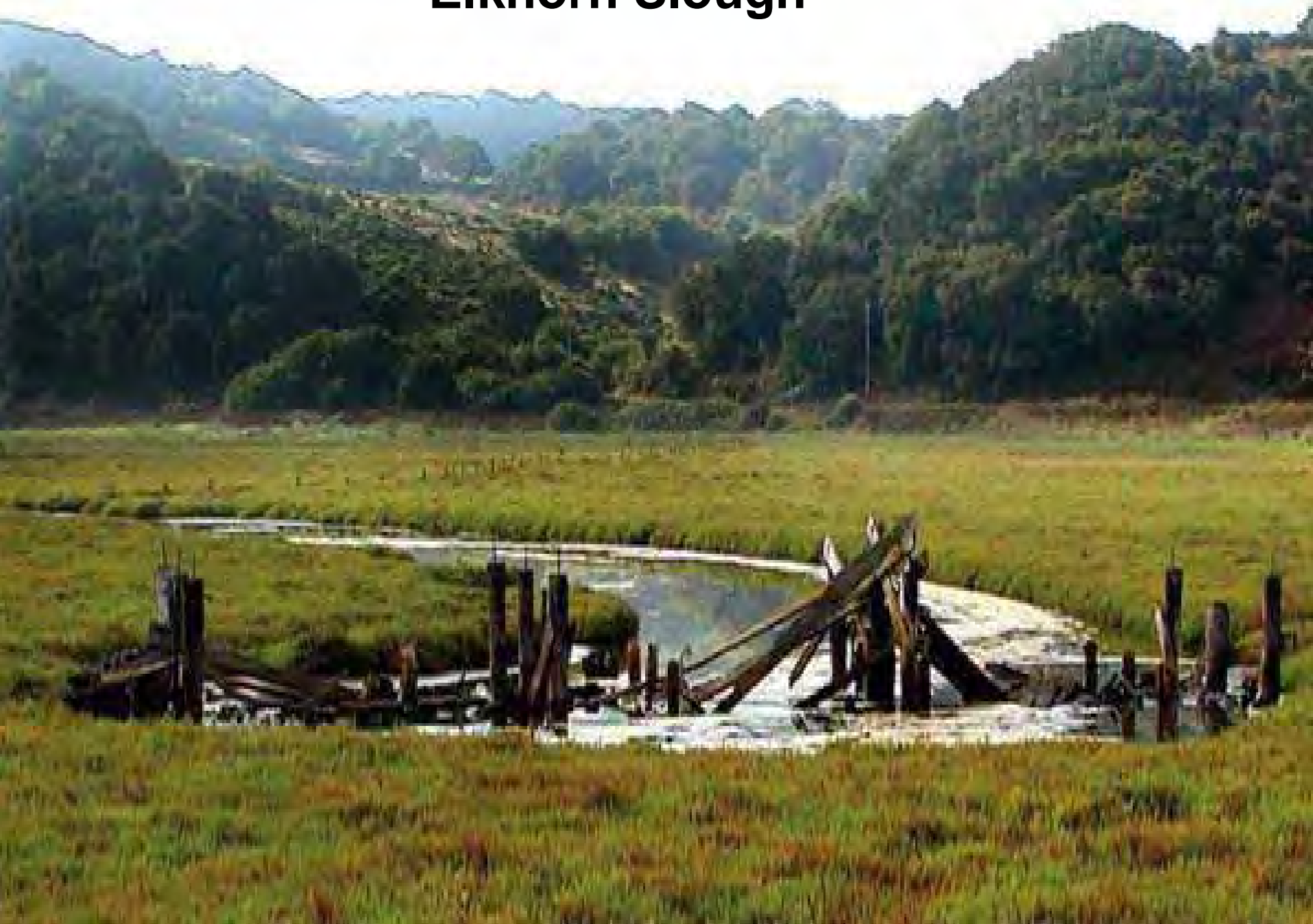


# Distribution and Abundance of *Cuscuta salina* (Salt Marsh Dodder) at Elkhorn Slough

Katie Griffith

University of California, Santa Cruz

# Elkhorn Slough



# *Cuscuta salina*: a parasitic plant

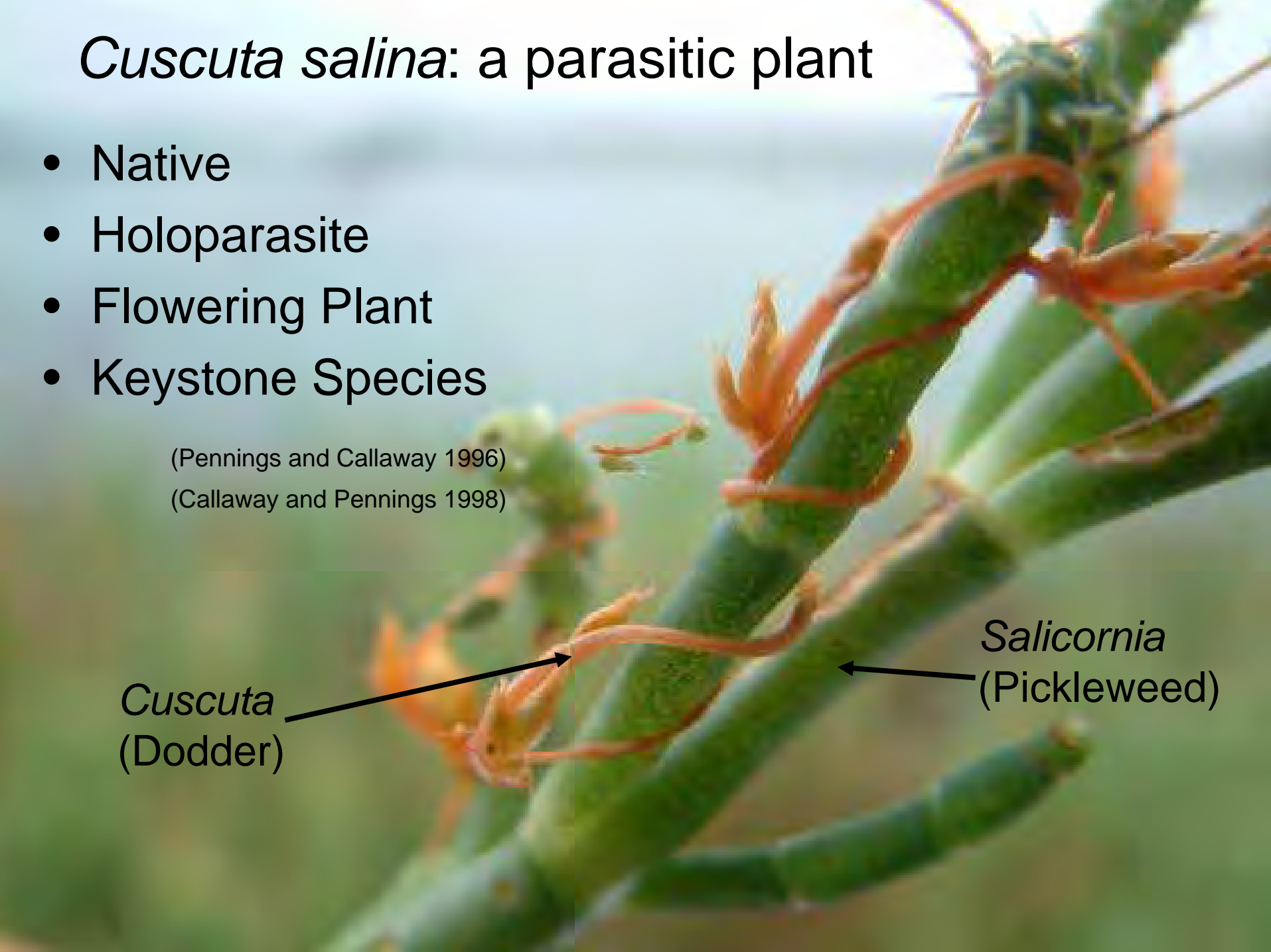
- Native
- Holoparasite
- Flowering Plant
- Keystone Species

(Pennings and Callaway 1996)

(Callaway and Pennings 1998)

*Cuscuta*  
(Dodder)

*Salicornia*  
(Pickleweed)









# Patchy Distribution!!

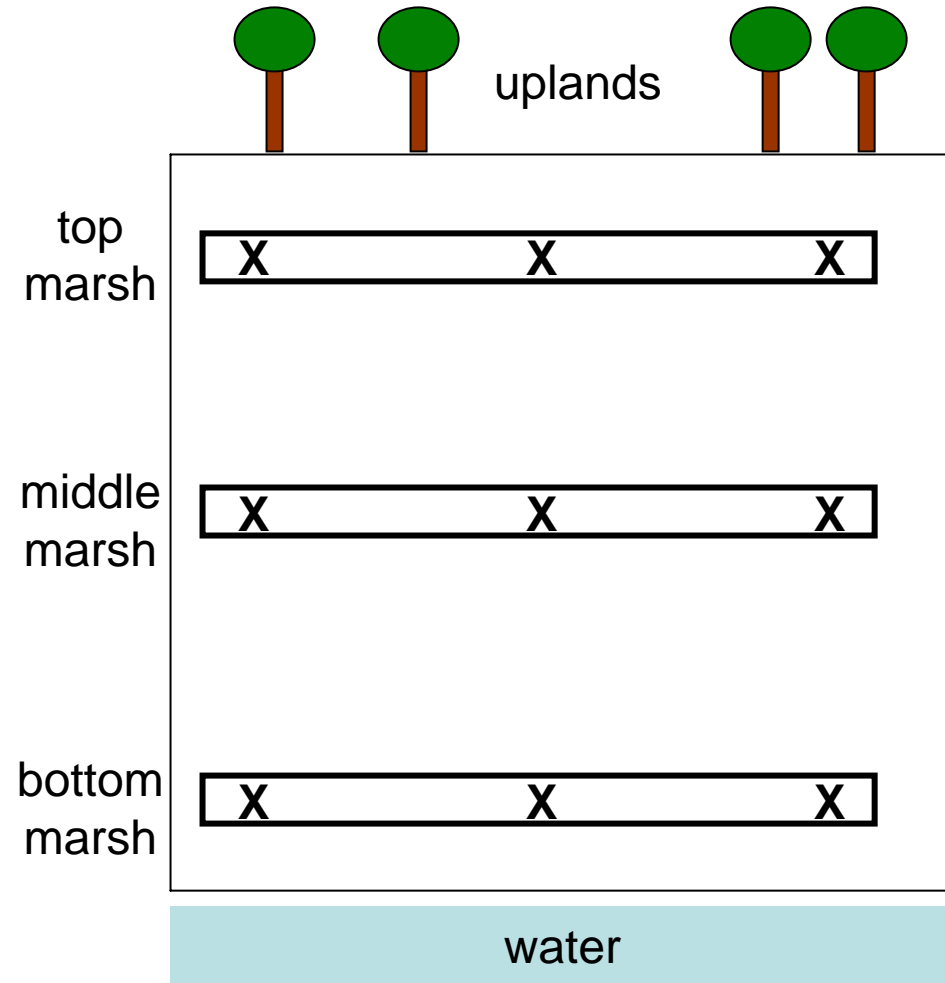
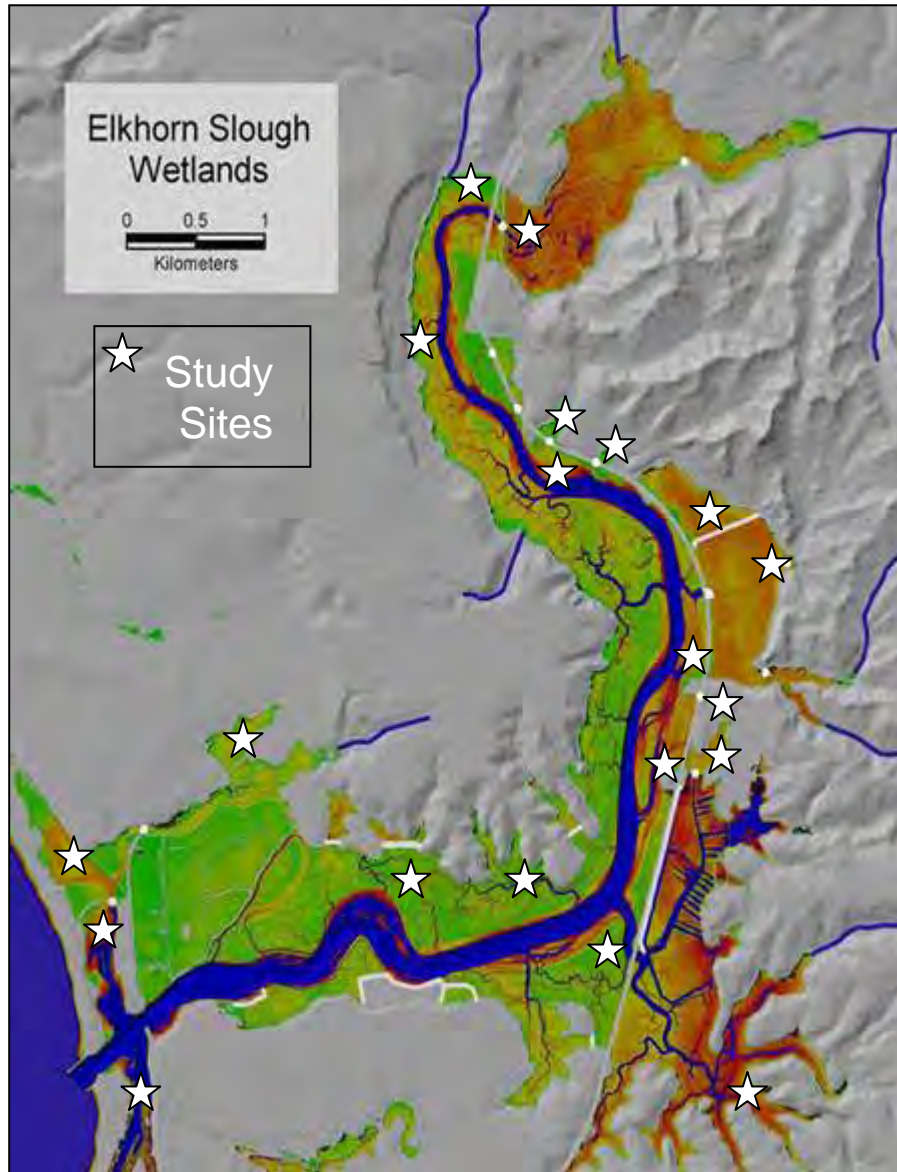


# Goal of Research

What limits the distribution and abundance of Dodder at Elkhorn Slough?

- Seed Recruitment
- Abiotic Conditions
- Host (Pickleweed) Quality

# Experimental Design



X = sampling location

# Sampling and Analysis

**In the Field:** Sediment Cores (Abiotic Conditions)

Pickleweed Tissue (Host Quality)

Wrack (Seed Recruitment)

Dodder Presence / Percent Cover

**In the Lab:**

Sediment Moisture, Salinity,  $\text{NO}_3\text{-N}$ ,  $\text{NH}_4\text{-N}$

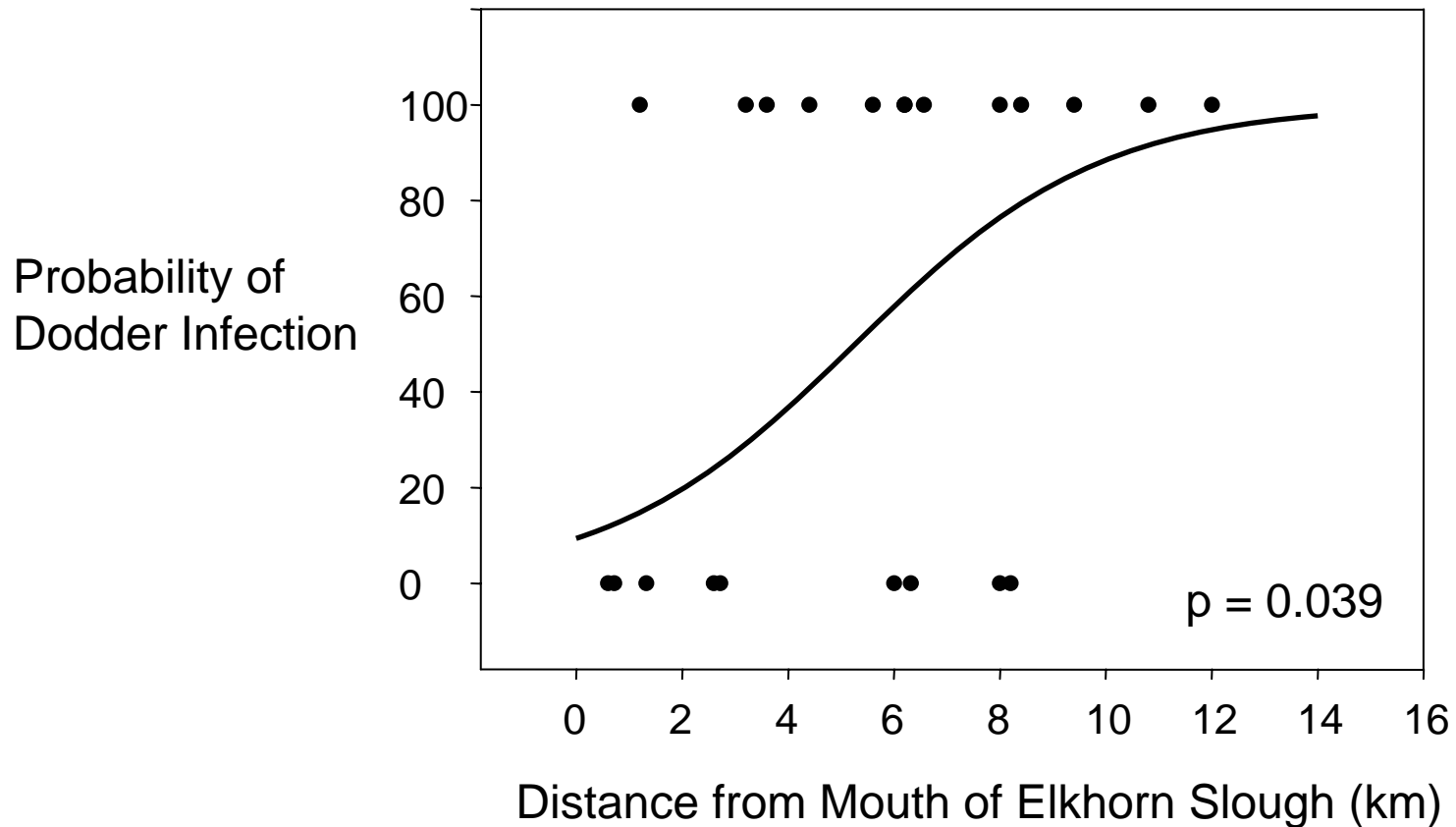
Pickleweed Salinity, %N, %C, C:N ratio

Counted any dodder seeds in wrack



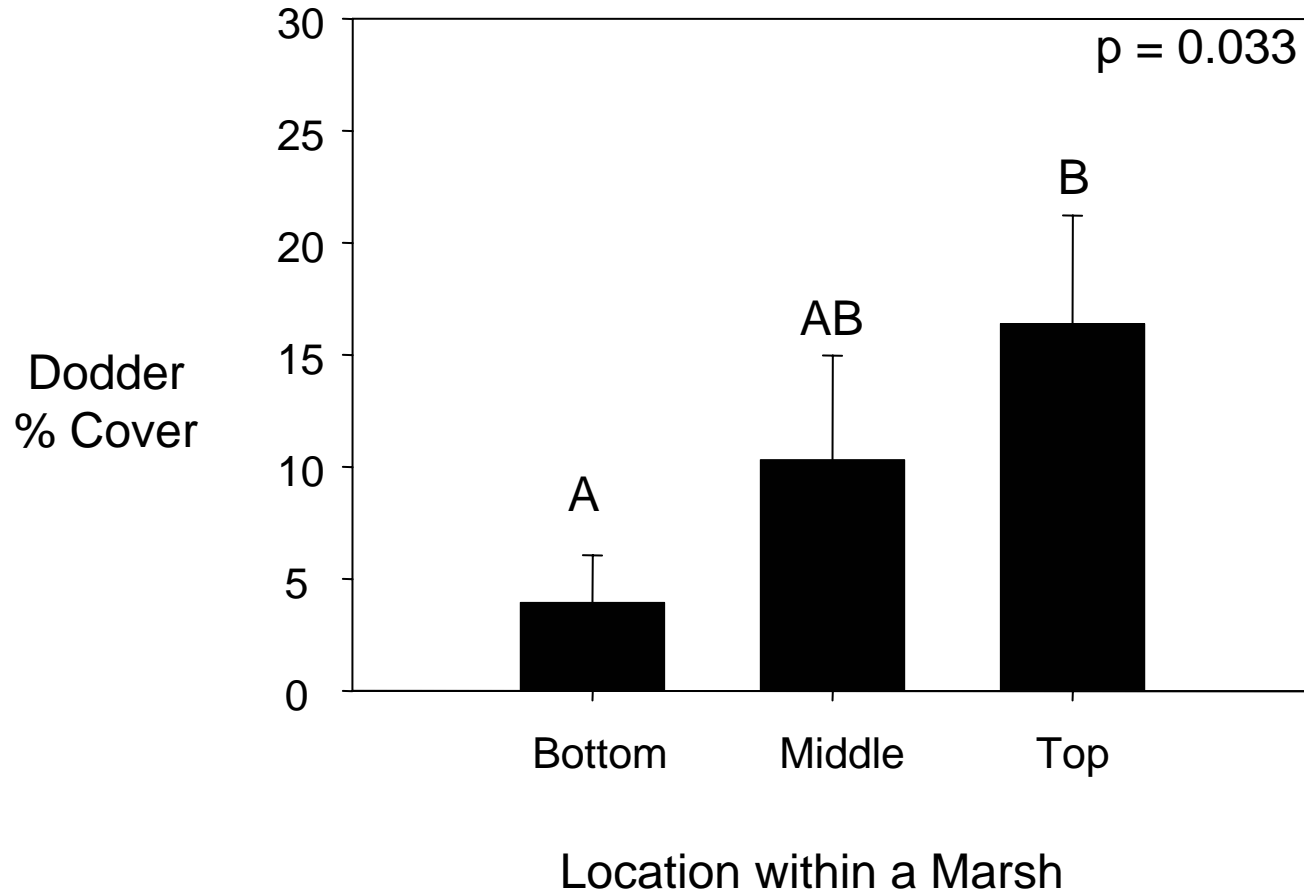
# Results

## Distance from the Mouth of Elkhorn Slough Predicts Dodder Presence



# Results

## Tidal Height is Associated with Dodder Abundance



# Results

**X** Composite Variable 1:  
N/S

Pickleweed %N  
Pickleweed C:N

**X** Composite Variable 2:  
N/S

Soil NO<sub>3</sub>  
Soil NH<sub>4</sub>  
Soil Moisture  
Soil Salinity

Relationship  
with Dodder\*?

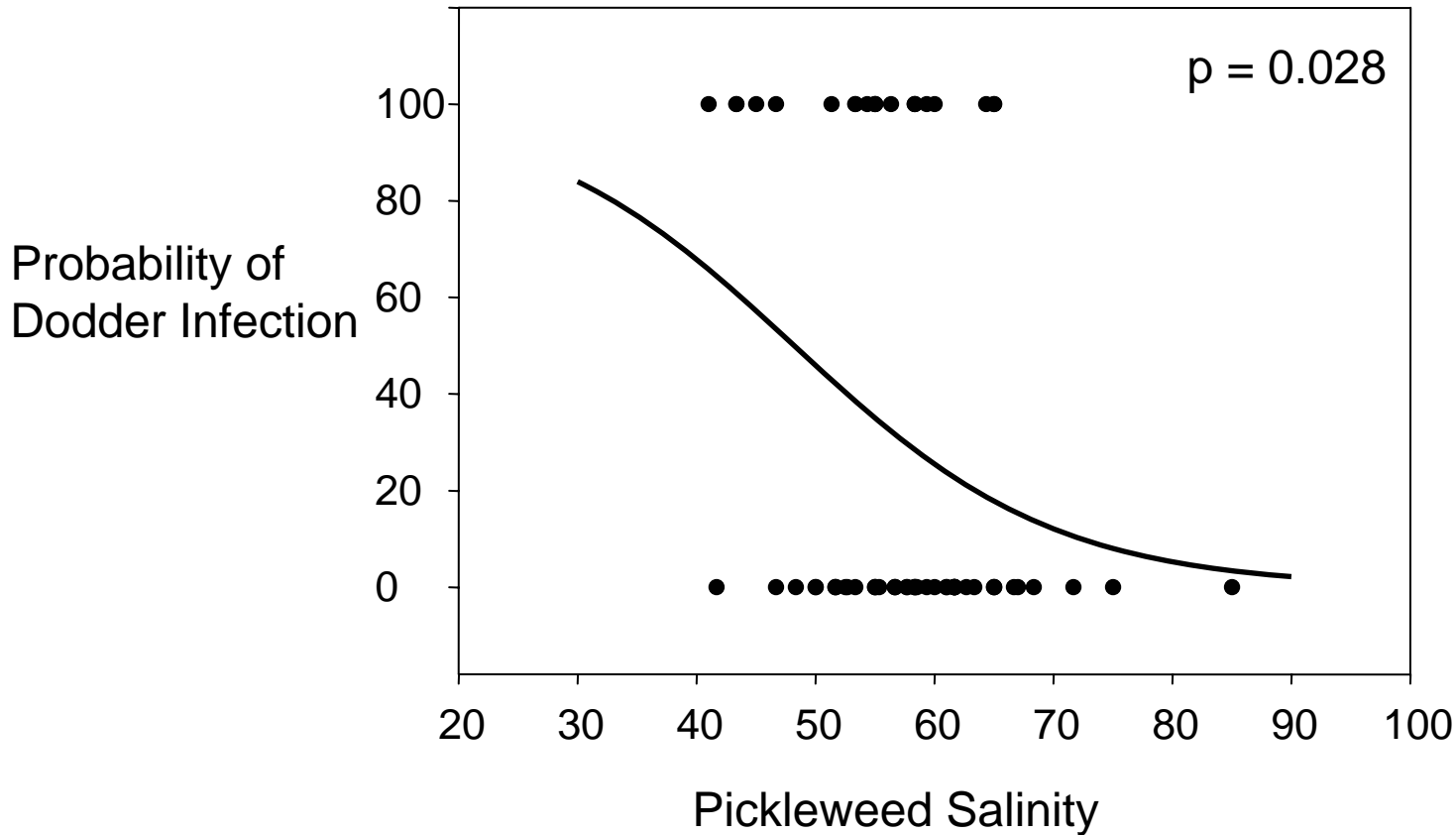
**✓** Composite Variable 3:  
 $p = 0.057$

Pickleweed Salinity  
Water Salinity  
Pickleweed %C

\* Logistic Regressions

# Results

## Pickleweed Salinity Predicts Dodder Presence



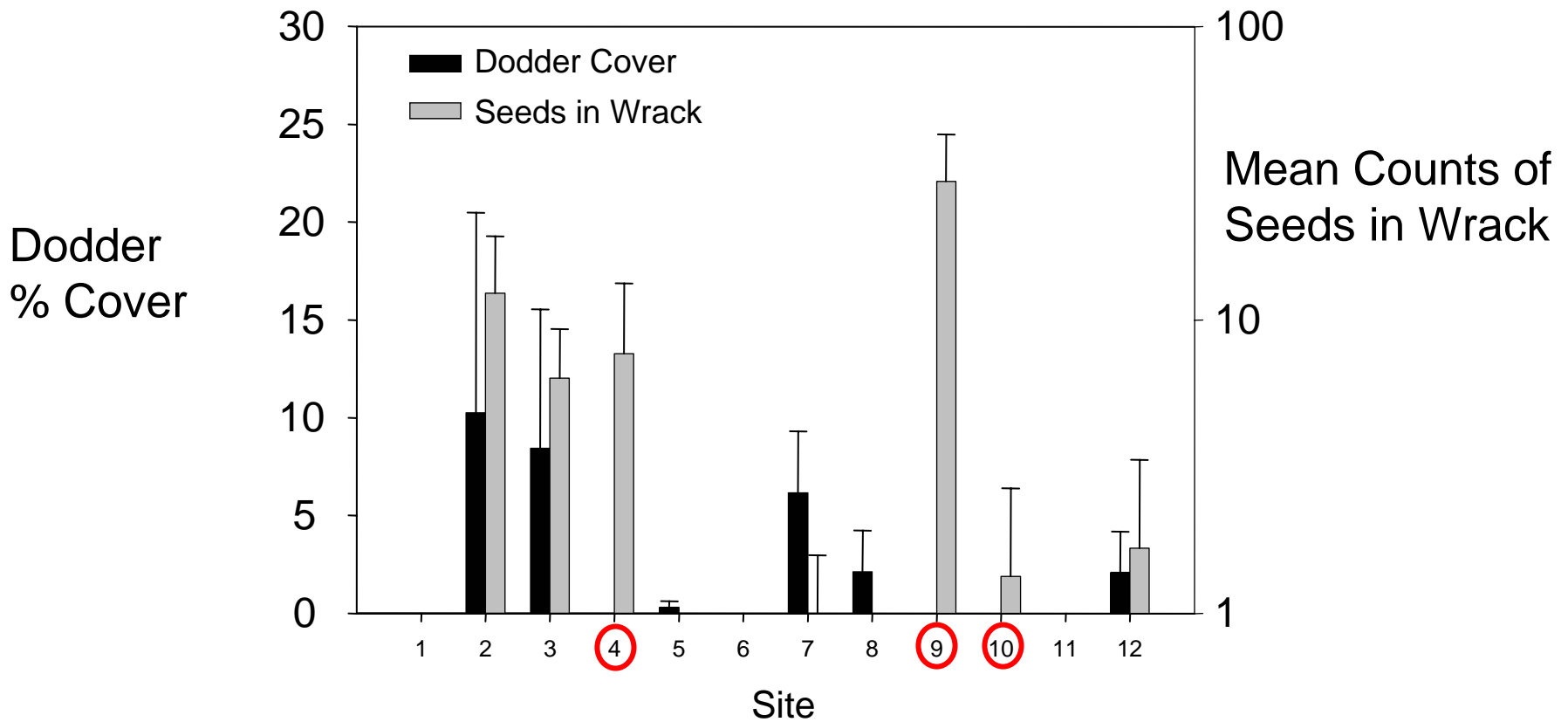
# Results

Seeds recruit to new sites with wrack



# Results

Seeds recruit to new sites with wrack



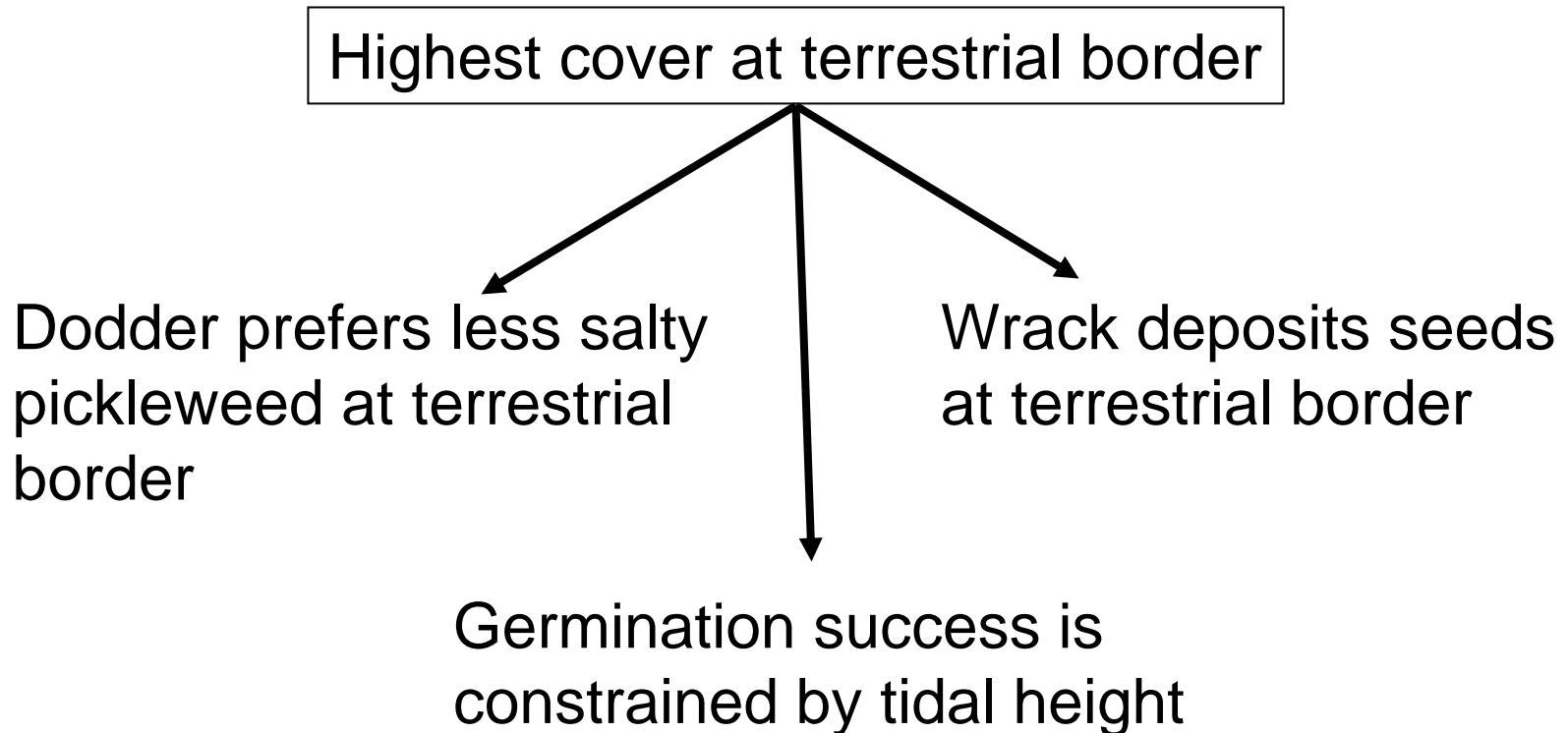
# Summary

Patterns emerge at 3 different spatial scales

1. Scale of Estuary
2. Scale of Marsh
3. Scale of Host

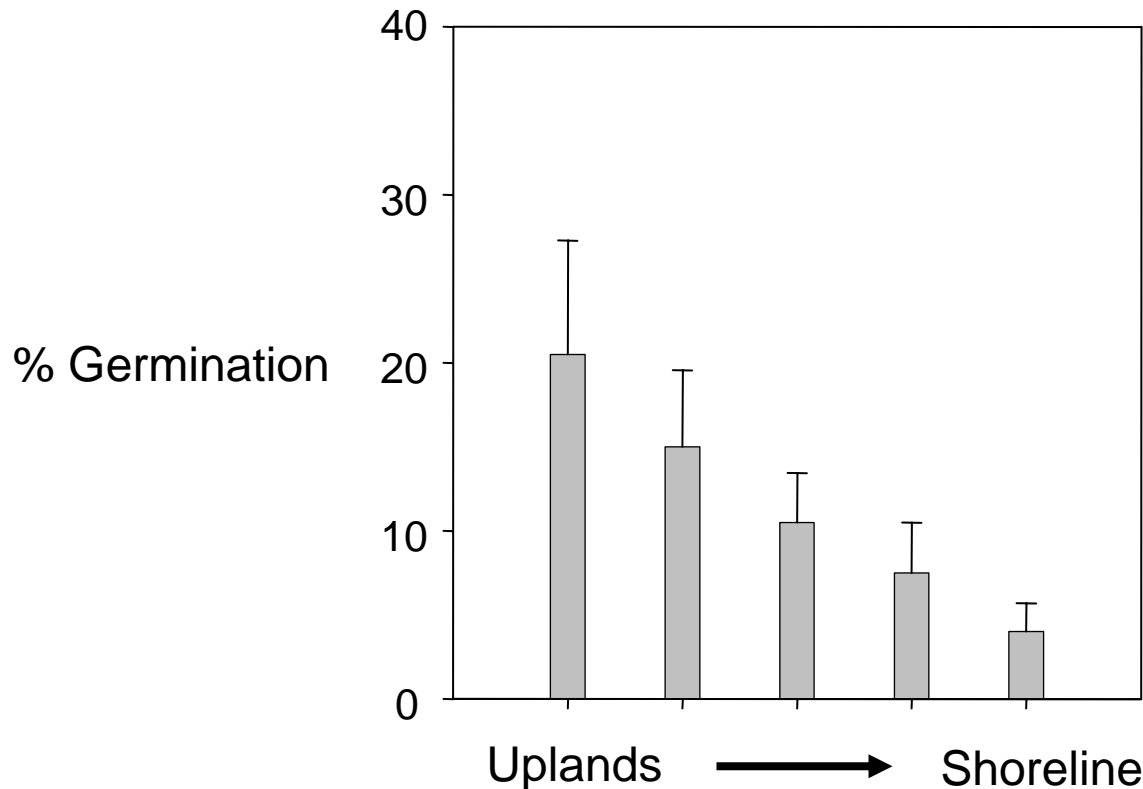
# More questions...

**What factors are driving these patterns?**



# Possible mechanism


## Tidal Height May Affect Germination Success



ANOVA:  $p = 0.047$

Hypothesis Test of a Linear Pattern:  $p = 0.003$

# Conclusions

1. Early stages of life cycle may have a disproportionate influence on distribution
  2. Host quality likely plays a role
  3. If (soil, host) salinity is important, then hydrological manipulations may affect dodder distribution and, in turn, the salt marsh community
- 
- A person wearing a wide-brimmed hat and a red shirt is bent over in a field, examining a plant. The field is filled with green grass and patches of orange-brown plants, likely dodder. The background shows a flat landscape under a hazy sky.

# Acknowledgments

Advisors: Todd Newberry and Pete Raimondi

Committee: Kerstin Wasson and Raphe Kudela

ESNERR, ESF, Packard Ranch

Thanks to: Alden Griffith, Mike Kennedy, Megan Gunvalson, Emma Reimer, Elena Finkbeiner, Marc Los Huertos, Rob Franks, tractor guy

**Funding: NOAA NERRS Fellowship, CDELSI, CNPS, STEPS, Myers Trust, Friends of Long Marine Lab**



Questions?



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