



# Evaluating eelgrass resiliency and restoration potential to enhance adaptive management techniques in a warming climate

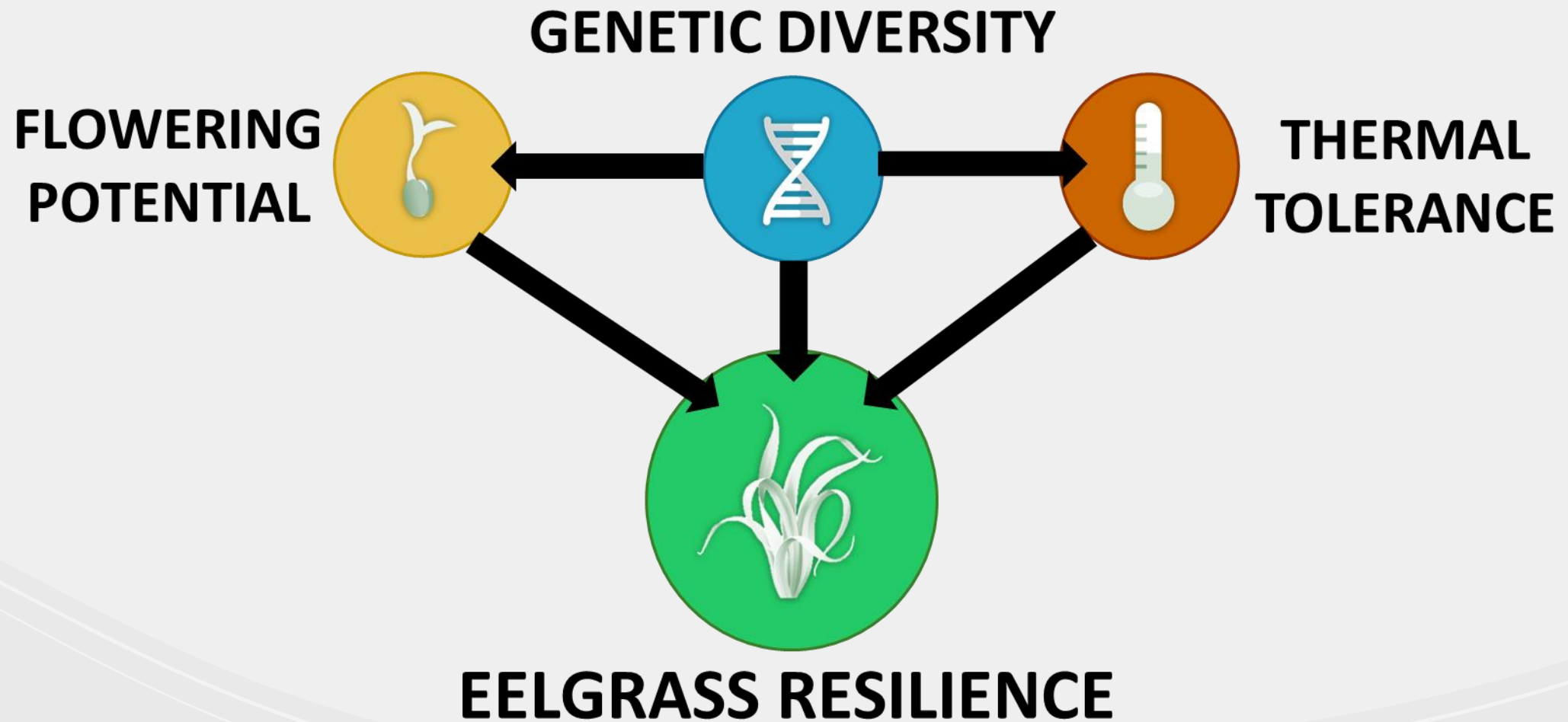
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Stephanie Kamel, Erin Shields, Sarah Nuss



[C.A.M. Lindman botanical drawings]

## *ZOSTERA marina*

- Range: Arctic Circle to NC <sup>2</sup>
- Cold-hardy
- Declining with rising water temperatures <sup>1,3</sup>
  - Stress: 25°C
  - Decline: 28°C
  - Mortality: 30°C
- Seed-based restorations ✓
  - Genetic diversity <sup>4</sup>
  - Sexual reproduction <sup>5</sup>





## MARGARET A. DAVIDSON GRADUATE FELLOWSHIP



### **NCNERR**

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Morgan Island  
Phillips Island / Middle Marsh



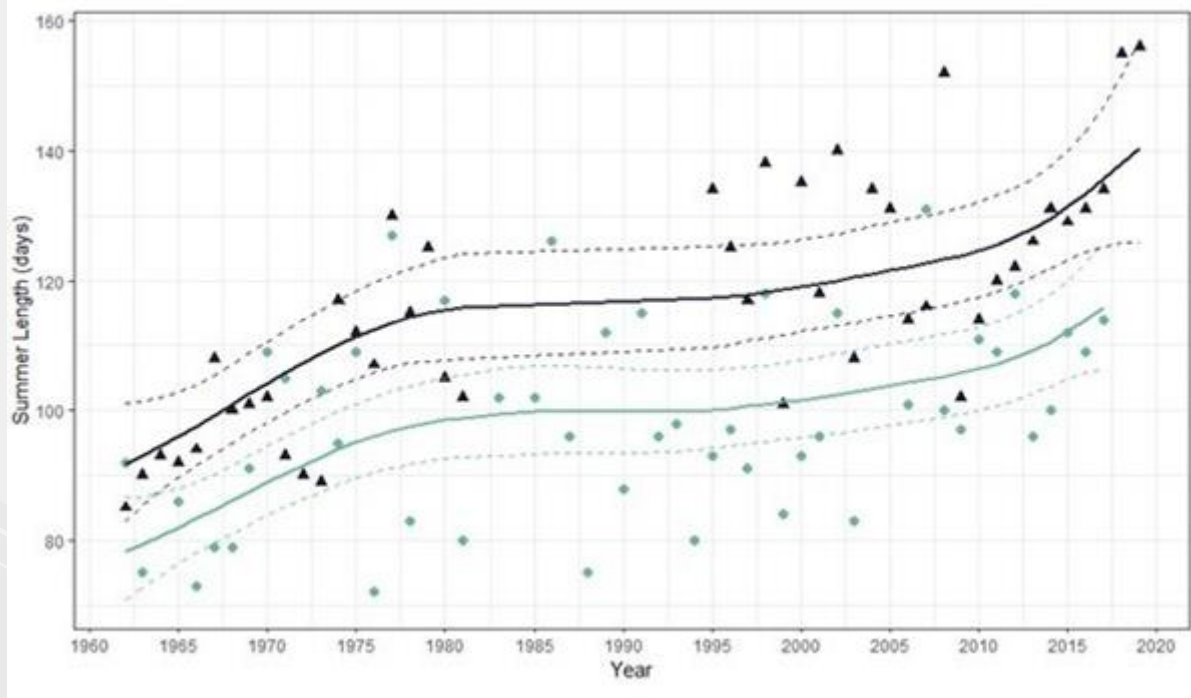
## CHESAPEAKE BAY NATIONAL ESTUARINE RESEARCH RESERVE VIRGINIA



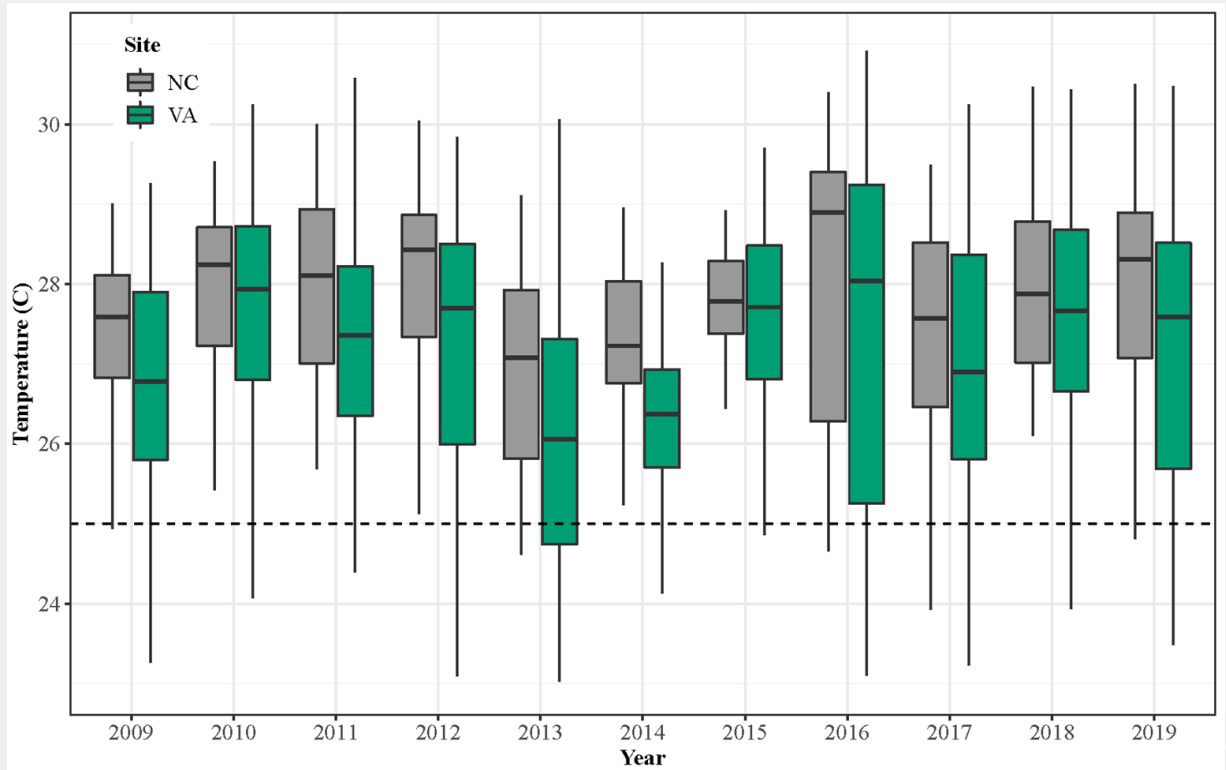
### **CBNERR-VA**

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Thorofare  
Goodwin Island



**Stressful summer length for *Zostera marina* in both Back Sound, NC (dark blue triangles) and York River, VA (teal circles), 1960-2020.**



**Daily mean water temperatures of York River, VA and near the Rachel Carson Reserve, NC compared to *Zostera marina* stress threshold (25°C), 2009-2019.**



# COMPARATIVE WHOLE GENOME SEQUENCING

- 2008, 2023, 2025
- Identify single nucleotide polymorphisms (SNPs)
- Correlate biallelic SNPs with mean water temperature
- Population genetic structuring

**DONOR**

High

High

High

2+ traits

**TRAIT**



# Traits

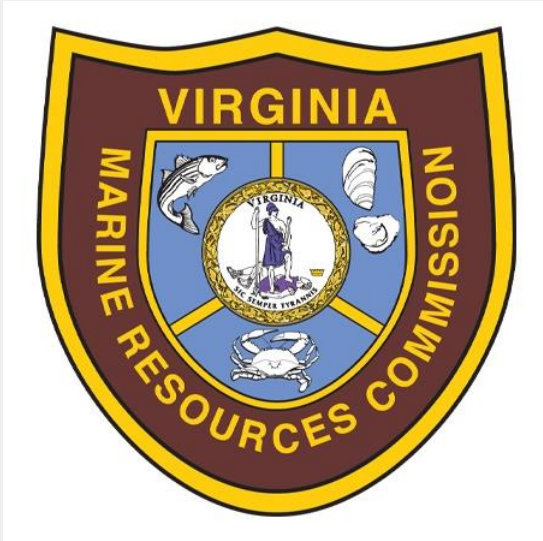
**RECIPIENT**

Low

Low

Low

1+ traits



**DONOR**

**TRAIT**

**RECIPIENT**

High



Low

High



High



2+ traits

# Traits

Low

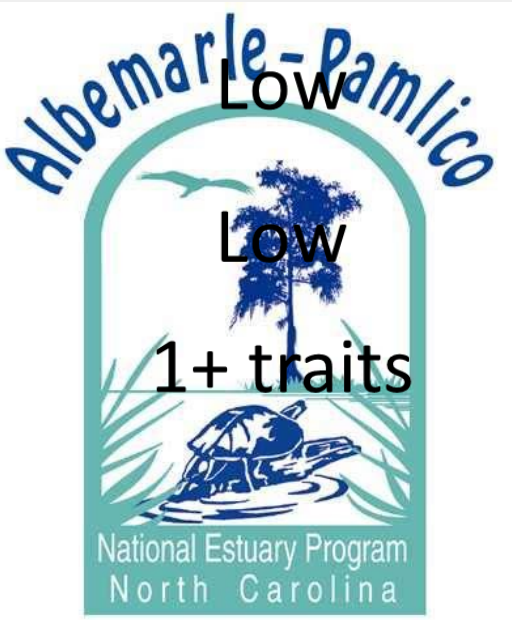
Low

1+ traits

**SHARE THE WEALTH**



**Chesapeake Bay Program**  
*Science. Restoration. Partnership.*



## References

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