Two Decades of Starry Stonewort

Two Decades of Starry Stonewort

History in Michigan

"Super Chara" in Late 1990's

Positively identified Lobdell Lake on 06 February 2006 but present in that lake for at least 8 years

It's Everywhere, It's Everywhere

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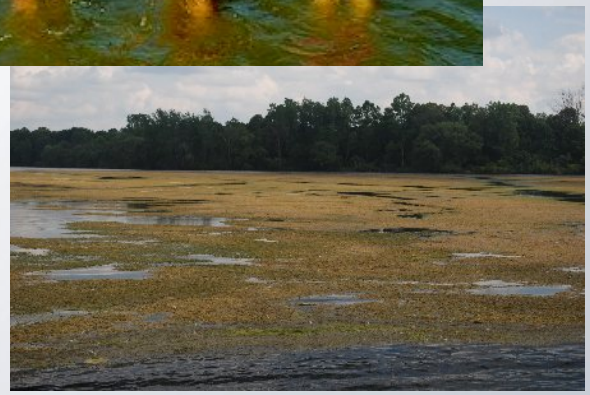
Management Expectations



Nuisance Control

Short-term

Seasonal

Year-to-Year

Total Suppression or Eradication

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But - We Do Know a Lot!

Predictably Unpredictable

Blooms AND Crashes

Identifiable – Hard to Find (non-nuisance conditions)

Easy Spread, Easy Go

Very Easy to Kill – Very Hard to Treat

Selective Treatment is Possible

May Not Show Up for the Party

Management Challenge – Not End of World

This Too Shall Pass

Two Decades of Starry Stonewort

Ecosystem Impacts








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How Bad Is It?

Reduces Species Richness

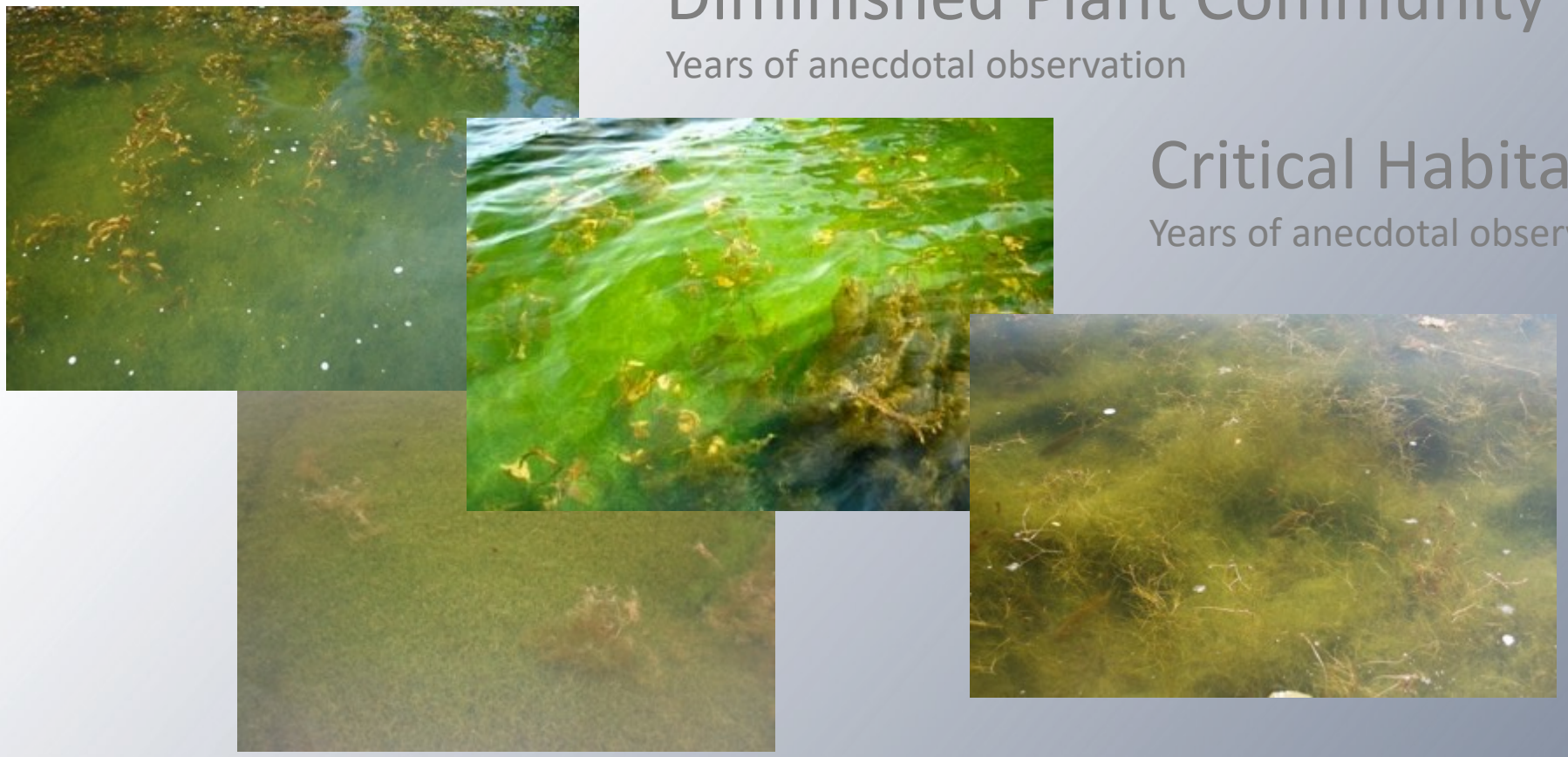
Brainard, A.S. & Schulz, K.L. (2017). Impacts of the cryptic macro-algal invader, *Nitellopsis obtsusa*, on macrophyte communities. Freshwater Science 36(1)55-62

Diminished Plant Community Biodiversity

Years of anecdotal observation

Critical Habitat Loss

Years of anecdotal observation



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Management in Michigan

Management began before it was identified

Innovations developed by practitioner trial and error

Selective control is cost effective

Impacts on other invasive species modifies response

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Management Challenges

Perennation

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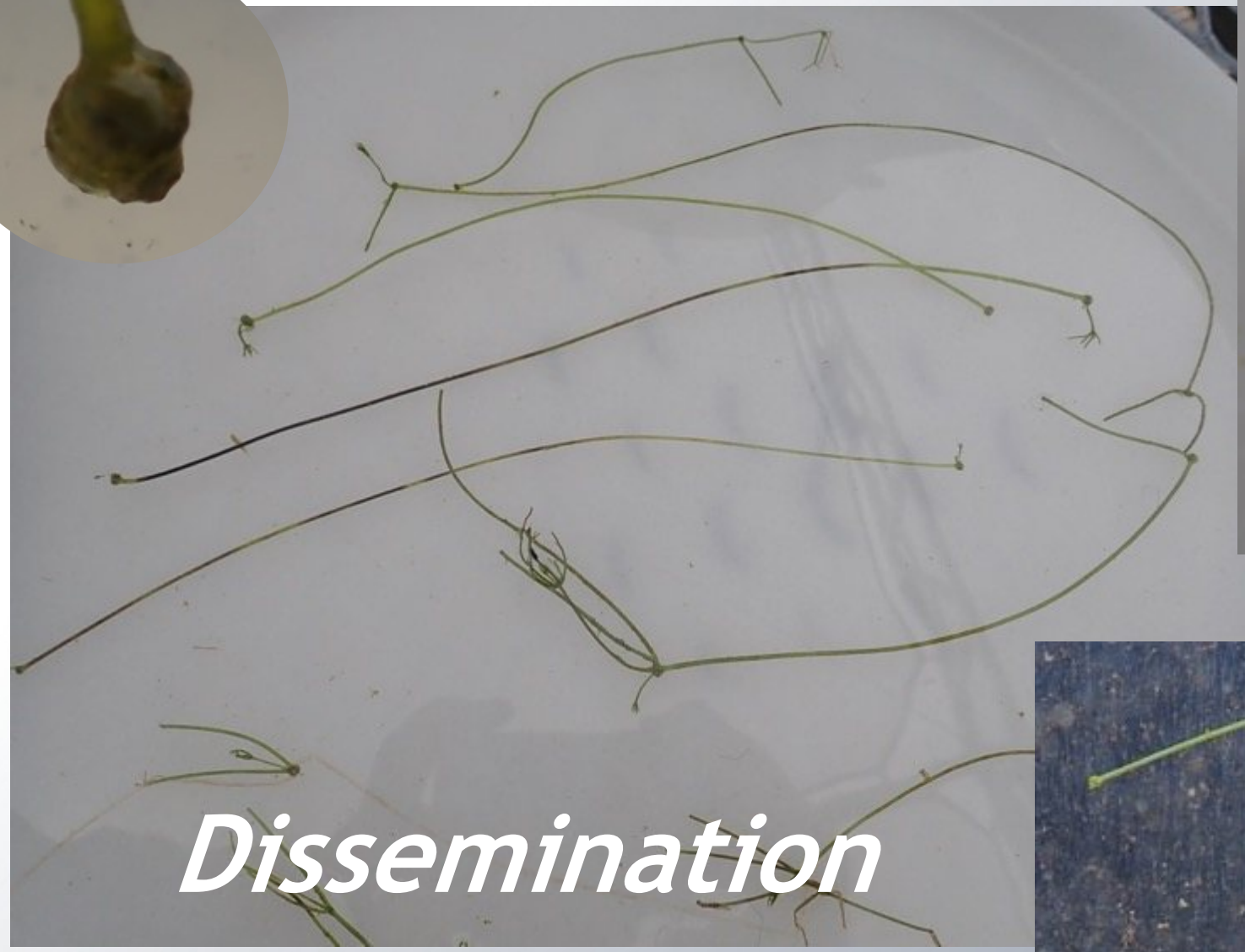
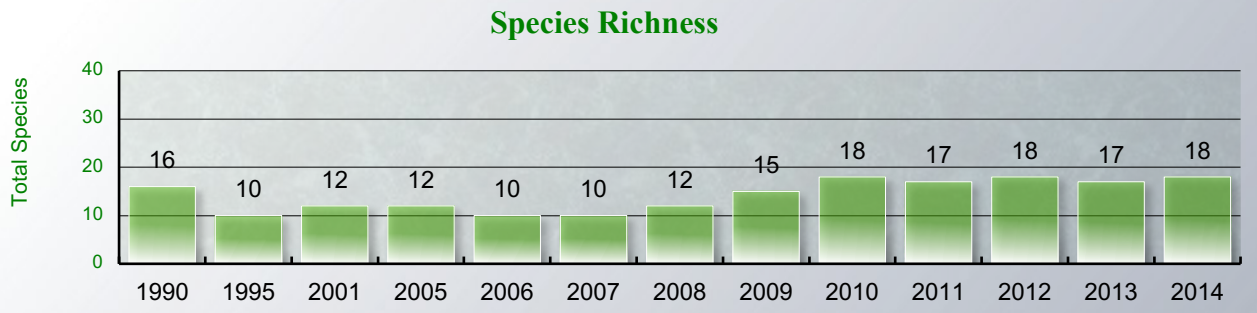
Management Challenges

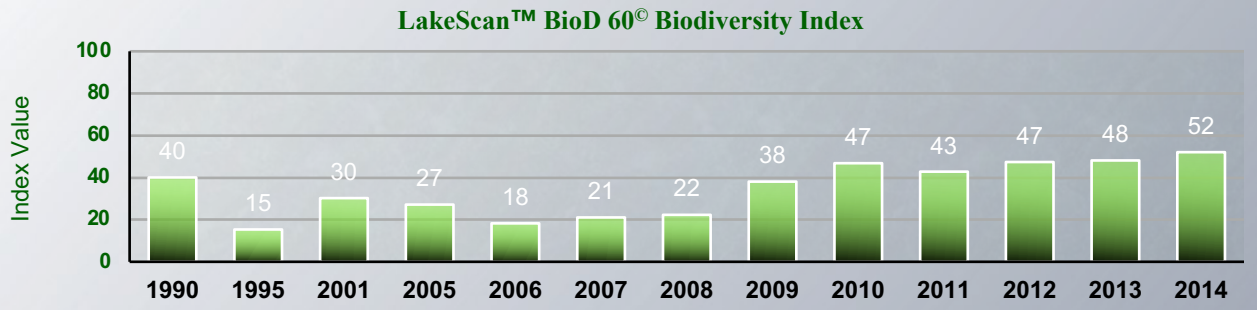


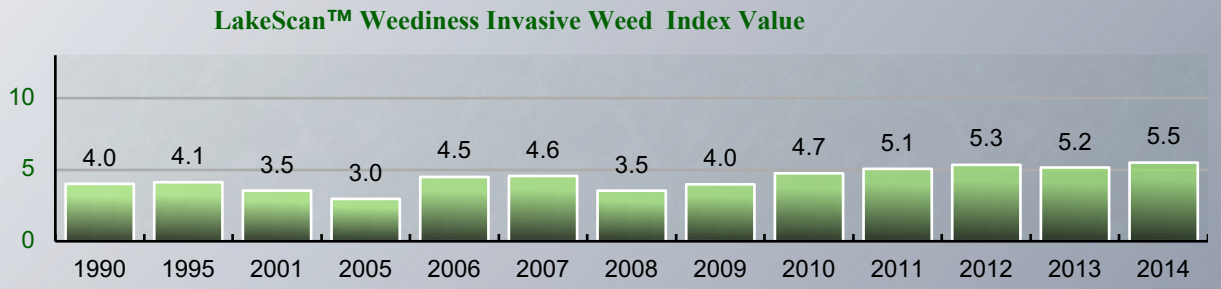
Dissemination

How Bad Is It – If Managed Properly?

Impact on a managed starry stonewort lake.







- LakeScan™ is a trademark of Aquest Corporation

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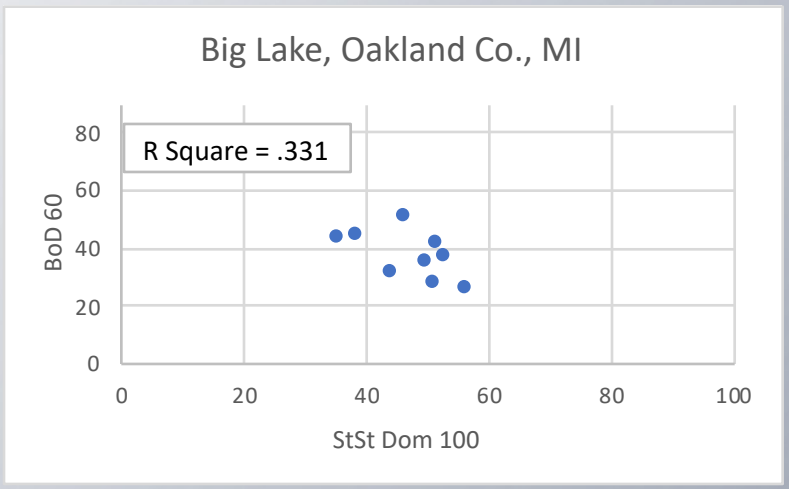
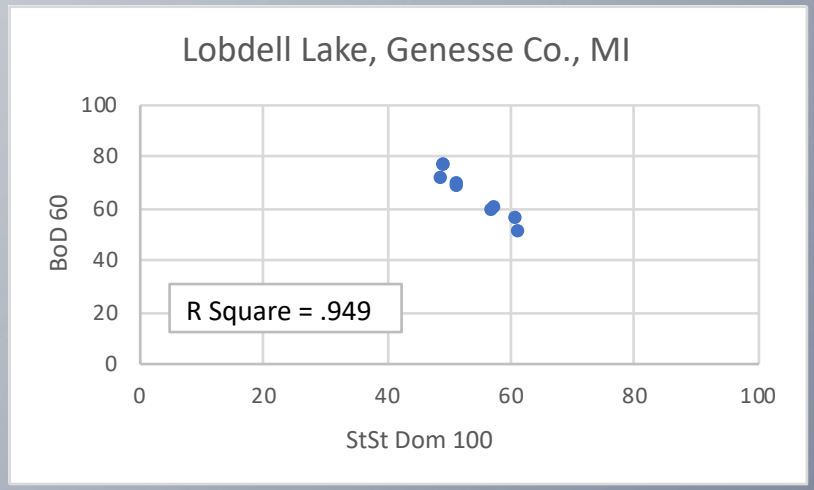
Impacts on “Lake Health”

	Years of Analysis	% AROS Acres	Mean BioD	StDev	StSt Dom	Dom R2
Big	9	100%	38	8.52	48	0.331
Lobdell	9	73%	65	9.15	55	0.949
Lower Straits	9	78%	17	8.24	46	0.121
North	7	54%	43	6.51	44	0.134
Shinanguag	7	100%	23	4.88	24	0.777
Tamarack	13	94%	22	7.32	17	0.316
Tipsico	14	66%	33	10.30	27	0.148
Whitmore	16	64%	43	9.60	14	0.249
Williams	13	71%	29	0.00	30	0.038
Means	11	78%	35	7.17	34	0.340





Impact on Biodiversity in Managed Lakes

- 9 Lakes
- 7 to 16 Years of data with Mean of 11 years
- 2 Lakes show negative correlation between StSt dominance and BioD
- 0 Lakes exhibit persistent nuisance plant conditions

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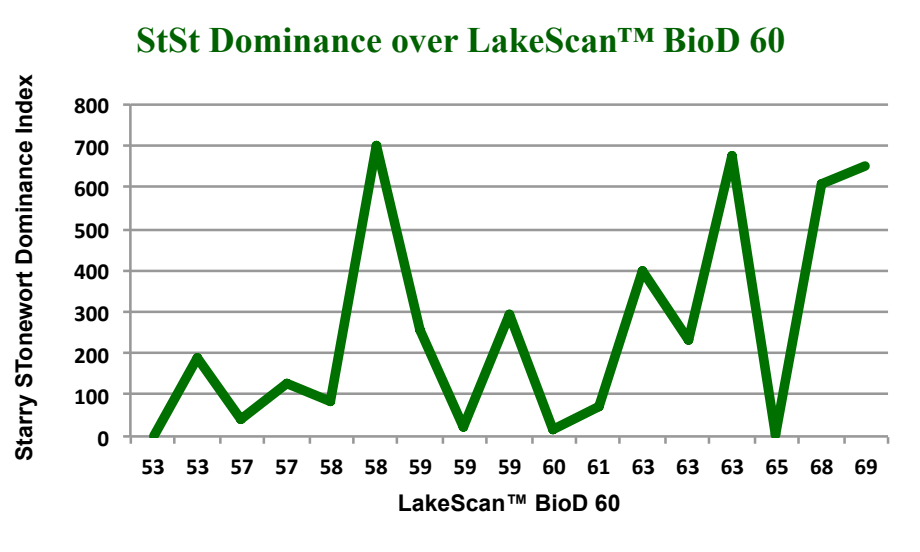
Impacts on “Lake Health

BioD and StSt Dominance Relationship



17 Starry Stonewort Infested Lakes in 2014

How Bad Is It When Managed Properly?

Typically, LakeScan™ BioD 60© plant community diversity has trended positively or has been stable in managed lakes, year after year.

But, weediness has generally Increased.

Nuisance conditions can be suppressed with current technologies (mechanical and biocides) but eradication may not yet be possible.

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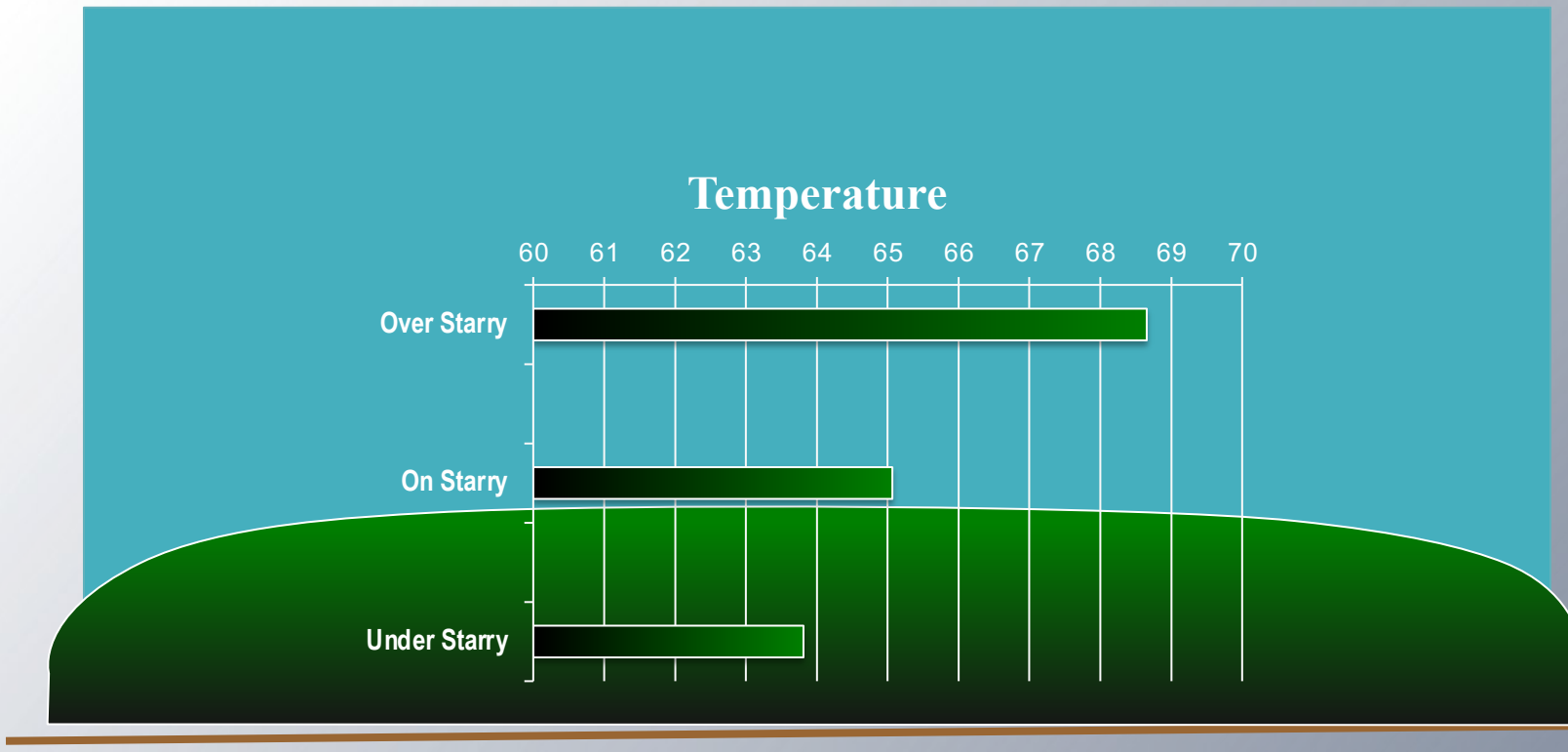
Management Challenges

Timing is Everything

Blooms, Crashes, Phyto-architecture

Starry Stonewort Management

Chemo-Thermal Observations



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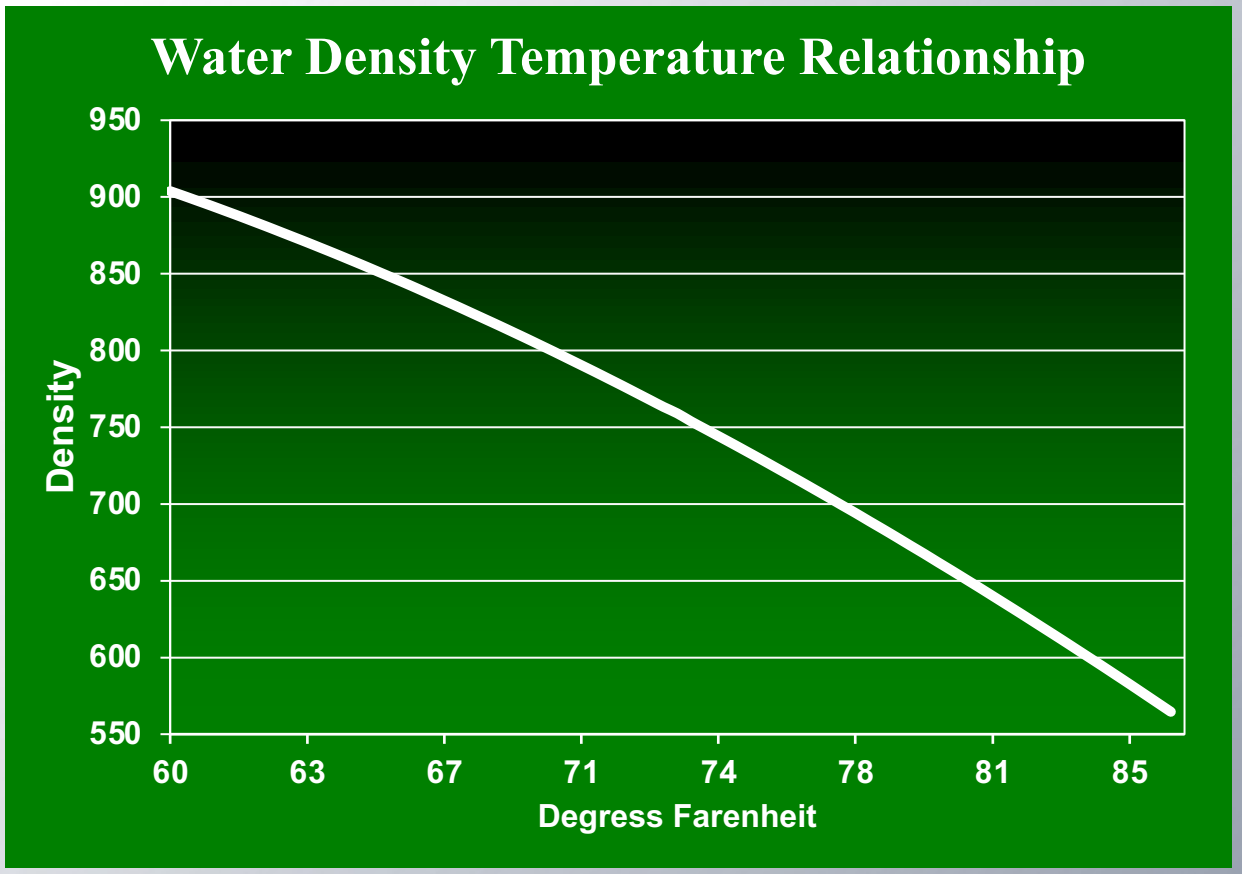
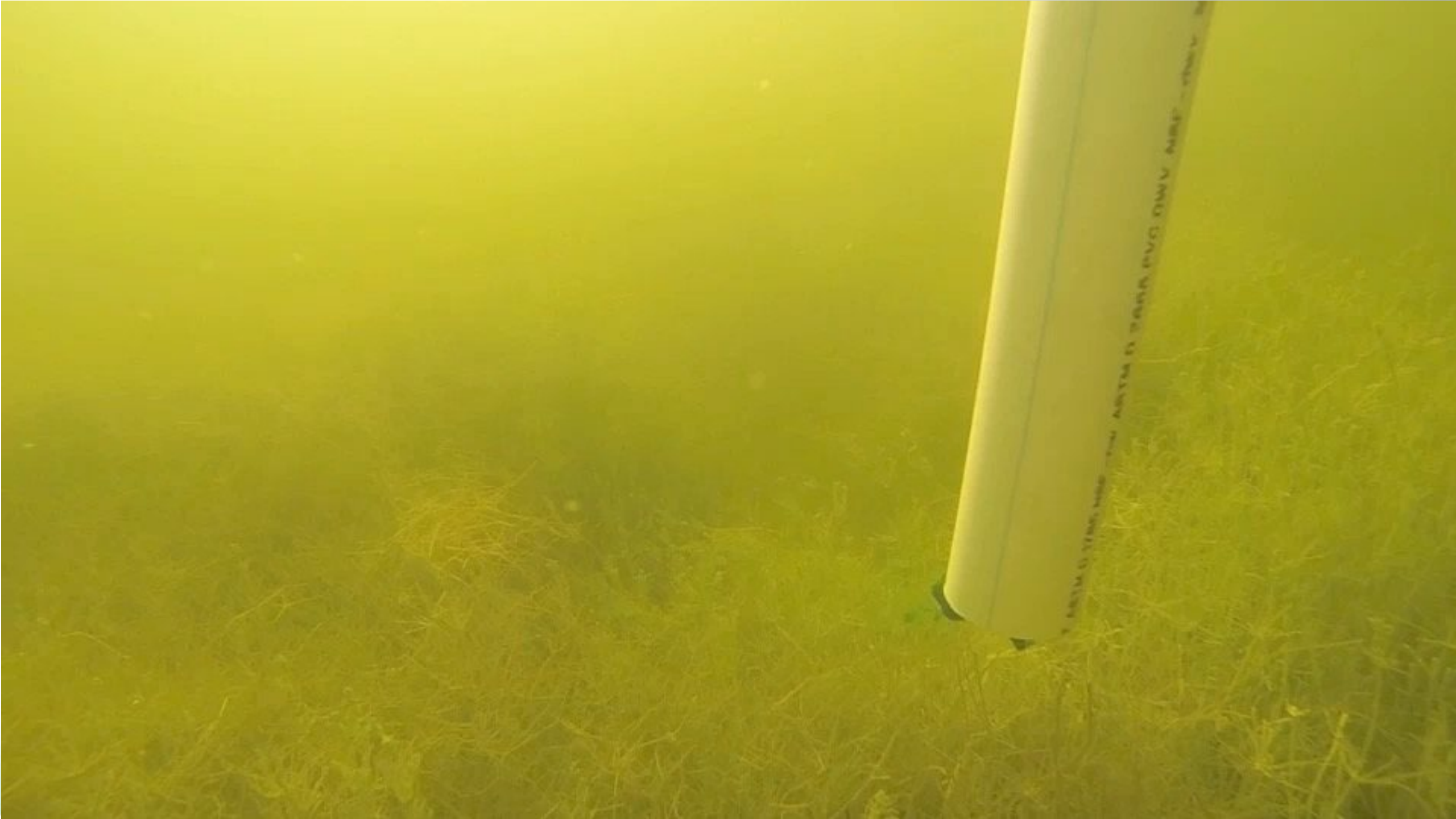
Starry Stonewort Management





Starry Stonewort Management

Application Method is Critical!

Targeted, Temperature Assisted Application System (TTAAS Chill)

Weighted Trailing Hoses

Spike Application

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Selective Aquatic Plants Management

- Target Plant Sensitivity (Biochemical)
- Required Agent Exposure Time (CET)
- Total Biomass
- Combination and Adjuvant Synergies
- Dose Rate(s)
- Water Movement
- Water Chemistry (Hardness and pH)
- Biotic Interference – Microbiome and Environmental Actors
- Target Plant Metabolism Rate
- Thermal Properties of Application Zone
- Weather (Temperature, Solar Irradiation, Wind and Wave)

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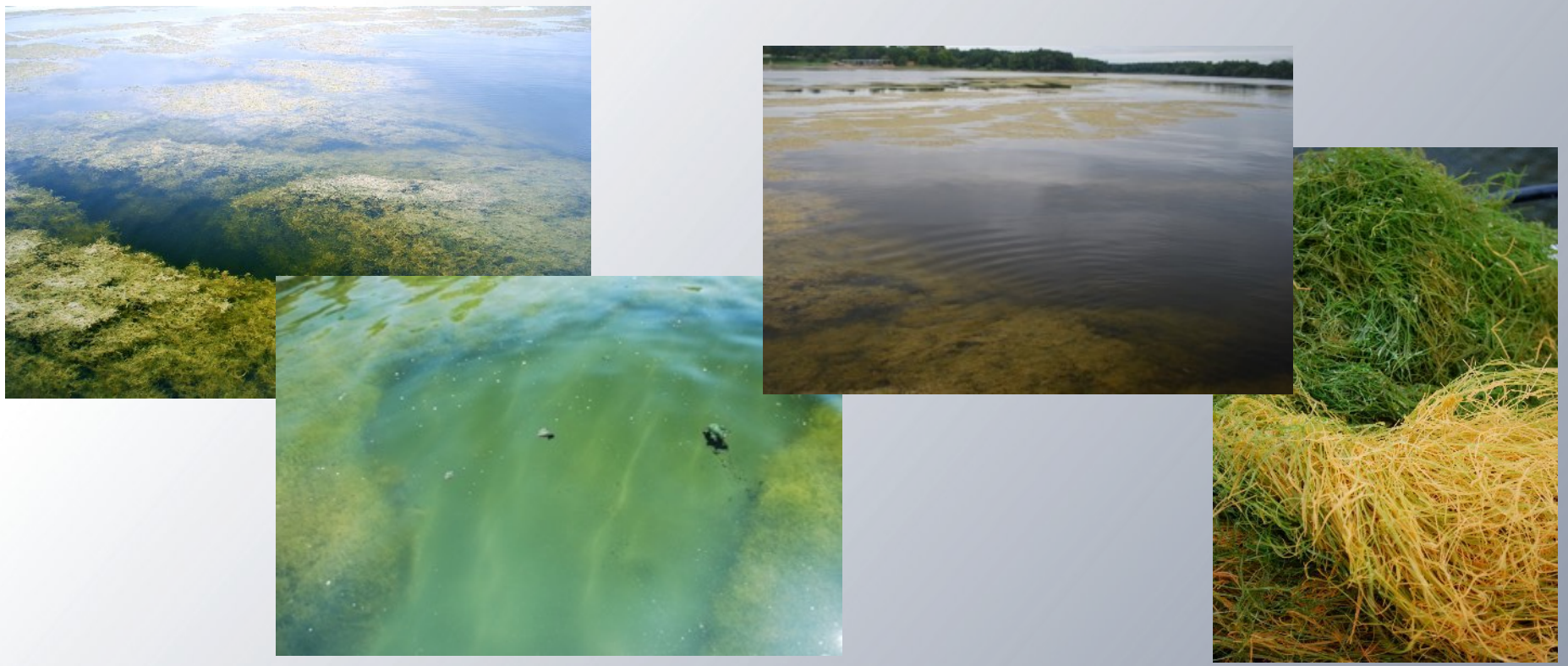
Dr. D's Wish List for Further Study

Crash Phenomenon



Programmed Cell Death

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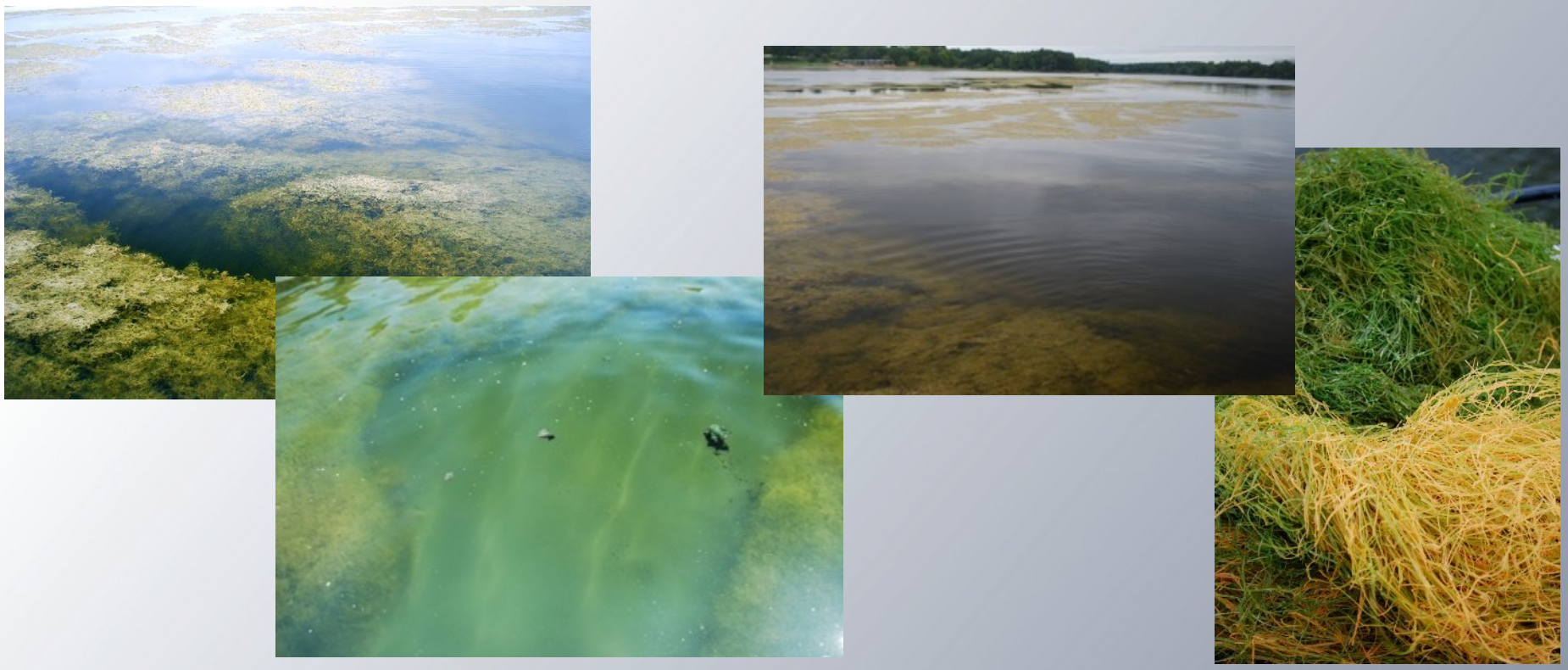
Dr. D's Wish List for Further Study

Crash Phenomenon



Programmed Cell Death

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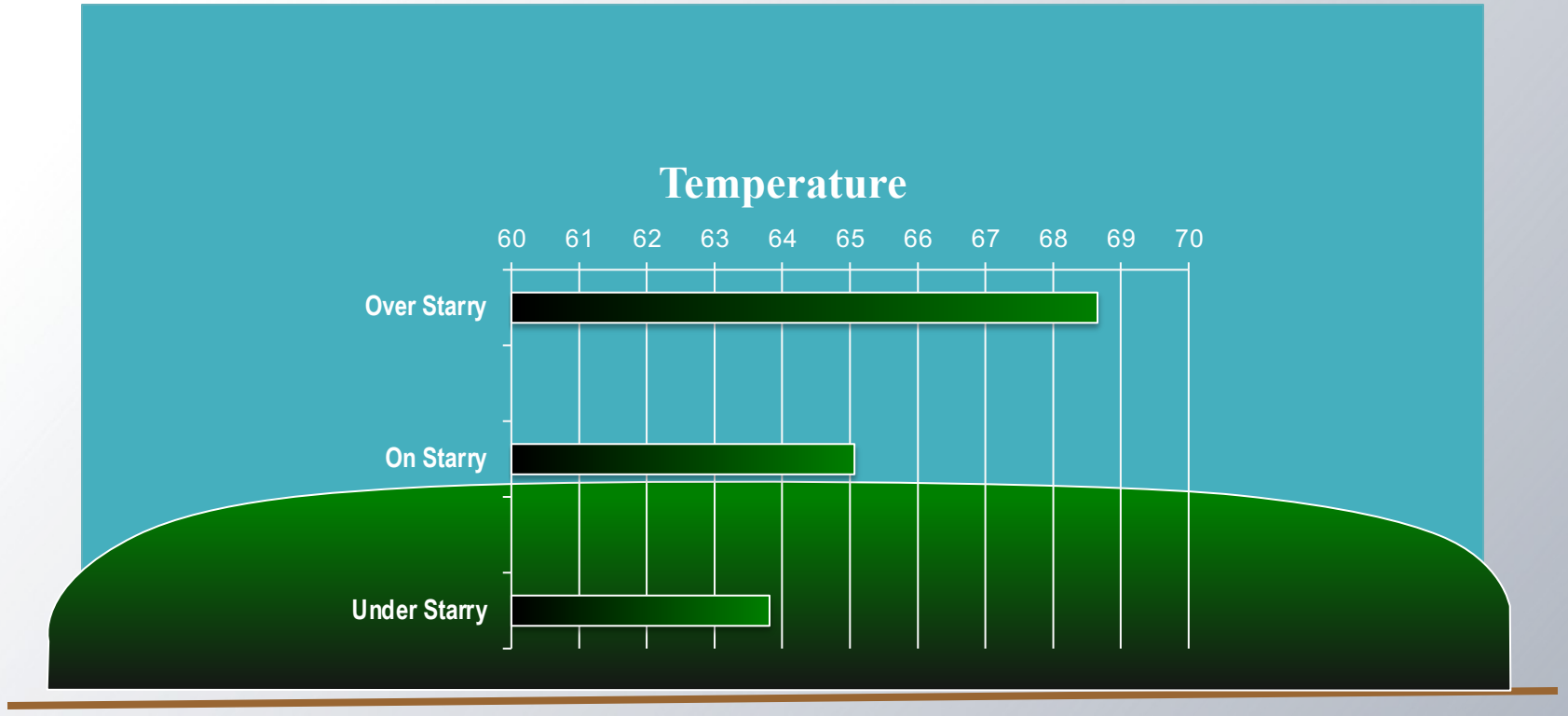
Starry Stonewort

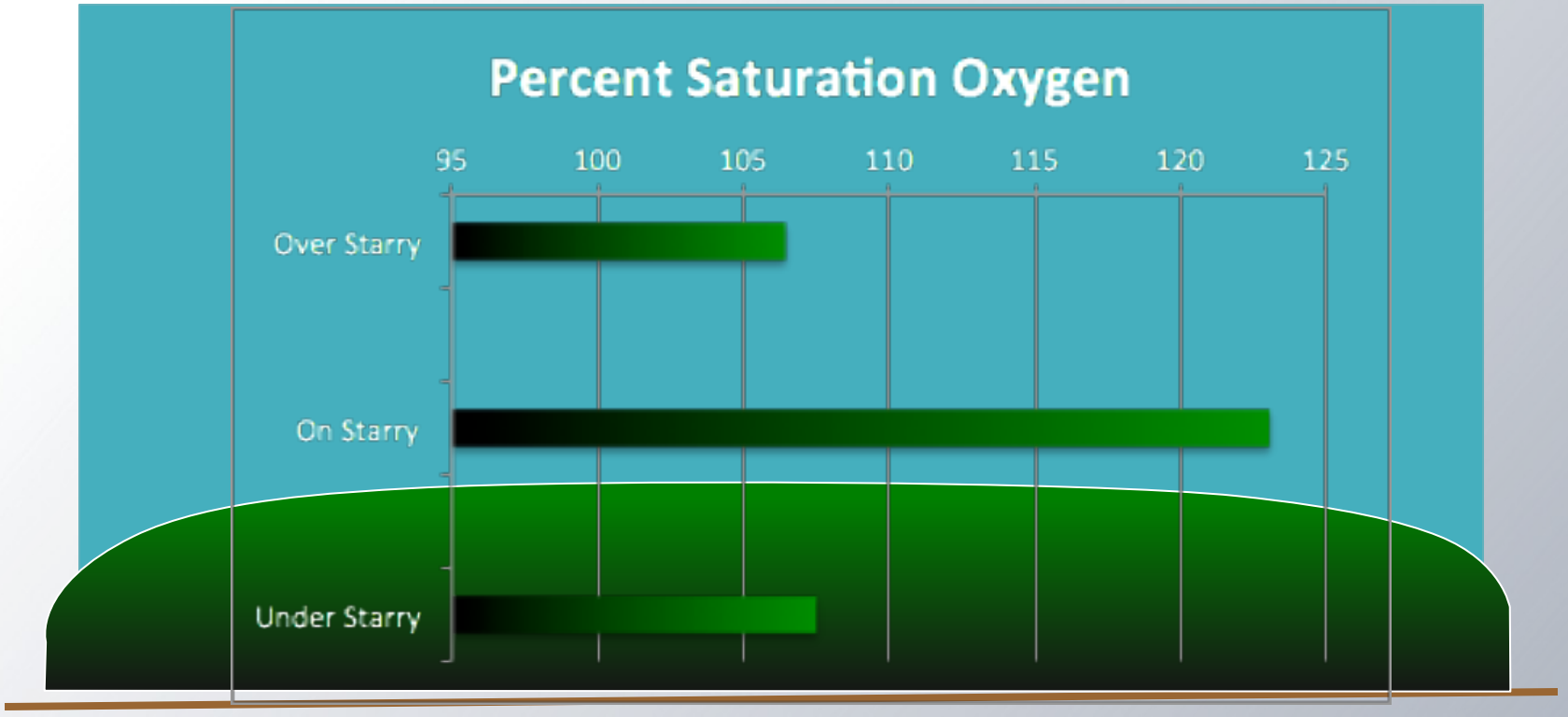
Chemo-Thermal Observations

20% Difference in Deviation From Water Density at 20° C



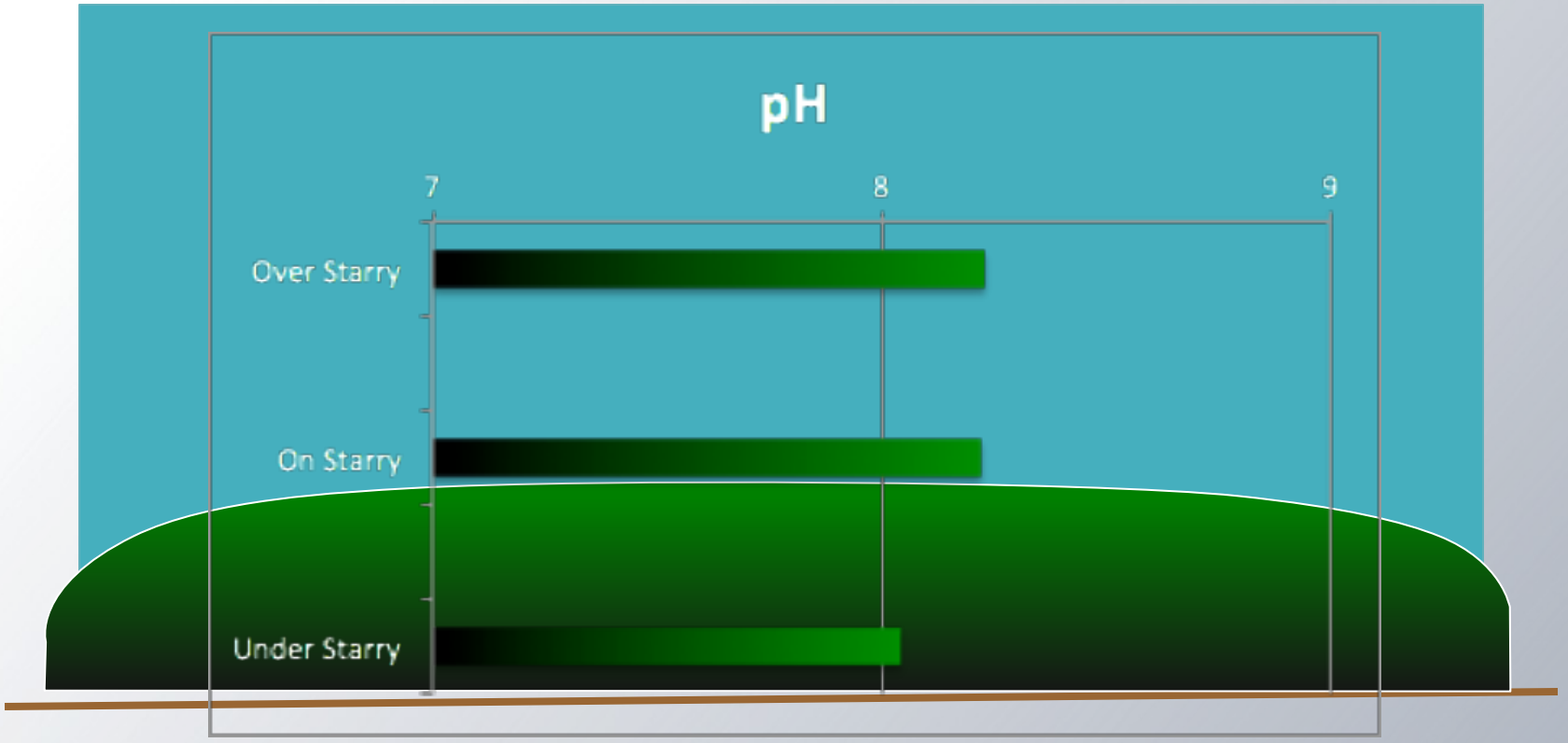
Starry Stonewort

Chemo-Thermal Observations



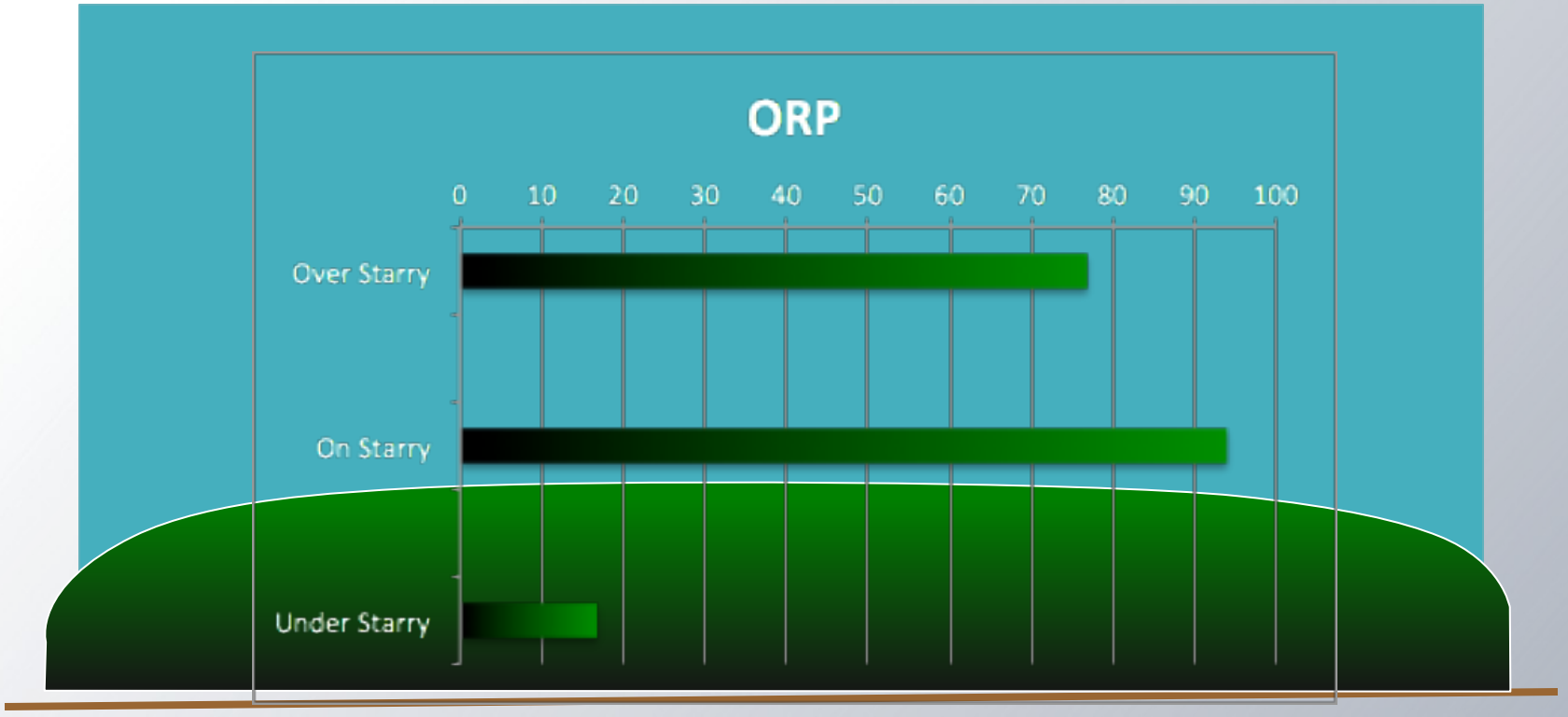
Starry Stonewort

Chemo-Thermal Observations



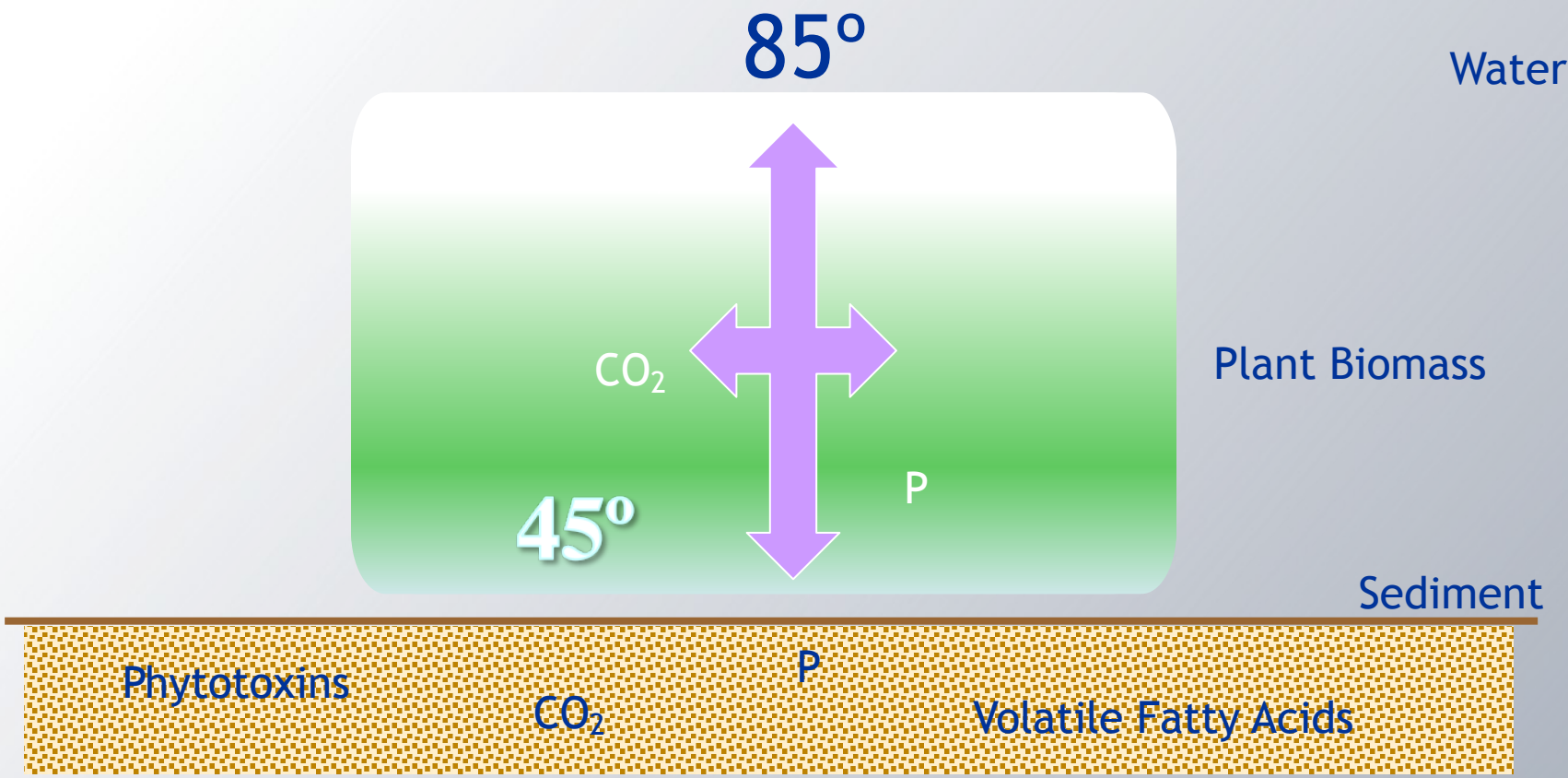
Starry Stonewort

Chemo-Thermal Observations



Starry Stonewort

Critical Circulation by Convection



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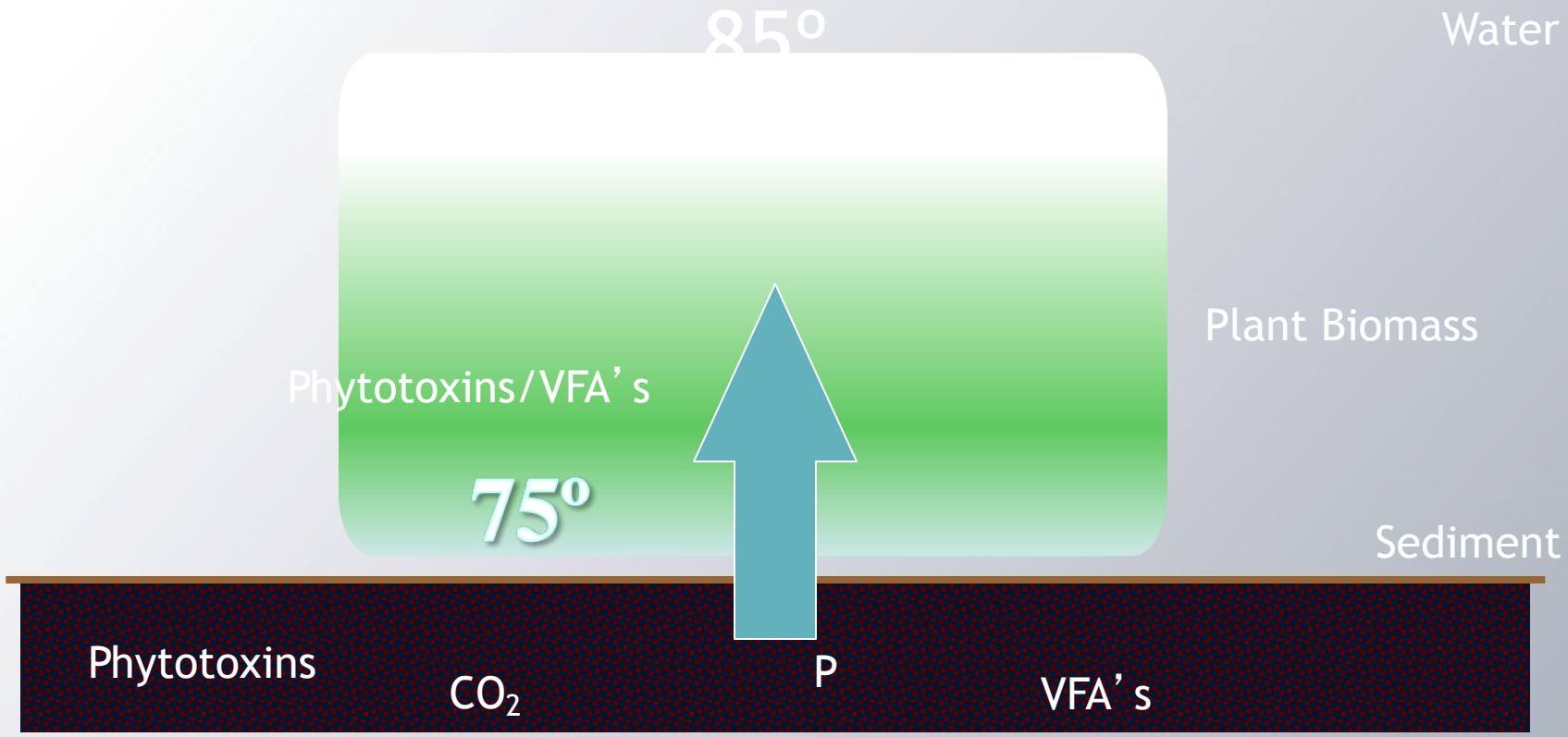
Starry Stonewort

Thermally Driven Convection

And Elevated Chance of Plant Community Collapse



One More Thing

Starry Stonewort Management As a Nuisance Perspective

Starry Stonewort Management - a Nuisance Perspective

- Effective control of nuisance ebrid watermilfoil Growth
- Clear water
- Often grows where nothing else will
- Does not impede boating

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Starry Stonewort Management - Nuisance Perspective

Treatment Approaches

- Hair-Cut
- To the Bottom
- Herbicide Combos

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Thank You!

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810-516-6830

Please Protect Aquatic Biodiversity

Support Invasive Species Management