ECOSYSTEM EFFECTS OF MSX

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Acknowledgements

DFO Gulf

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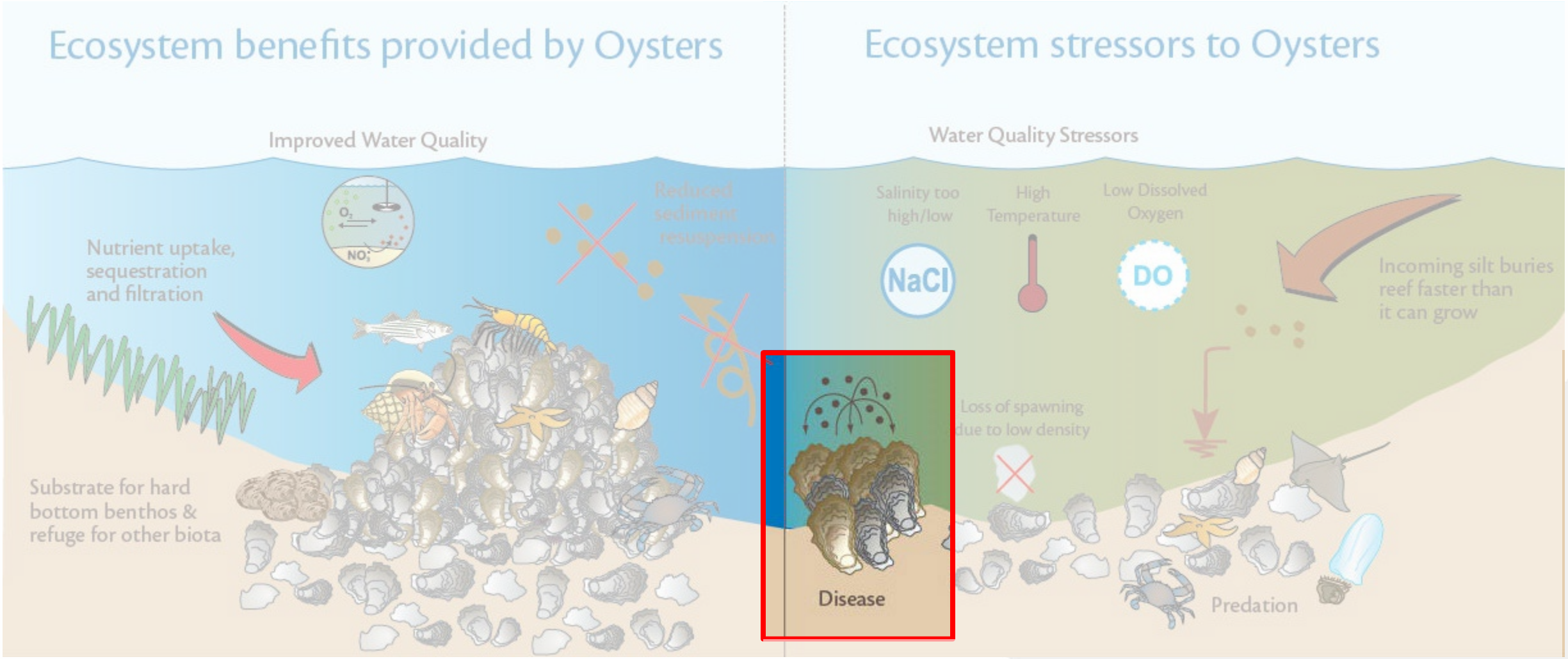
Ecosystem benefits provided by Oysters
Improved Water Quality
Nutrient uptake, sequestration and filtration
Reduced sediment resuspension
Substrate for hard bottom benthos & refuge for other biota
Ecosystem stressors to Oysters
Water Quality Stressors
Salinity too high/low
High Temperature
Low Dissolved Oxygen
NaCl
DO
Incoming silt buries reef faster than it can grow
Loss of spawning due to low density
Disease
Predation

Fisheries and Oceans Canada | Pêches et Océans Canada

Photo: Gov. PEI, AIN 29.2025

Canada

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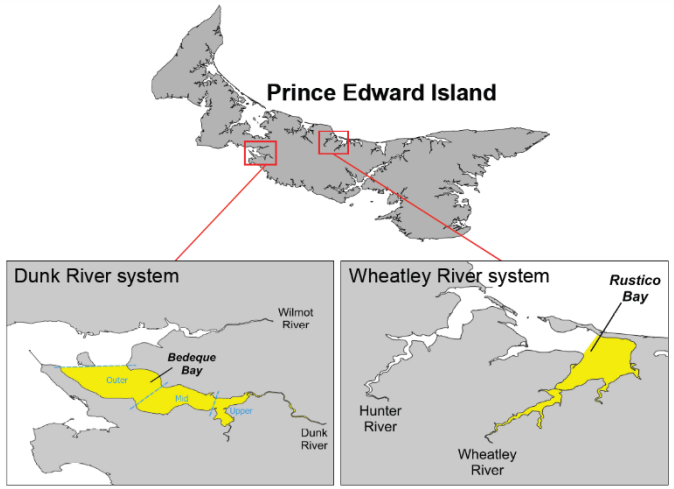
Agriculture Best Mgmt Practices

https://ingenium.ca/wp-content/uploads/2025/08/2310-EN-CAFM-InWithInnovationPoster-YJiang-2025-07.pdf

Canada

Can **mass mortality from MSX** affect **ecosystem-level processes** & **influence management decisions** for combating eutrophication?

ABMPs



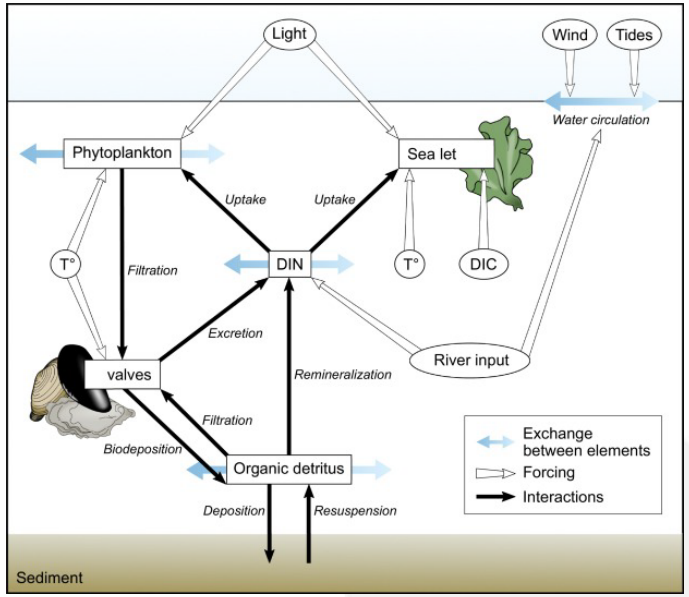
BACI survey

Oyster density

2021 ► 2025

Dunk (MSX affected)

Wheatley (unaffected control)



Ecosystem model

Dunk River

Phytoplankton biomass

Primary production

Nitrate-N concentration

Dissolved oxygen

Sea lettuce biomass

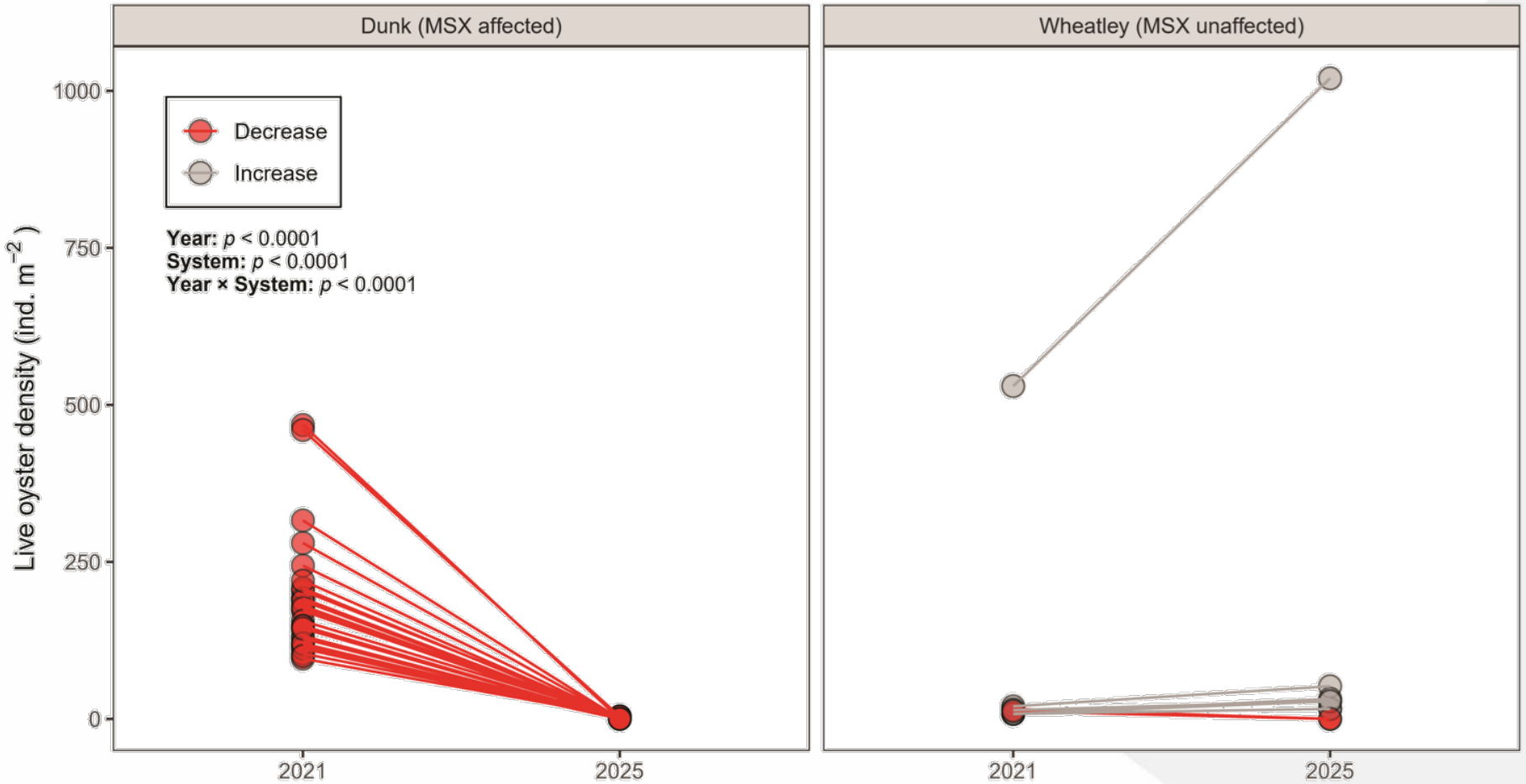
Eelgrass biomass

MSX

ABMP

ABMP MSX

Dunk pop'n declined by 99.6% since 2021
Wheatley doubled



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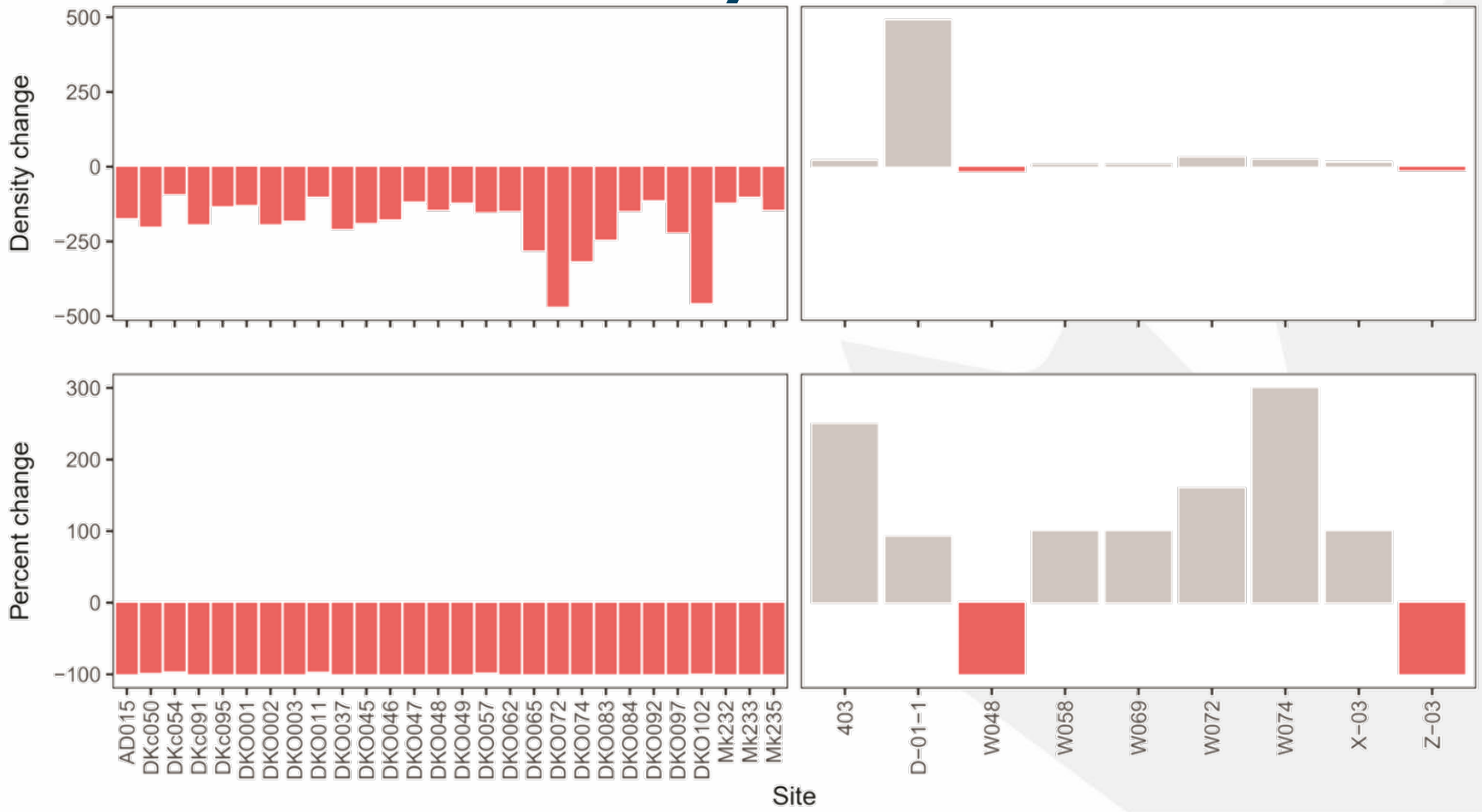
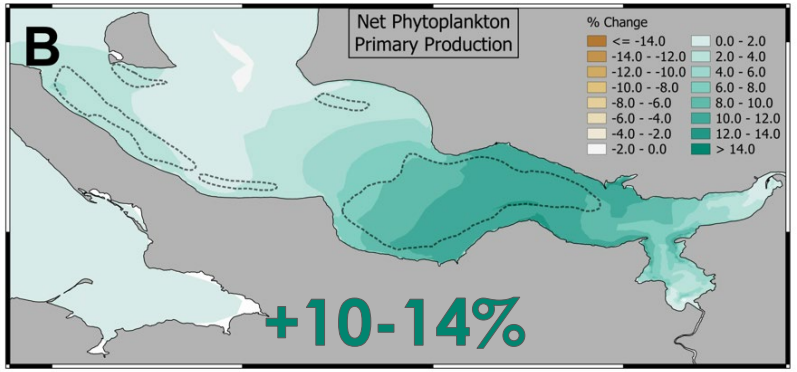
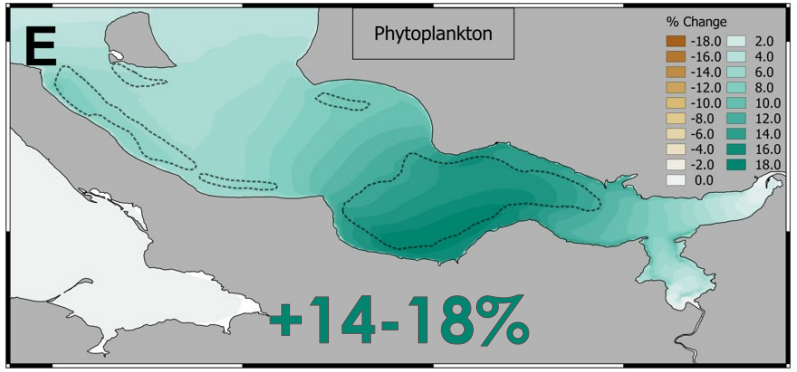


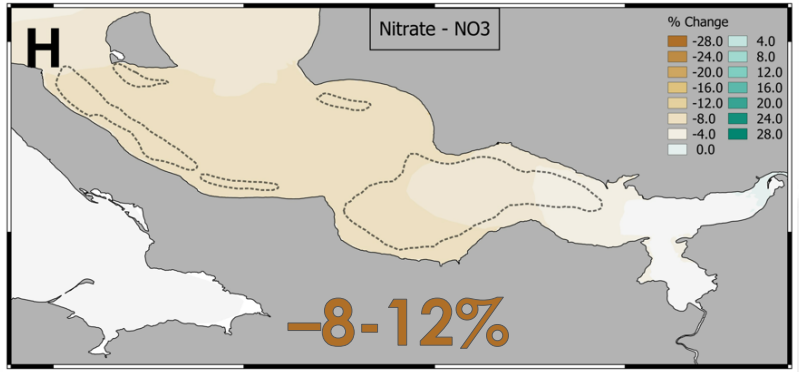
MSX-driven mortality can alter ecosystem

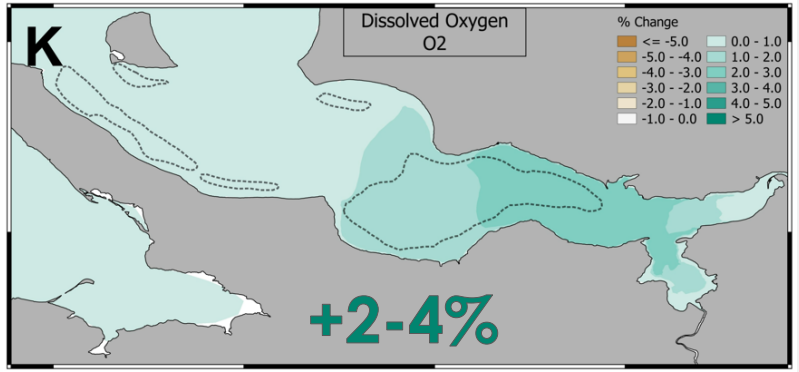
Microalgae



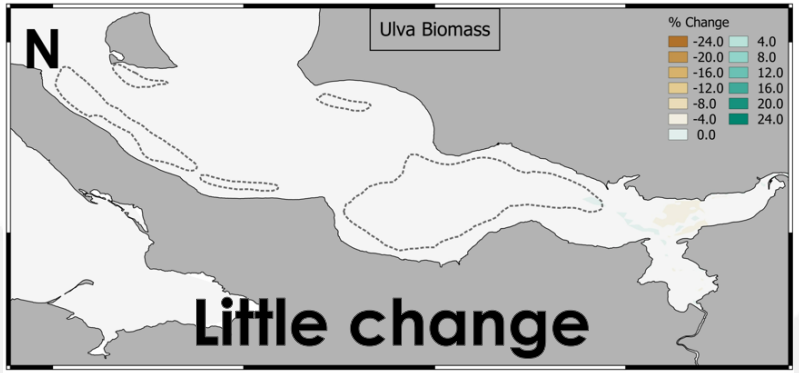


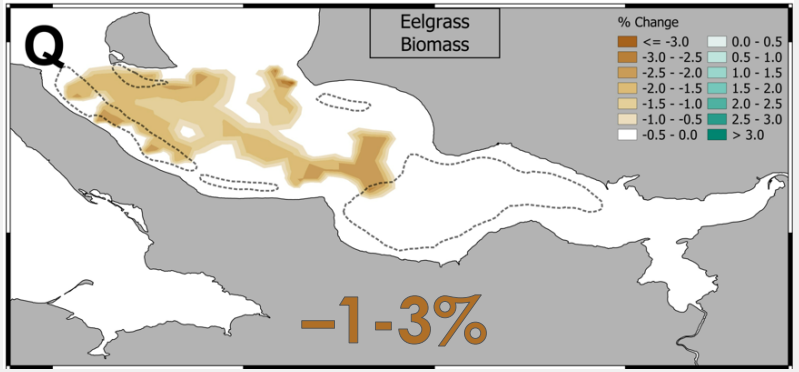
Abiotic



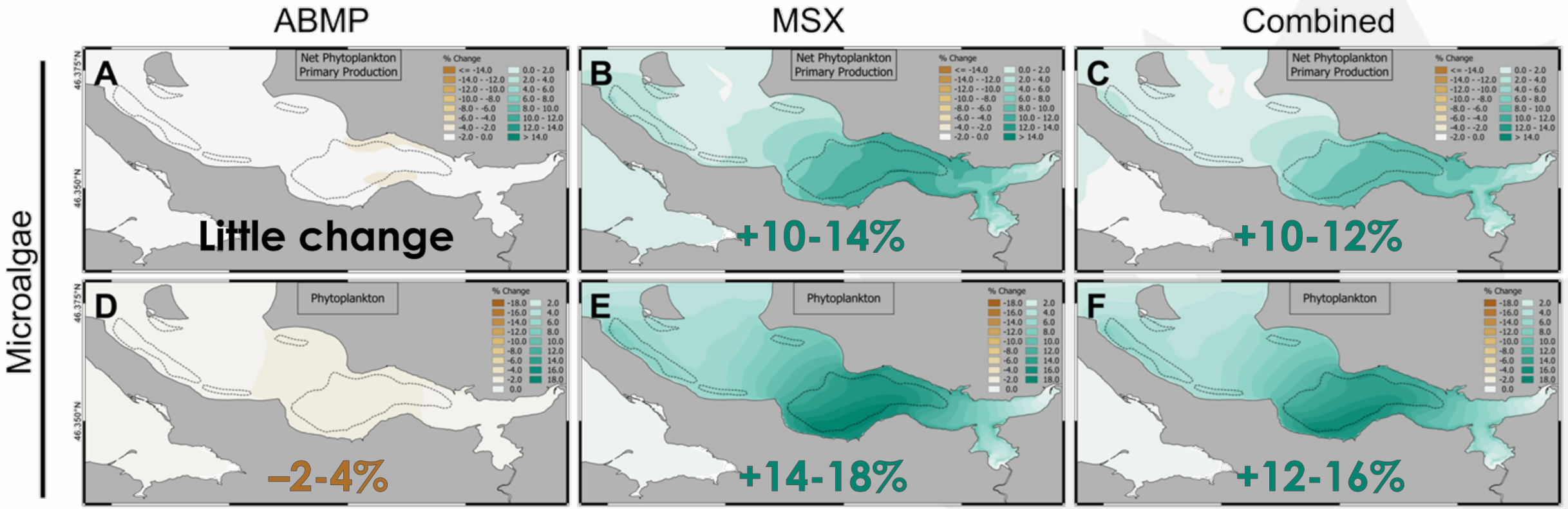


Macrophytes





MSX alters efficacy of land-based ABMPs



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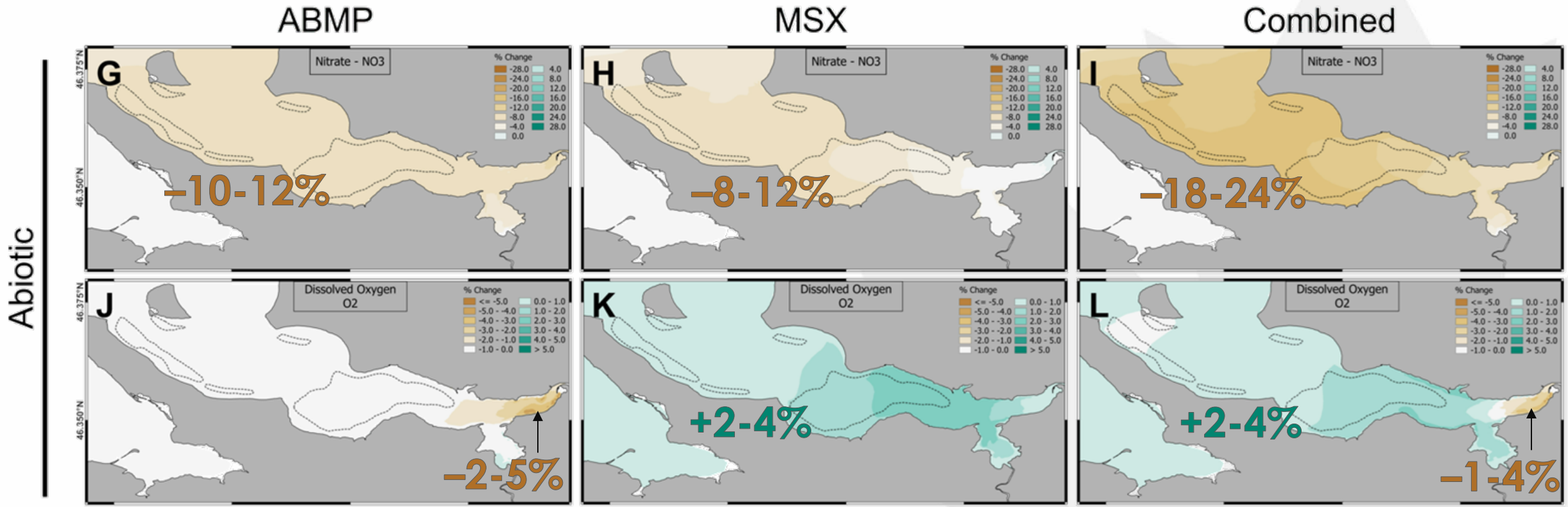
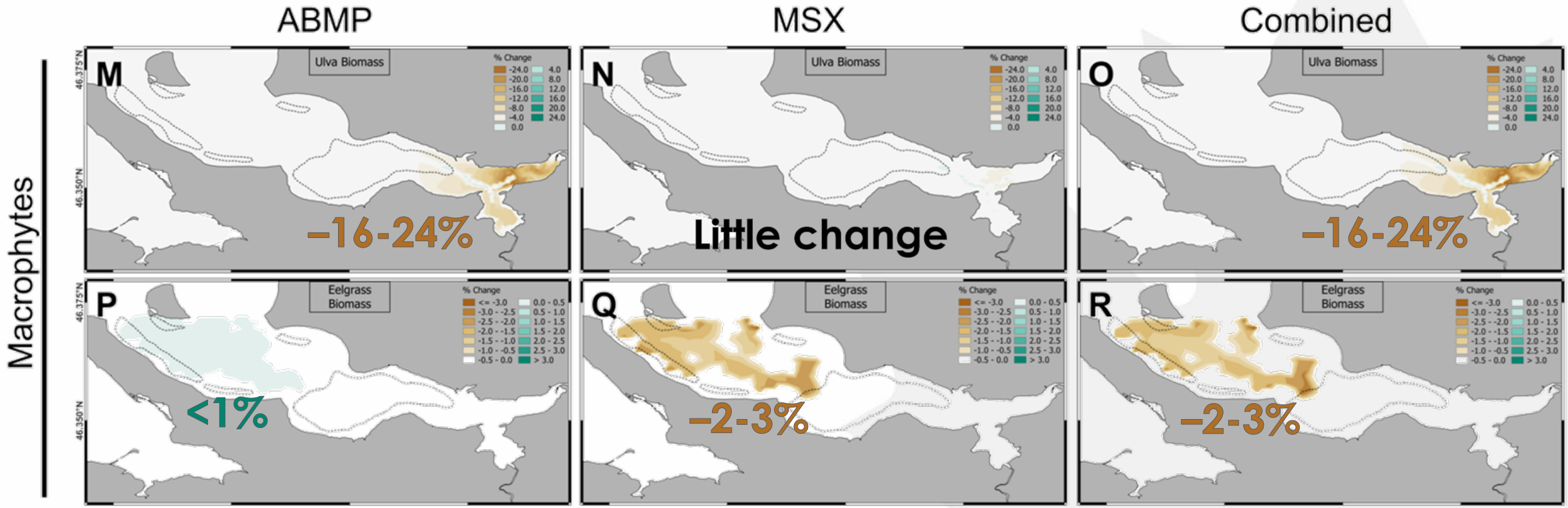


MSX alters outcomes of land-based ABMPs



Recap

Drastic population decline after MSX

- >99% in the Dunk

Ecosystem shift to more eutrophic state

- Largely overrides positive effects of ABMPs
- Particularly in long-term

Management implications

- Robust mgmt needs to account for ecosystem change

Questions?

Thank you / Merci

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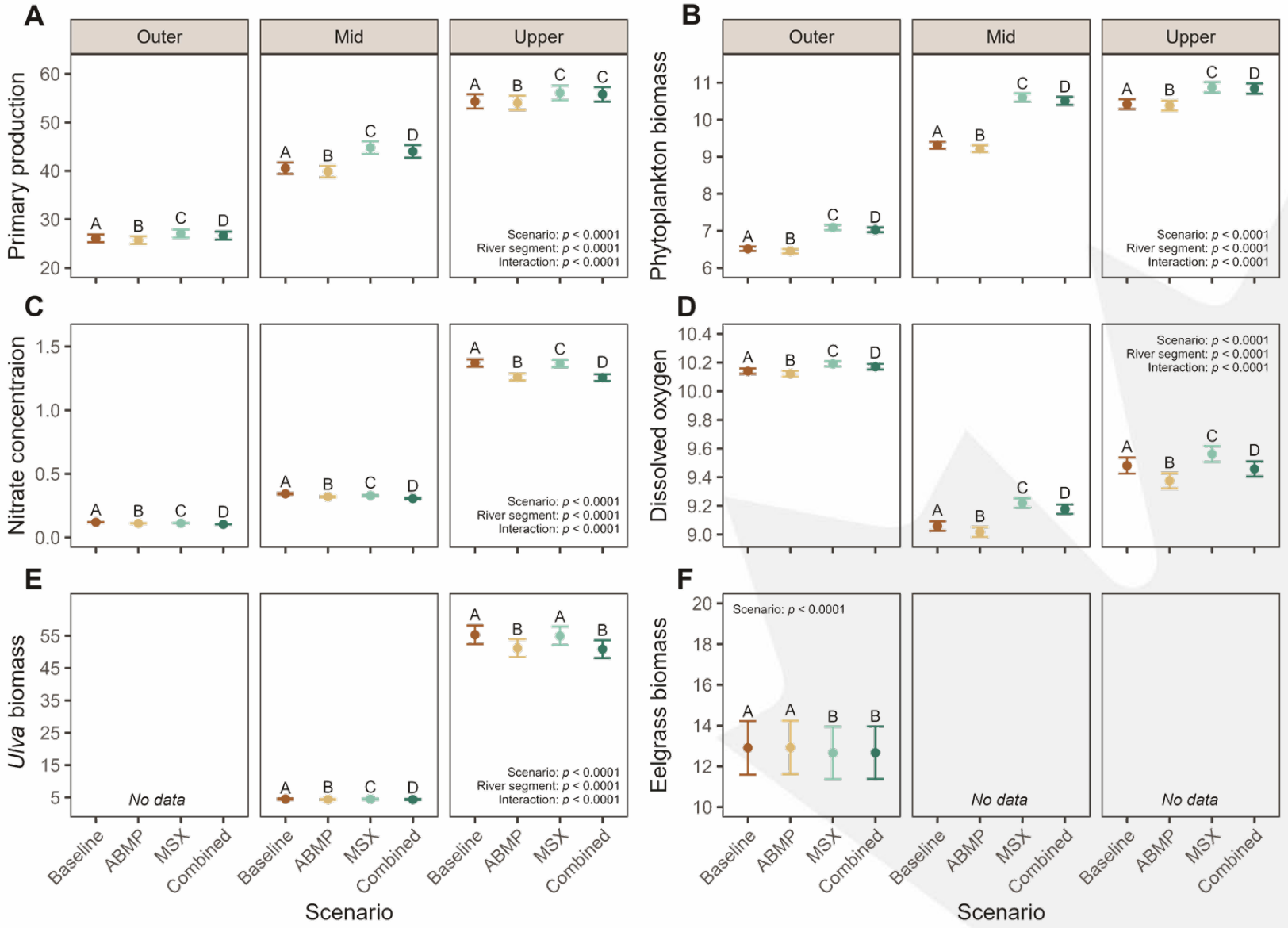
A
Outer
Mid
Upper
Primary production
Scenario: p < 0.0001
River segment: p < 0.0001
Interaction: p < 0.0001
B
Phytoplankton biomass
C
Nitrate concentraion
D
Dissolved oxygen
E
Ulva biomass
No data
F
Eelgrass biomass
Baseline
ABMP
MSX
Combined
Scenario