

The effects of drought and salinity on seed germination in three wetland species

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Introduction

- Suisun Marsh is a brackish wetland fed by the San Pablo Bay and the San Joaquin Delta
- Increases in urbanization and agriculture, along with warming global temperatures, are leading to drier, saltier conditions in Suisun Marsh
- Land managers need strategies for combatting worsening conditions
- Finding native species most suited to projected future conditions is a priority



Objectives

- Evaluate effects of salinity and drought on seed germination in three species for potential use in restoration of Suisun Marsh.
- Use experimental data to inform land managers of potential strategies for changing conditions.

Conclusions

- As the Suisun Marsh continues to experience increasing levels of drought and salinity, germination of native species may be negatively impacted.
- Shifts in community composition will be important for land managers to consider as warming climate, urbanization of the surrounding area, and increased diversion of water to support agriculture continue to strain the Suisun Marsh.
- Halophyte species, such as *S. pacifica* or *F. salina*, that showed higher performance in saline treatments might be considered for use in restoration of the Suisun Marsh as conditions become drier and more saline.

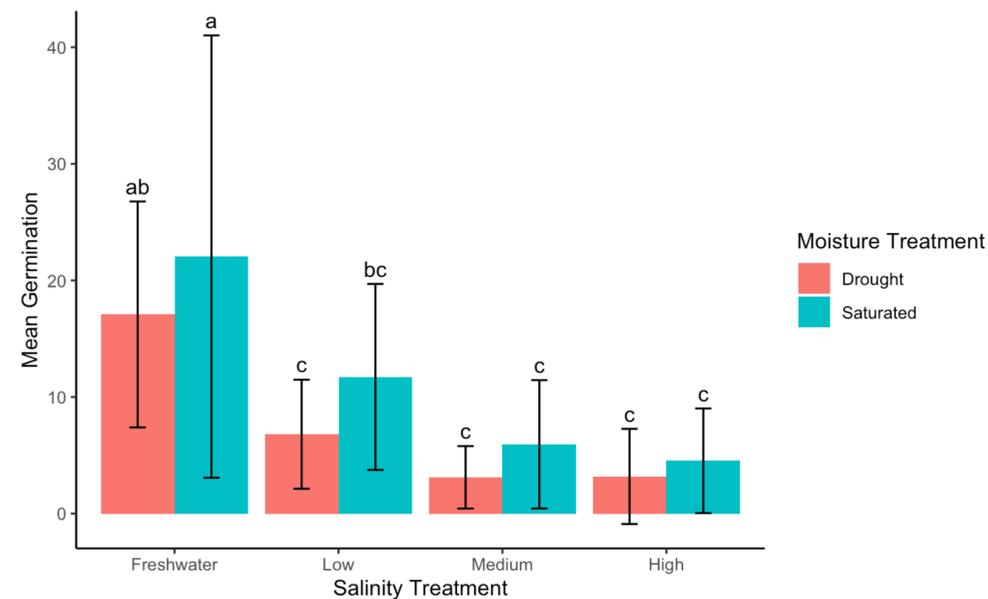


Figure 1: Total germination of all species in each salinity treatment.

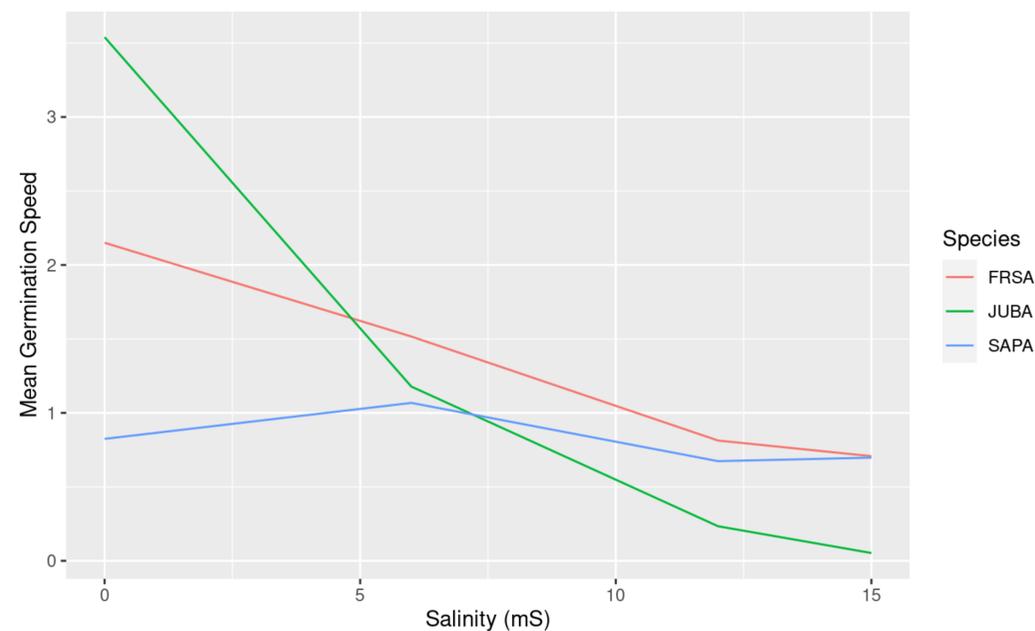


Figure 2: Each species' speed of germination in varying levels of salinity.

Methods

Performed a greenhouse experiment manipulating water & salinity levels:

- 4 salinity levels (Freshwater, Low (6 mS), Medium (12mS), High (15mS))
- 2 moisture levels (Drought and Saturated)
- 3 wetland species (*Juncus balticus*, *Salicornia pacifica*, *Frankenia salina*)

Determined germination speed and total germination of each wetland species. Assessed effects of drought and salinity on germination using a two-way ANOVA



Results

- The highest levels of germination were observed in the freshwater treatments.
- Both total germination and germination speed tended to decrease as salinity increased. Saturated treatments consistently showed higher germination than drought treatments across all salinity levels.
- Freshwater treatment had significantly higher germination compared to all salinity treatments.



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