Saltwater intrusion impacts on agriculture

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Salty STAC Meeting | 27 May 2026

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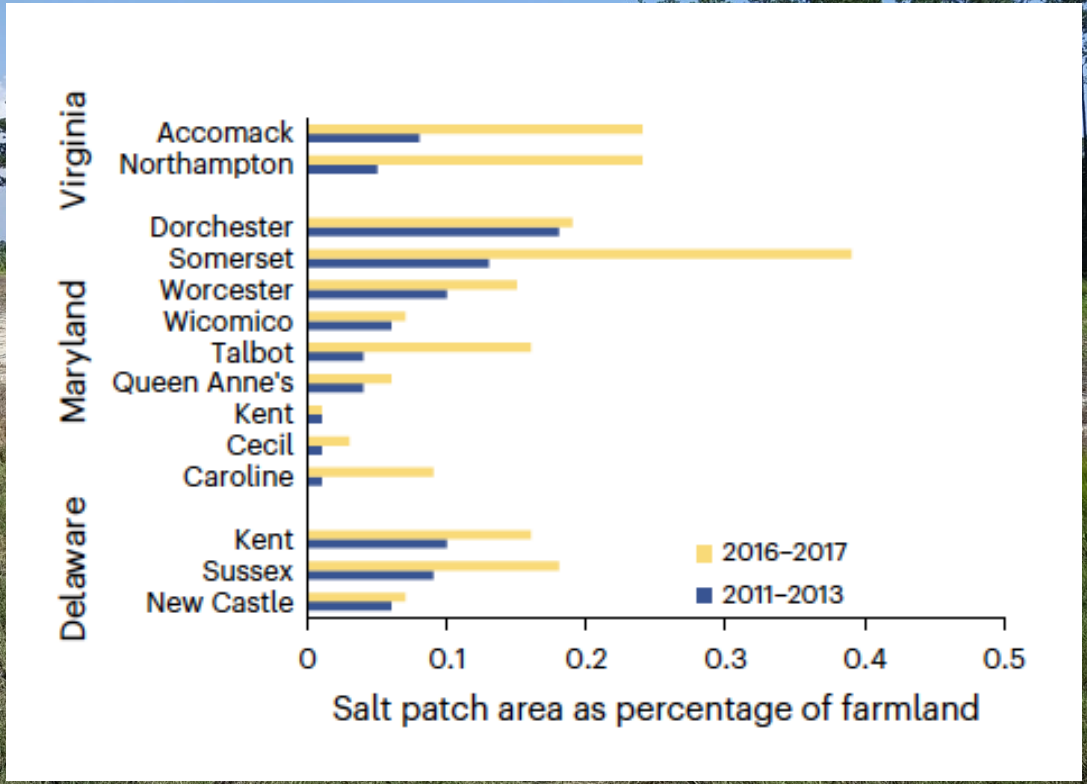
Stages of SWI on farmlands

Managing salty farms

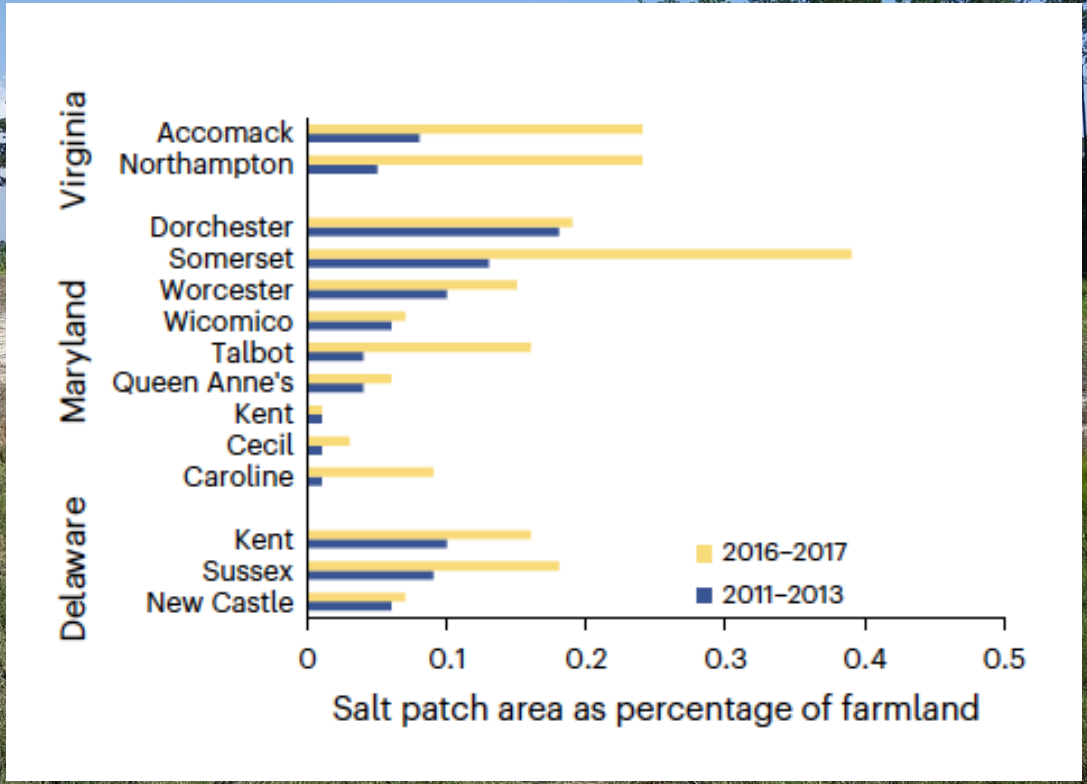
Looking ahead

Between 2011 and 2017, visible salt patches doubled across the Delmarva and…



Mondal et al. 2023 Nature Sustainability

Between 2011 and 2017, visible salt patches doubled across the Delmarva and **20,000 acres** farmland converted to marsh.



Mondal et al. 2023 Nature Sustainability

Proposed stages of SWI on ag fields

- 0 — No impact
- 1 — Early signs
- 2 — Moderate impact
- 3 — Severe impact
- 4 — Marsh

Visual indicators of SWI on ag lands

Description	Plants	Soil Appearance	Hydrology
No impact	Healthy crop	No visible salt	Well-drained

Schulenburg et al. *under review*

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Moderate impact	Poor germination, uneven stands, bare patches, marsh species on field edges	Expansion of salt damage and/or bare areas, algae on soil near field edges or ditches	Poor drainage or slow drainage areas expand

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Severe impact	Very low to no crop productivity, established stands of marsh plants on field	Large visible salt or white patches, soil dispersion, cracking, algae	Prolonged saturation

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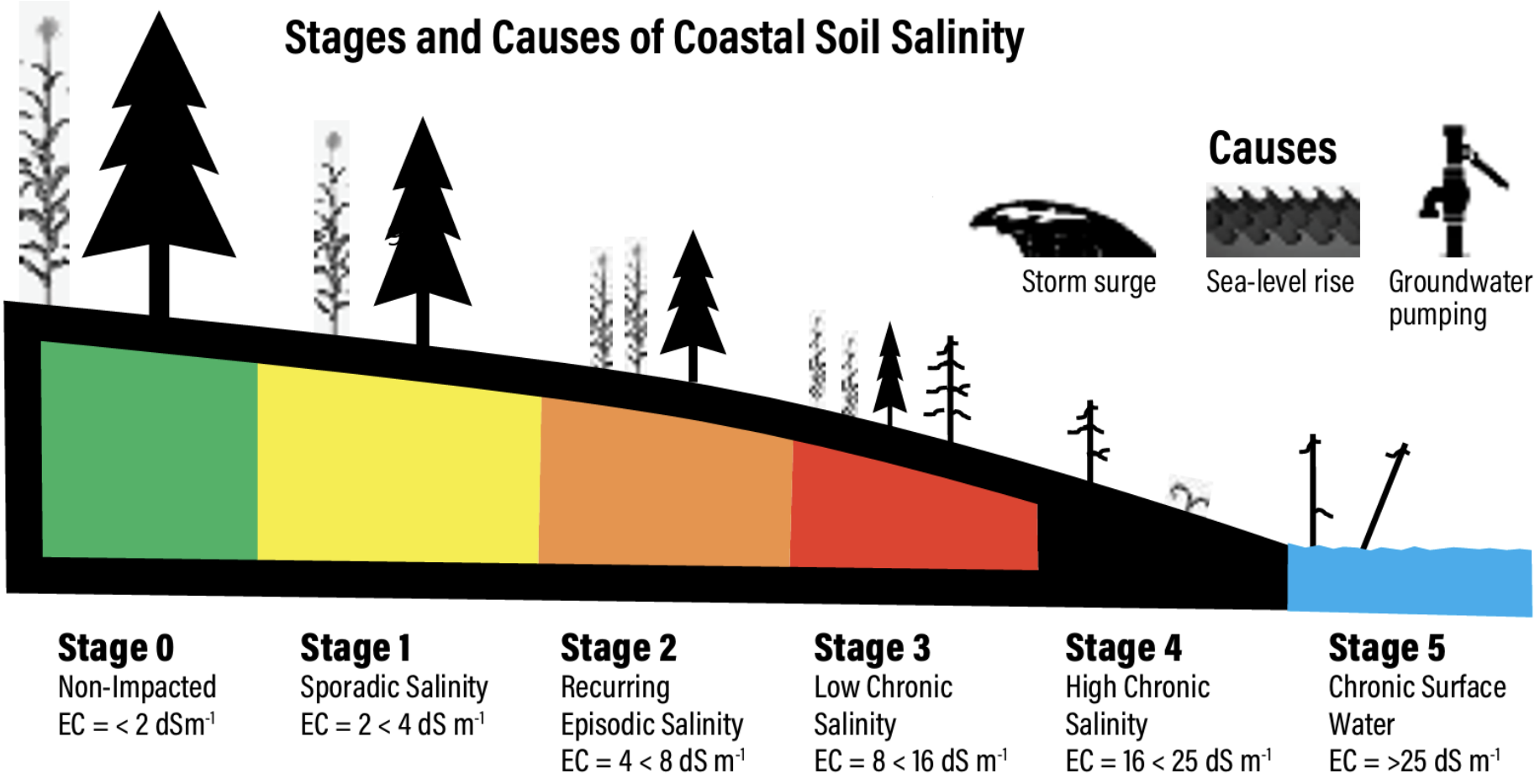
Marsh conversion	Native marsh vegetation	Hummocky soils, saturated, organic matter	Standing water, tidally influenced water cycles

Schulenburg et al. *under review*



Gibson et al. 2021

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Landowner responses or adaptive measures

Protective measures

Ag practice adjustments

Land transition

Becky Epanchin-Niell

Landowner responses or adaptive measures

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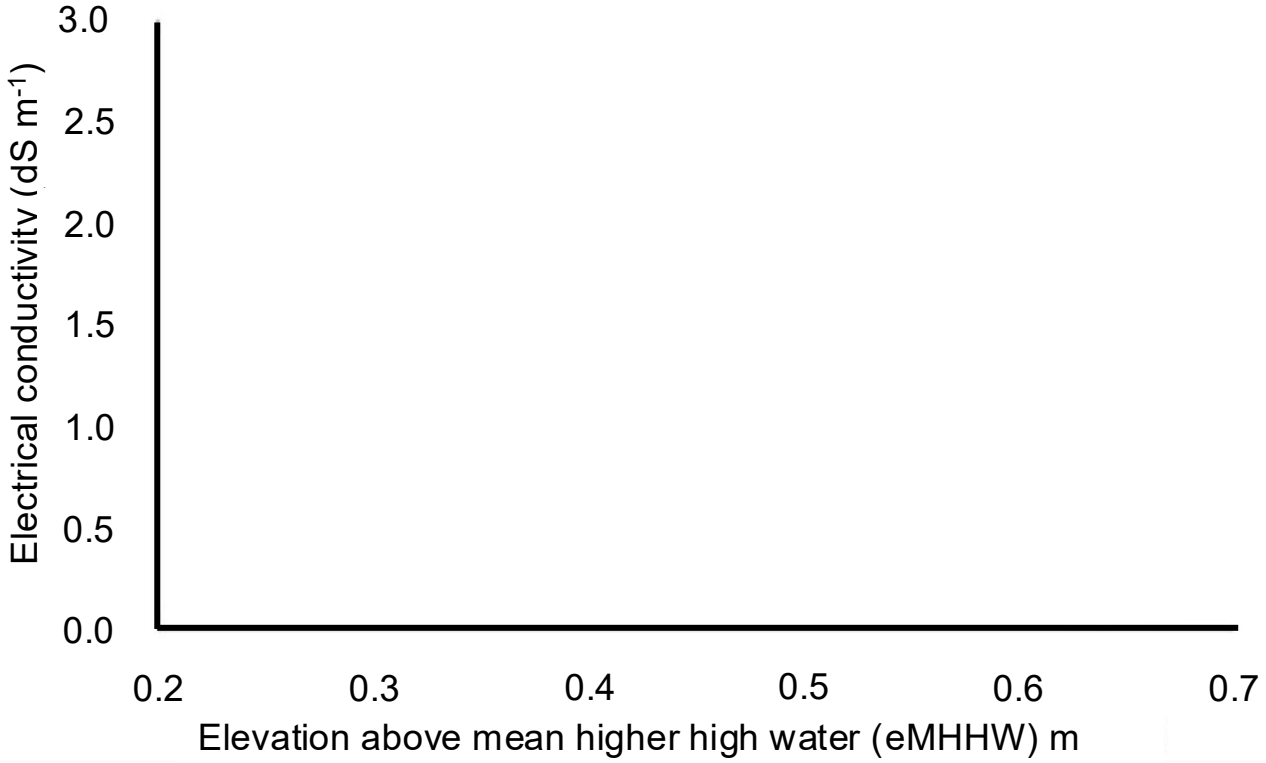
PBS
NEWS
HOUR

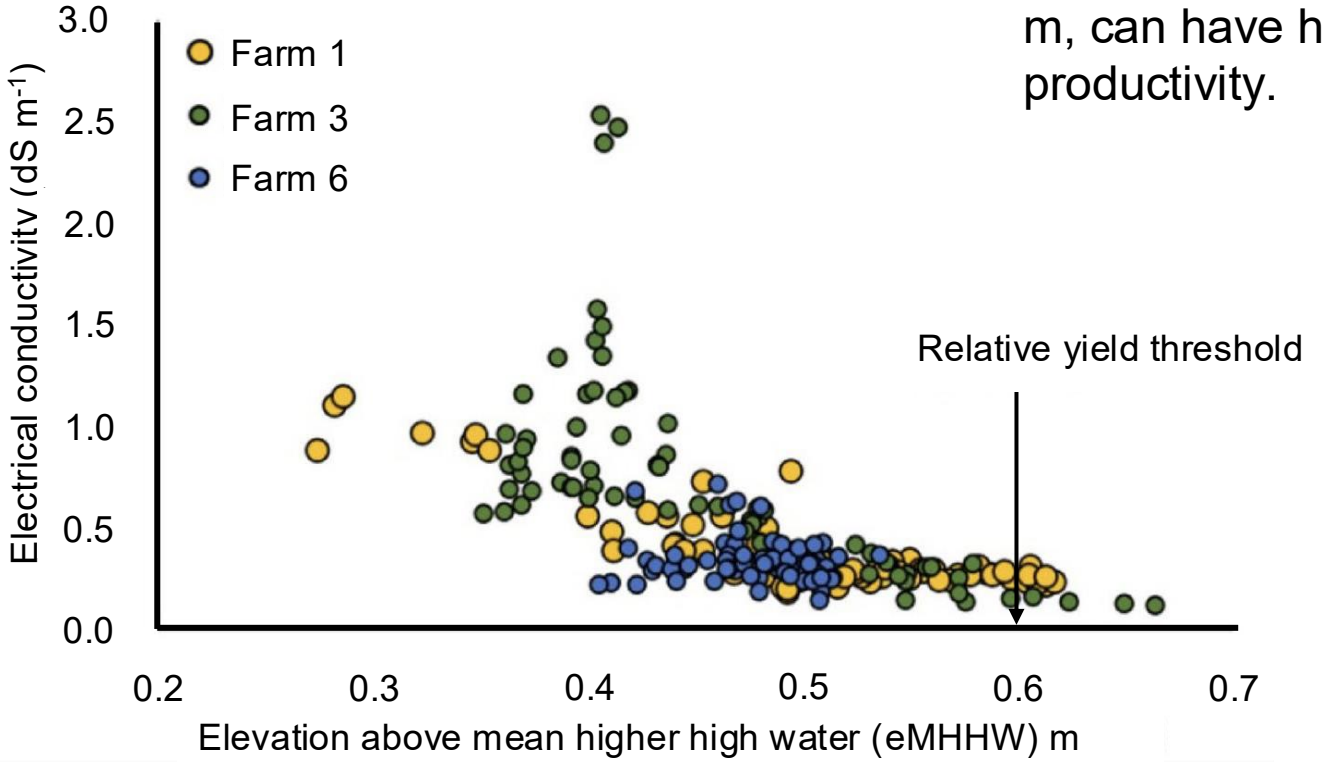
Fighting for inches



Miller et al. 2025 Discover Agriculture

Fighting for inches

Very small changes in elevation <1 m, can have huge impact on crop productivity.



Miller et al. 2025 Discover Agriculture

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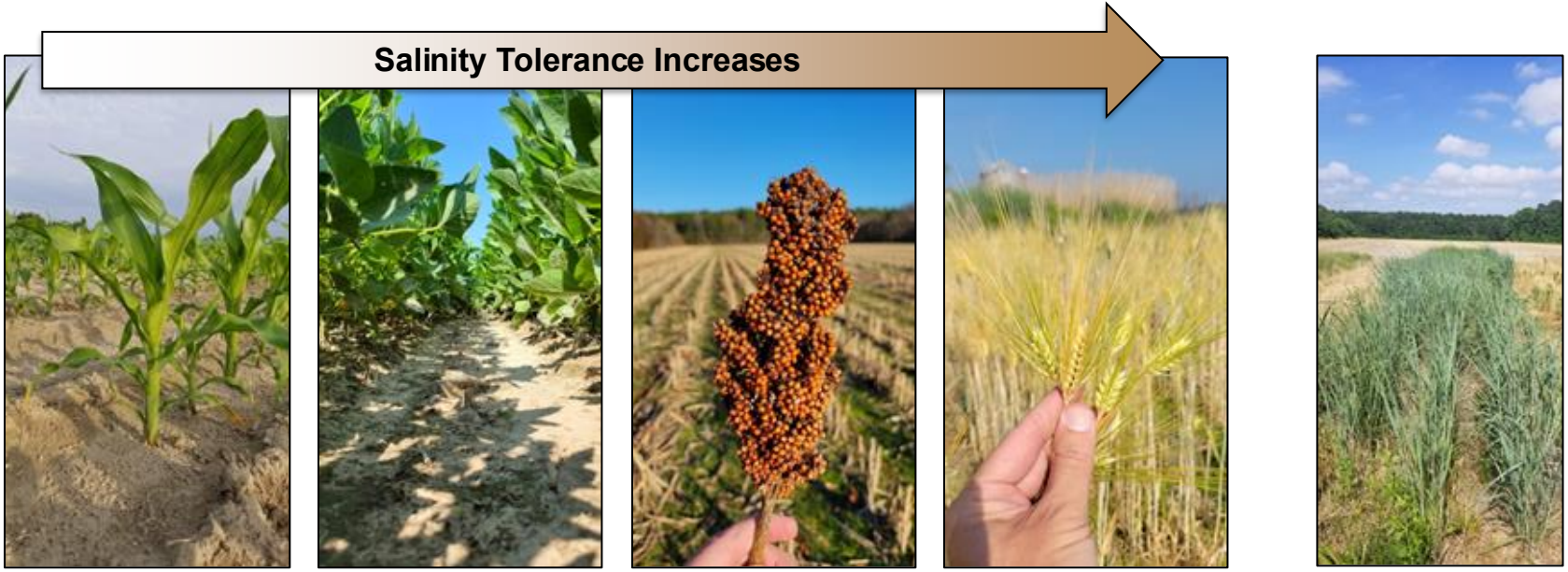
Farmers respond through crop management



Corn Soybeans Sorghum Barley Switchgrass

Traditional crops

Alternative crops

Perennial crops

It's hard to watch crops die

Barley can germinate under salty conditions, but often fails in fields.

Salt-tolerant soybeans are not worth the higher seed cost.

Sorghum is promising

31-53 bu/ac on some fields

Ag practice adjustments: Growing switchgrass

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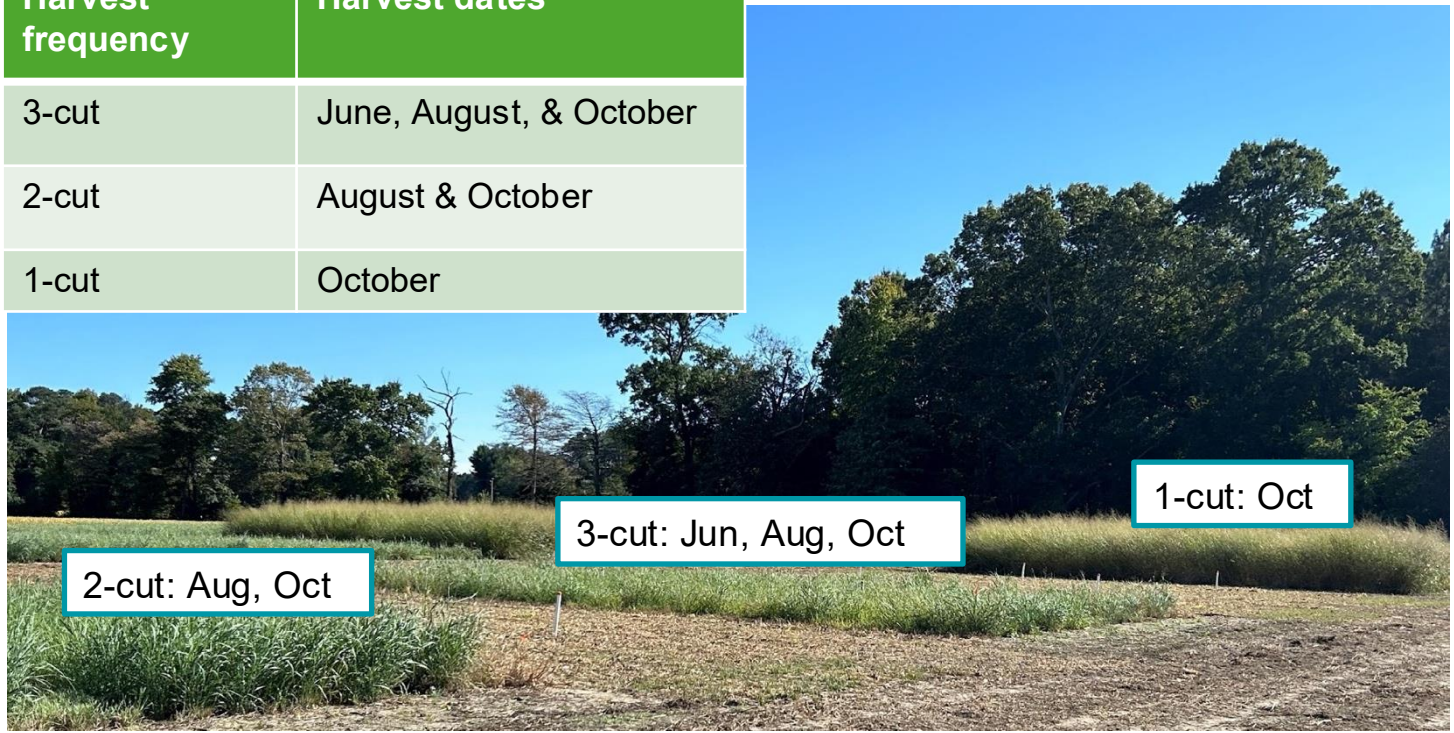
Harvest frequency	Harvest dates
3-cut	June, August, & October
2-cut	August & October
1-cut	October



Day before October harvest (2024)

Panicum virgatum switchgrass

Landowner responses or adaptive measures

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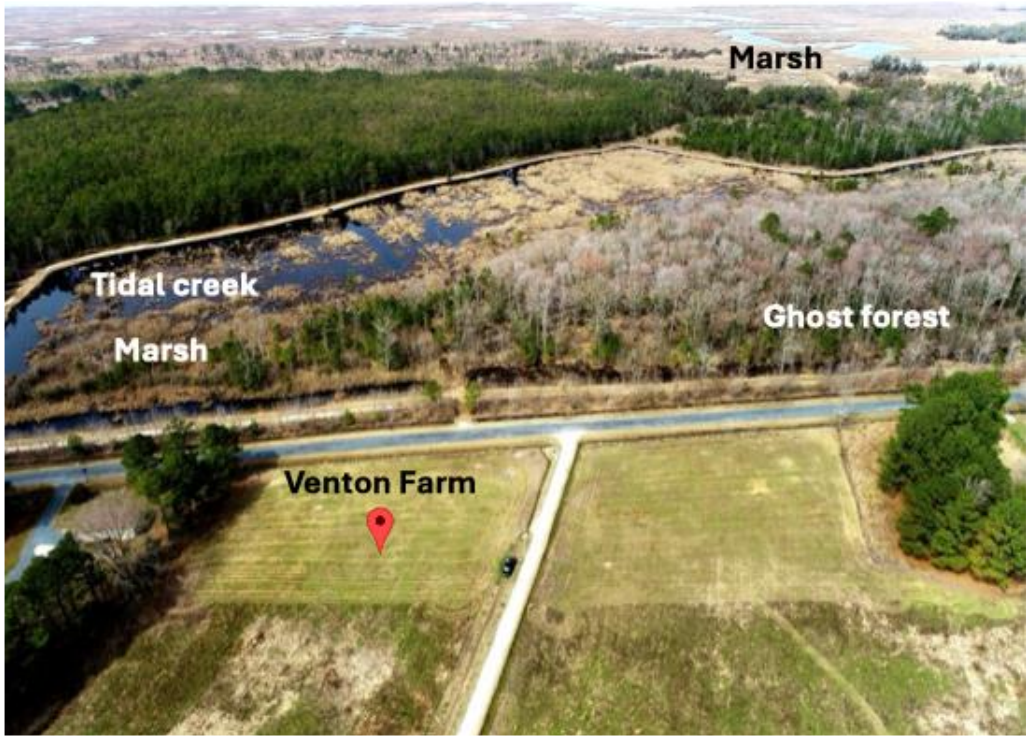
Land transition: Candidate restoration species



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What will grow on salty fields?
Eligible for USDA-NRCS programs?

Panicum amarum

Panicum virgatum

Spartina patens

Spartina pectinata

Paspalum floridanum

Tripsacum dactyloides

Species	Δ Biomass ($g\ m^{-2}$)	Δ Na accumulation ($kg\ ha^{-1}$)	Conservation practice / Potential uses							
			327 – Conservation Cover	386 - Field borders	390 - Riparian Herbaceous Cover	420 - Wildlife habitat	422 - Hedgerow/ wind barrier	512 - Pasture and Hay	512 - Biomass	580 - Stream/Shore stabilization

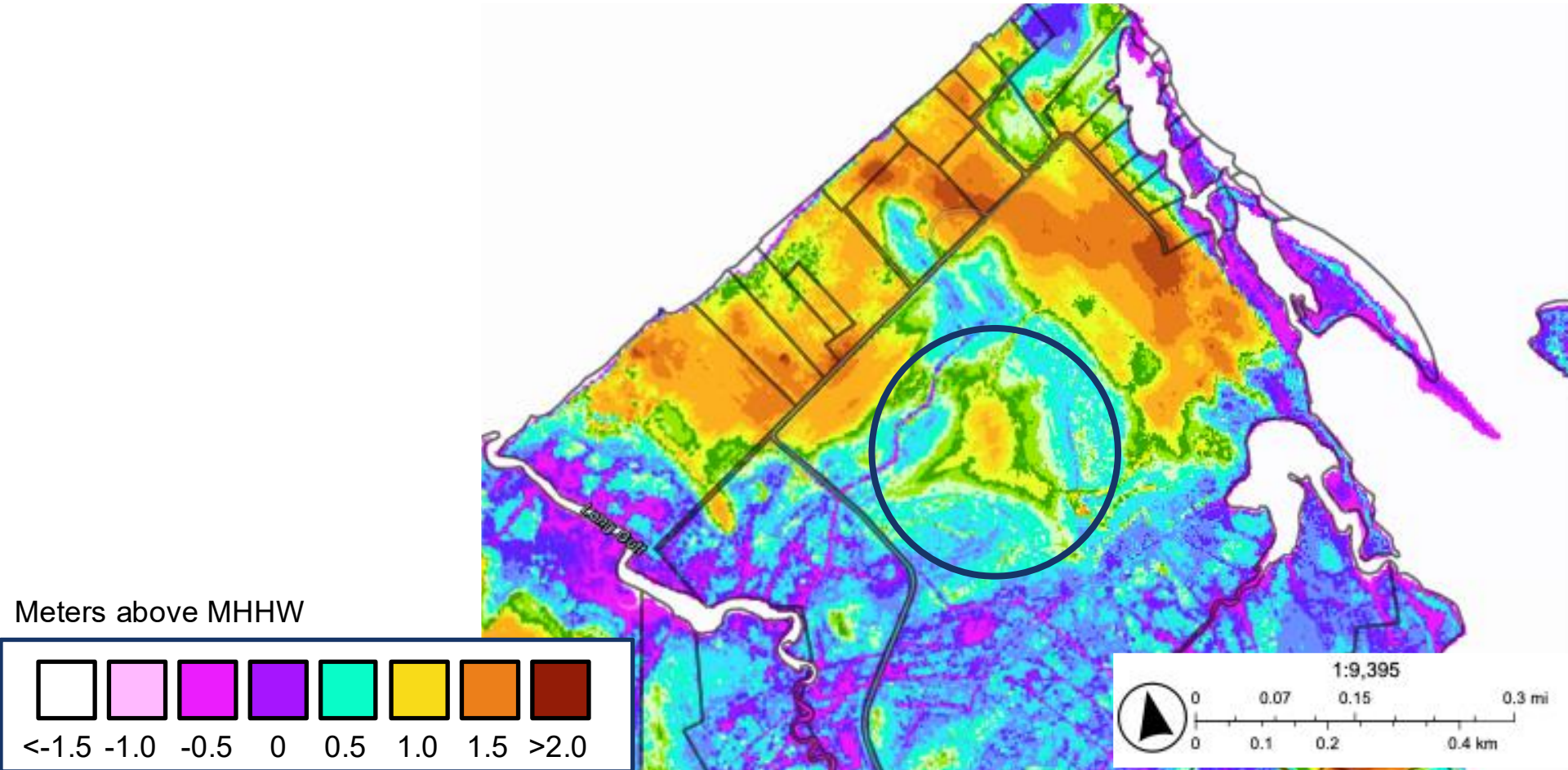
Barros et al. 2025 AGEE

Species	Δ Biomass ($g\ m^{-2}$)	Δ Na accumulation ($kg\ ha^{-1}$)	Conservation practice / Potential uses							
			327 – Conservation Cover	386 - Field borders	390 - Riparian Herbaceous Cover	420 - Wildlife habitat	422 - Hedgerow/ wind barrier	512 - Pasture and Hay	512 - Biomass	580 - Stream/Shore stabilization
Panicum amarum	↑ 79.90	↑ 0.27	★	★	★★	★	★★		★	★★
Panicum virgatum	↑ 30.58	↑ 0.70	★	★	★★	★	★			★★
Paspalum floridanum	↓ -11.40	0	★★	★	★★	★★		★★	★	★
Spartina patens	↑ 119.93	↑ 2.97			★	★★				★★
Spartina pectinata	↑ 93.01	↑ 2.07			★★	★			★	★★
Tripsacum dactyloides	↑ 184.18	↑ 0.09	★★	★★	★★	★★		★★		★★
★ Acceptable	★★ Optimal									

The values presented in the table represent the average data from both study farms (Oriole and Venton Farm). Arrows indicate trends in biomass and Na accumulation over time: ↑ for an increase and ↓ for a decrease

Barros et al. 2025 AGEE

Land transition: Elevation above mean higher high water



Land transition: Targeted planting

Saltmeadow cordgrass

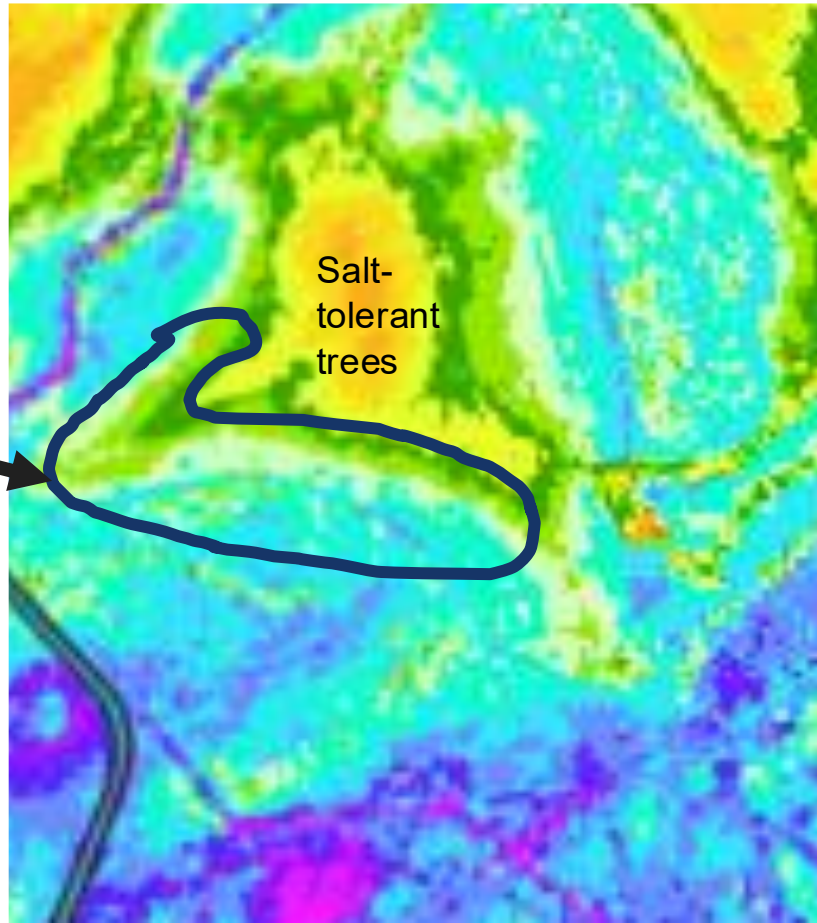
Spartina patens

Switchgrass

Panicum virgatum

Eastern gamagrass

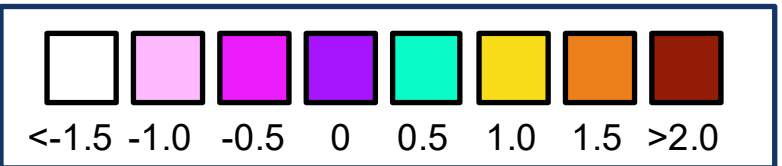
Tripsacum dactyloides



Threshold where crops fail and salinity levels are high

0.6-0.7

Meters above MHHW



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RISING: Resilience Implementation for Salt-INtruded Geographies

www.rising-midatlantic.org

Photo credit: Jarrod Miller

RISING

- Maryland, Delaware and New Jersey
- Privately-owned coastal farms and forests
- Co-develop strategies

Photo credit: Jarrod Miller

RISING Project Leaders

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Amanda Archer
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Becky Epanchin-Niell
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Priscila Alves
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Researcher

Emmie Woerner
Univ. of Maryland
Postdoc

Collaborative effort to address saltwater intrusion

Farmers

Foresters

Landowners

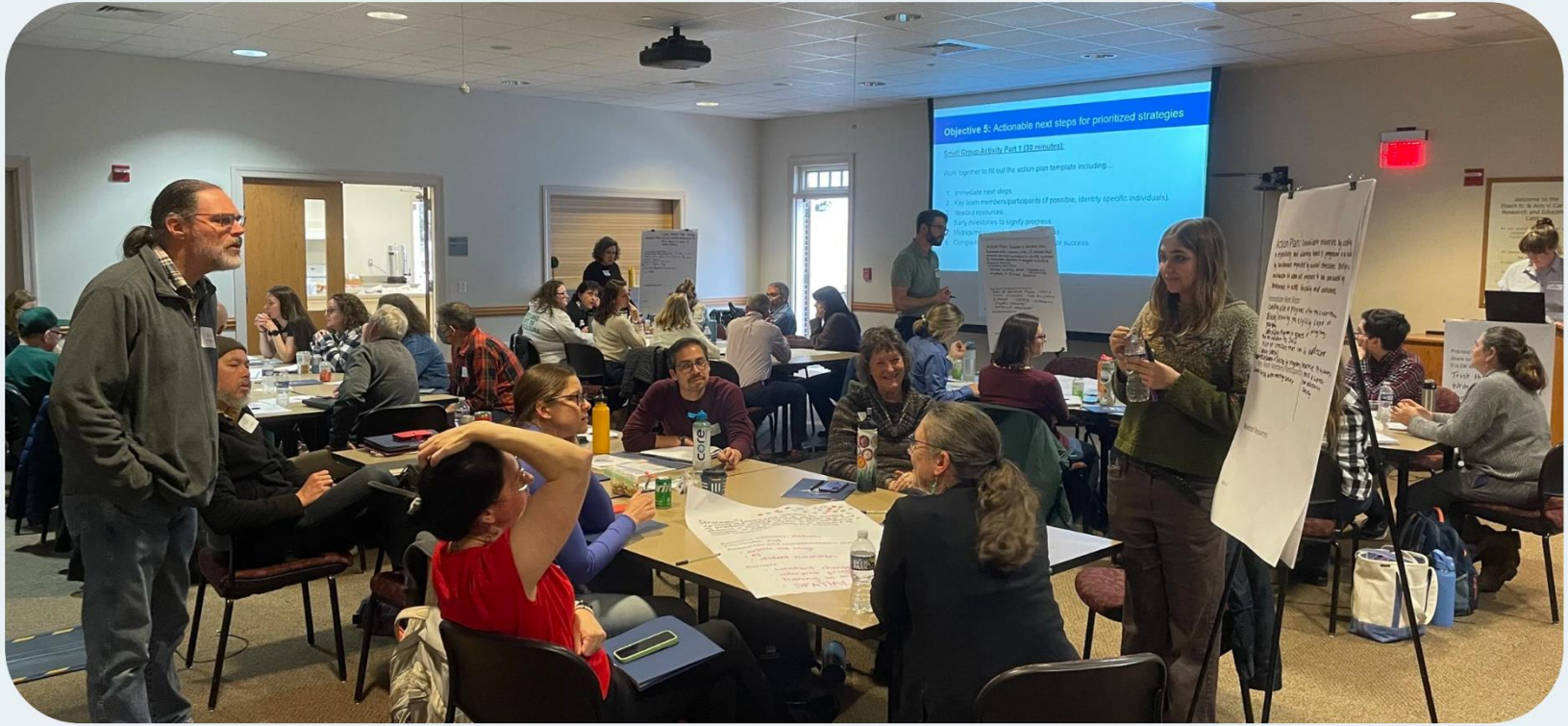
Government

Academia

Non-profits

Private sector

Cross-State Workshop – Feb 2026



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Thank you!

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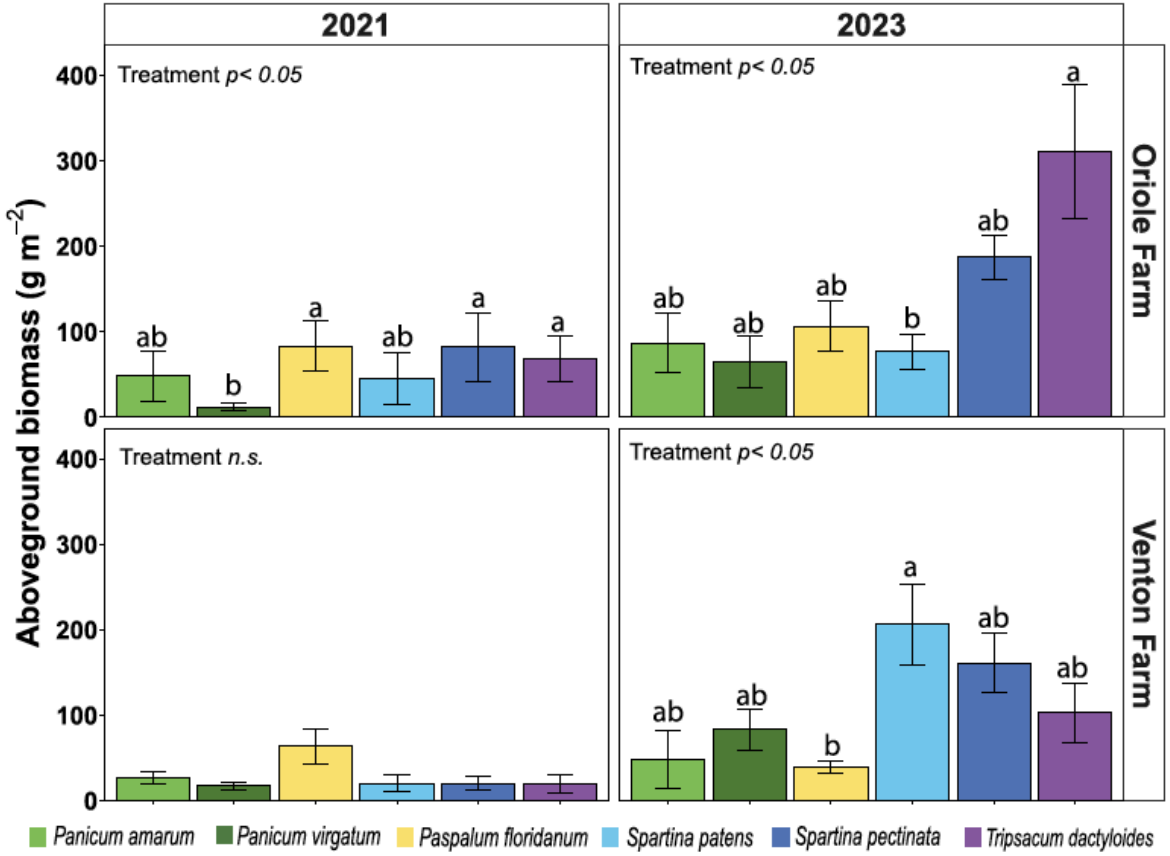
	Protective	Alternative cropping	Transition
Financial incentive programs & policy	- Environmental Quality Incentive Program - Management of tax ditches - Crop insurance	- Specialty Crop Block Grants - Sustainable Agriculture Research and Education	- Environmental Quality Incentive Program - Conservation Reserve Program - Conservation Reserve Enhancement Program - Conservation Stewardship Program - Nature-Based Solutions
Technical assistance	- Tide gates maintenance - Amendment rates - Program and practice selection	- Market development - Equipment adjustments - Crop selection and management information	- Sources of native seed plugs - High tide maps for planting plans - Program and practice selection

Land transition: Candidate restoration species



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THE ENVIRONMENTAL JUSTICE JOURNALISM INITIATIVE PRESENTS

ERODING HISTORY

A FILM BY ANDRÉ CHUNG

PRODUCED BY RONA KOBELL | CO-PRODUCED BY SEAN YOES AND ANDRÉ CHUNG
WRITTEN BY RONA KOBELL AND SEAN YOES | DIRECTED BY ANDRÉ CHUNG

A CLIMATE JUSTICE STORY AT THE INTERSECTION OF SEA LEVEL RISE, HISTORIC RACISM AND THE DISAPPEARANCE OF BLACK COMMUNITIES

BEST OF BALTIMORE

OFFICIAL SELECTION Nature Without Borders International Film Festival

LONELY WOLF INTERNATIONAL FILM FESTIVAL
SEMI-FINALIST

OFFICIAL SELECTION Chesapeake Film Festival 2023

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