Estimating Invasive Plant Risk to Federally Listed Plants in California's Central Coast

Jutta C. Burger and Nikki Valentine

California Invasive Plant Council

Thanks to:

- CDFW and USFWS for Section 6 funding!
- Heather Schneider and Sean Carson (Santa Barbara Bot. Garden) for partnership in the grant
- Marina LaForgia for help with plant character analysis
- Laura Riege (TNC) who supported work locally at Dangermond Preserve
- California Botanic Garden (esp. Naomi Fraga), local botanists, land managers, and other experts that contributed information to this project.

The Problem:

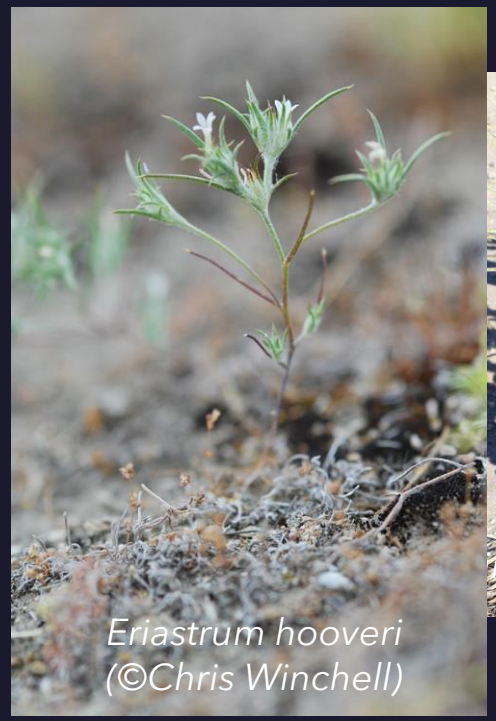
- Competition from invasive species is considered a major threat to endangered plants (Lawler et al., 2002)
- Information that has been gathered on threats has not been compiled and compared to help prioritize species and locations
- Land managers rarely have clear guidance on where and how to best reduce invasive species threats to listed species

Focus Region

- Central Coast of California
- Home to 50 federally listed Endangered and Threatened Plant Species
- ---and lots of invasive plants!

Goals

1. Develop an invasive plant risk score for listed plant species and their populations to better prioritize where more information and management is needed
2. Collect field data for three listed species to track invasive plant co-occurrence and year-by-year population variation [no time to talk about this]


Eriastrum hooveri (©Chris Winchell)


randia mereseens ssp. vill

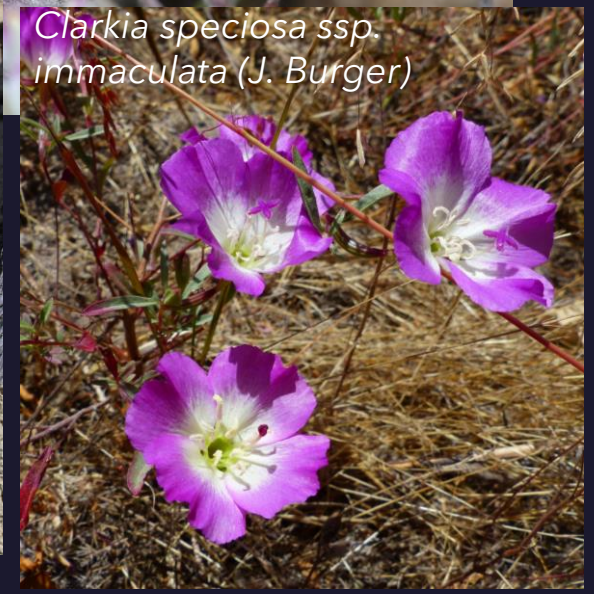

Layia carnosa (©John Doyen)


Chloropyron m. maritimum (@Chris Winchell)


Lupinus nipomensis (©Justin Luong)


Hooveria purpurea var. reducta

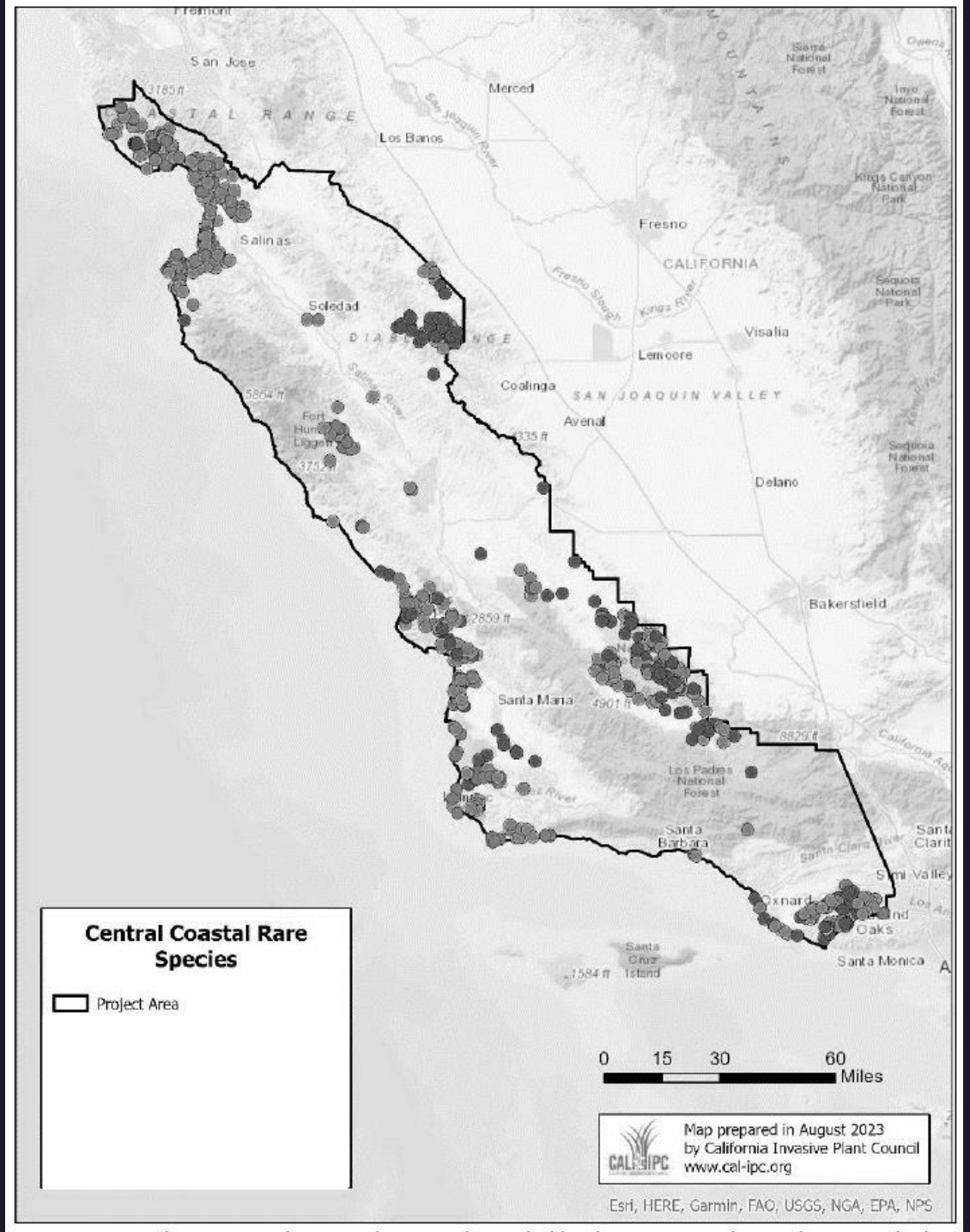

Dudleya cymosa agourensis (©Adam Searcy)


Clarkia speciosa ssp. immaculata (J. Burger)


Caulanthus californicus (©Amelia Ryan)

The Dataset

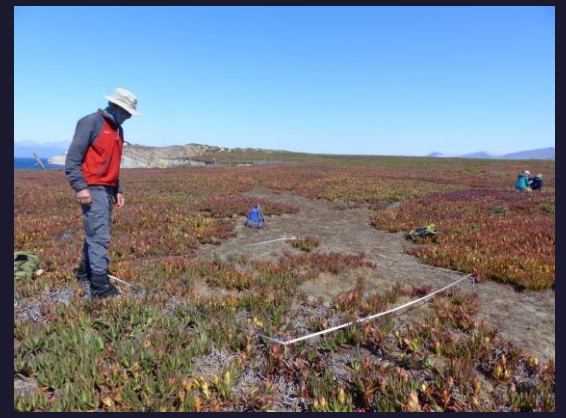
- 718 rare plant populations used (sourced from CNDDB, CAPR, CCH2, and botanists)
- 457 had some information on invasive plants
- 229 had invasive plants specifically identified as a threat
- Added in a 3-tiered confidence score based on amount of data available



Most Problematic Invasive Species

Non-native Genus / Category	# Co-occurrences at a rare plant population threatened by invasives
Bromus	71
Iceplants	66
Non-native annual grasses (unspecified)	61
Ehrharta	44

Out of 229 records with invasives considered a threat



Invasive Plant Risk Score

Scored by population

A **10-point** score by comprised of:

2 pts: Previous report of species-level invasive plant threat

4 pts: Co-occurring Cal-IPC-listed spp (1); Presence of high threat invasive species (1), Report of population-level invasive threat (2)

4 pts: Road adjacency (1); Nitrogen deposition (1); Overlap with USGS quad w/ high CDFW ACE Invasive plant stressor score (2)

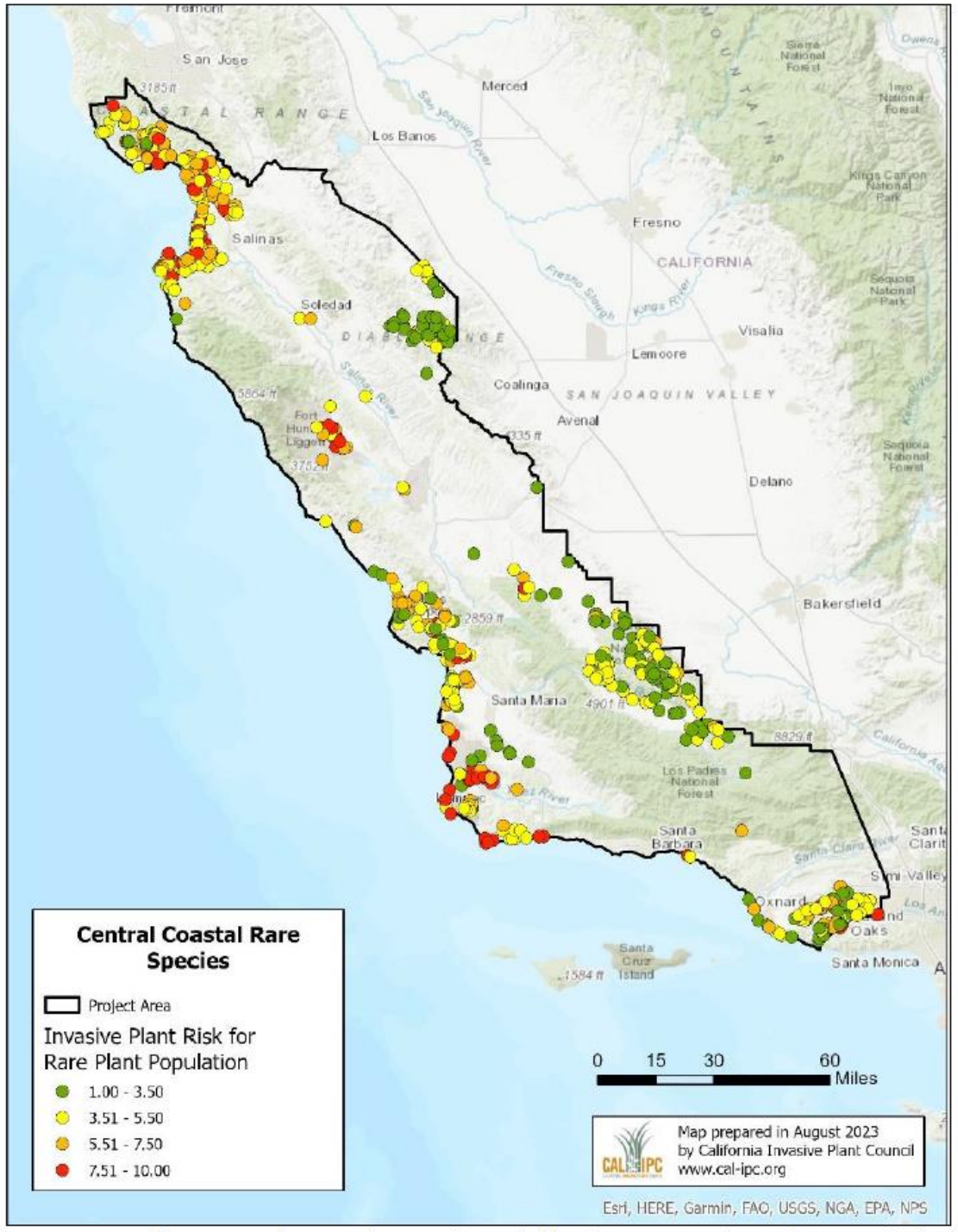
-2 pts if: Serpentine soil (-1); Perennial habit with underground storage (-0.5); Dormancy (-0.5)

Results

- 97 populations “HIGH” risk
- 160 populations “MODERATE”
- 277 populations “MODERATE-LOW”
- 184 populations “LOW”

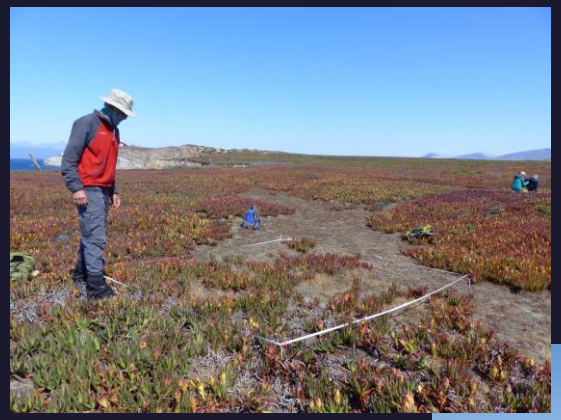
Patterns

- Coastal populations at higher risk
- Plant characteristics (structure, life history etc.) not clearly correlated with threat [data not shown]



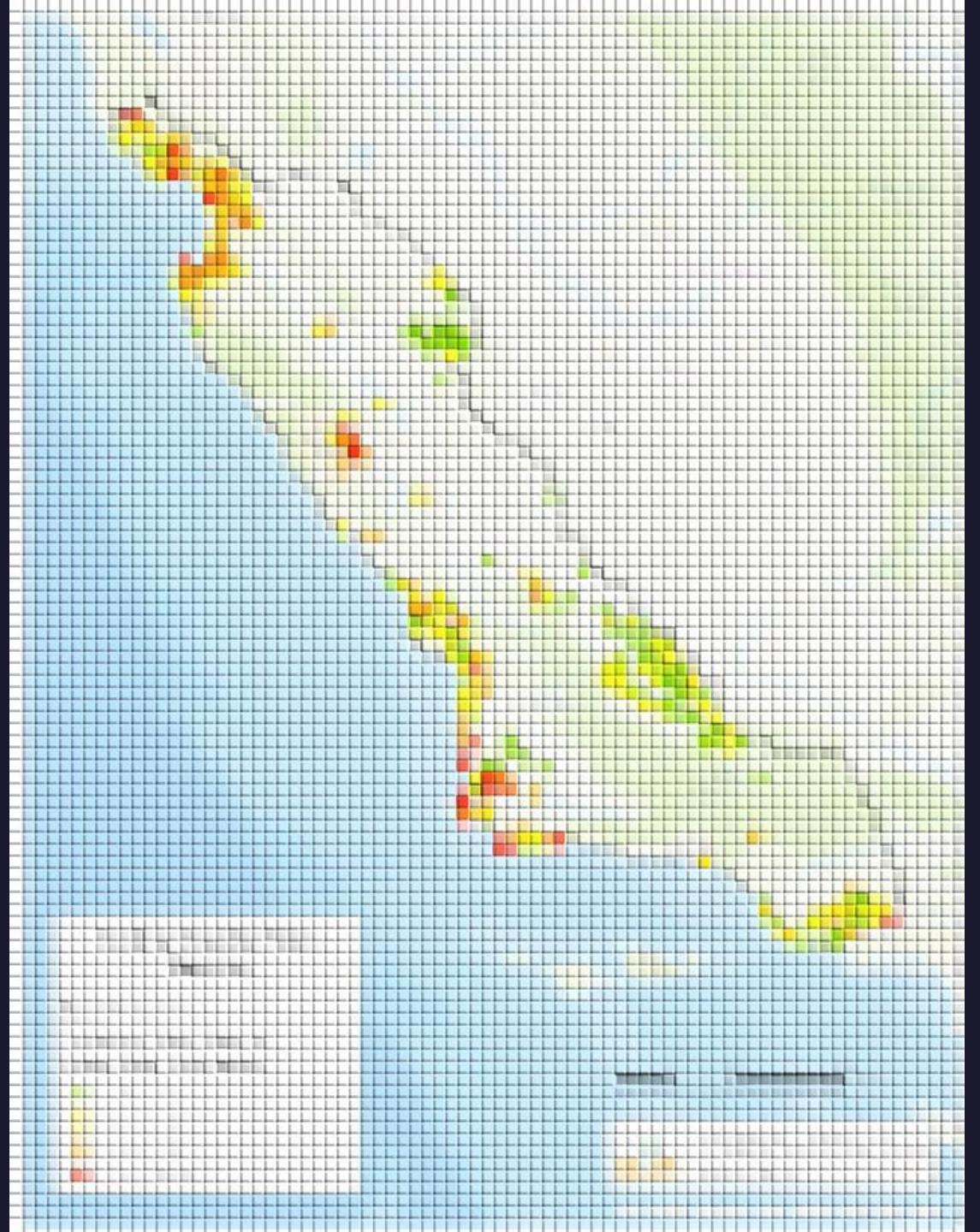
Gaviota Tarplant

- Signif. population-level variation
- Future experimental work planned for high-risk sites at Dangermond Preserve

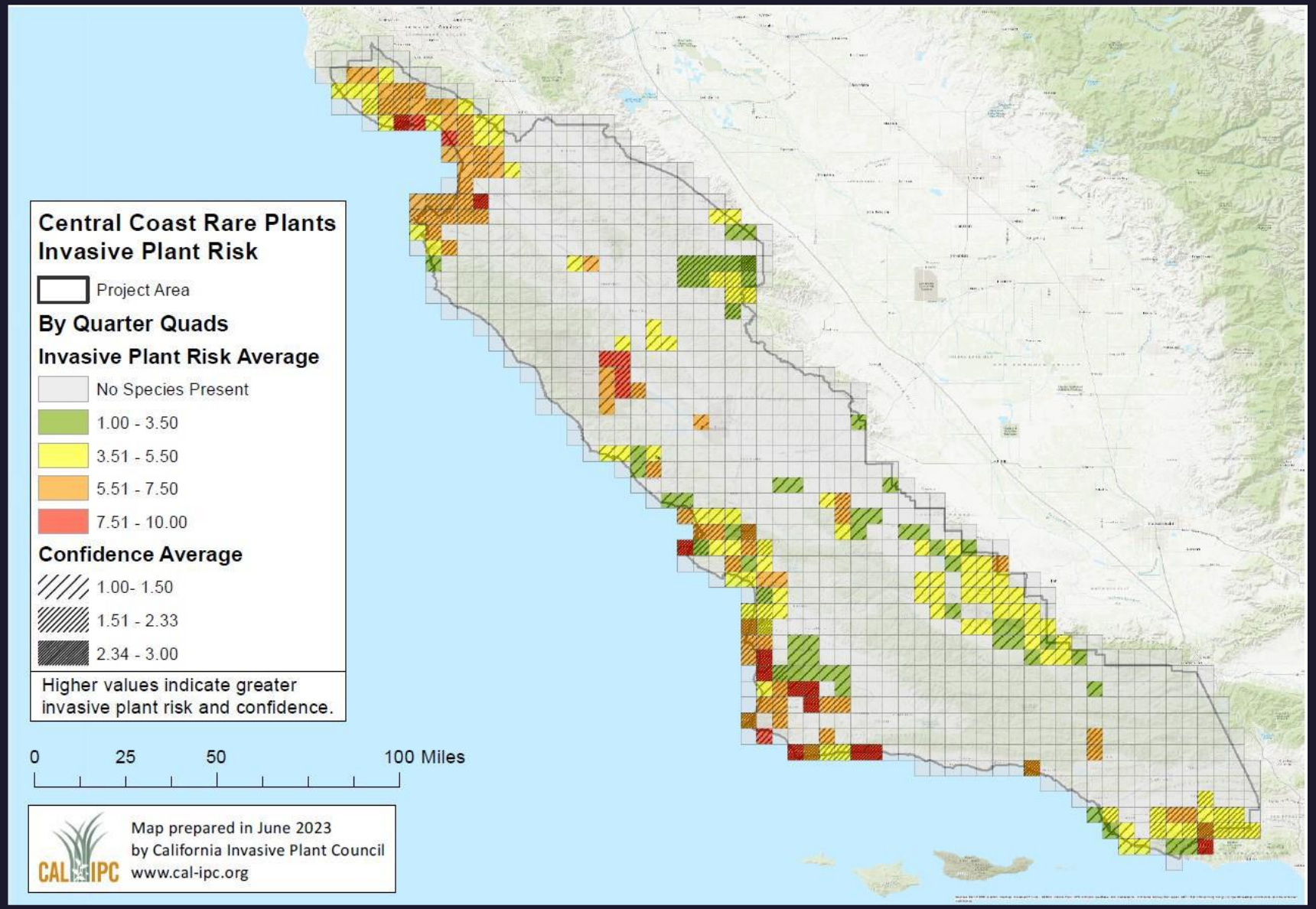


Regional Patterns

We averaged population-level scores by quarter-quad to gain insight into spatial patterns and protect location information



Results


Central Coast Rare Plants
Invasive Plant Risk
Project Area
By Quarter Quads
Invasive Plant Risk Average
No Species Present
1.00 - 3.50
3.51 - 5.50
5.51 - 7.50
7.51 - 10.00
Confidence Average
1.00- 1.50
1.51 - 2.33
2.34 - 3.00
Higher values indicate greater invasive plant risk and confidence.
0
25
50
100 Miles
CAL IPC
Map prepared in June 2023
by California Invasive Plant Council
www.cal-ipc.org

Species Risk Scores

- 17 species “HIGH” risk
- 23 species “MODERATE” risk
- 5 species “MODERATE-LOW” risk
- 5 species “LOW” risk

Species	Net Invasive Plant Risk[1]	Risk Ranking	Average Confidence	# Populations (Extant)[2]
Chorizanthe robusta var. *hartwegii*	8.92	HIGH	2.50	4
Erysimum menziesii	8.89	HIGH	1.67	9
Chorizanthe robusta var. *robusta*	8.87	HIGH	1.60	15
Potentilla hickmanii	8.75	HIGH	3.00	2
Diplacus vandenbergensis	8.74	HIGH	2.94	17
Gilia tenuiflora ssp. *arenaria*	8.70	HIGH	1.44	25
Chorizanthe pungens var. *pungens*	8.61	HIGH	1.58	50
Hooveria purpureum var. *purpureum*	8.48	HIGH	1.50	26
Layia carnosa	8.20	HIGH	2.38	8
Clarkia speciosa* ssp. *immaculata	8.15	HIGH	1.27	26
Holocarpha macradenia	8.09	HIGH	1.94	17
Hooveria purpurea* var. *reducta	8.00	HIGH	1.75	4
Chorizanthe parryi var. *fernandina*	8.00	HIGH	3.00	1
Lupinus nipomensis	8.00	HIGH	3.00	2
Chorizanthe pungens var. *hartwegiana*	7.89	HIGH	1.17	18
Polygonum hickmanii	7.67	HIGH	3.00	3
Piperia yadonii	7.54	HIGH	1.65	26
Navarretia fossalis	3.50	LOW	1.00	1
Dudleya cymosa ssp. *agourensis*	2.83	LOW	3.00	3
Camissonia benitensis	2.66	LOW	2.06	50
Eriodictyon altissimum	2.00	LOW	1.00	6
Eriastrum hooveri	1.50	LOW	1.00	1


Eriastrum hooveri (©Chris Winchell)


Imandra increscens ssp. vill

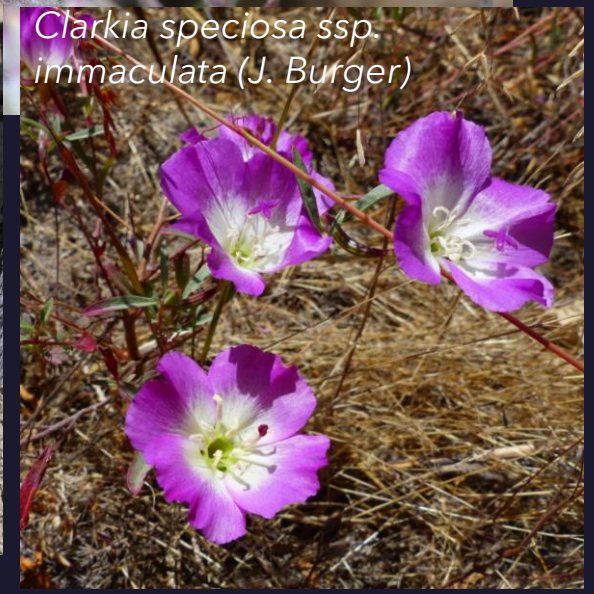

Layia carnosa (©John Doyen)


Chloropyron m. maritimum (@Chris Winchell)


Lupinus nipomensis (©Justin Luong)


Hooveria purpurea var. reducta


Dudleya cymosa agourensis (©Adam Searcy)


Clarkia speciosa ssp. immaculata (J. Burger)


Caulanthus californicus (©Amelia Ryan)


Eriastrum hooveri (©Chris Winchell)


Deinandra increscens ssp. villosa


Layia carnosa (©John Doyen)


Lupinus nipomensis (©Justin Luong)


Chloropyron m. maritimum (@Chris Winchell)


Hooveria purpurea var. reducta


Dudleya cymosa (©Adam Searcy)


Clarkia speciosa ssp. immaculata


Caulanthus californicus (©Amelia Ryan)

Next Steps

- Make risk scores and quarter-quad dataset available to public
- Incorporate climate change vulnerability w/ Tom Robinson Consulting and Stuart Weiss
- Expand risk scoring for other regions
- Conduct field trial on effects of periodic invasive grass and iceplant removal
- Encourage standardized data entry for co-occurring invasive plants and their potential risk

Thank You!

jburger@cal-ipc.org
nvalentine@cal-ipc.org