



Prioritizing Weed Populations for Eradication

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Research Objectives

- Identify reasons to prioritize weed populations for eradication
- Develop a method to prioritize populations
- Test the prioritization tool on CDFA A-rated weeds
- Provide implementation strategy for the prioritization tool





Reasons to Prioritize Populations

- CDFA and County Ag Depts. 100 years of eradications
- Budget cuts decrease weed programs statewide
- Species-level assessments have limitations
- CDFA tracking over 1,700 active populations
- Need strategic process to identify the highest priority populations of the high-priority species



Leafy spurge



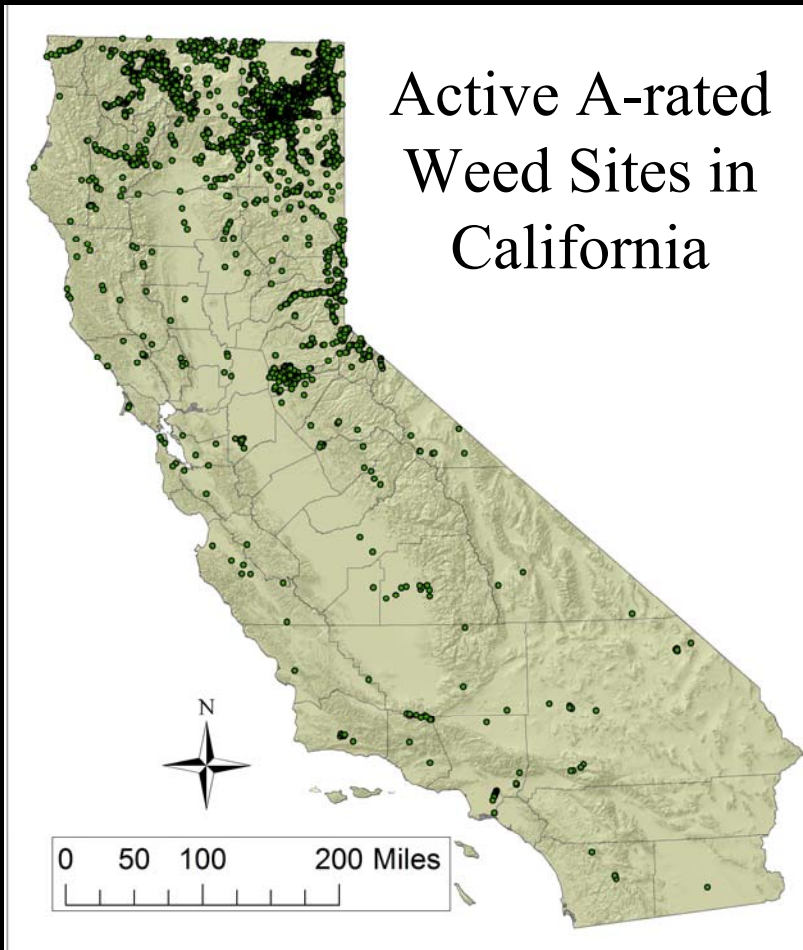
Steps to Build a Prioritization Tool

- Identify and inventory (GIS) weeds
- Choose ranking criteria
- Weight ranking criteria
- Score ranking criteria
- Rank populations
- Assess available resources
- Choose eradication targets



Biddy-biddy

Identify and Inventory Weeds



- CDFA A-rated Weeds



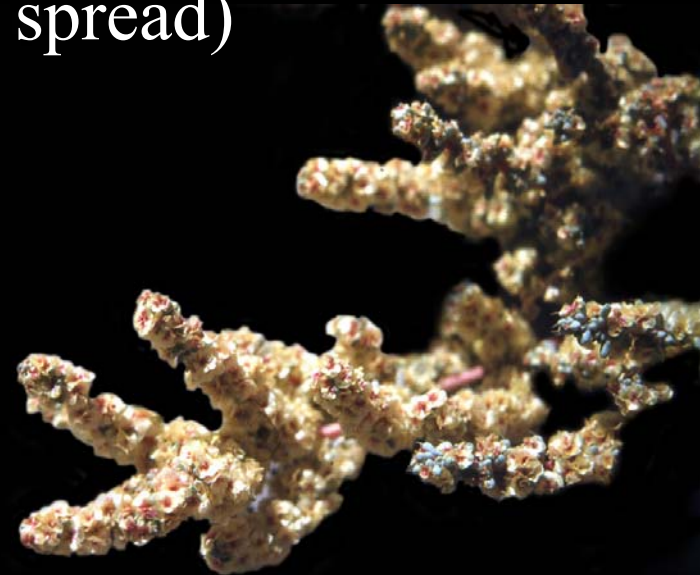
- WMA Dirty Dozen
- Cal-IPC High Alerts

Fertile capeweed



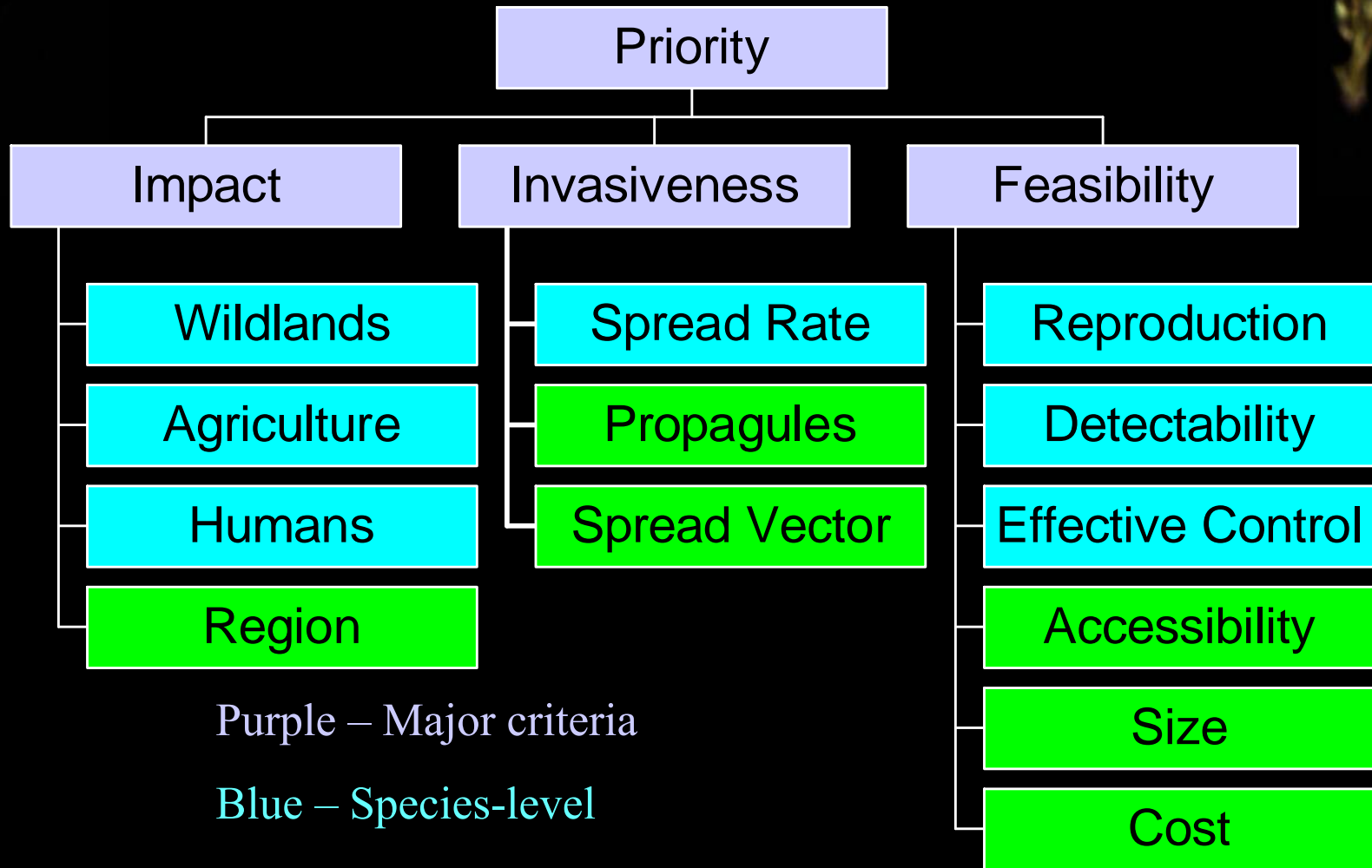
Choose Ranking Criteria

- Choose criteria that contribute most to the decision to eradicate
 - Impact
 - Invasiveness (potential rate of spread)
 - Feasibility of Eradication
- Arrange in a hierarchy



Halogeton

Ranking Criteria Hierarchy





Weight Ranking Criteria

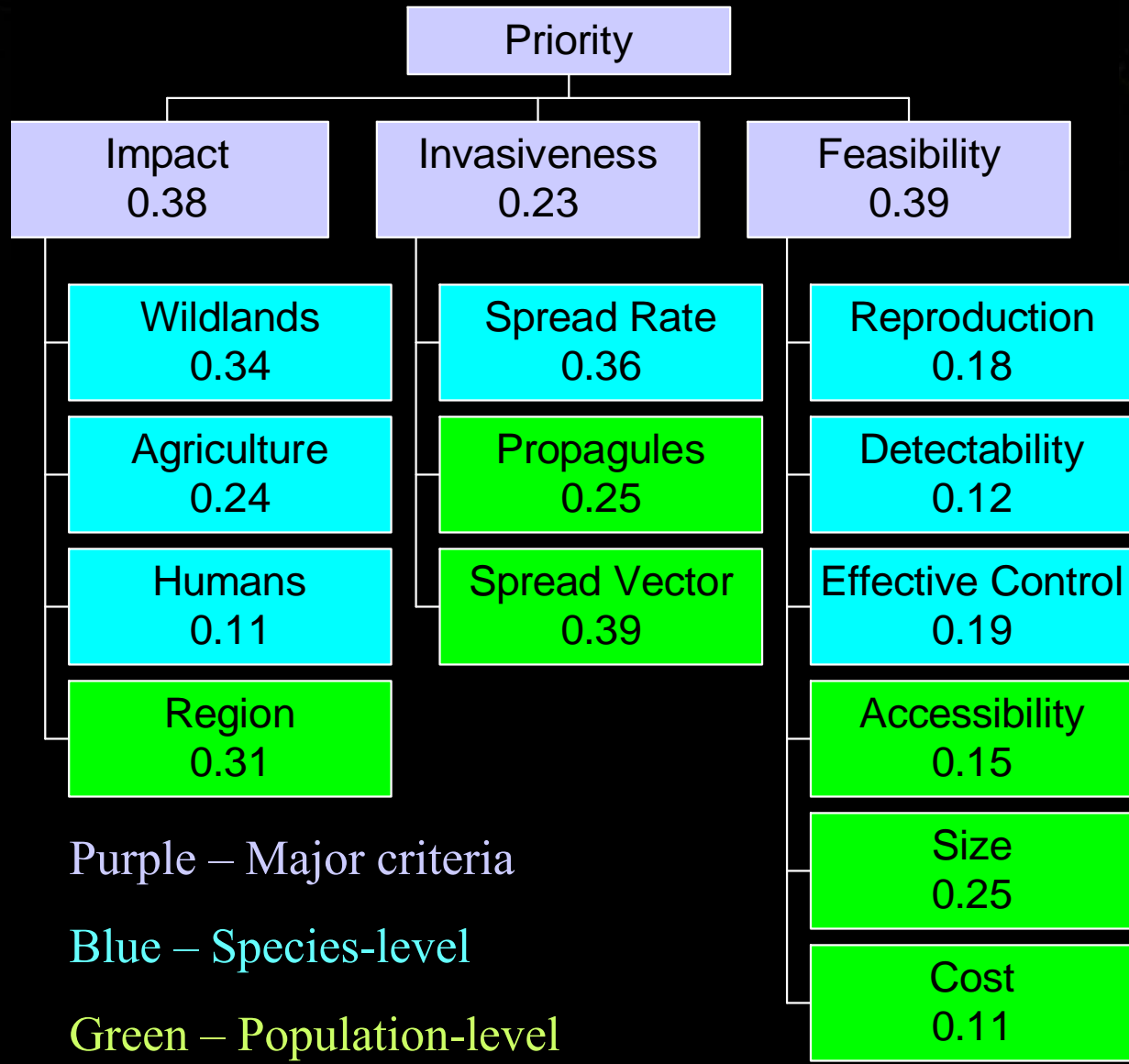
- Analytical Hierarchy Process
 - Mathematical process utilizing paired comparisons of criteria to calculate weights
- Used by Parks Victoria, Australia (1992) and Santa Monica Mtns NRA (2007)



Iberian starthistle



Ranking Criteria Weights

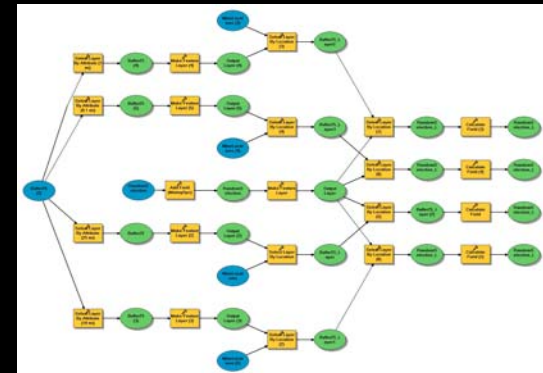


Score Ranking Criteria

- Scale to emphasize high priority attributes
 - 10 = very high; 6 = high; 3 = medium; 1 = low
- Species-level assessments
 - Cal-IPC Plant Assessment Forms
 - *Weeds of CA and other Western States*
 - Expert interviews
- Population-level assessments
 - ArcGIS geoprocessing models

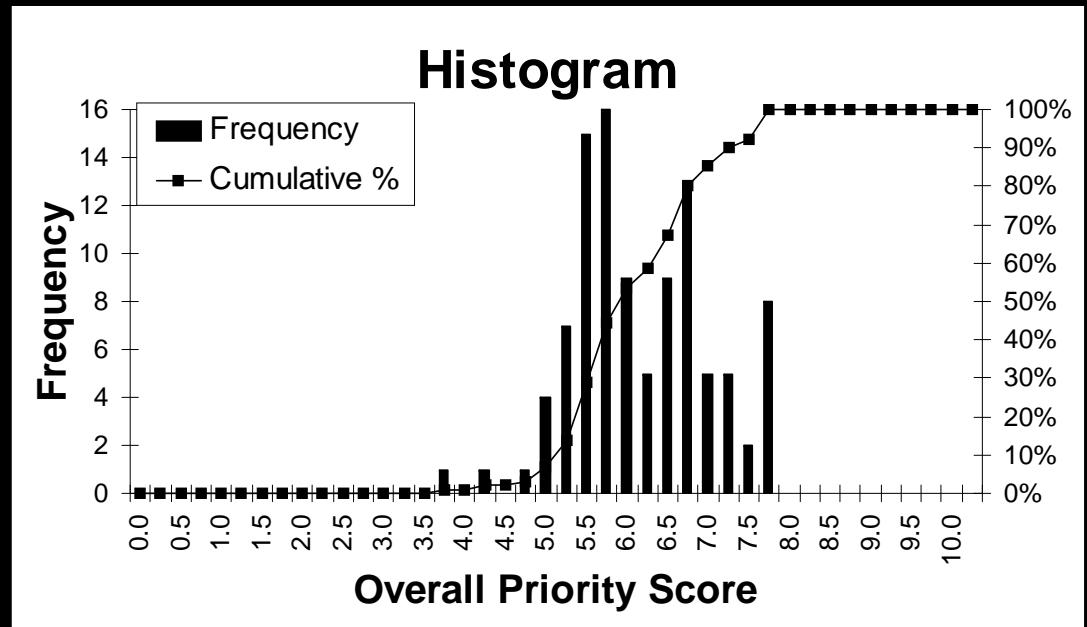


Illyrian thistle



Calculate Overall Priority Rank

- Major criteria = $\Sigma(\text{Score} * \text{Weight})_{\text{sub}}$
- Overall = $\Sigma(\text{Score} * \text{Weight})_{\text{major}}$





Assess Resources

Choose Targets

- Consider external circumstances
- Use WeedSearch™ tool to estimate cost & probability of success
- 60:30:10 approach
- Track progress using performance measures
 - Pete Holloran, Cal-IPC 2006 Proceedings
- Re-evaluate as more data become available

Skeletonweed

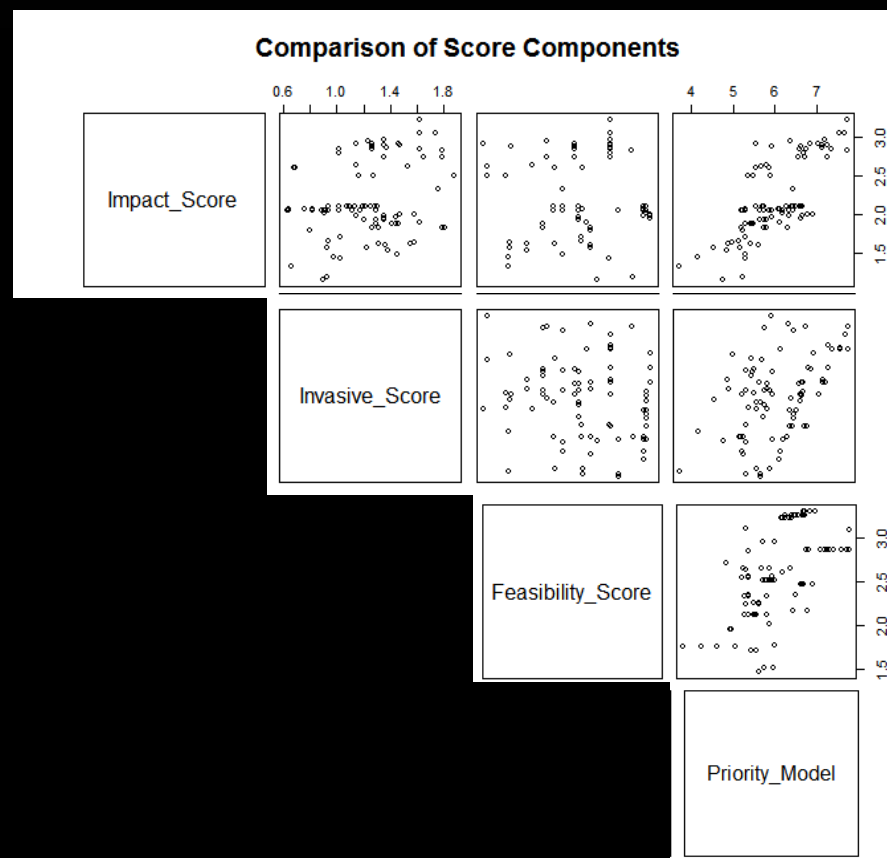


Preliminary Results



Wormleaf salsola

- Preliminary findings
 - Distribution of scores: 7.7 – 3.7
 - Species do not clump
 - Component scores not significantly correlated
- Further Analysis
 - Model validation
 - Sensitivity analysis
- Future Refinements
 - Data quality
 - Cost function
 - Decision Points





Conclusions



- Regional eradication achieves clear benefits
- Prioritization tools focus resources
- Species-level assessments do not allow for regional and population-level consideration
- This prioritization scheme is designed to address eradication of individual populations
- By strategically targeting weed populations, we minimize future spread and mitigate future impacts

Acknowledgements

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- UC Davis, Dept. of Plant Sciences
- NSF IGERT Short-term Fellowship
- UC Davis Graduate Student Association



Musk thistle



Thank you!



Dalmatian toadflax



Fertile capeweed



Punagrass



Halogeton

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Diffuse knapweed