



Apr 5th, 1:45 PM - 2:00 PM

## Is local adaptation a factor in planning eelgrass restoration? Initial assessment of responses to temperature by eelgrass growing across a stressor gradient

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# Is local adaptation a factor in planning eelgrass restoration?

Kate Buenau, Celia Thurman, John Vavrinec, Amy Borde and Ronald Thom

Salish Sea Ecosystem Conference  
Seattle, WA

April 5, 2018

# Acknowledgments

Jeff Gaeckle (WA DNR)

Many interns: Celia Thurman, Hannah Lea, Ethan Whattam, Nicolle Ho, Allie Simpson, Brandon Payne



# Information for restoration planning

Thom et al. 2018  
Restoration Ecology

Monitoring

Modeling

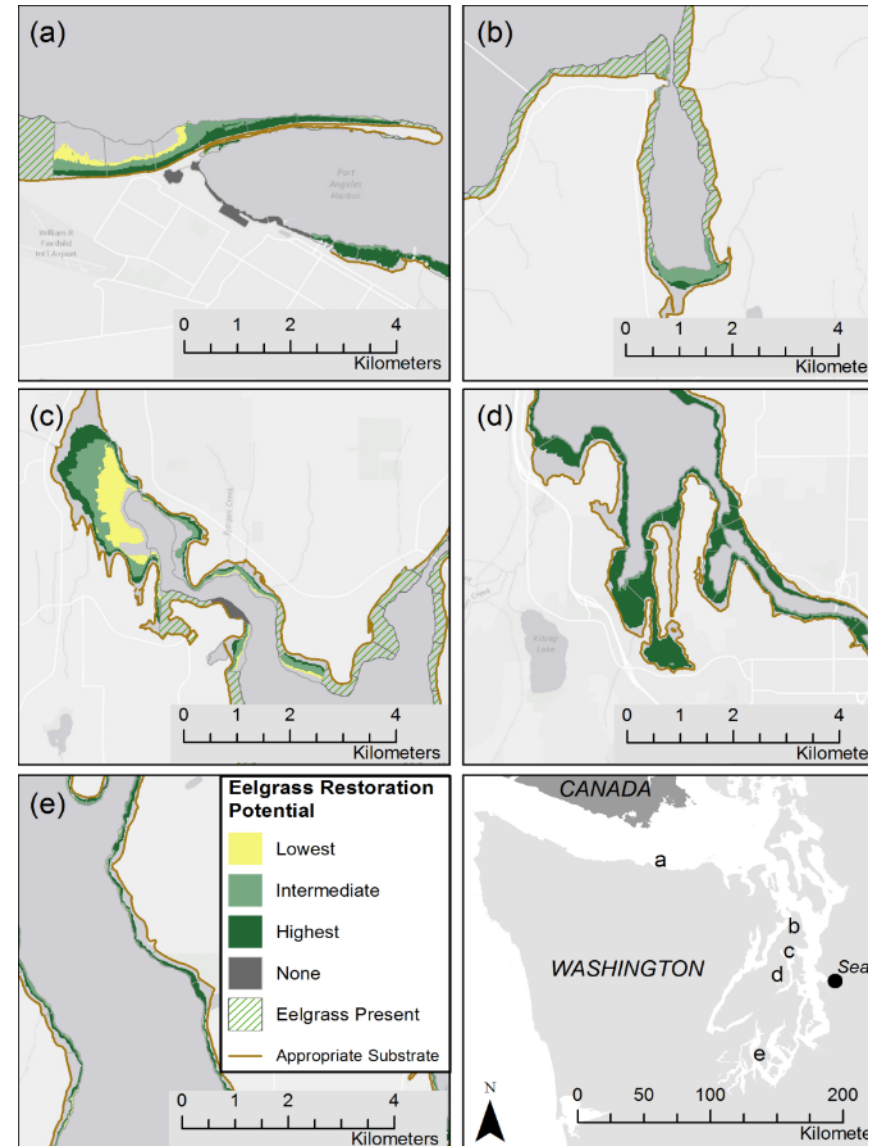
Stressor evaluations

Site visits

Site-specific water quality data



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# Information for restoration planning

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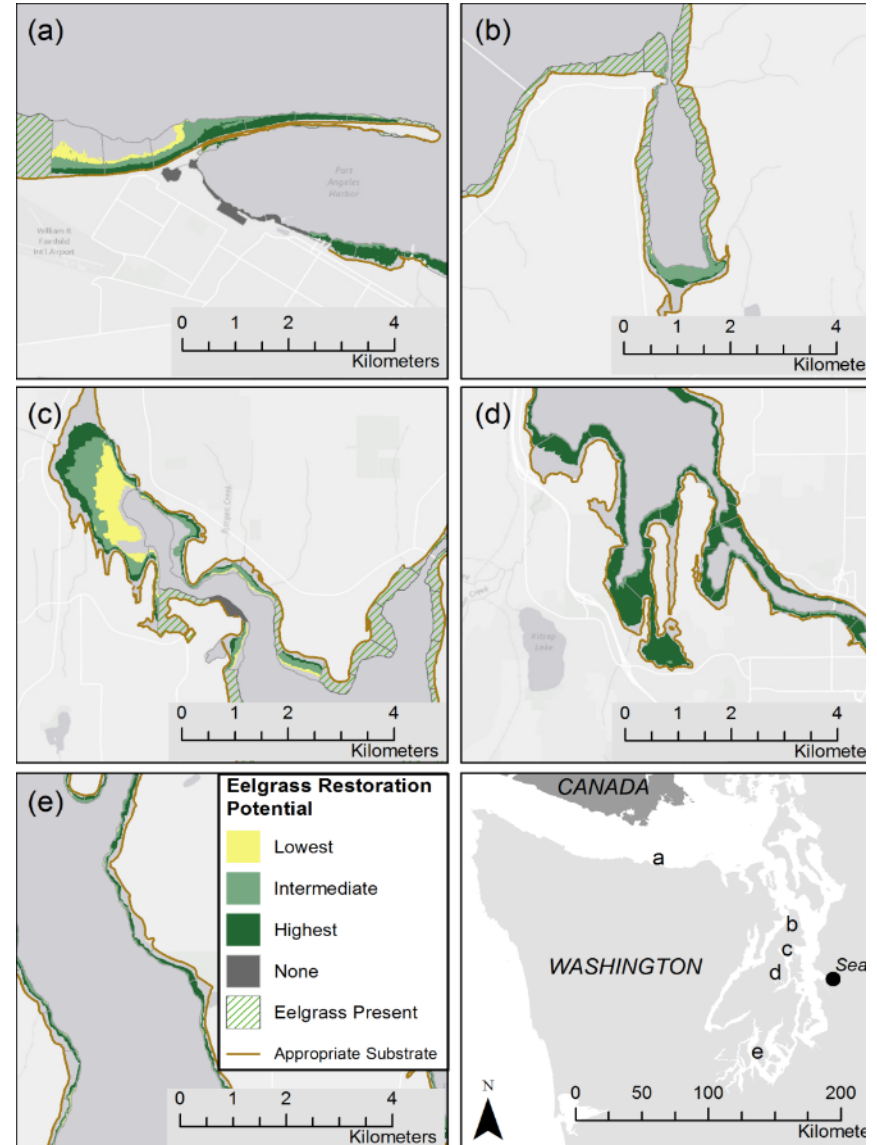
Stressor evaluations

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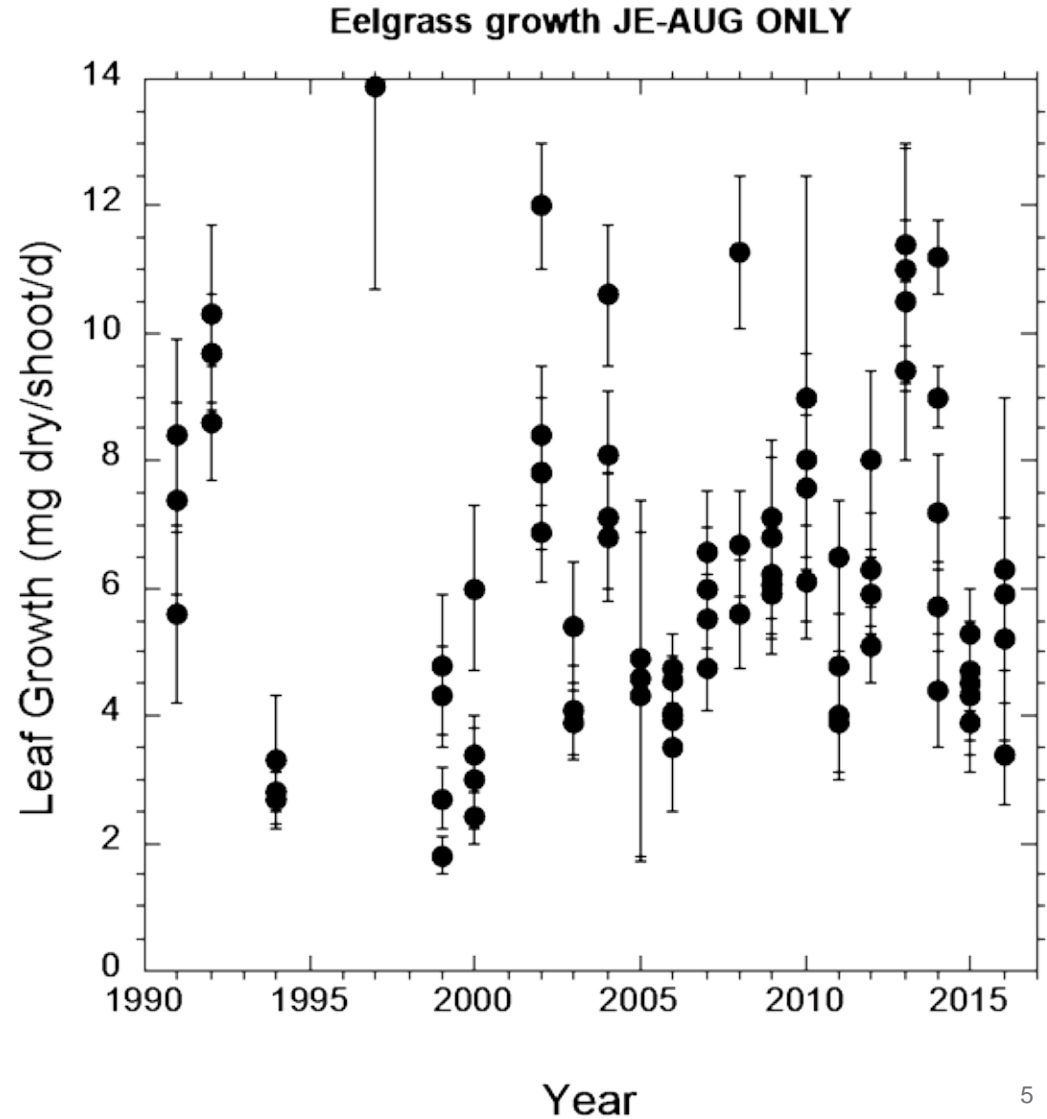
Site-specific water quality data



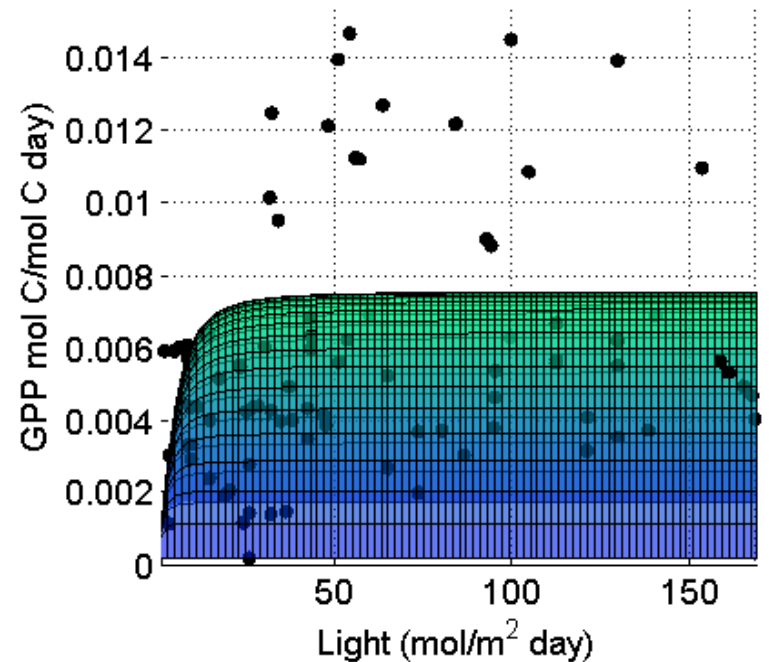
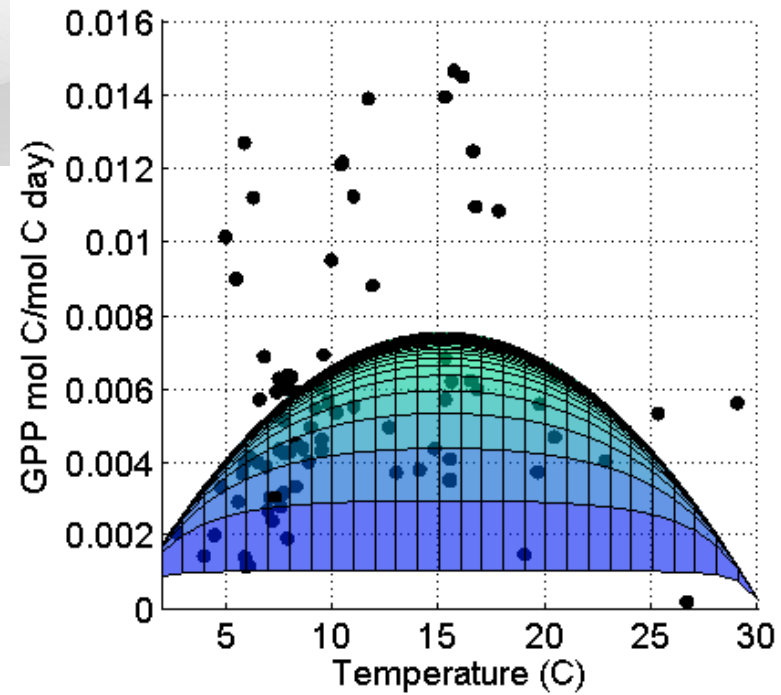
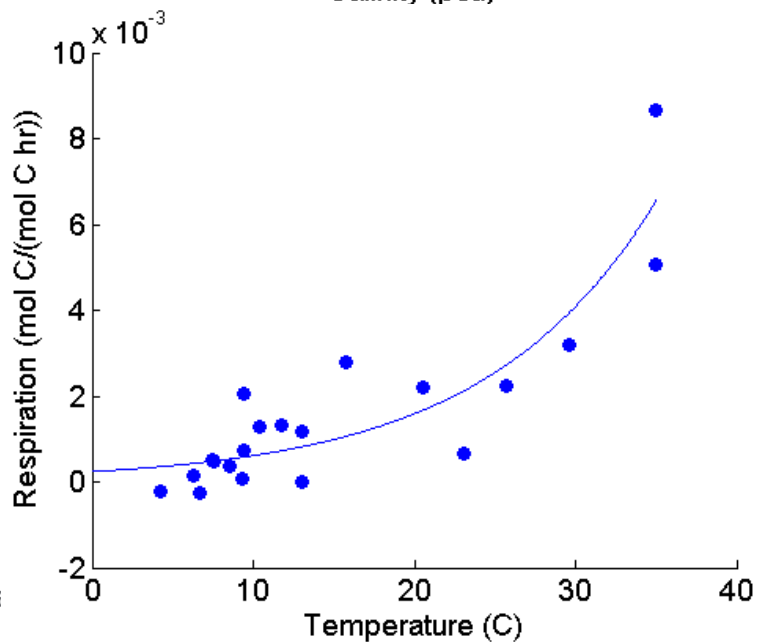
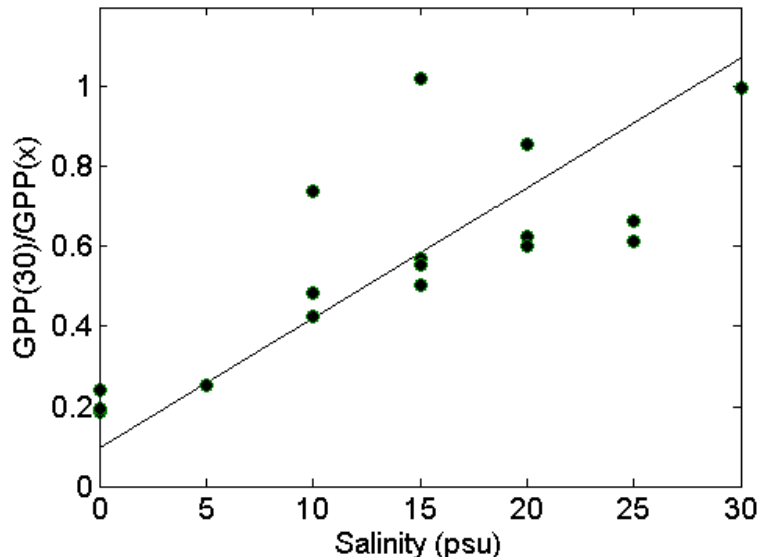
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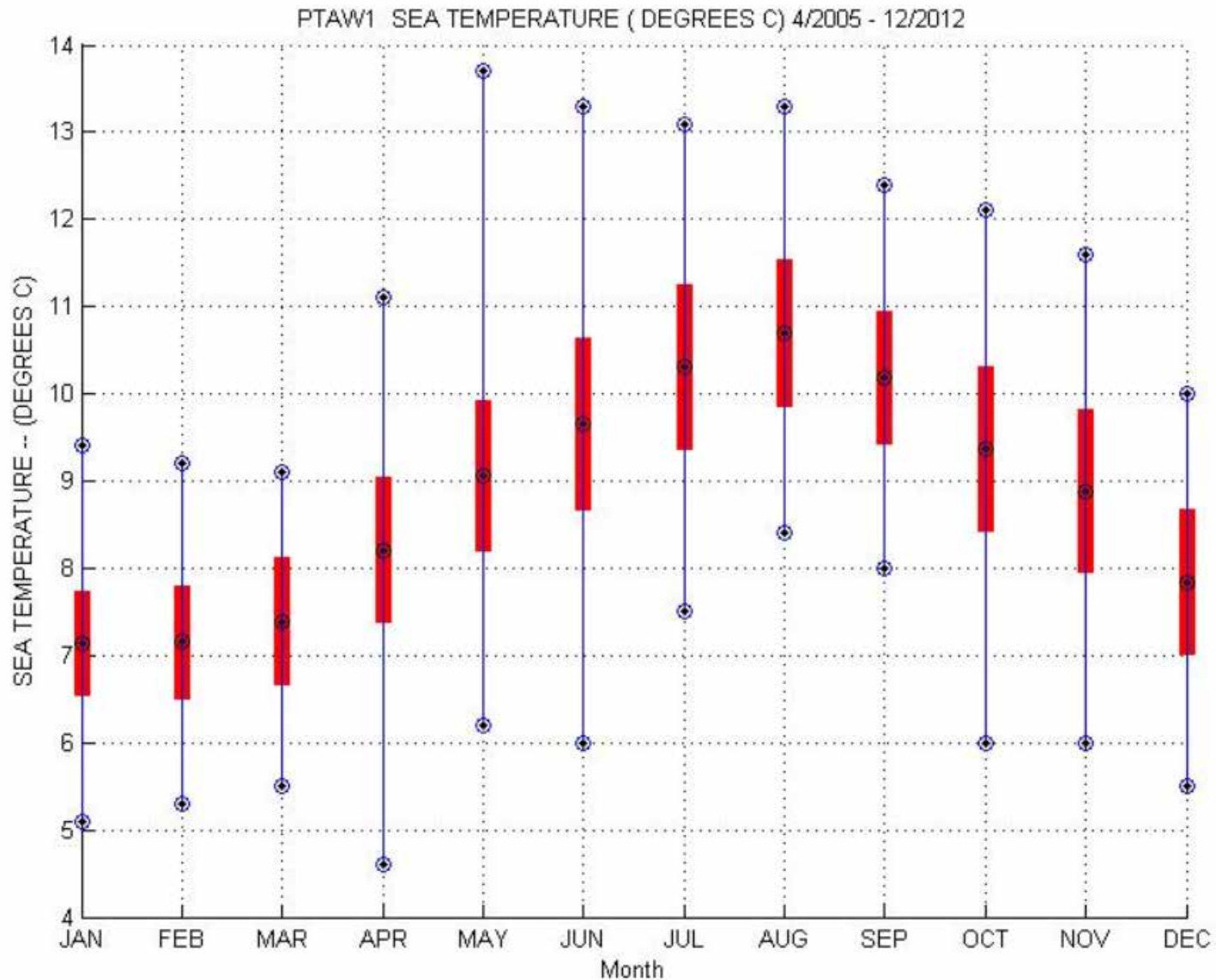
# Data collected at PNNL Marine Science Laboratory (Sequim)



# Physiological data collection



# Range of water temp. at Port Angeles 2005-2012

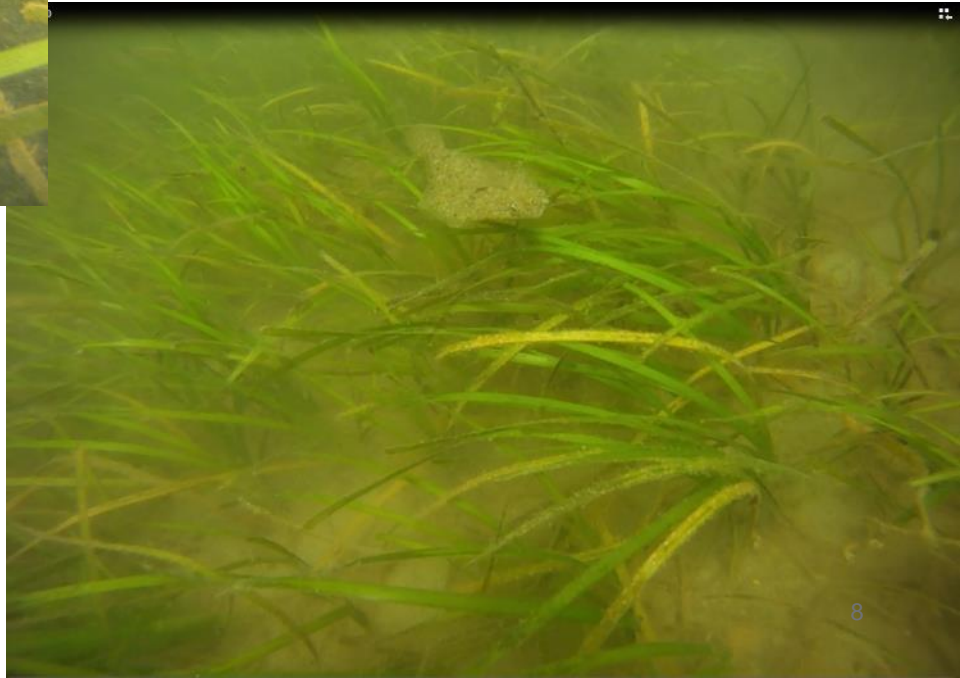




# Morphological variability

Large morphs (Clinton Ferry Terminal)

Small morphs (Case Inlet)



**Do genotypic and/or phenotypic variation affect the response of eelgrass to temperature?**

Does the relationship between temperature and production vary across environmentally and geographically distinct stocks?

Restoration implications:

Site selection

Transplant sources/methods

Stressor abatement



Restoration success

# Collection sites



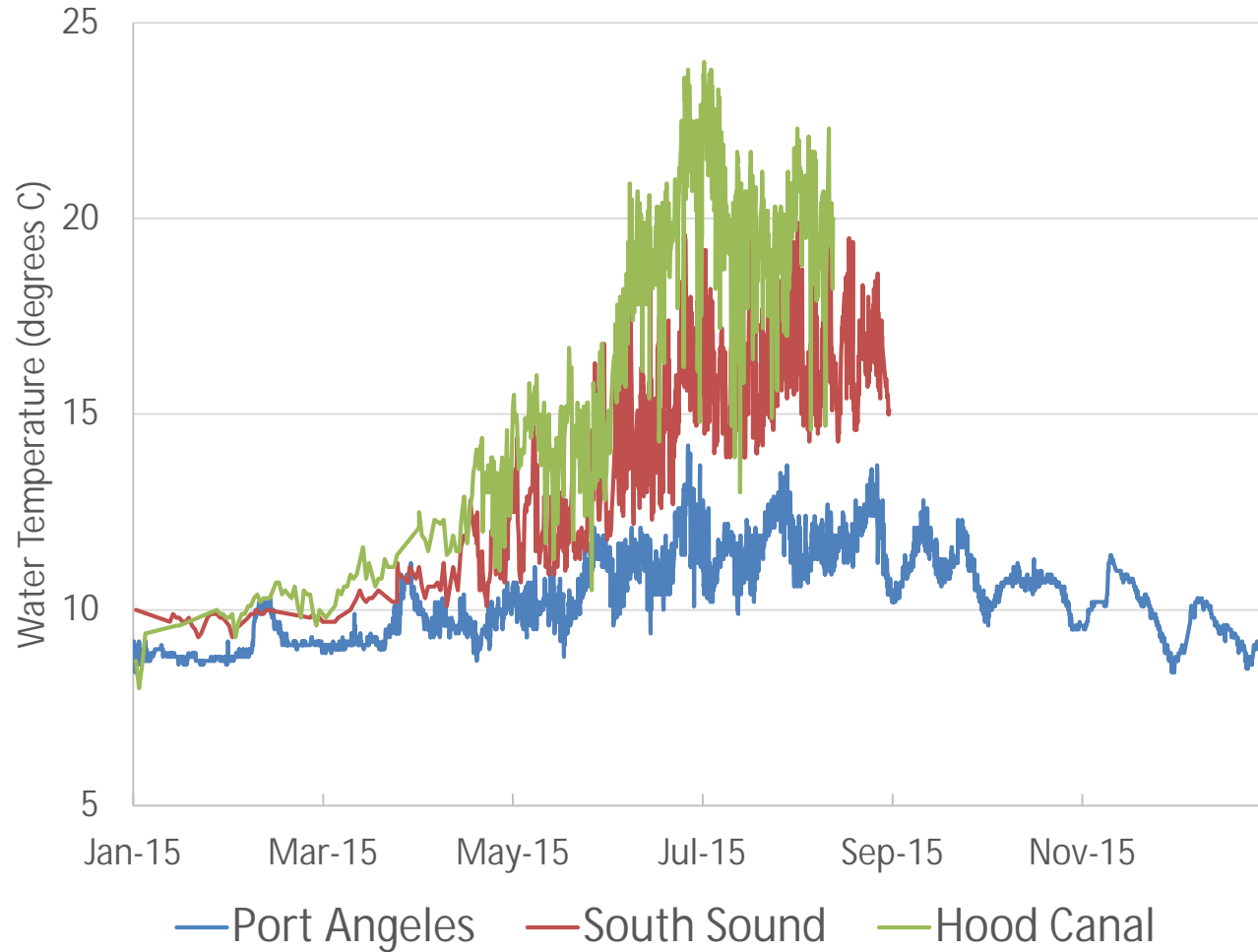
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	Sample site
	NOAA buoy



# Temperature range at sites



# Methods



# Methods

Whole plants collected ~-3 ft MLLW and stored in outdoor flowing seawater tanks

Light/dark measurements on 8 cm leaf segments for 3 sites x 2 temperatures per trial

12° and 20° (2x)

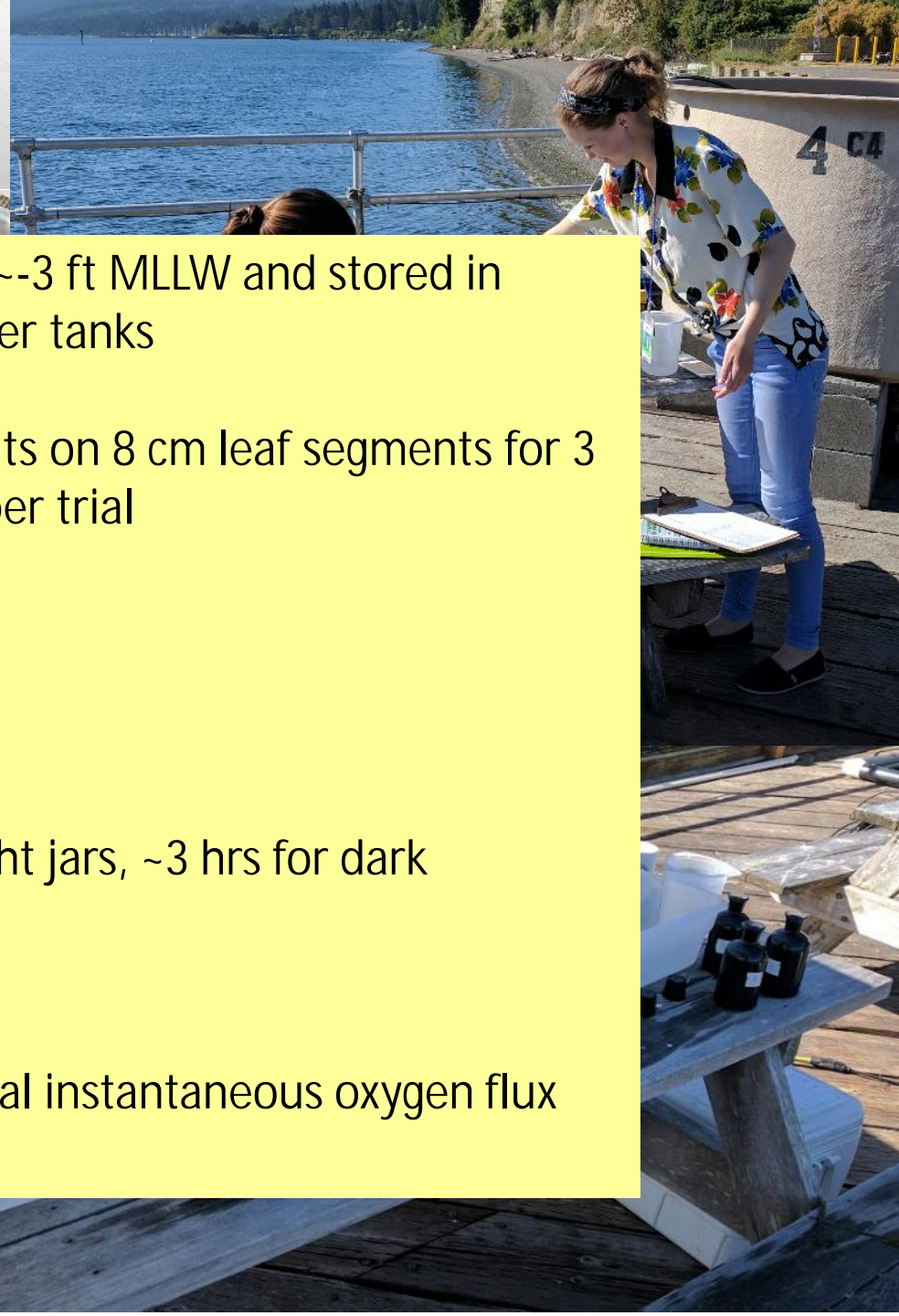
16° and 25° (3x)

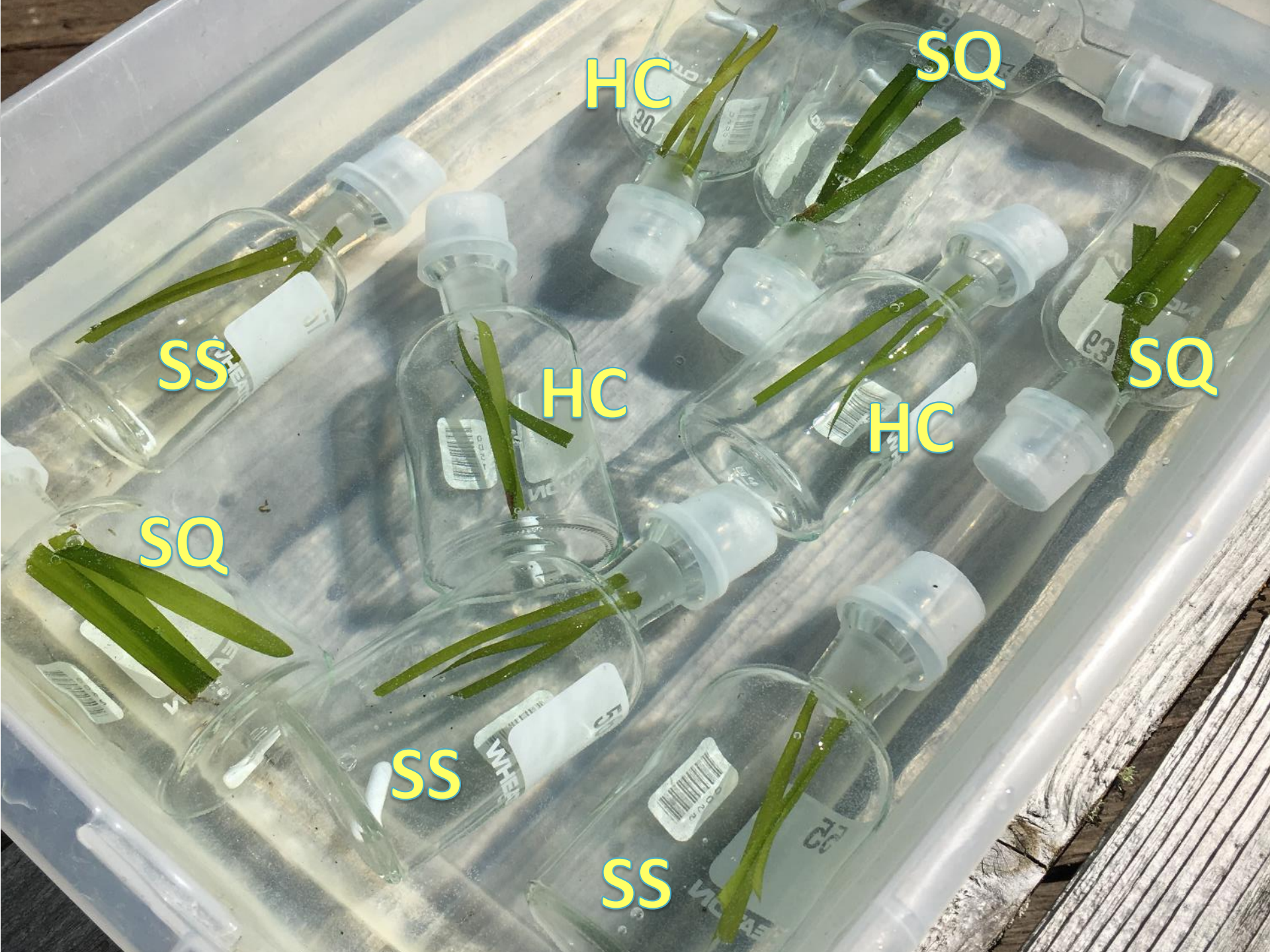
20° and 25° (1x)

~2 hrs incubation for light jars, ~3 hrs for dark

No light limitation

Measured initial and final instantaneous oxygen flux and biomass (g dry wt)





HC

SQ

SS

HC

HC

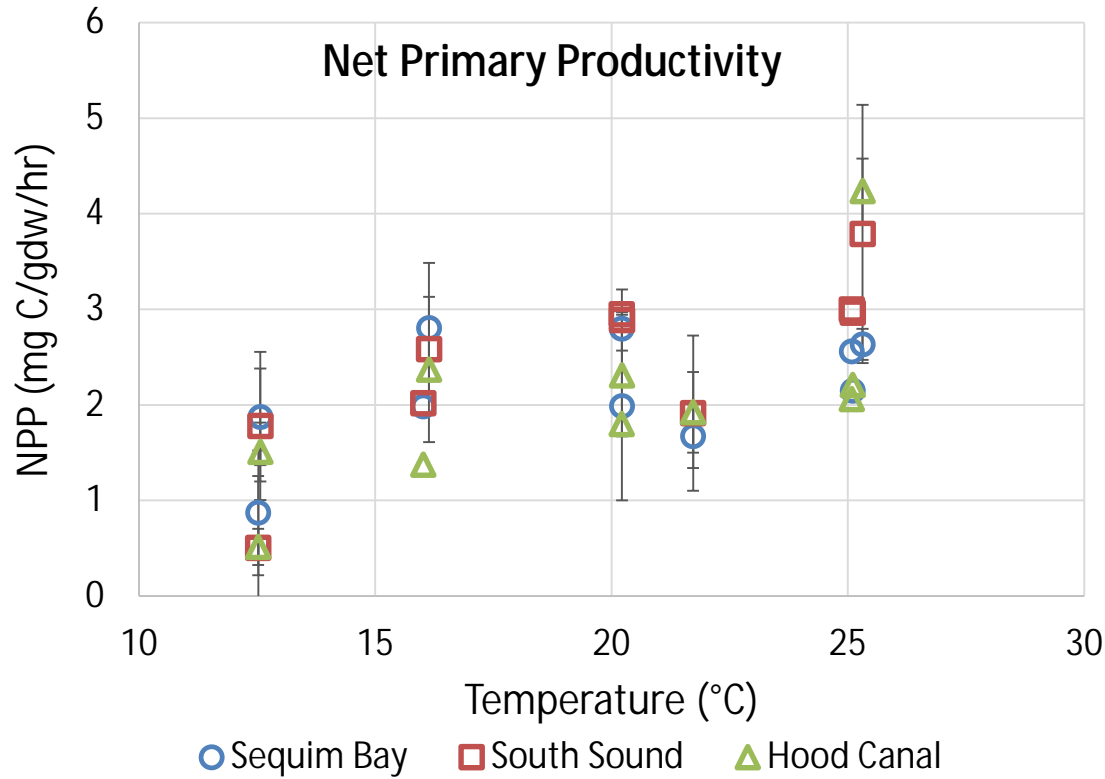
SQ

SQ

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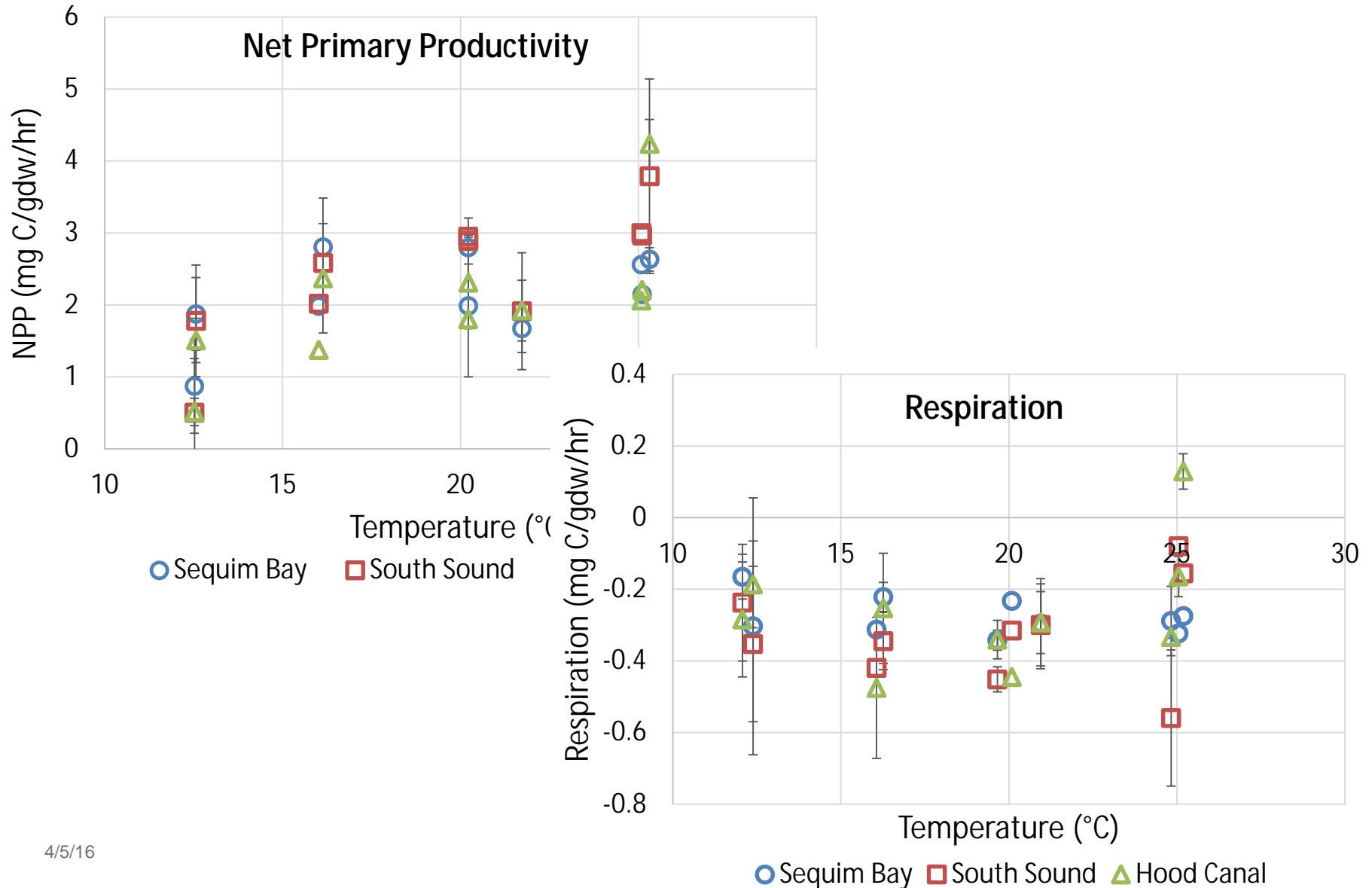
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# Results

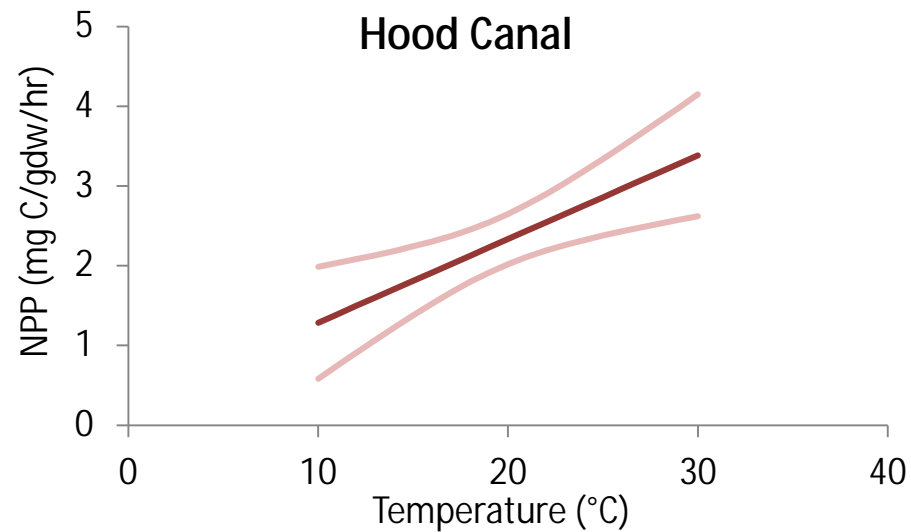
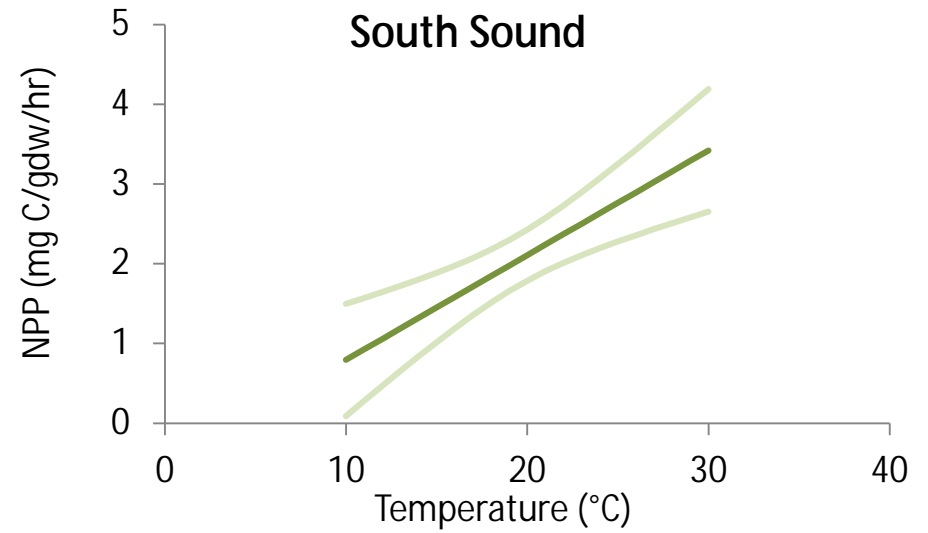
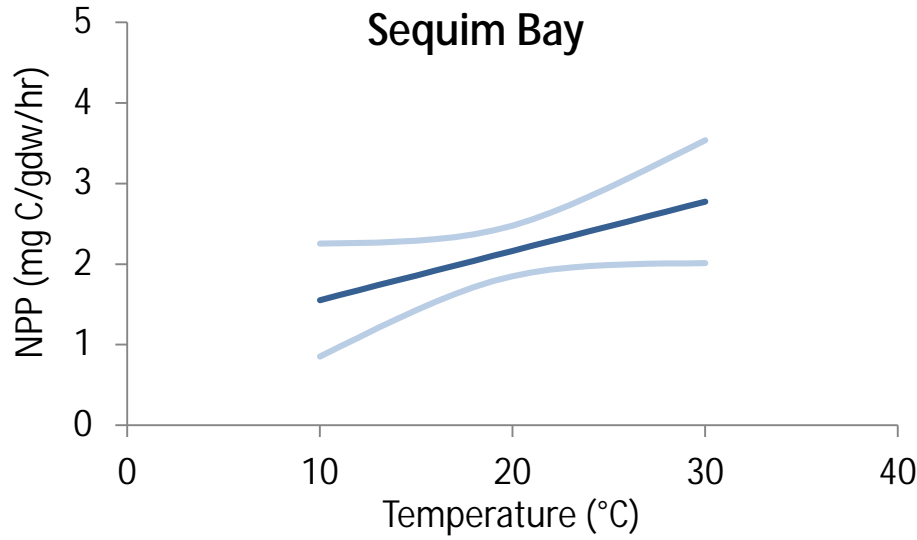




# Results



# Results



# Preliminary Conclusions

- ▶ No significant difference in short-term productivity or respiration for plants from different temperature (and light) regimes.
- ▶ Lots of variation in results.
- ▶ Notable morphological and epiphyte differences between sites.

# Next Steps

- ▶ More short-term data collection to address variability
- ▶ Additional sites
- ▶ Interaction of light limitation and temperature
- ▶ Mesocosm experiments—temperature treatments, light treatments

