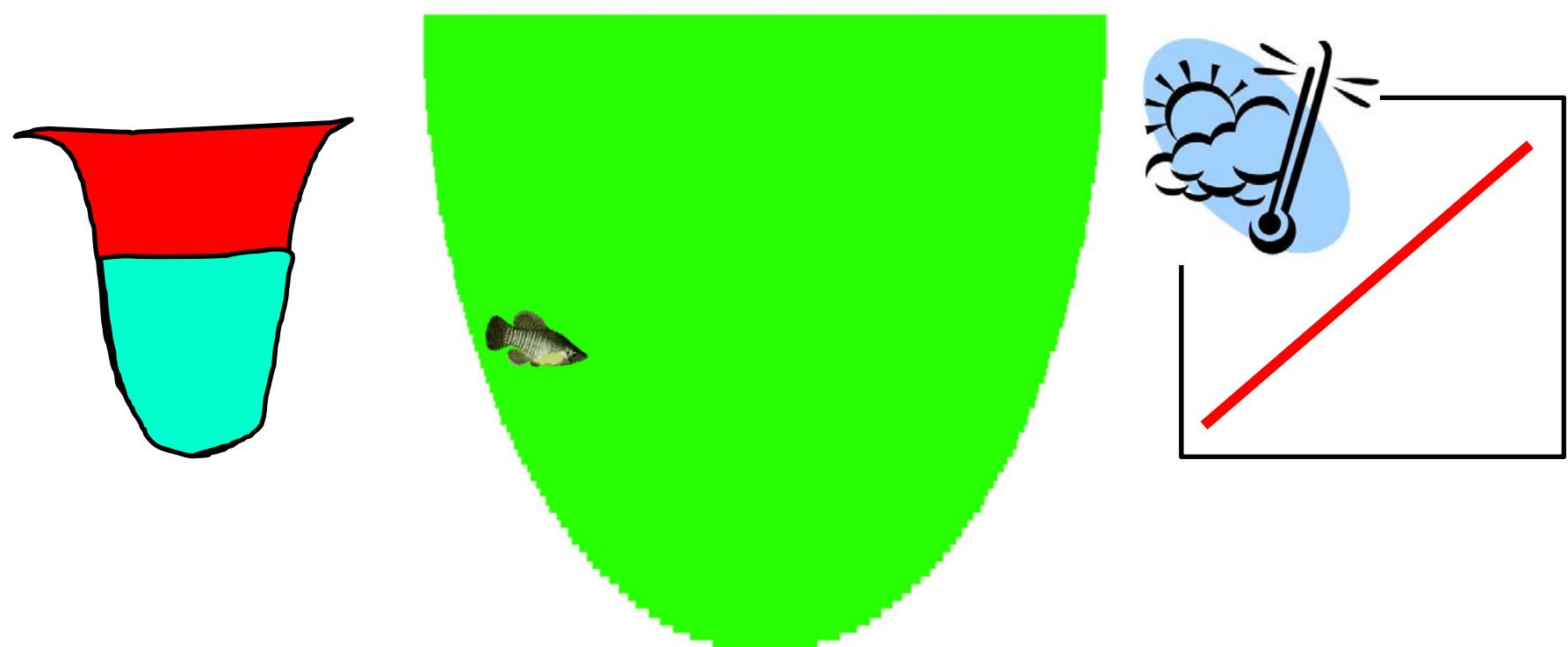




Oxythermal Stress of a Dimictic Lake In Response to Changing Climate



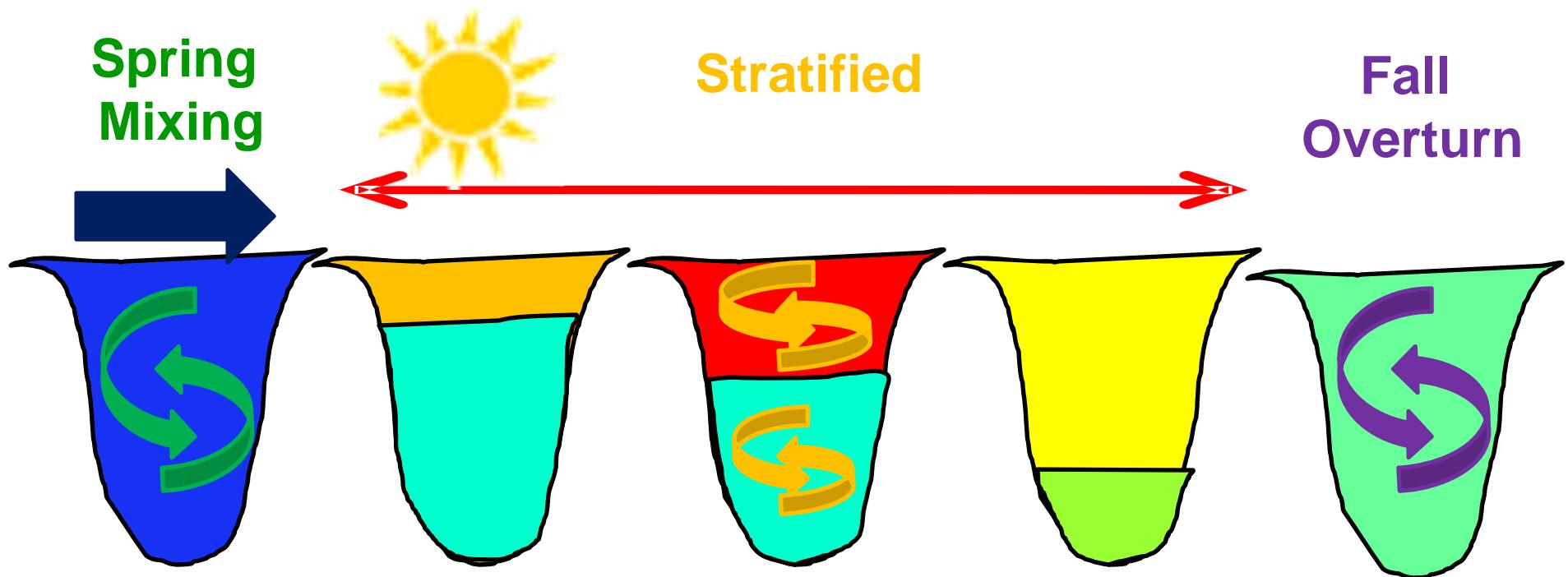
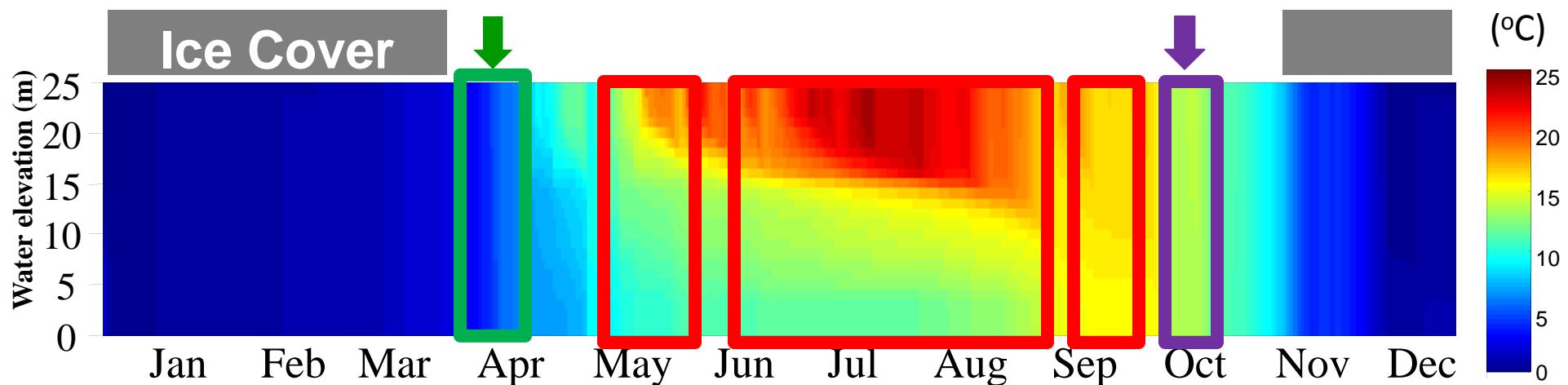
37th Annual Meeting American Water Resources Associations Wisconsin Section



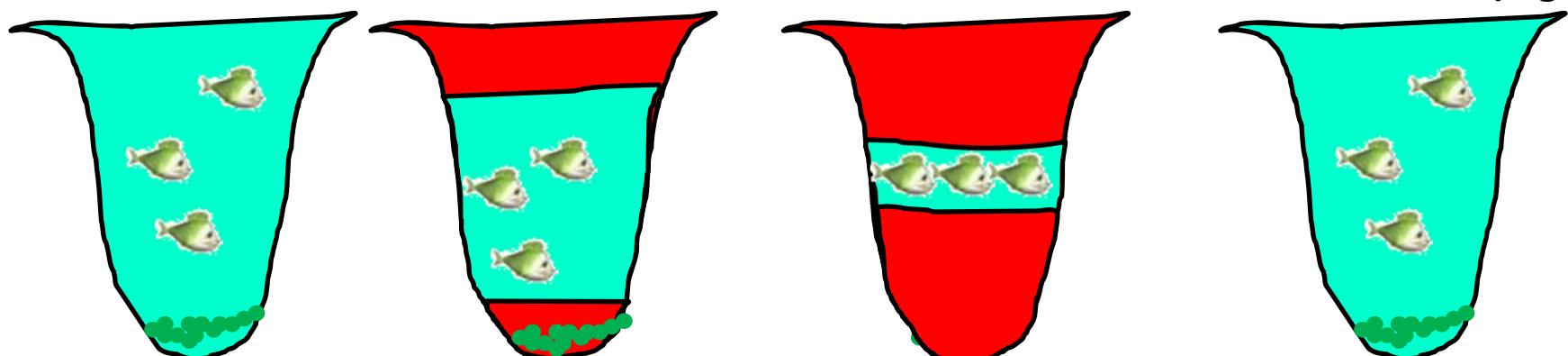
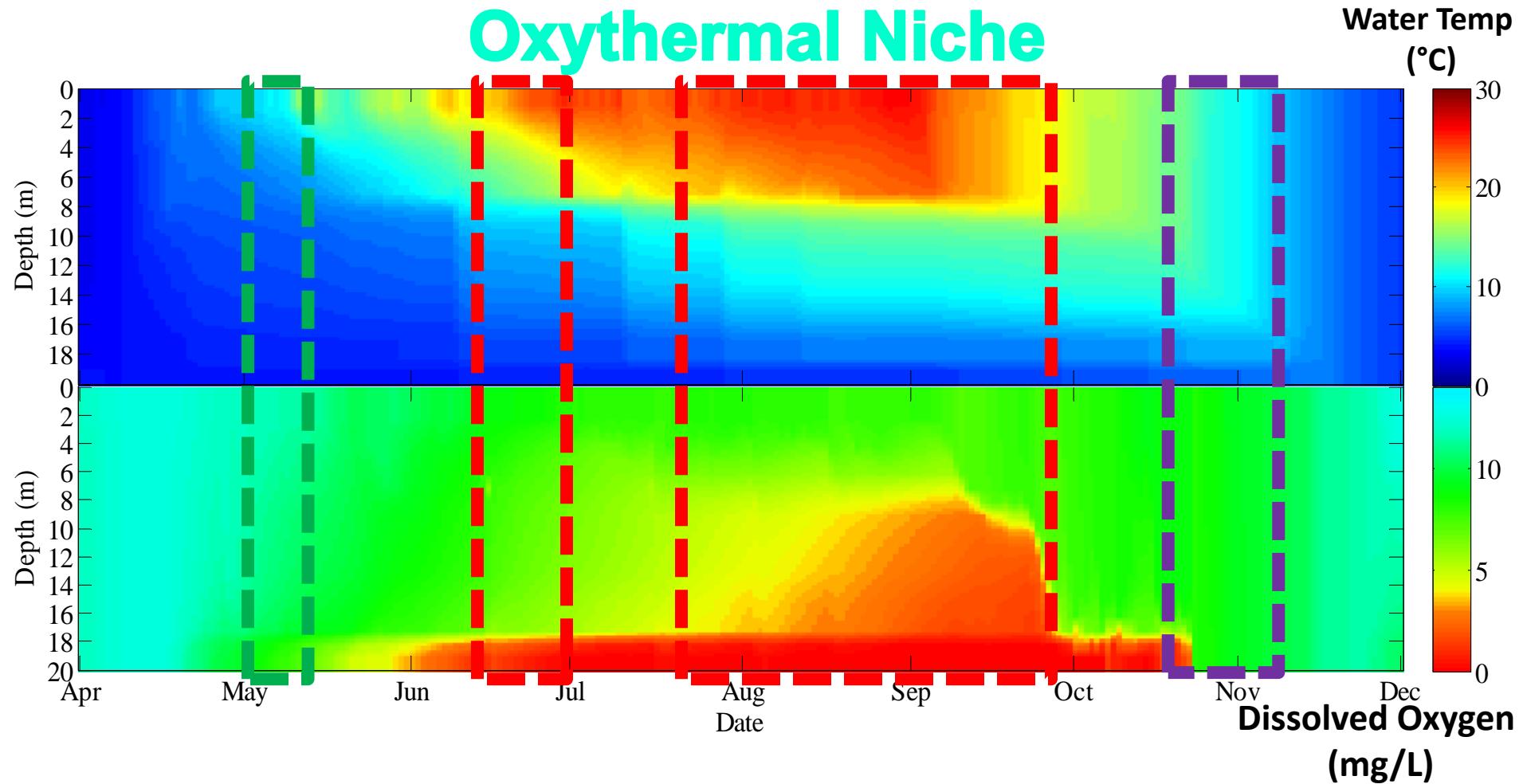
Madeline Magee and Chin Wu
University of Wisconsin, Madison



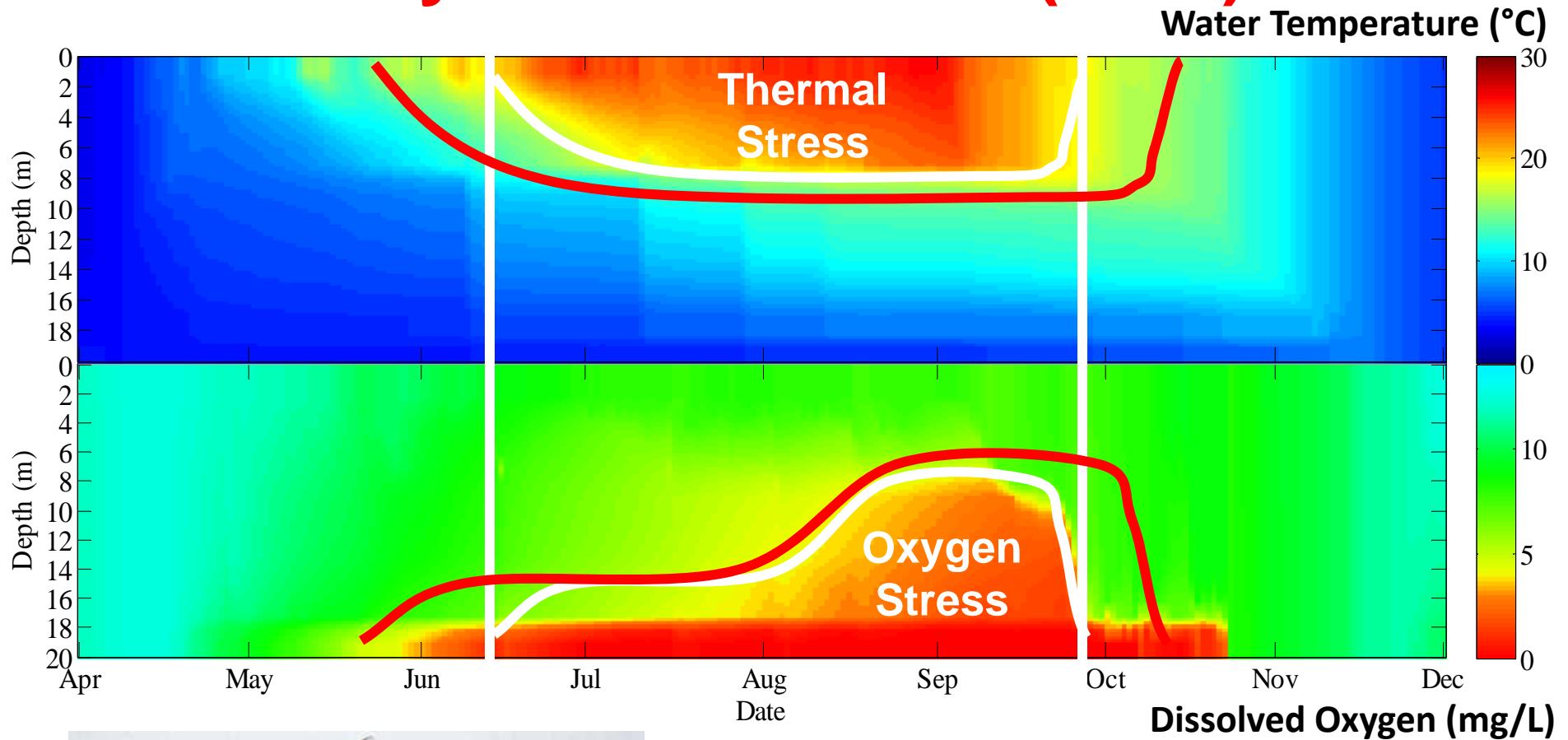
Lake Stratification



Oxythermal Niche



Oxythermal Stress (OTS)



Cisco (*Coregonus artedi*)

DO < 3 mg/L

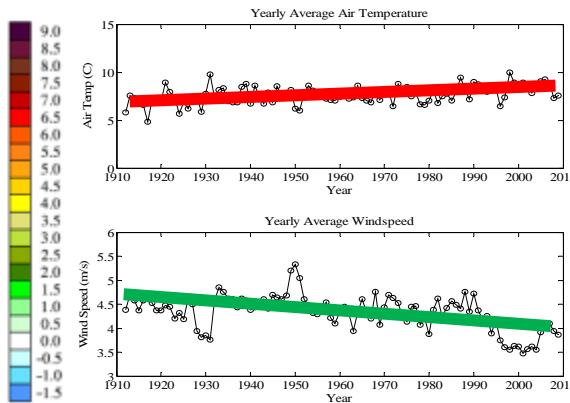
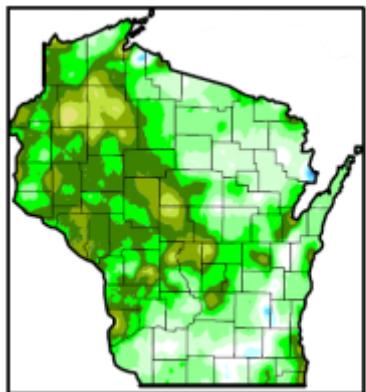
Water Temp > 16 $^{\circ}\text{C}$

Research Questions

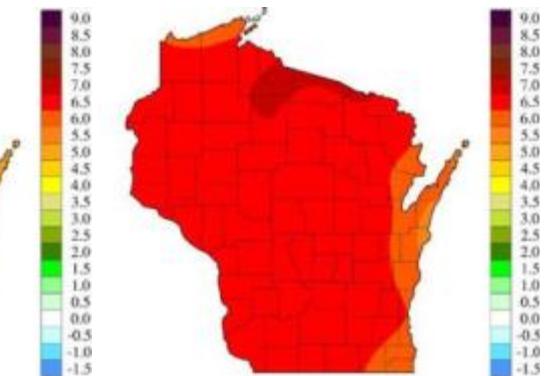
(OTS)

*How does changing climate impact oxythermal stress?

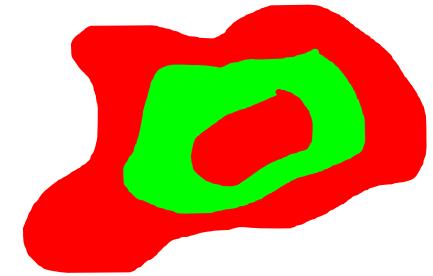
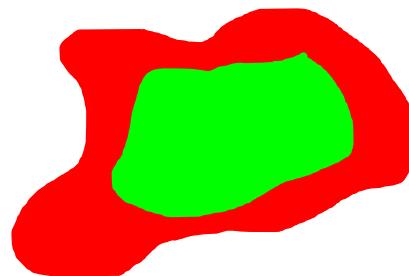
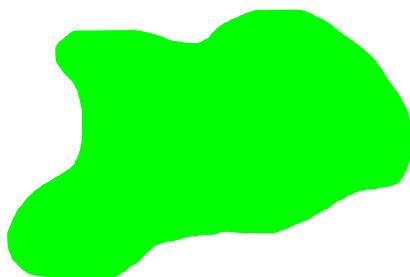
Historical Climate



Projected Climate (WICCI)

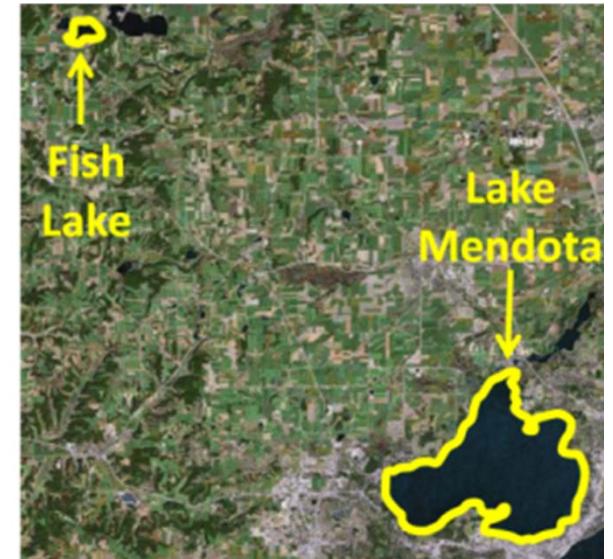
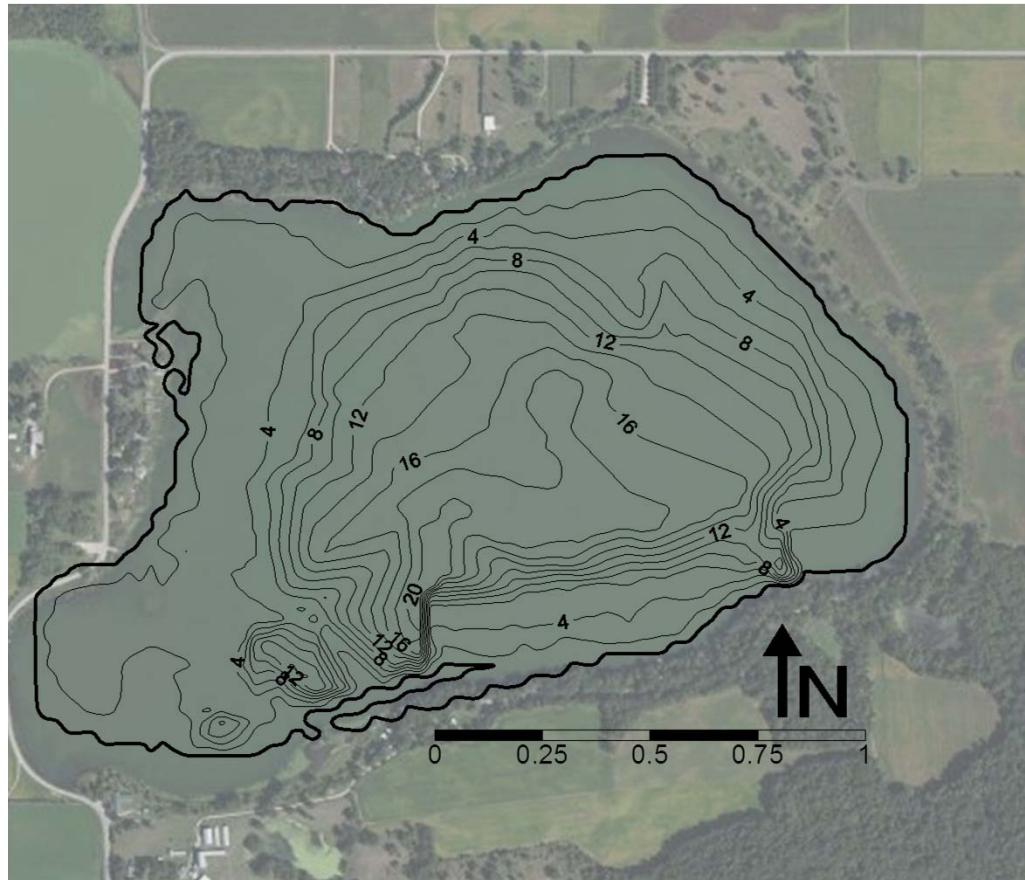


*How will the spatial distribution of OTS evolve?



*How should we mitigate OTS effects due to climate change?

Study Site-Fish Lake

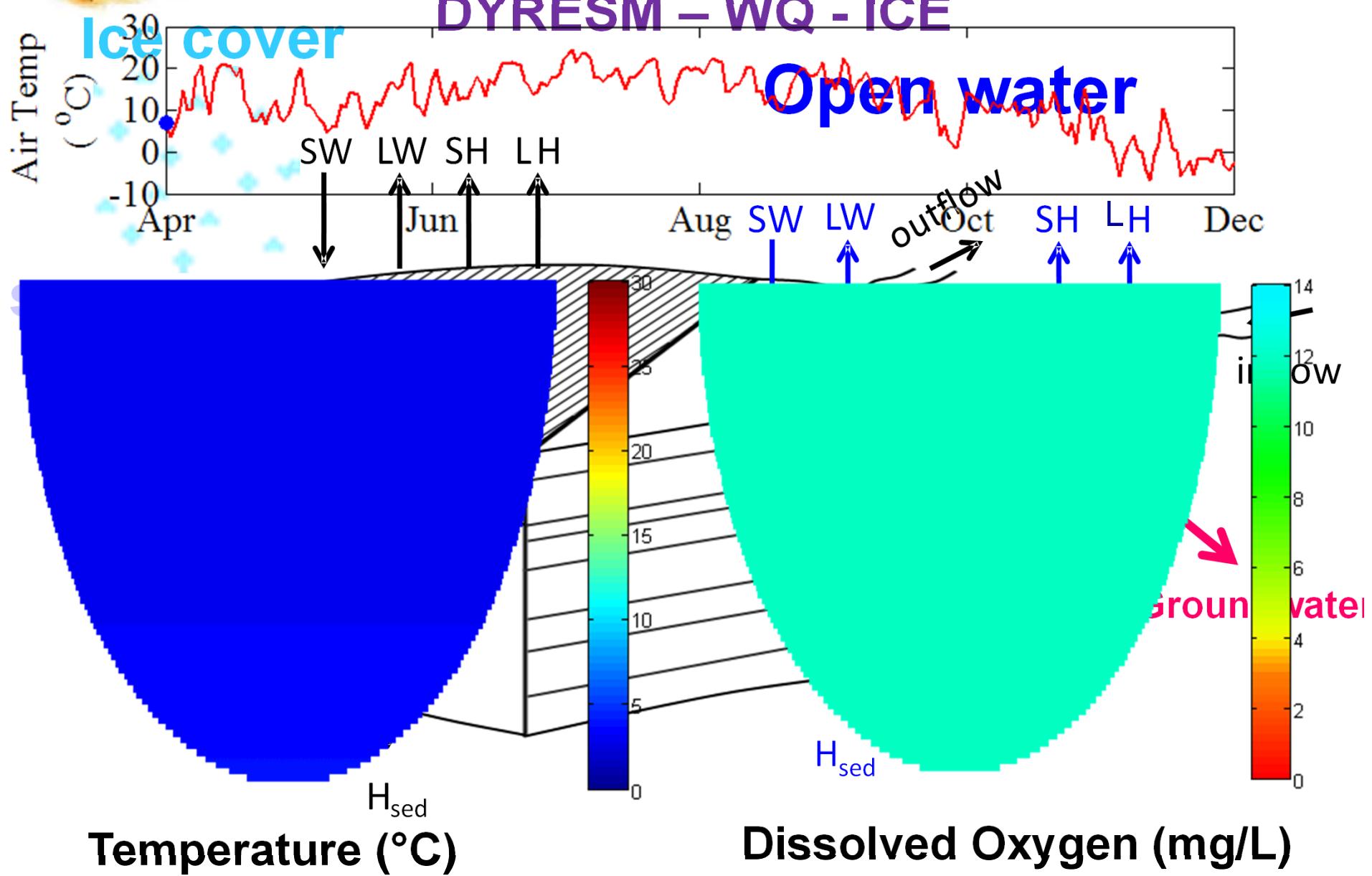


Mean Depth (m)	6.6
Max Depth (m)	19.9
Surface Area (ha)	87.4
Groundwater Hydrology	Groundwater Flowthrough
Surfacewater Hydrology	Seepage
Percentage GW Input	6

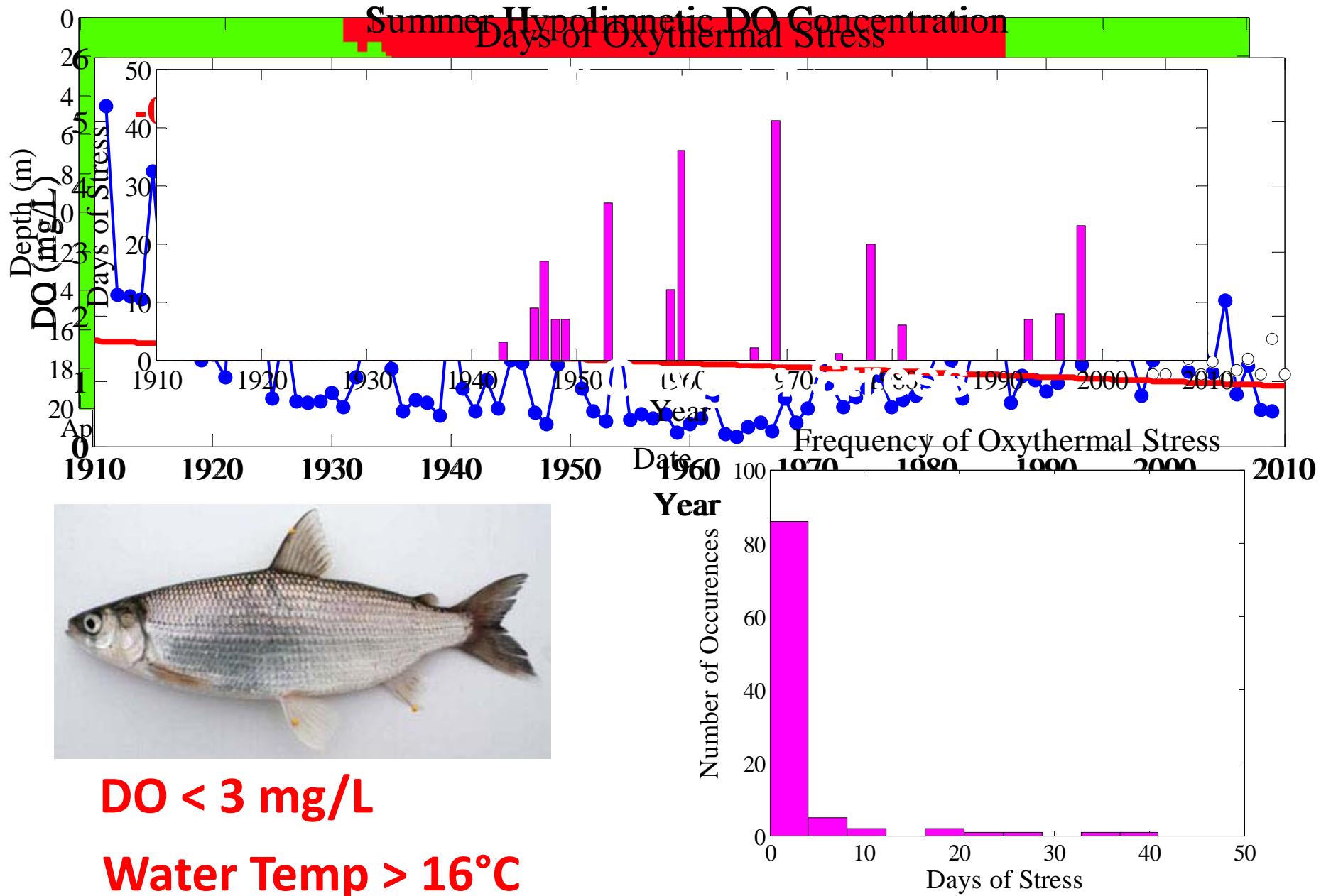


1D Modeling

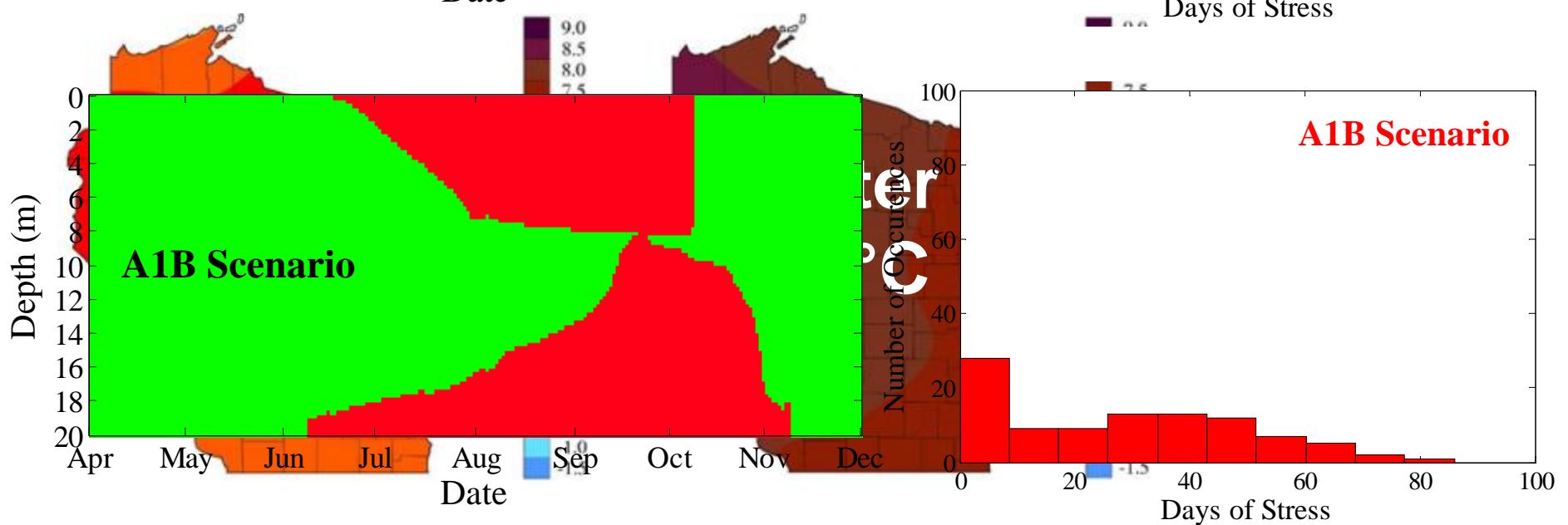
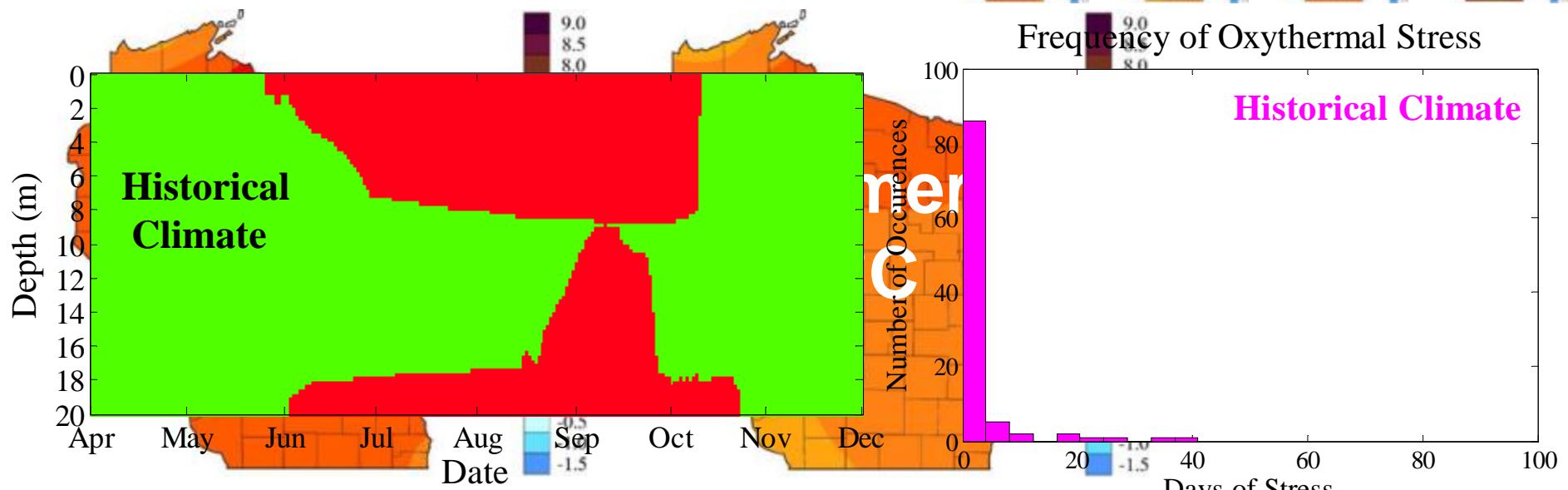
DYRESM – WQ - ICE



Historical Change in OTS

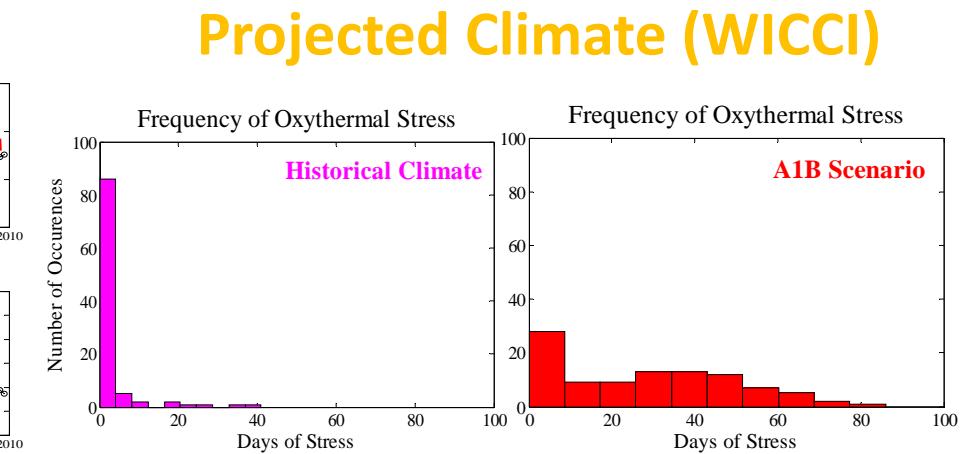
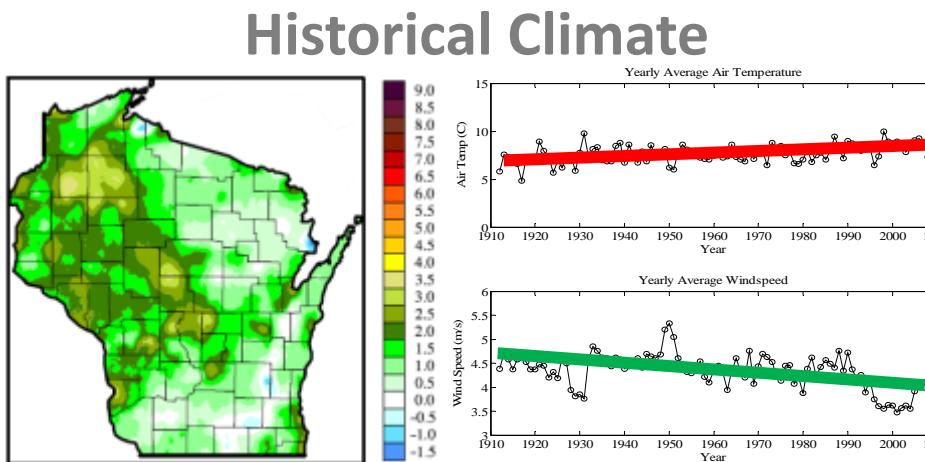


A1B Scenario

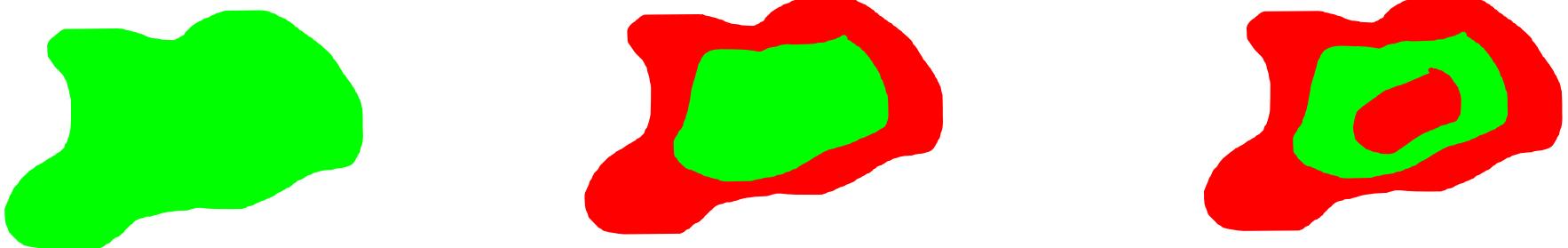


Research Questions

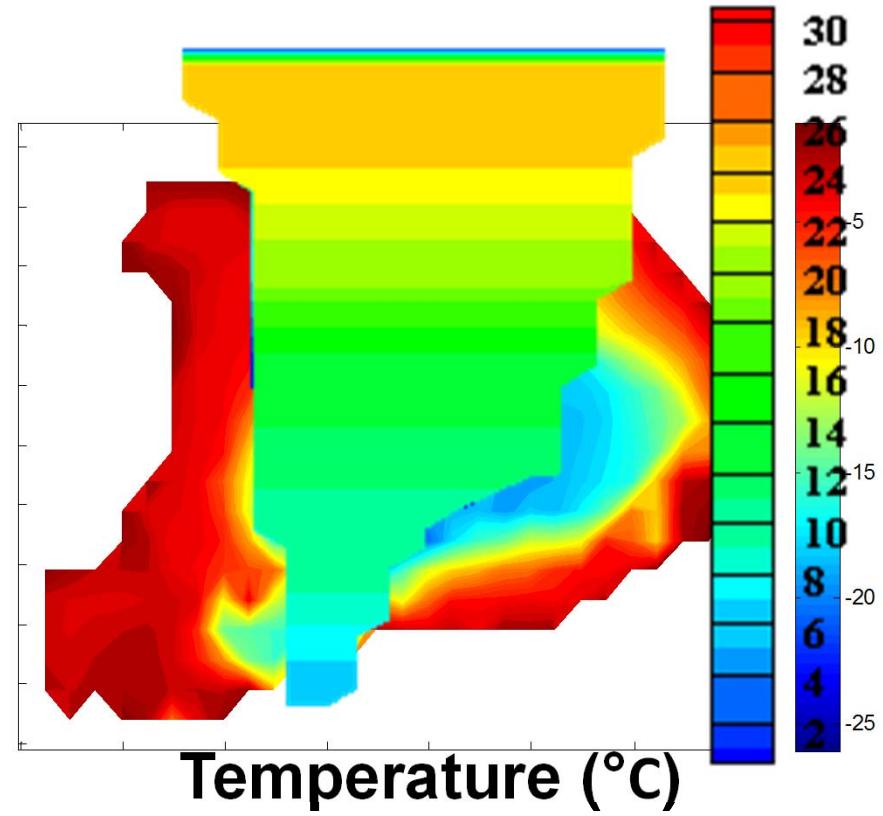
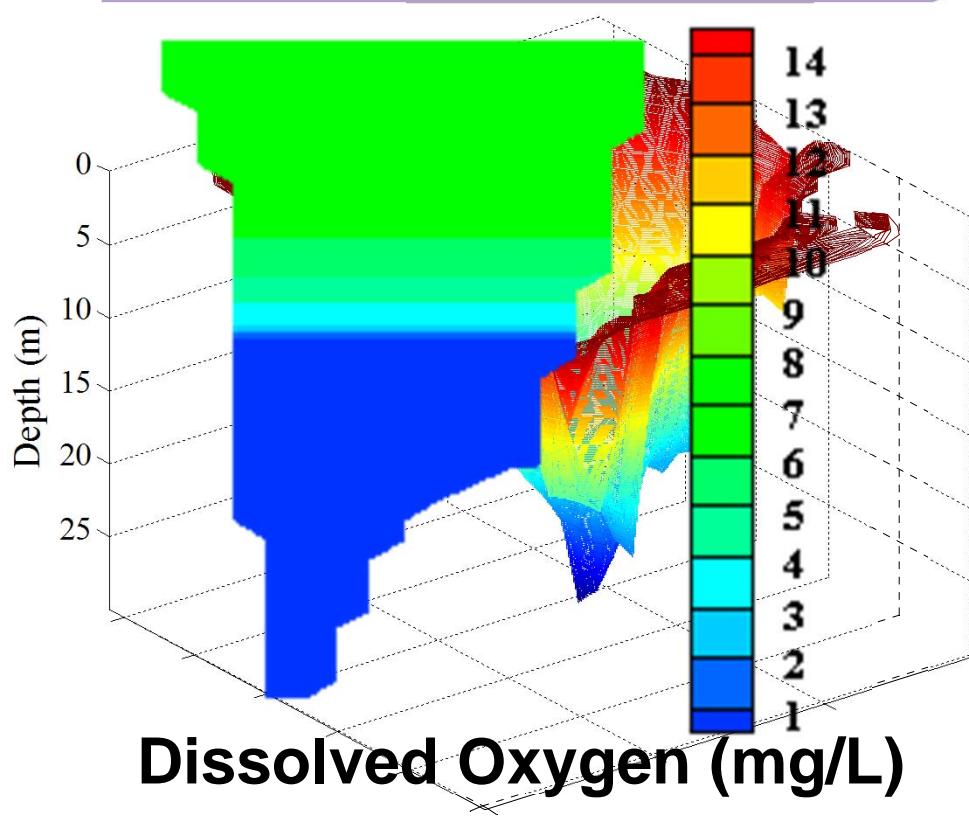
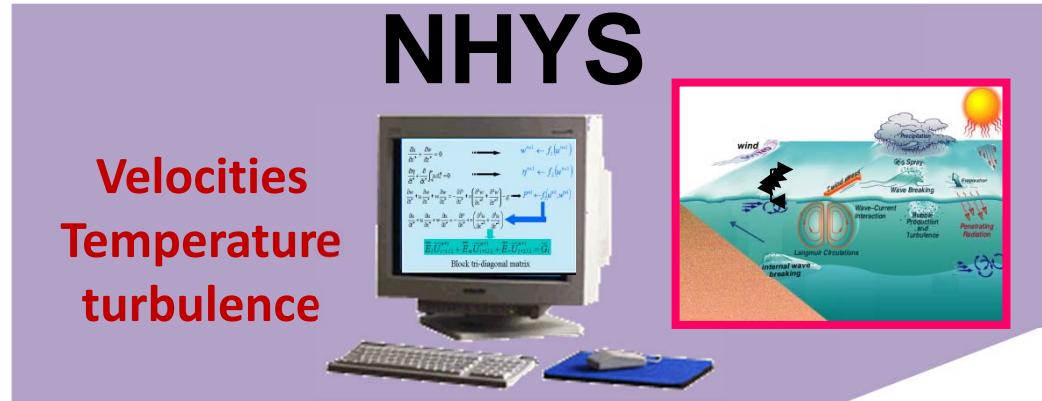
*How does changing climate impact oxythermal stress? (OTS)



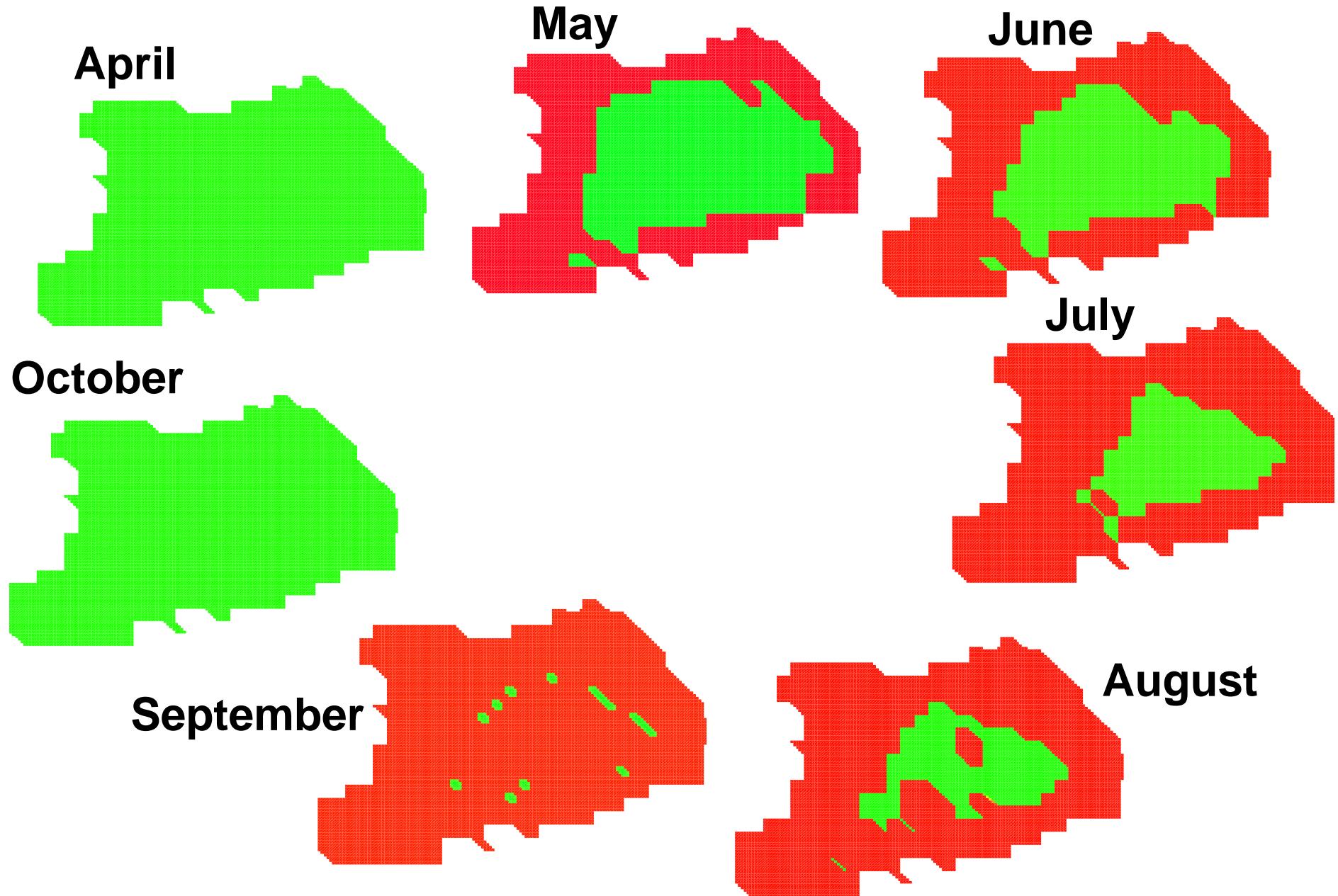
*How will the spatial distribution of OTS evolve?



3D Modeling

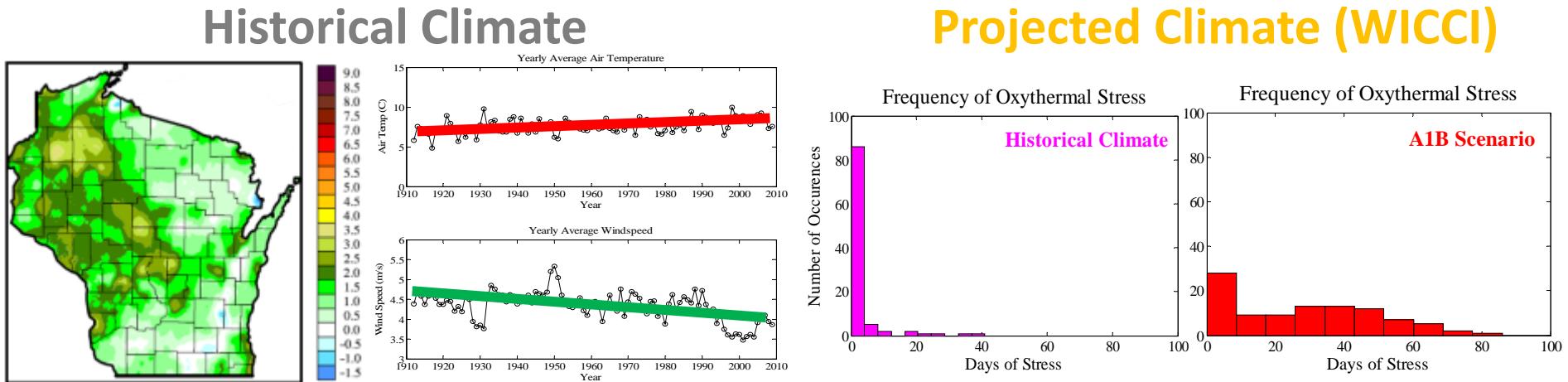


Spatial Distribution of OTS

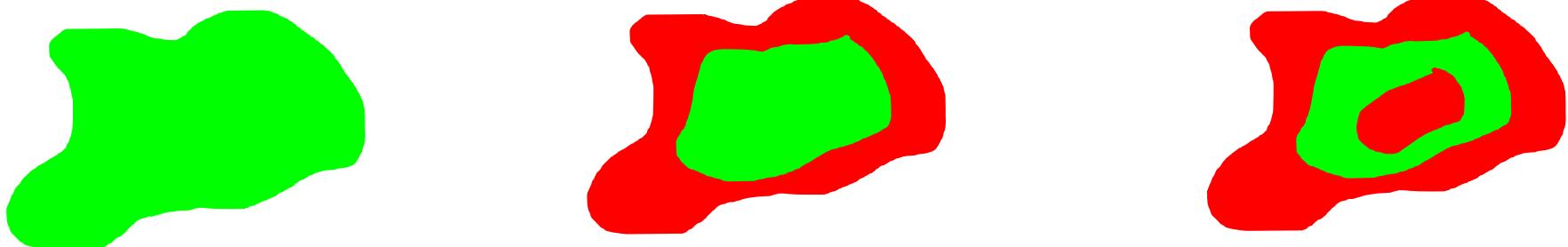


Research Questions

*How does changing climate impact OTS?



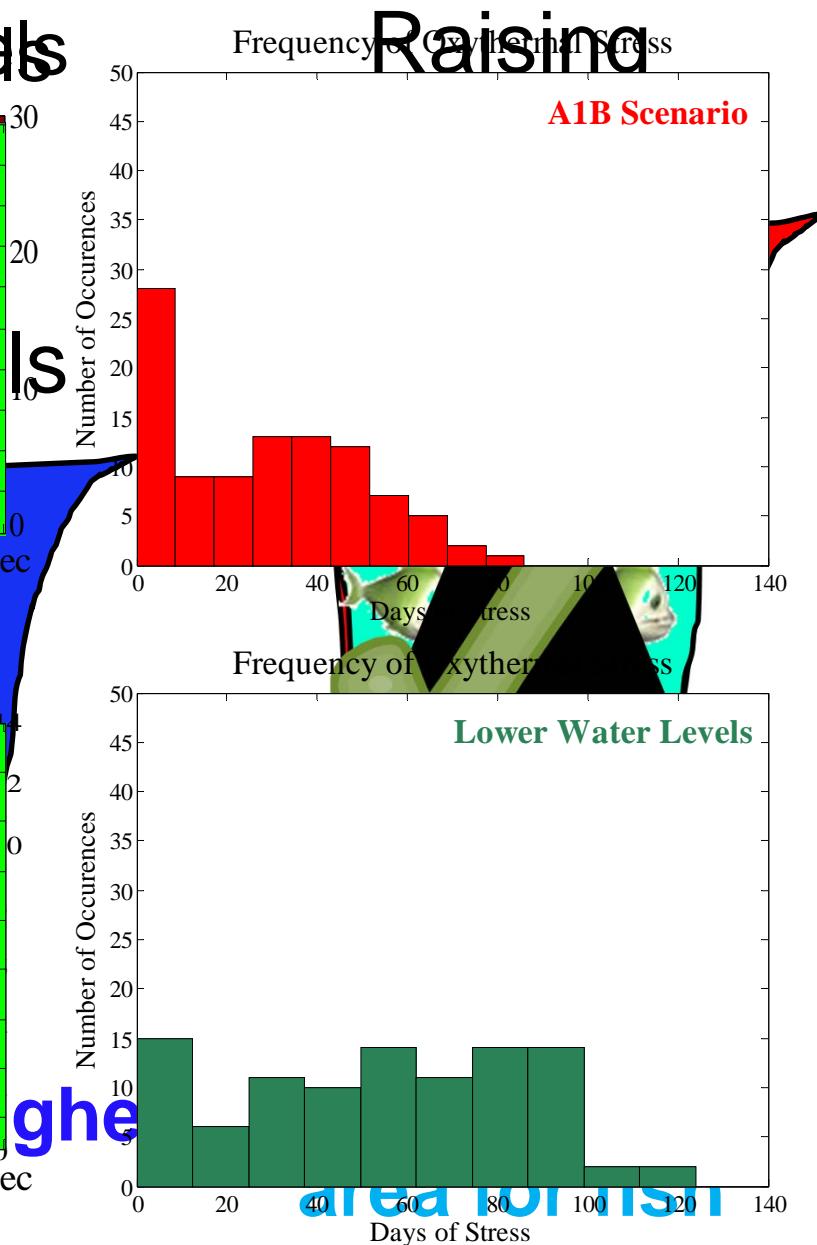
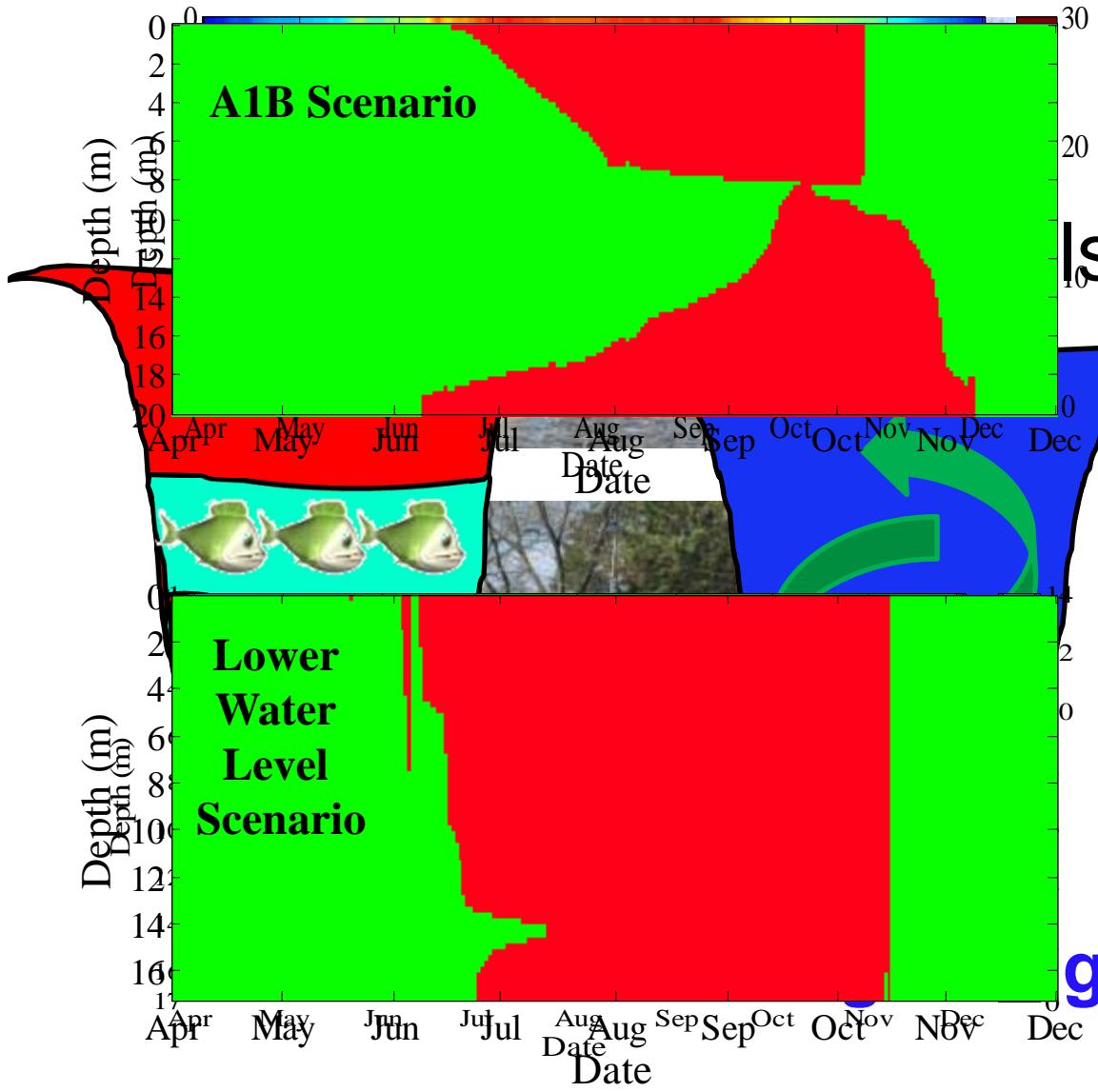
*How will the spatial distribution of OTS evolve?



*How should we mitigate OTS effects due to climate change?

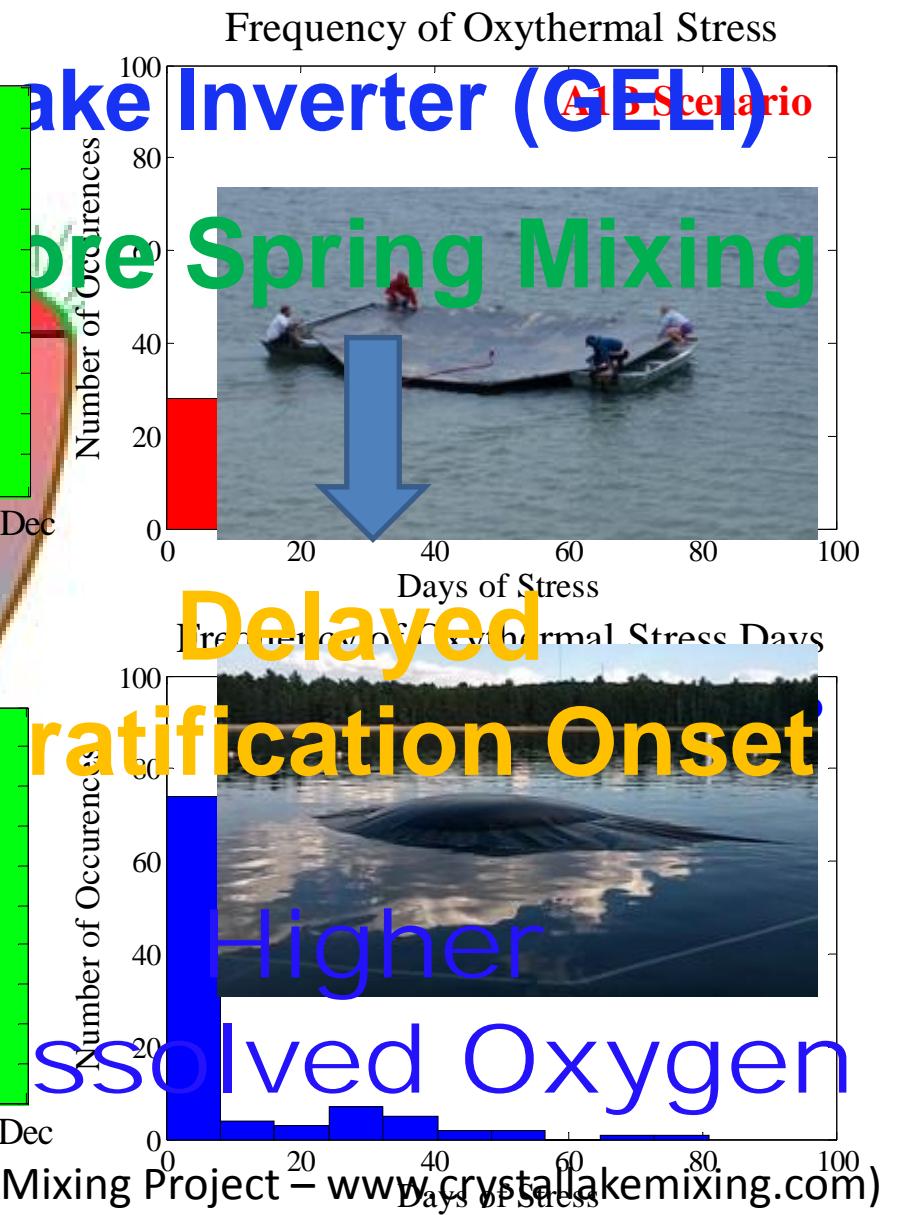
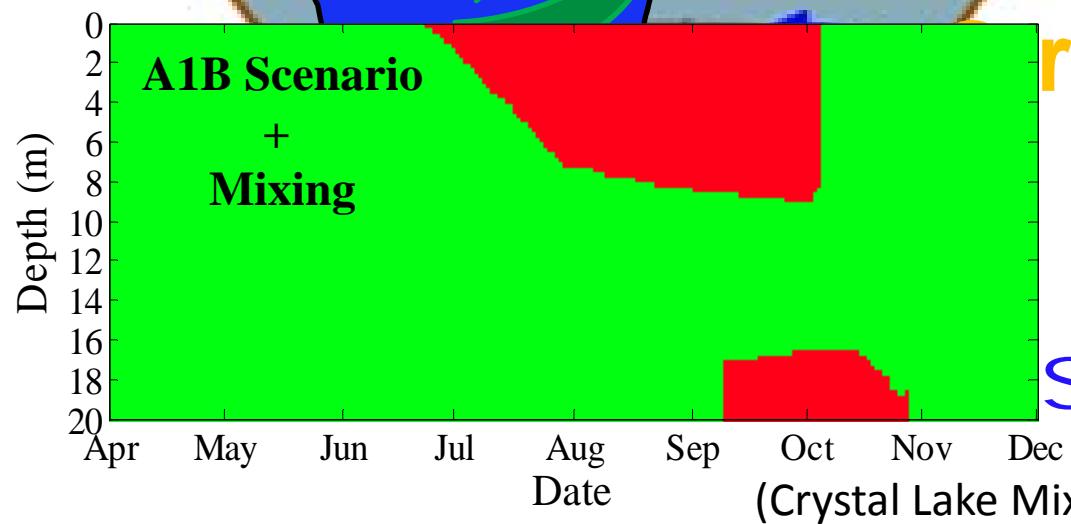
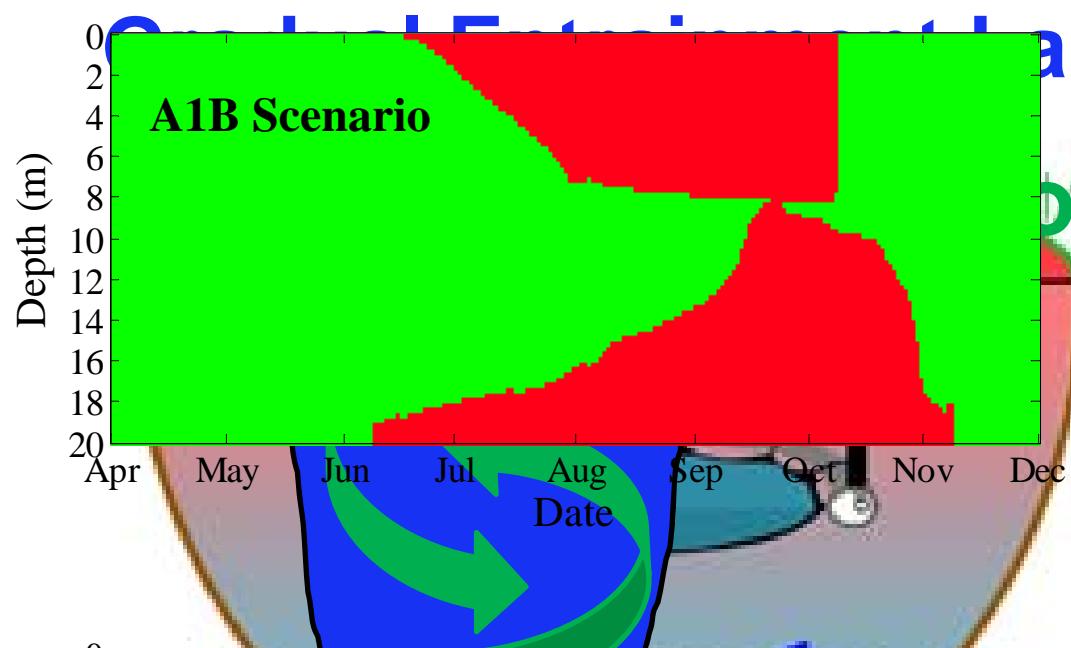
Mitigation/Adaptation Strategy

Option 1: Changing Water Levels



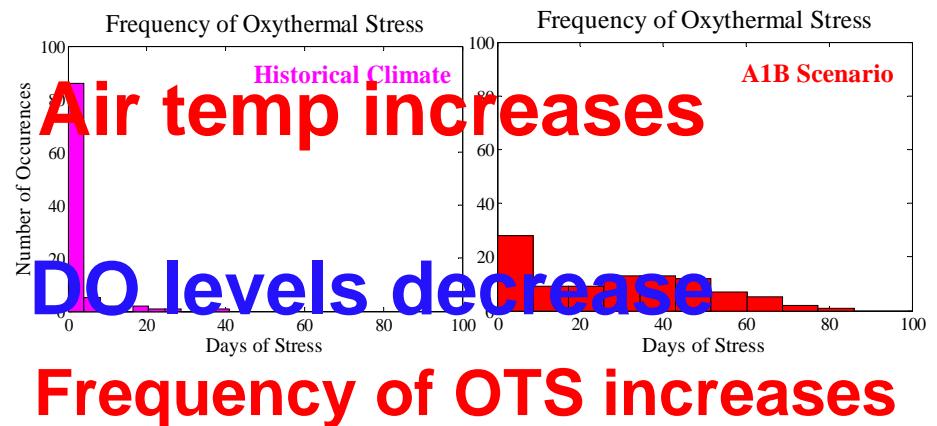
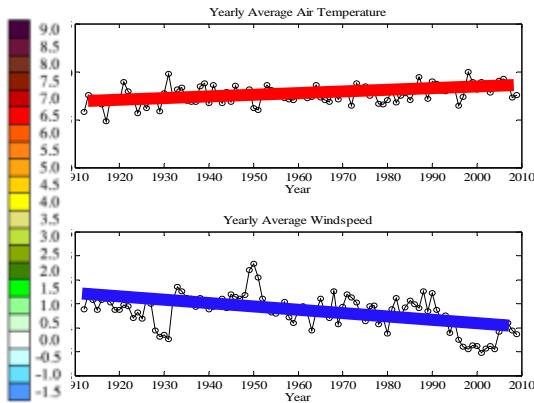
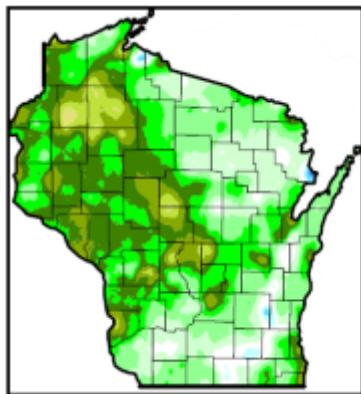
Mitigation/Adaptation Strategy

Option 2: Artificial Mixing



Conclusions

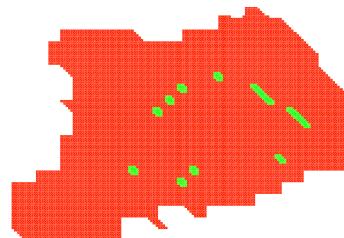
*How does changing climate impact oxythermal stress?



*How will the spatial distribution of OTS evolve?

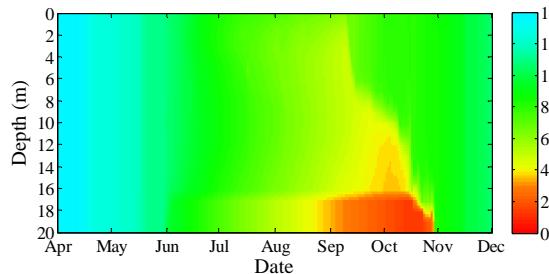


April-July
low spatial
OTS



Aug + Sept
high spatial
OTS

*How should we mitigate OTS effects due to climate change?



Artificial Mixing reduces OTS



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- Funding: NSF, NTL-LTER, UW-Madison WRI,



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