South to Australia (36º S)
  - Suitable Climate and Habitats in U.S.
    - 1/3 - 2/3 of Coastal Zones in the U.S.
      - VA to FL, Wet to TX
      - CA
  - **Score: Medium (2)**
- **Step 2 - Determine Characteristics of Invasiveness**
  - Forms Monoculture, Crowds out Natives
  - Seed Production - up to 10,921 Seeds/m²/YR
  - Growth Rate in SC - BV Runners - 1.8 m/YR (74 In.)
  - Soils Underneath Plant - Hydrophobic
  - 2-10% of Light Penetrates BV Canopy
  - Roots Release Toxic Compounds
  - Wind and Salt Spray Tolerant
  - **Score: High (3)**

Stage 2 - Determine Economic and Environmental Importance

- **Step 3 - Determine Potential for Spread After Establishment**
  - As an Ornamental, BV has Potential for Spread Throughout Southeastern Coastal Areas
  - As a Free Living Plant, BV Seeds and Stem Fragments are Spread Along Beaches by Waves and Near Shore Currents
  - **Score: High (3)**
- **Step 4 - Determine Economic Impact**
  - Reduced Crop Yield - N/A
  - Lowering of Commodity Value
    - Reduced Value of Ocean Front Properties
  - Loss of Markets
    - Impact on Real Estates Markets for Ocean Front Properties
  - **Score: Medium (2)**



Stage 2 - Determine Economic and Environmental Importance

- **Step 5 - Determine Environmental Impacts**
  - Forms Monocultures - Crowding out Natives
  - Accounted for 84% of Stems in BV Colonies
  - Degrades Sea Turtle Nesting Habitat
    - Will Impede Nesting
    - Will Impede Hatchling Emergence and Movement to Ocean
  - Tight Leaf Canopy Prevents Deposit of Windblown Sand
  - **Score: High (3)**
- **Step 6 - Determine Local and State Interest in Control**
  - Phase 1 - Seedling Removal by Volunteers
  - Phase 2 - Land Owner Cost Share Program through FWS

Stage 2 - Economic and Environmental Importance Summary

(Consequences of Introduction)

- Habitat Suitability: Medium (2)
- Spread Potential: High (3)
- Economic Impact: Medium (2)
- Environmental Impacts: High (3)
- CUMULATIVE SCORE: Medium-High (10/12)

Stage 3 - Determine Likelihood of Introduction

- 100% - Intentionally Introduced in the 1980s
- Score: High (3)

Stage 4 - Determine Pest Risk Potential

- Likelihood of Introduction = High (3)
- Consequences of Introduction = Medium (2)
- Overall Pest Risk Potential = Medium-High

- Additional Factors
  - Occupies Small Percentage of Potential Range
  - Can be Eradicated with Public Cooperation

Beach Vitex - A Successful Invader on the Carolina Coast

- **Arrival**
  - Intentionally Introduced from Korea
- **Establishment**
  - Actively Growing Plants on 70+ Sites in SC (10+ Years Old)
- **Ability to Spread**
  - Spreads to adjacent properties by vegetative runners
  - Seeds and stem fragments spread along beach by waves
  - Spread to undeveloped island by ocean currents (North Island)

Preliminary Recommendations

- Search for Additional Funding for Task Force Activities
- Submit PRA to USDA APHIS and Clemson University for Listing as a Federal Noxious Weed and a State Noxious Weed
- Determine Extent of Infestations in North Carolina - Submit PRA to NCDA for Listing as NC State Noxious Weed
- Establish Land Owner Cost Share Removal Program through FWS Partners for Wildlife Program

Australian Weed Risk Assessment System

- **Developer:** Paul Pheloung, 1995
- **49 Questions** (N=-1 to 1; Y=1-2)
  - **History/Biogeography**
    - Section 1 – Cultivation Status
    - Section 2 – Climate Suitability
    - Section 3 – Weed Elsewhere
  - **Biology/Ecology**
    - Section 4 – Undesirable Traits
    - Section 5 – Plant Type (Aquatics Mostly Rejected) (Y=5)
    - Section 6 – Reproduction
    - Section 7 – Dispersal Mechanisms
    - Section 8 – Persistence Attributes
- **Assessment Outcome**
  - <1 = Accept for Importation
  - 1-6 = Further Evaluation
  - >6 = Reject Entry

NZ Weed Ranking System

- **Susan Timmins**, Department of Conservation, 2000
- **39 Questions**
  - **Section A – Invasiveness Traits**
    - History of Invasiveness, Reproduction, Dispersal, Dormancy
  - **Section B – Impacts**
    - Desirable Species, Commodities, Services, Smothering Monocultures, Health, Erosion, Fire Regimes, Hydrological Cycles
  - **Section C – Potential Spread**
    - Current Status (Single Small, Many Large), Spread Rate,
- **Priority Weed Status** – (Can be Eradicated?)
- **Final Score**
  - Most Weeds: (A+B+C)
  - Priority Weeds: (A+B+C)(1.1)

NatureServe Weed Ranking System

- **Qualifying Questions**
  - Established outside cultivation in region of concern?
  - Occurs in conservation areas?
- **Ecological Impacts (5 Questions, 50% of I-Rank Score)**
  - Impact on abiotic ecosystem processes (33 pts)
  - Impact on community structure (18 pts)
  - Impact on community composition (18 pts)
  - Impact on individual native plants or animals (9 pts)
  - Conservation significance of threatened native species (18 pts)
- **Current Distribution and Abundance (4 Questions, 25% of I-Rank Score)**
  - Current range size in region (15 pts)
  - Proportion of current range negatively impacted (15 pts)
  - Proportion of region's biogeographic units invaded (3 pts)
  - Diversity of habitats or ecosystem system invaded (3 pts)

NatureServe Weed Ranking System

- **Trend in Distribution and Abundance (7 Questions – 15% of I-Rank Score)**
  - Current Trend in total range within the region (18 pts)
  - Proportion of potential range currently occupied (15 pts)
  - Long distance dispersal potential within the region (9 pts)
  - Local range expansion or change in abundance (18 pts)
  - Inherent ability to invade conservation areas (6 pts)
  - Similar habitats invaded elsewhere (9 pts)
  - Reproductive characteristics (9 pts)
- **Management Difficulty (4 Questions – 10% of I-Rank Score)**
  - General management difficulty (18 pts)
  - Minimum time commitment (15 pts)
  - Impacts of management on native species (15 pts)
  - Accessibility of invaded areas (3 pts)

NatureServe Weed Ranking System

- **Invasiveness Sub-Rankings**
  - I. Ecological Impacts (50% of Final Score)
  - II. Current Distribution & Abundance (25%)
  - III. Trend in Distribution & Abundance (15%)
  - IV. Management Difficulty (10%)
- **Invasiveness Impact Ranking**
  - 76-100: High
  - 51-75: Medium
  - 26-50: Low
  - 0-25: Insignificant

NatureServe Test Case Summaries

- Tree of Heaven (*Ailanthus altissima*)
  - **Impact:** Low; **Distribution:** High; **Trend:** High/Medium; **Management:** Medium; **I-Rank:** Medium
- Camel Thorn (*Alhagi maurorum*)
  - **Impact:** Low; **Distribution:** Low; **Trend:** High/Medium; **Management:** Medium/Low; **I-Rank:** Low
- Kudzu (*Pueraria montana*)
  - **Impact:** Medium; **Distribution:** High; **Trend:** Medium; **Management:** Medium/Low; **I-Rank:** Medium

Mandatory Pre-Screening/Prohibited Listing Approach

- Pre-screen all New Species Proposed for Importation
  - Official National List of Plants and Animals
    - Native, Cultivated Exotics, Free Living Exotics
- Include Species Found to be Invasive on Prohibited List
- Maintain Informal Permitted List

-Biological Protection Ethic-

Codes of Conduct for Nursery Professionals and Gardeners

- Phase out existing stocks of regionally invasive species.
- Purchase and promote non-invasive, environmentally safe species.
- Remove invasive species from your land and replace them with non-invasive species suited to site conditions and usage.
- Work with neighbors or volunteers at botanical gardens and natural areas to eliminate populations of invasive plants.