Assessing Research Needs for Invasive Plants in CA

A Project of the California Invasive Plant Council
Funded by California Department of Food and Agriculture
Weed Management Area Research Funds

Cal-IPC Symposium
October 3, 2008

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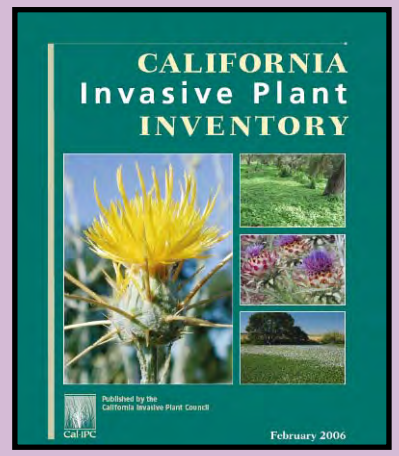
DiTomaso

History of Research Needs Assessment Project



Need for research on many weeds evident during preparation of CA Invasive Plant Inventory ☞☞☞

Meeting held at UC Davis in 2005, attended by 29 researchers

Purpose of meeting:

- Determine where the gaps in invasive plant research are and propose steps to close the gaps
- 10 focus areas were identified:

Research Needs Topic Areas

1. Biology and Ecology
2. Ecological Impacts
3. Distribution, Biogeography and Range Modeling
4. Risk Assessment
5. Human Pathways and Prevention
6. Control and Management Methods
7. Restoration
8. Economic Impacts
9. Social Issues
10. Policy and Laws

DiTomaso

Goals of RNA Project

- Gather information on who is conducting invasive plant research in California
- Develop a white paper on needs for invasive plant species research
- Outreach to academics and graduate students to stimulate work in the priority areas
- Share results with the larger invasive species community

As stated by a member of the Research Needs Assessment,

"We don't know what we need to know."

Research Needs Methods

- Interviewed 45 researchers in CA and elsewhere
- Compiled information into draft Research Needs report, available for review, comments accepted until November 15
- Work group today at 10 in Bell MU 211 to gather feedback and help with prioritization of Research Needs
- This talk presents the results of the interviews and suggests next steps for the Research Needs process

1. Biology and Ecology

STARTING POINT FOR RESEARCH AND MANAGEMENT

UC Regents

Cal-IPC

Research Needs from Interviews

- Synthesis of Biology and Ecology Information for individual plant species (e.g. Ecological Flora of British Isles)

Research Needs from Interviews

- Encourage below-ground biological research as a key to understanding above-ground dynamics
- Use genetic and molecular tools for taxonomic as well as biogeographical questions
- Study seed biology and seedbank dynamics to aid long-term eradication projects

2. Ecological Impacts

WHAT ECOLOGICAL AND GENETIC HARM ARE WEEDS CAUSING?

Tamarisk Invasion

Arundo Invasion

Photos: Tncweeds.ucdavis.edu

Research Needs from Interviews

- OVERALL: More hard data needed on invasive plant impacts
- Suggestions for study:
  - Light absorption in native vs. introduced tree canopies
  - Studies of water use efficiency of natives vs. invasives
  - Nutrient cycling in invaded vs. non-invaded areas

European beachgrass changes shape, height and orientation of sand dunes

More Research Needs

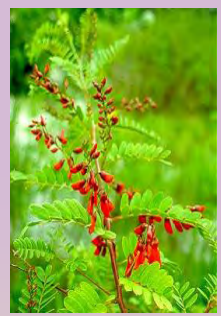
- Interaction of wildlife and invasive plants, positive or negative?
- What are acceptable thresholds for invasive plants?
- How do ecological impacts vary regionally and among communities? Over time and space?

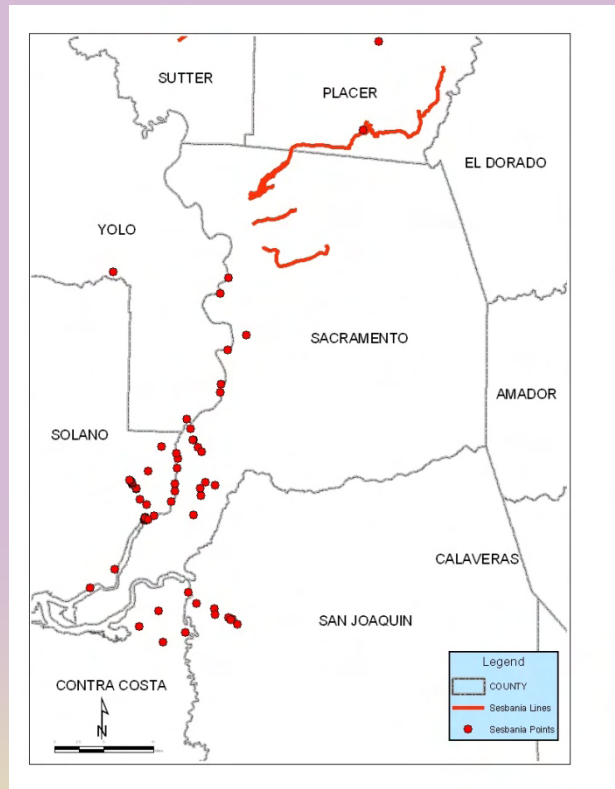
3. Distribution, Biogeography & Range Modeling

WHERE ARE THE WEEDS NOW AND WHERE CAN THEY SPREAD?

Some Techniques:

- Mapping
- Remote Sensing
- Biogeography
- Monitoring
- Modeling
- Early Detection Efforts

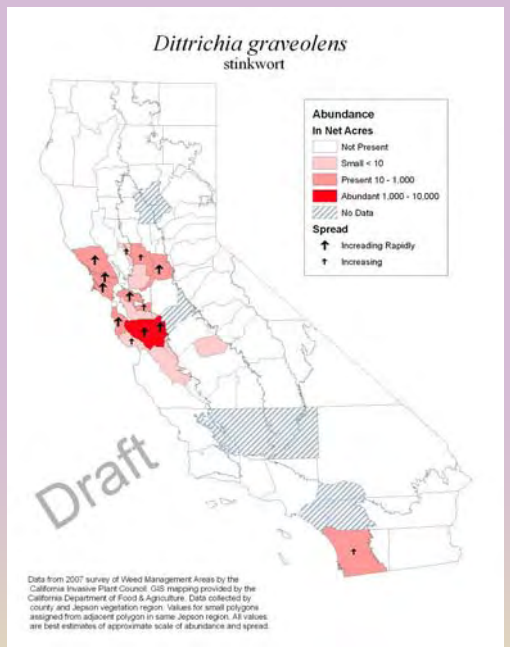




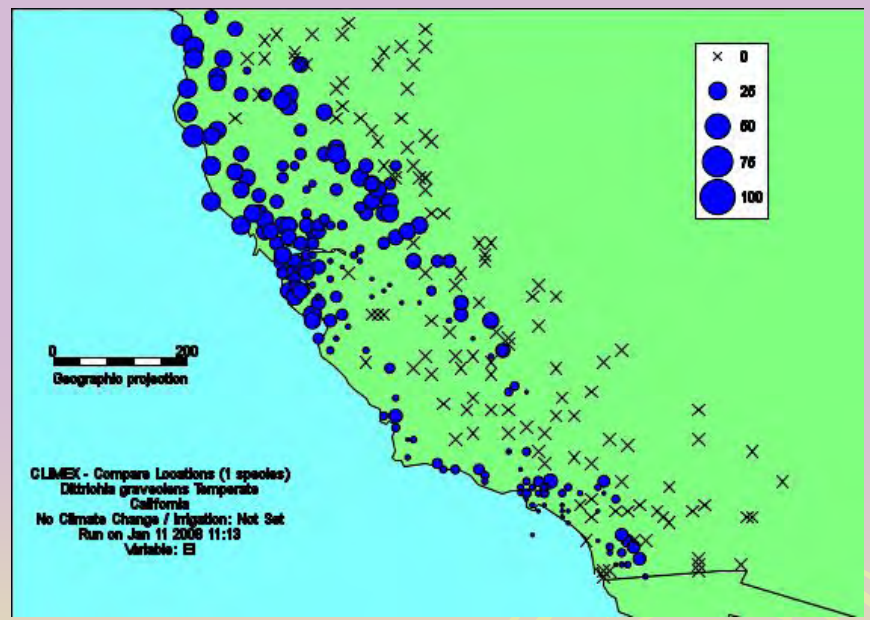
Red Sesbania Distribution in Sacramento Region

Research Needs from Interviews

- Mapping – CA needs centralized map of weed locations
- Modeling – Develop easy ways for land managers to use modeling for management



Dittrichia Statewide Map



Dittrichia CLIMEX Model

Cal-IPC Risk Assessment Project Incorporates Mapping and Modeling to Determine Which Plants May Be the Highest Risks

More Research Needs -- Invasion Dynamics

- Time cycles of invasions, use for management
- How to determine if arrived plants will expand later?
- Will some invasions die out over time and which ones?

Dittrichia graveolens
stinkwort

Expanding in Northern CA, Where Will it Spread???

4. Risk Assessment

DECISION MAKING ABOUT WHAT TO ALLOW IN AND HOW TO MANAGE WHAT WE ALREADY HAVE

Sub-Area: Screening Horticultural Plants for Invasiveness

Cal-IPC Horticultural Invasives Project (Cal-HIP)

PLANT RIGHT
KEEP INVASIVE PLANTS IN CHECK
www.plantright.org

Alternatives to Horticultural Invasives

Research Needs from Interviews

PRE-BORDER SCREENING AND ANALYSIS

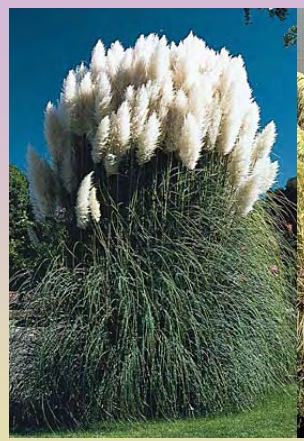
- Conduct pathway analysis for California
- Improve screening methods, use Australian model
- Develop biological information needed for existing screening models

Chinese tallow (*Sapium sebiferum*)

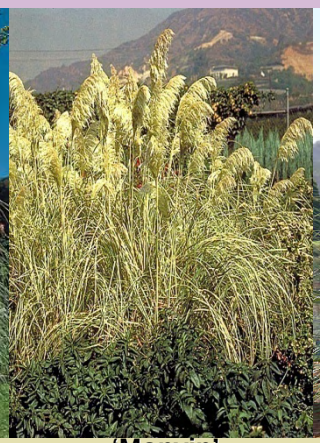
Research Needs from Interviews

POST-BORDER PRIORITIZATION AND MANAGEMENT

- Develop list of what has been introduced with date of introduction
- Methods needed for predicting invasive tendencies of unknowns
- EDRR – Early Detection Rapid Response
- Gina's Population Prioritization Model for CDFA
- Evaluation of Horticultural plants for invasiveness



Pampas Grass



'Monvin'
Sun Stripe®

'Pumila'
Ivory Feathers®

?

Which cultivars are escaping?

5. Human Pathways and Prevention

HOW ARE WE ENCOURAGING INVASIONS?

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Research Needs

- Roads
  - BMPs for reducing spread of weeds
- Changes in Fire Frequency
  - Research on fuel management in grassland, chaparral and coastal sage scrub
- Nitrogen Deposition
  - Are serpentine grasslands more invasible due to N deposition?
- Climate Change
  - Which invasive plants will become more prevalent under different climate change scenarios?

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6. Control and Management Methods

WHAT ARE THE BEST CONTROL AND MANAGEMENT ALTERNATIVES?

G. Archbald

Cal-IPC

Brusati

Research Needs from Interviews

- Herbicides
  - Which native plants are susceptible to selective herbicides?
- Fire and Flaming
  - How can fire be kept as an option in urban grasslands?
  - Which species are effectively managed with flaming?
- Grazing
  - Techniques needed to facilitate timed, high intensity grazing for weed management

Steve Hartman

Bill Baxter, CDF

Research Needs from Interviews

- Secondary ecological effects of control methods
- Replacement of ecological processes with management techniques
  - Example, can cutting or mowing be equivalent to burning?
- Encourage use of integrated techniques

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7. Restoration

WHAT HAPPENS AFTER CONTROL MEASURES?

Before and During Cape Ivy Removal, photos by GGNRA

Cape ivy seedling sprouting after removal project

Research Needs from Interviews

- How to encourage natural processes to benefit “passive restoration”
- Use of soils and “below-ground” community to improve active restoration success
- Quick and easy ways for effectiveness monitoring of restoration projects
- What does a restoration look like 10+ years after a project is finished, are the weeds back?

USFWS San Pablo Bay Refuge

Monterey CNPS Chapter

8. Economic Impacts

HOW DO WE / SHOULD WE USE OUR RESOURCES TO COMBAT INVASIVE PLANTS?

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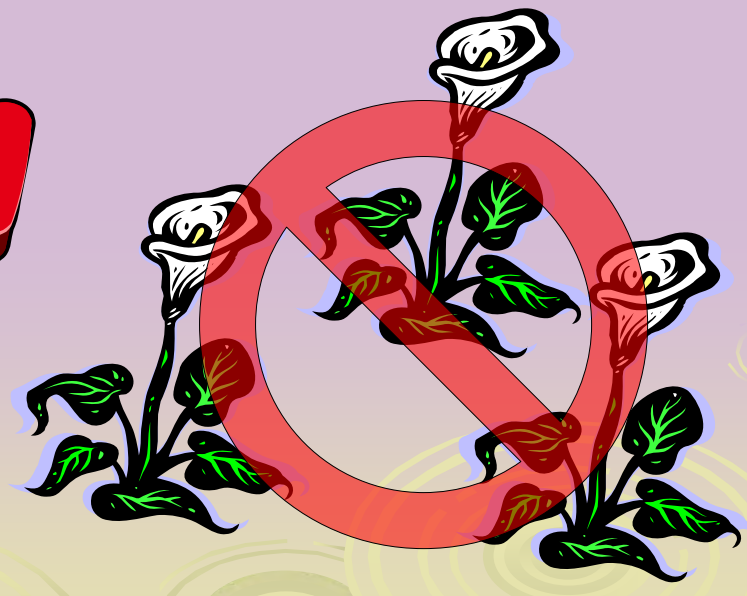

Research Needs from Interviews

- Costs/Accounting
  - What is the overall cost to the economy of invasive plants?
  - What are the real costs of different management activities?
- What is the economic value of an ecosystem service?
- What is the cost per plant in a control program and how can it be scaled up?
- Collaboration needed between economists and ecologists

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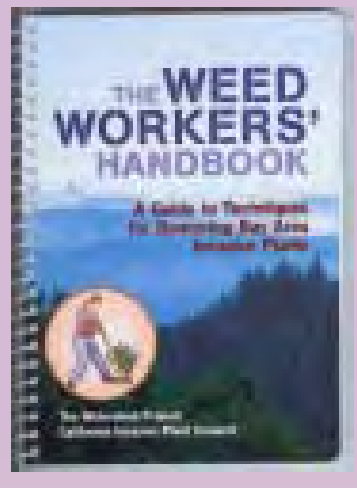
9. Social Issues

WHAT SOCIAL ASPECTS ARE CONTROLLING OUR EFFORTS TO MANAGE INVASIVE PLANTS?

Photos by Cal-IPC and Carolyn Martus



Japanese Dodder Spread in Urban Areas by Humans

Research Needs from Interviews

- Volunteer stewardship and psychology
- Messaging about invasive plants for education
- How we tell story of invasive plant projects
- Political aspects of how weed projects get done

10. Policy and Laws

WHAT SHOULD WE DO ABOUT ALL THIS?

California's Noxious and Invasive Weed Action Plan

Research Needs from Interviews

- Establish Invasive Species Advisory Council in CA
- Re-evaluate the CA Noxious Weed List for wildland weeds
- Assess performance of Weed Management Area (WMA) program
- Evaluate the success of voluntary codes of conduct vs. government regulation (Horticulture industry example)

Photos by Elizabeth Brusati, Cal-IPC

Overall Findings and Synthesis

- Synthesize research in many areas
- Gather data on economic and ecological impacts of invasive plants
- Communicate research results between academic and management communities

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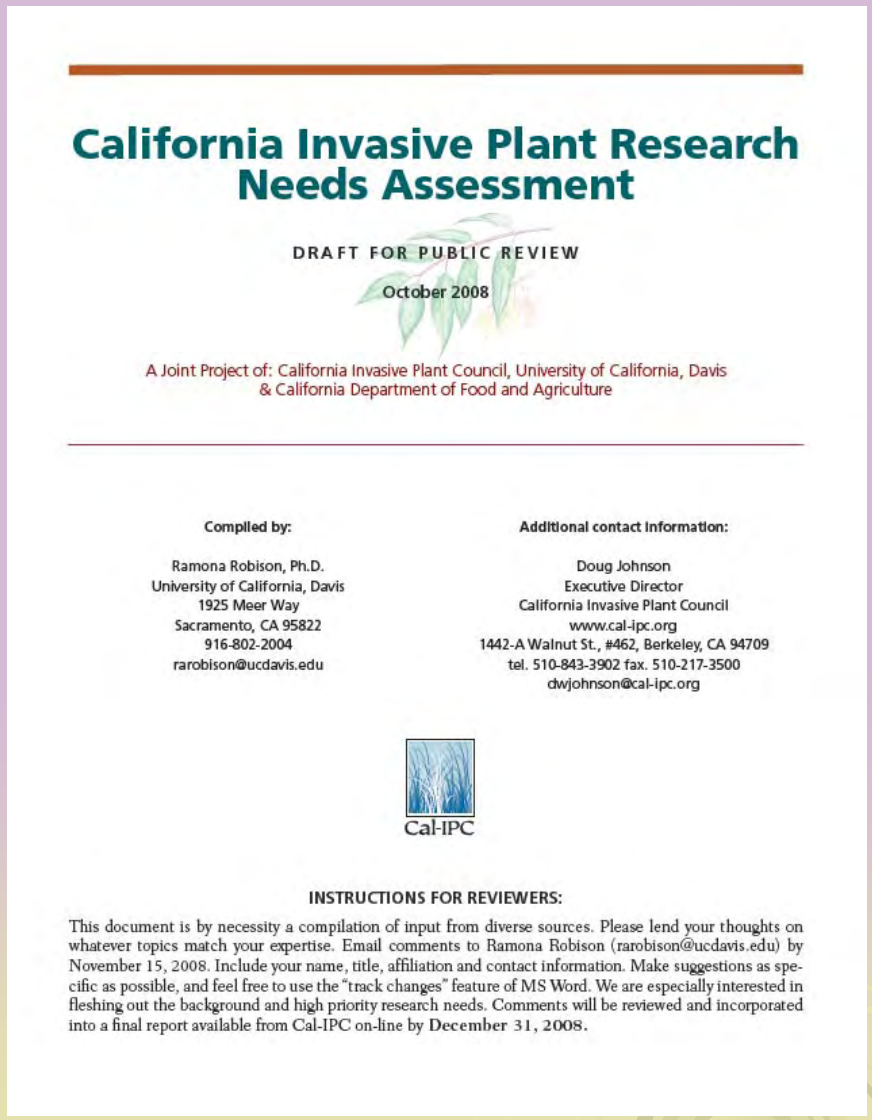
Next Steps for RNA



California Invasive Plant Research Needs Assessment

DRAFT FOR PUBLIC REVIEW

October 2008

A Joint Project of: California Invasive Plant Council, University of California, Davis & California Department of Food and Agriculture

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INSTRUCTIONS FOR REVIEWERS:

This document is by necessity a compilation of input from diverse sources. Please lend your thoughts on whatever topics match your expertise. Email comments to Ramona Robison (rarobison@ucdavis.edu) by November 15, 2008. Include your name, title, affiliation and contact information. Make suggestions as specific as possible, and feel free to use the "track changes" feature of MS Word. We are especially interested in fleshing out the background and high priority research needs. Comments will be reviewed and incorporated into a final report available from Cal-IPC on-line by **December 31, 2008.**

Draft Available for Review!

- Funding opportunities for Grad Students
- Feedback on WMA mini-grant funding topic areas…..

WMA Research Mini-Grants

Topic: Wildlife and Invasive Plant Interactions

Project: Effect of invasive *Spartina densiflora* and its removal on macroinvertebrate communities (Humboldt NWR)

Topic: What happens after a restoration project?

Project: Restoring Soil Conditions to Enhance Native Grassland Resistance to Weed Invasion (Yolo RCD)


Tussocks of dense-flowered cordgrass on a salt marsh island in the Mad River Slough.

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  - Edith Allen, Climate Change and Nitrogen Deposition (Section 5)
  - Lincoln Smith, Biological Control (Section 6)
  - Tara Athan, Economics (Section 8)
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  - Elizabeth Brusati
  - Joe DiTomaso
  - Jennifer Erskine-Ogden
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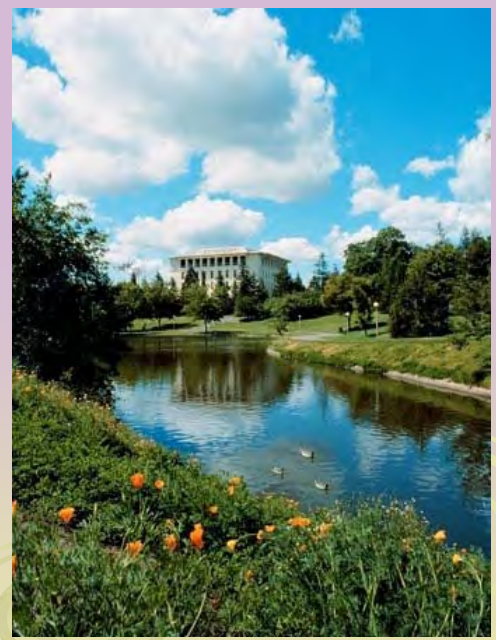

Questions?

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