A Population Approach to Understanding Mechanisms Controlling the Submerged Aquatic Vegetation species *Ruppia maritima* L. (widgeongrass) at the Everglades-Florida Bay Ecotone

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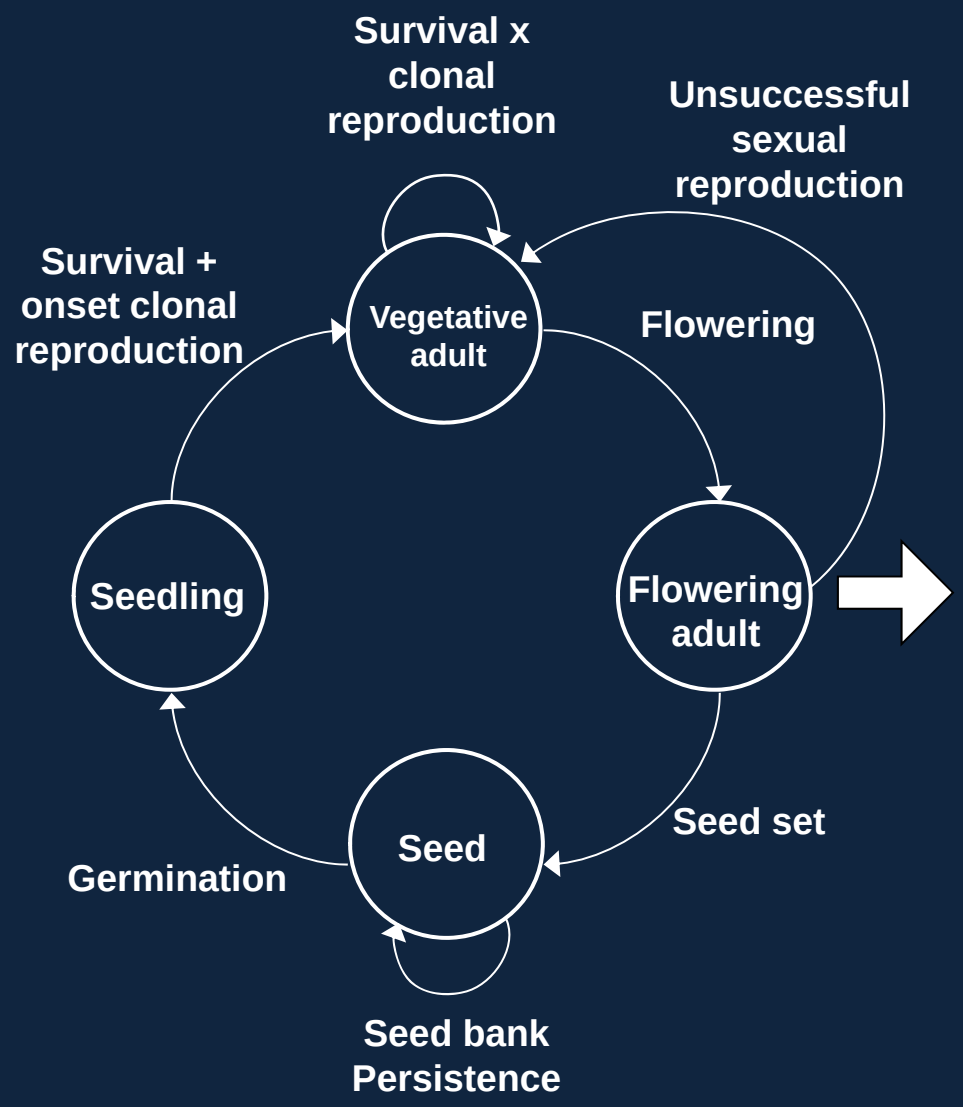
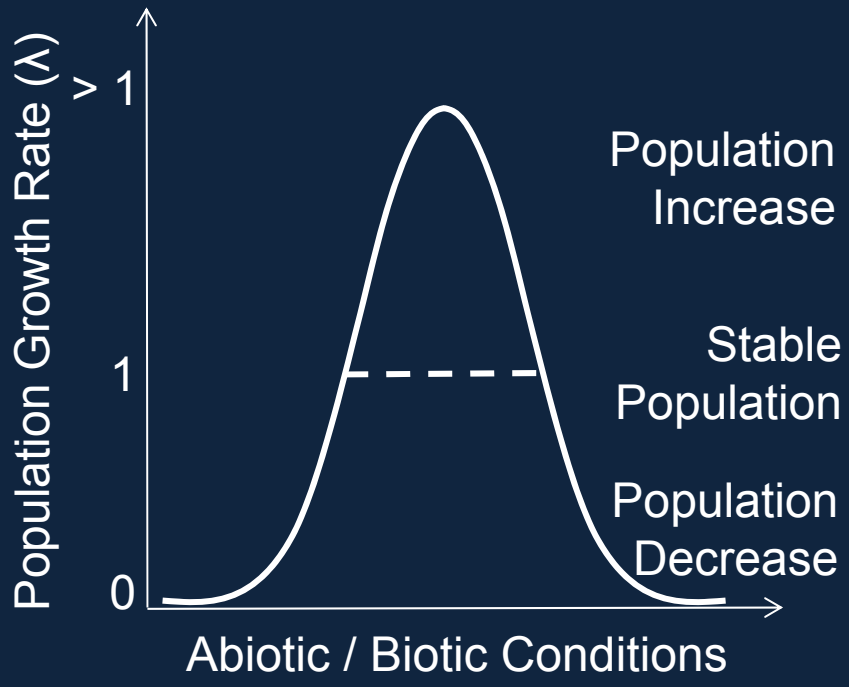
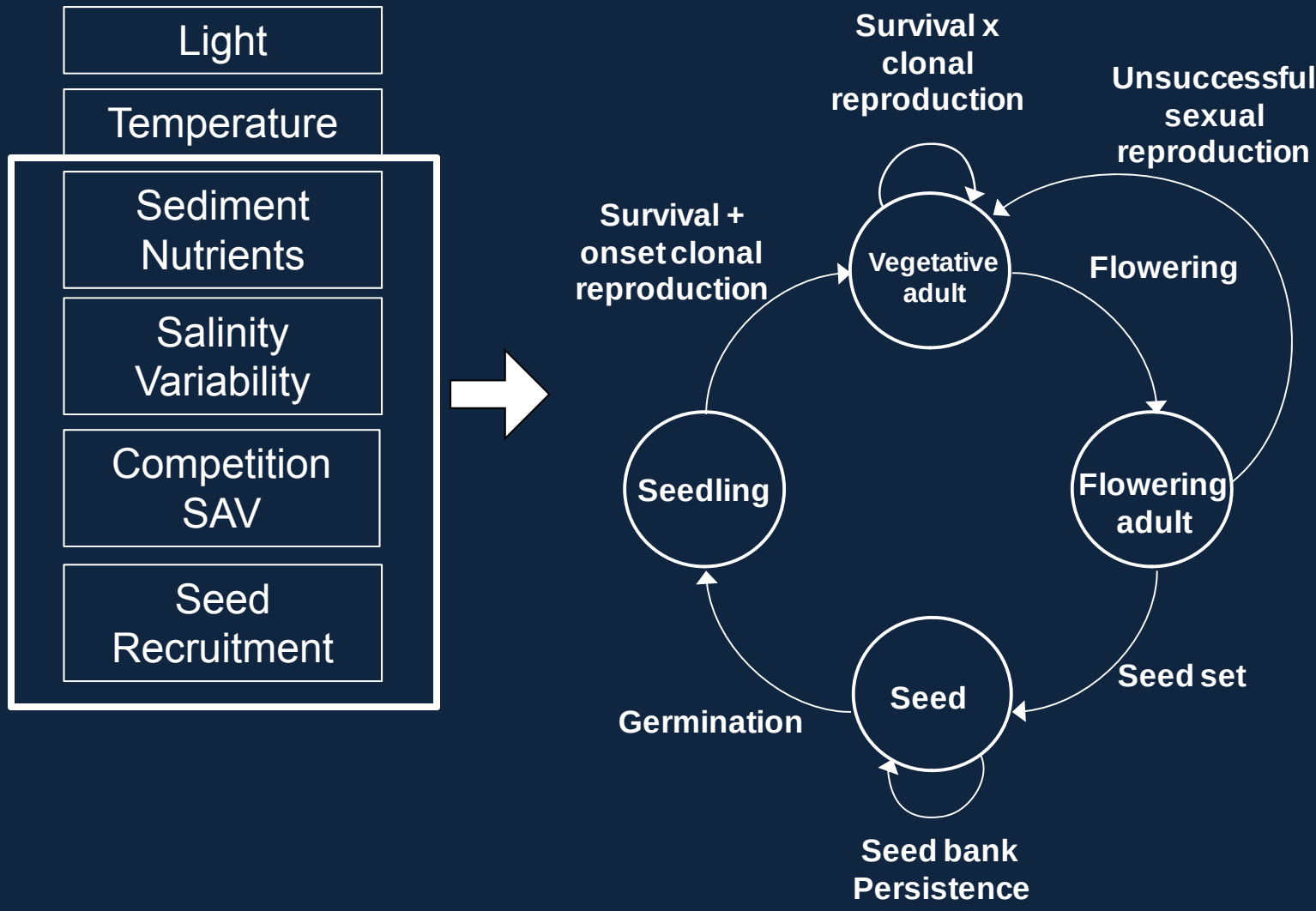
Conceptual Summary Population Approach





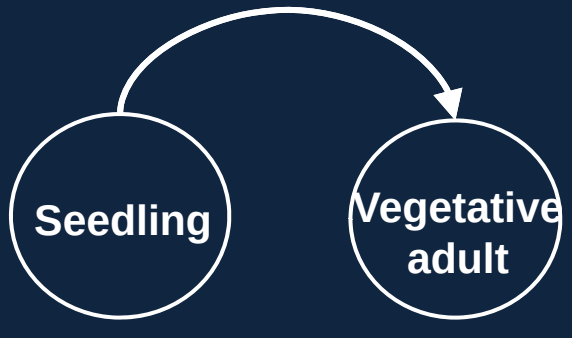
Empirically-Based Predictions
Water Management (MFL)
Everglades Restoration (CERP)
Sea Level Rise

Life History Model Parameterization

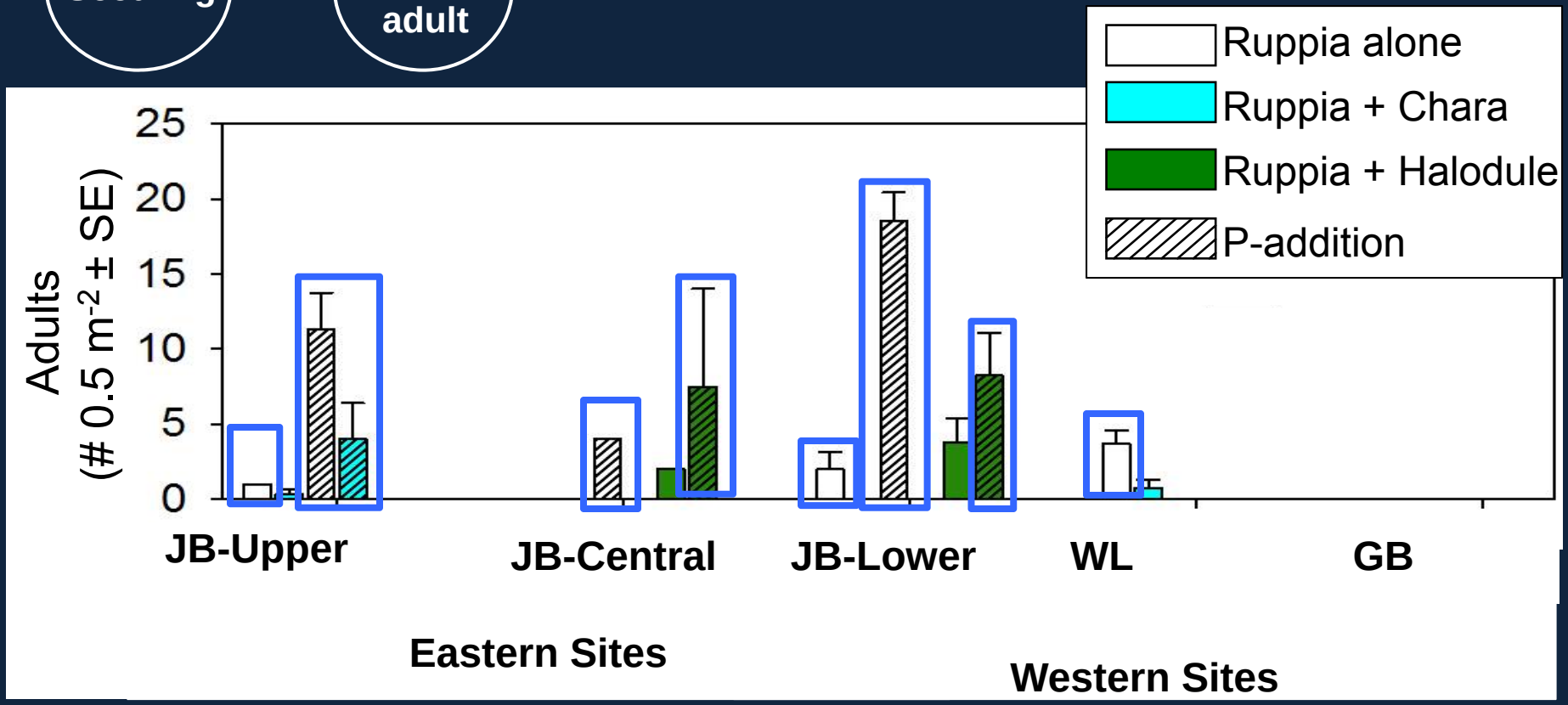


Ecotone Field Sites

Abiotic Factors: Salinity gradient (N-S), Nutrient-P Gradient (E-W)
Biotic Factors: Competition, Recruitment



Seedling Survival to Adult



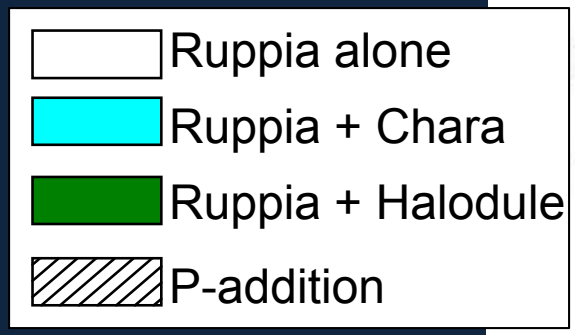
Take Home Points:

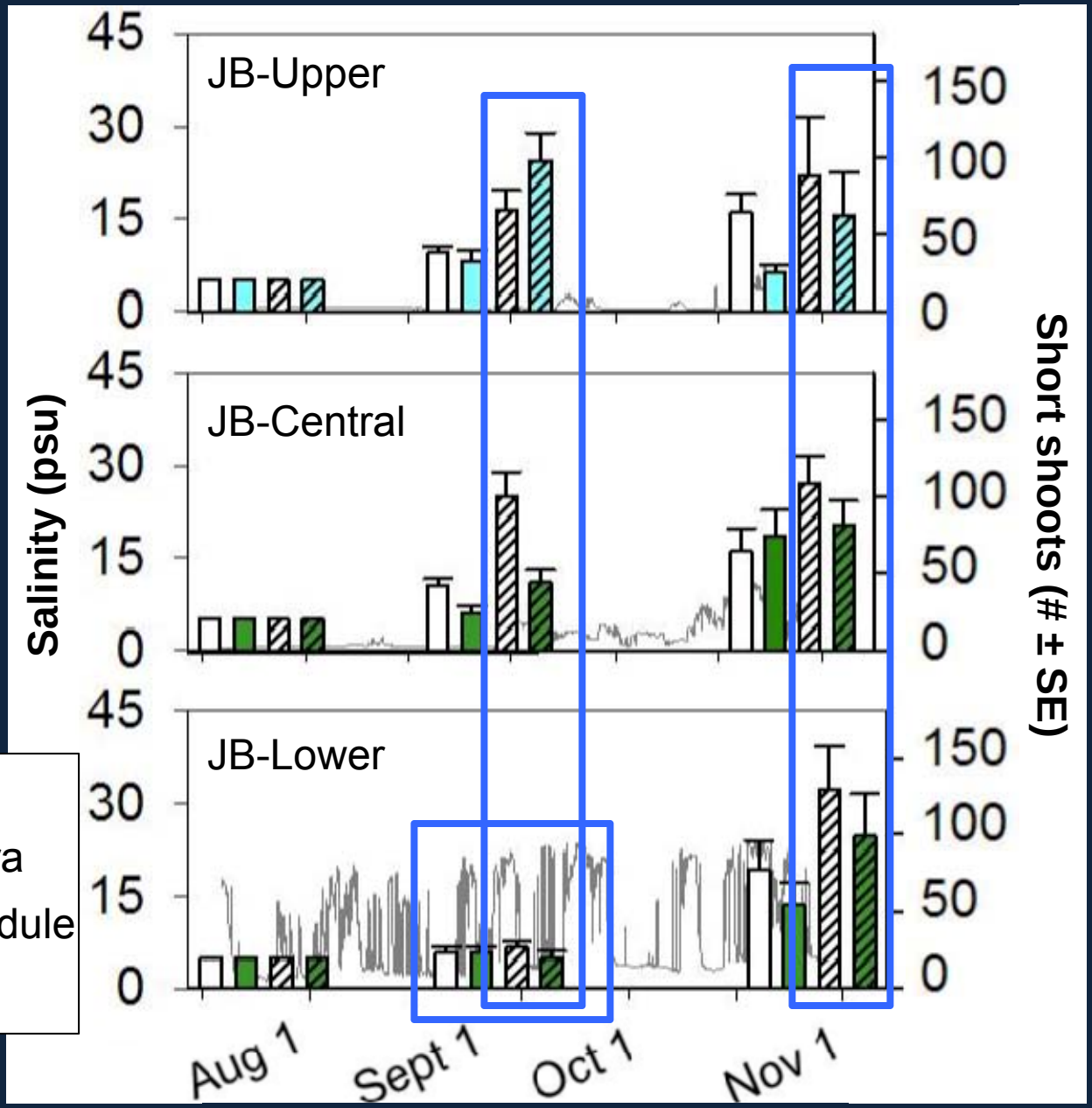
- Low seedling survival across ecotone both eastern and western sites
- High P increases seedling survival in P-limited eastern sites
- Chara lowers Ruppia seedling survival

Clonal Reproduction Eastern Ecotone

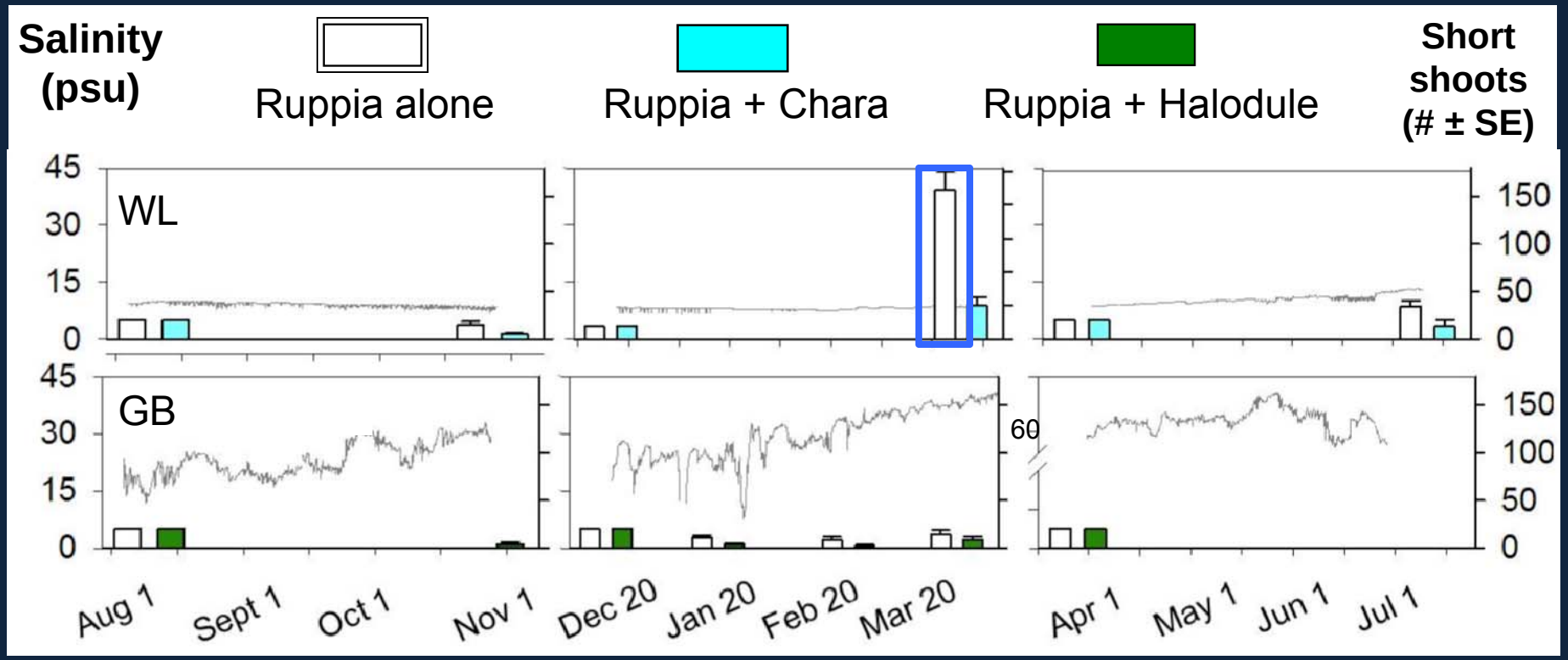
Take Home Points:

- Variable salinity limits reproduction
- P-availability enhances clonal reproduction





Clonal Reproduction in the Western Ecotone



Take home points:

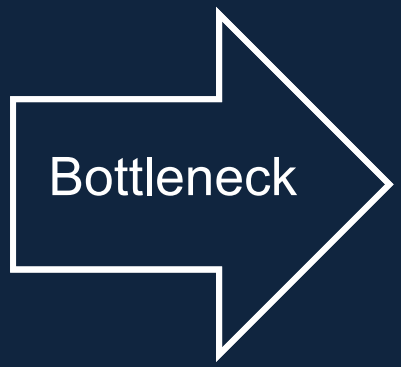
- High salinity in western ecotone (GB) appeared to limit clonal reproduction
- Salinity not driver at West Lake (Light)
- Low, stable salinity (<12 psu) resulted in rapid shoot production in spring
- Chara limited Ruppia shoot production

Life History Model Parameterization

<u>Early Life History and Clonal Reproduction</u>

Limited:

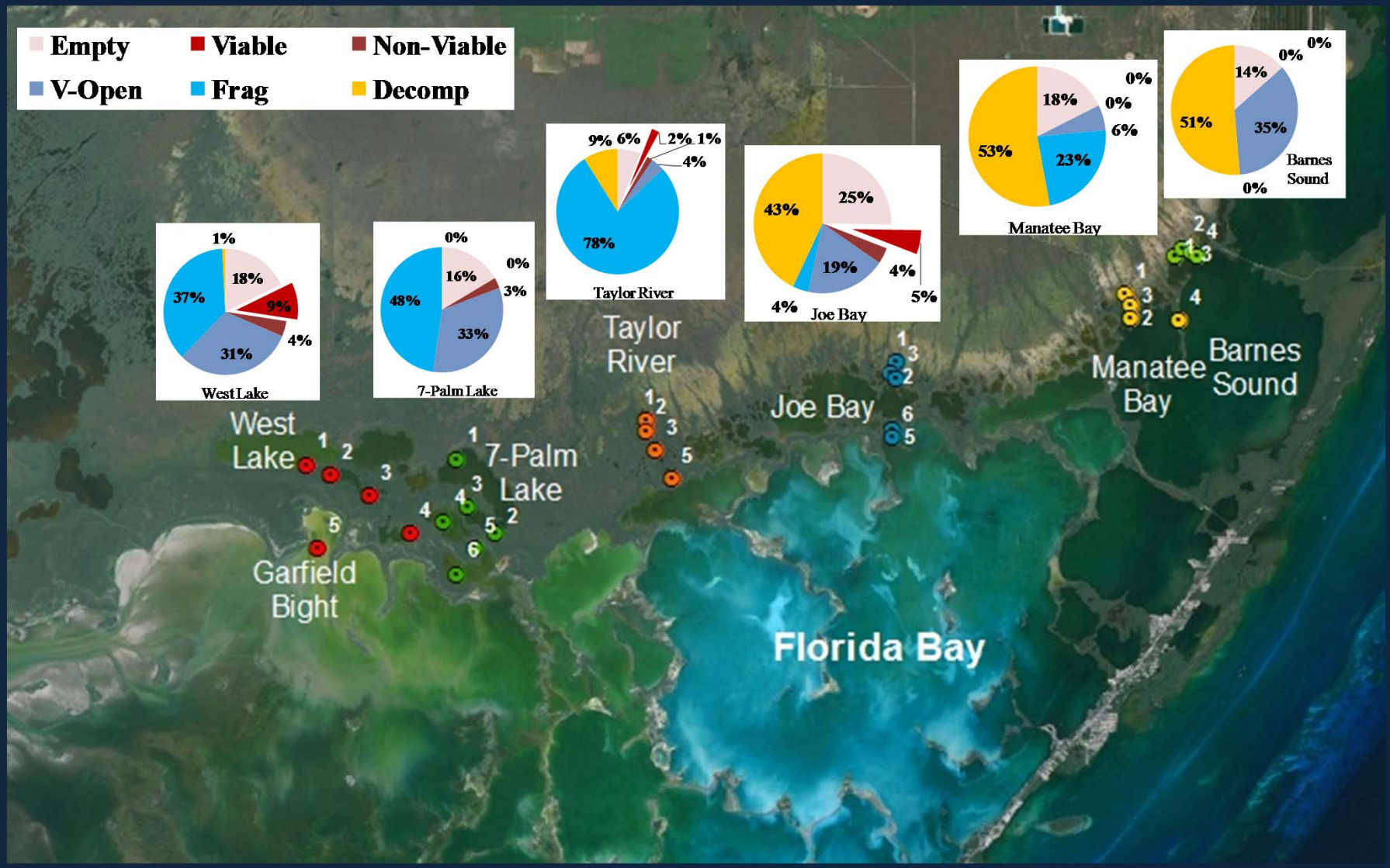
- Seedling survival ↓
- Seedling survival limited by P
- Adult Survival Variable
- Clonal reproduction ↓ salinity variability ↑ and nutrients ↓
- Competition with *Chara*



<u>Meadow Sustainability</u>

- Seed Bank
- Reproductive Events

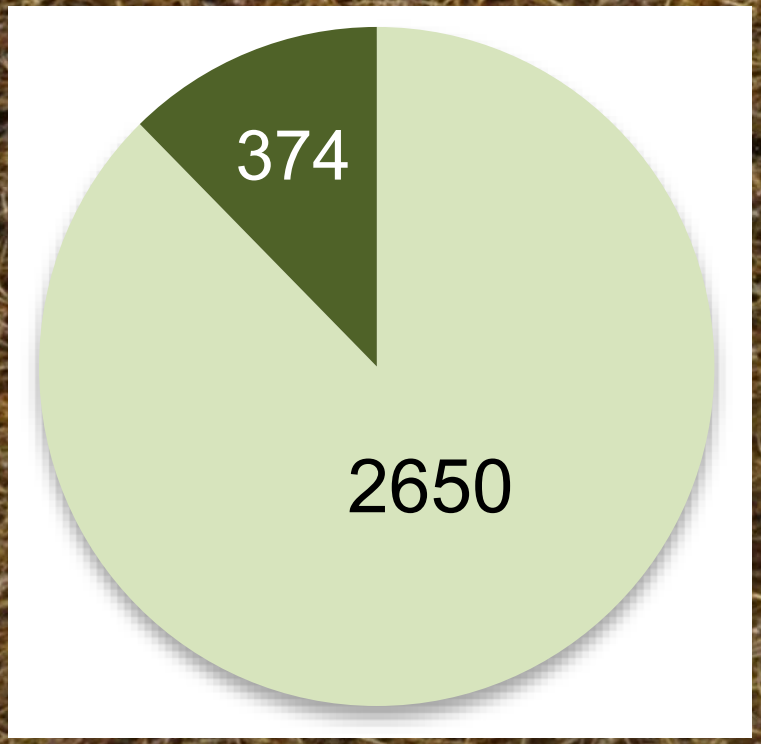
Seed Bank



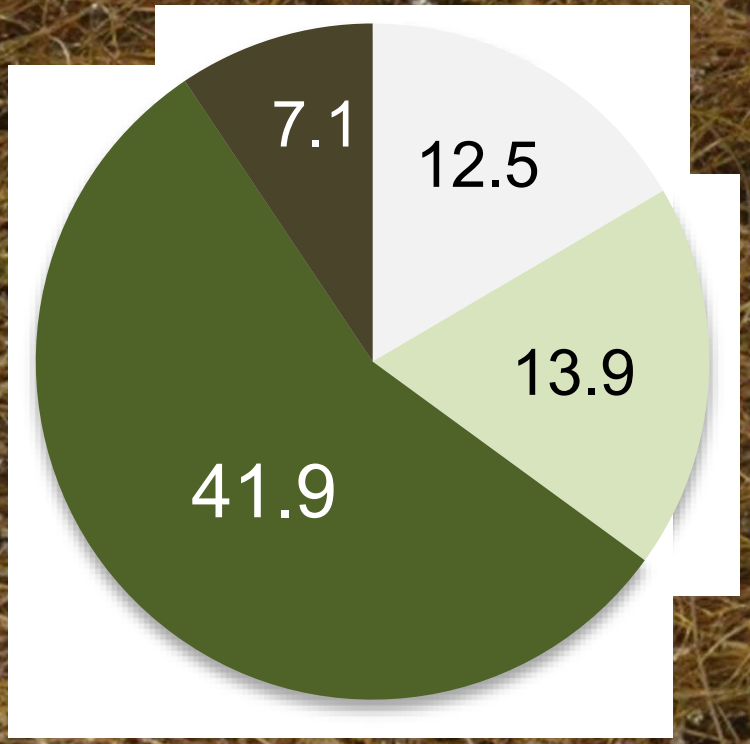
Low viability <5% seeds (0-160 m^{-2})

Western Ecotone (Long Lake) Reproductive Vegetation

Shoot Distribution (# m^{-2})



Biomass Distribution (g m^{-2})



Short Shoots

Reproductive Shoots

Rhizome

Root

Photo credit: Tom Frankovich

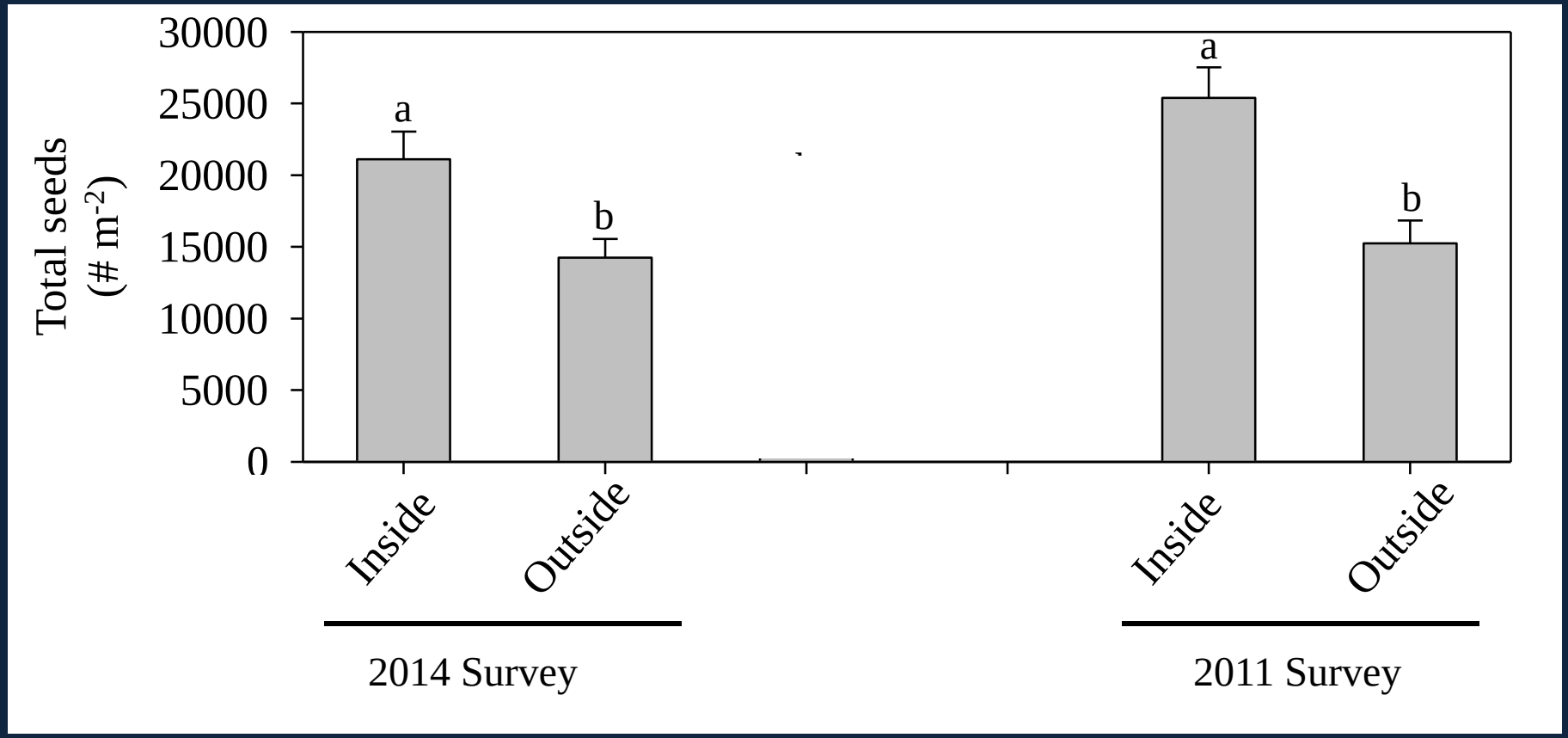
Reproductive Shoots

Inflorescences (# m^{-2})

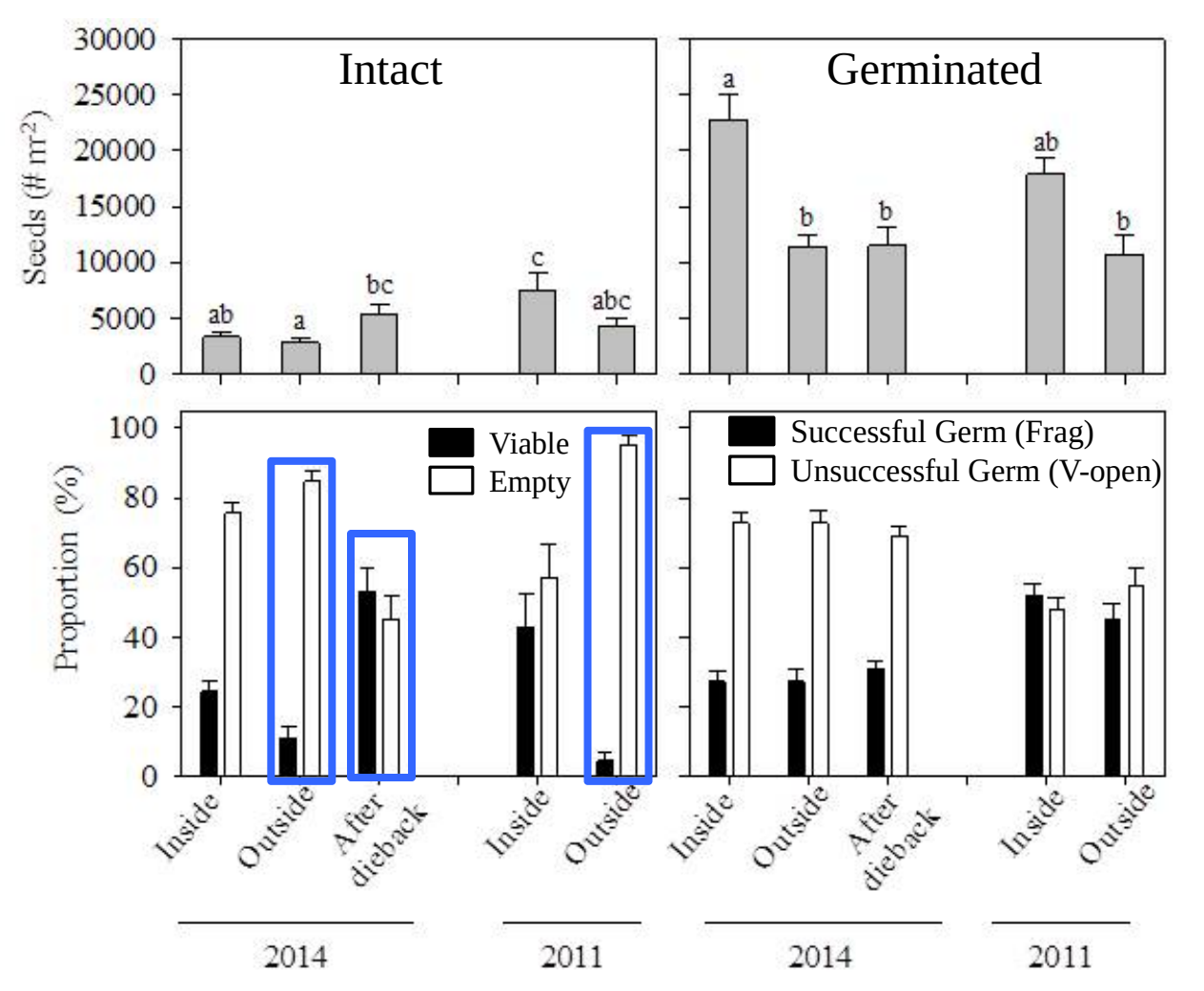
115 with Immature Seeds (405)

131 with Mature Seeds (435)

Reproductive Seed Bank Sampling



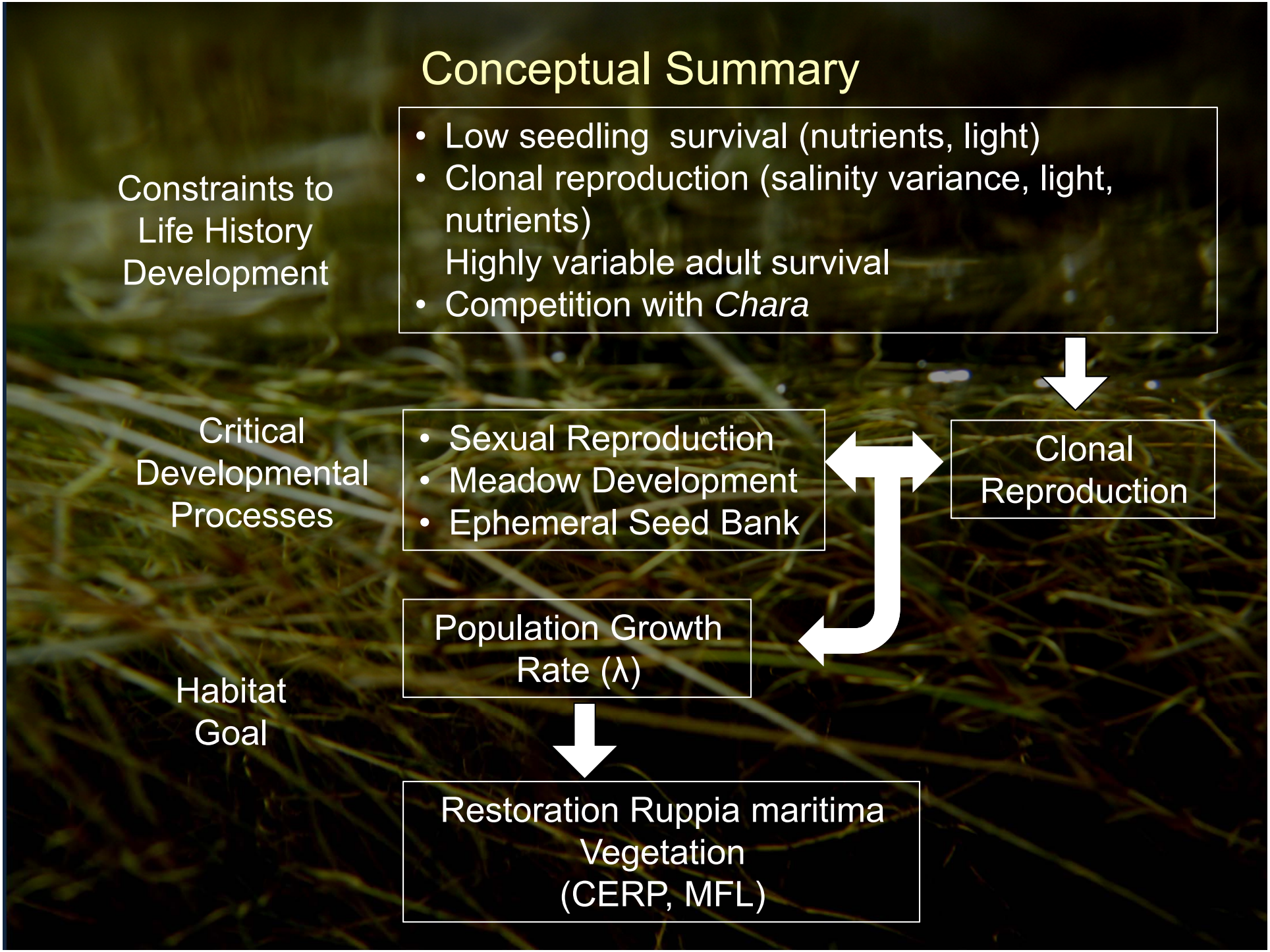
Seed Conditions and Viability



Take home points:

- Most seeds germinate (>79%) indicating a transient seed bank
- Low viability seeds outside meadow
- Vegetation senescence (dieback) mechanism for seed release

Conceptual Summary



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