

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Not so Black(lock) and white: managing invasive phragmites in endangered species habitat



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CA Department of Water Resources

California Invasive Plant Council Symposium
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Acknowledgements – Team Effort!

DWR Project Managers: Laurel Richardson, Krista Hoffmann, JT Casby, & Madison daSilva

Fieldwork & Lab support: Suisun RCD, Leading Edge, SOLitude Lake Mgmt, UC Davis, Weck Lab

Funders & Collaborators: SSJDC Prop 1 Grant, DWR Fish Restoration Program, & USBR



SACRAMENTO - SAN JOAQUIN
DELTA CONSERVANCY



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Why care about invasive phragmites?

Negative effects on:

- Native vegetation, fish, and wildlife
- Water quality
- Recreation

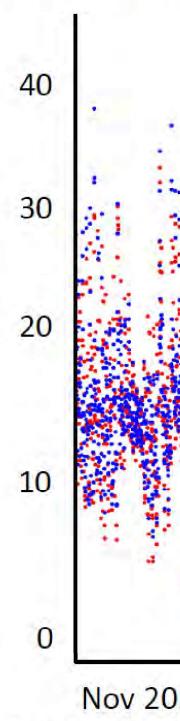


Photo: Blacklock phragmites encroaching over Masons *lilaeopsis* population

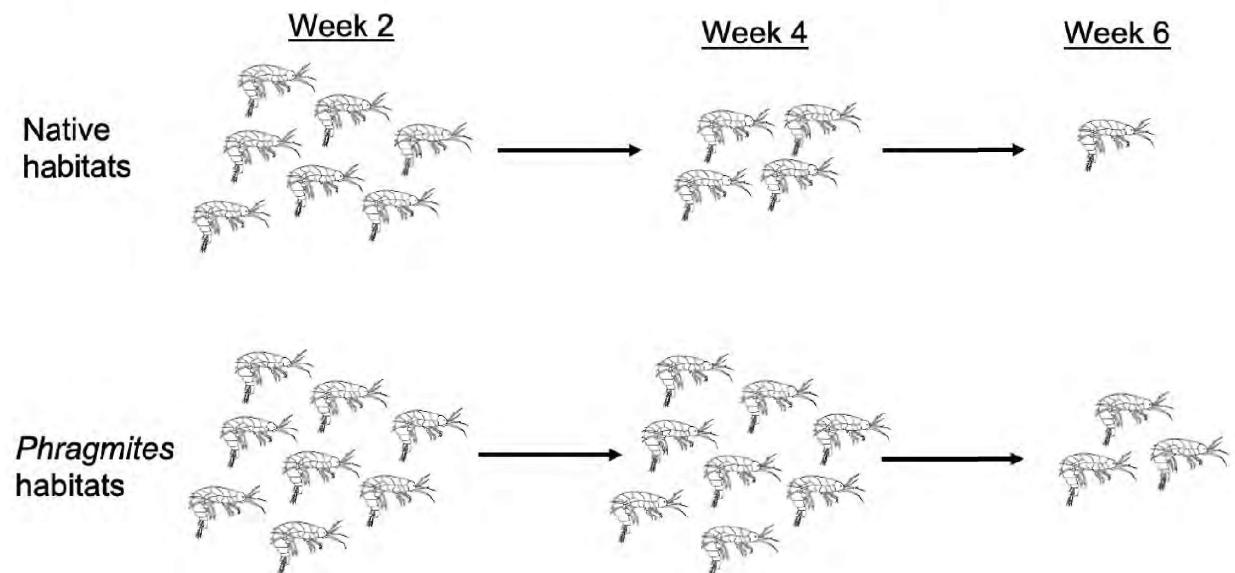


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Phragmites patches shelter invertebrates from heat stress

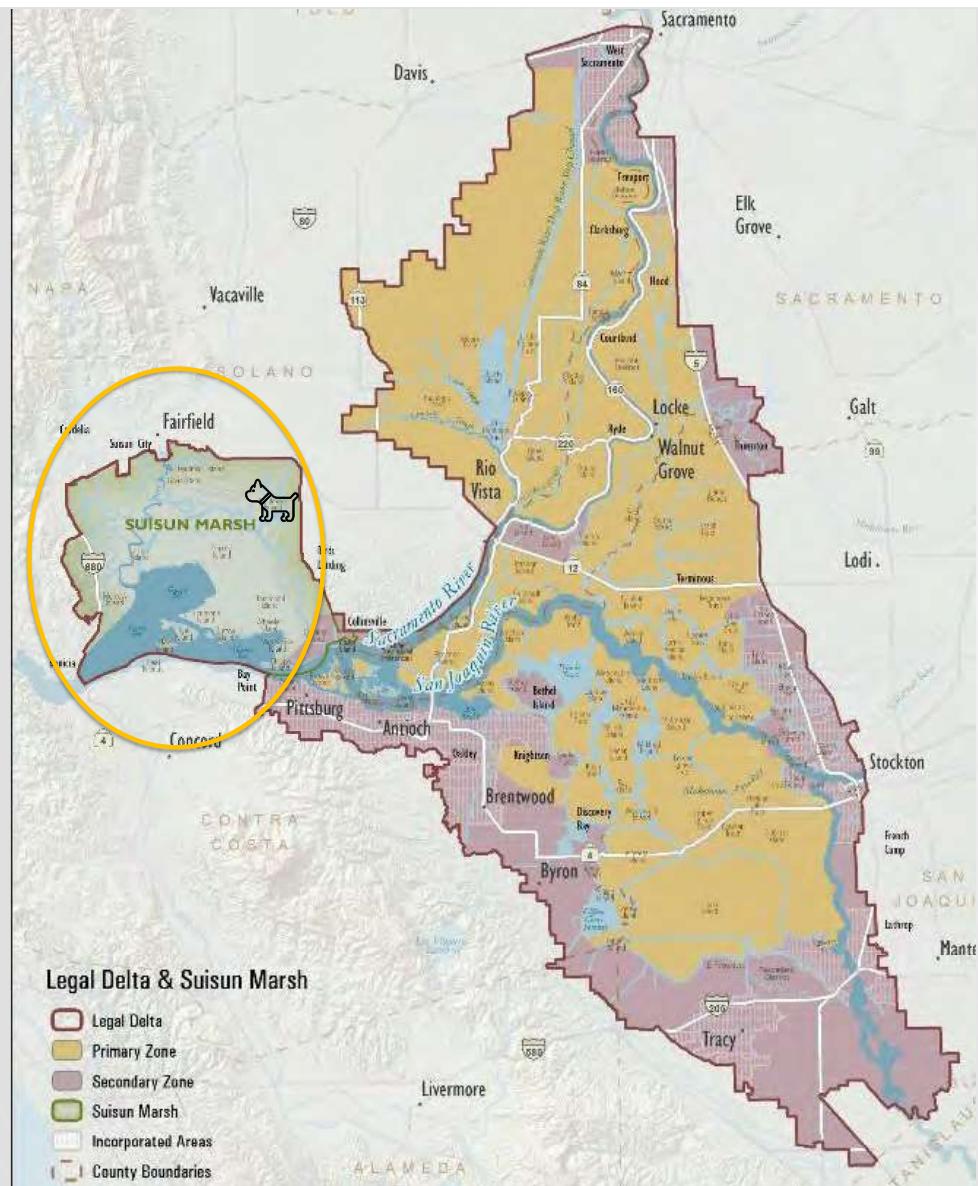


Cooler and less variable climate under *Phragmites* increases food quality



Tanner, Takekawa, Haworth, Landa, Pache

Haworth, Nancollas, Todgham, and Tanner *in prep*



Blacklock Phragmites Control Study

- **Goal:** Functional habitat
- **Purpose:** Inform permits for sitewide implementation
- **Objectives:** Evaluate Efficacy & Impacts
- **Timeframe:** 2019 – 2022
- 2019: Funding and permits secured
- May 2022: Last drone flight
- March 2023 Final Report submitted



Selecting Actions & Performance Measures

Action: Imazapyr, glyphosate, and mow treatments 2019-2022

Performance measures:

- NDVI
- Native recruitment
- Water quality



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Monitoring

Physical
Vegetation
Sampling

Water Quality
Sampling

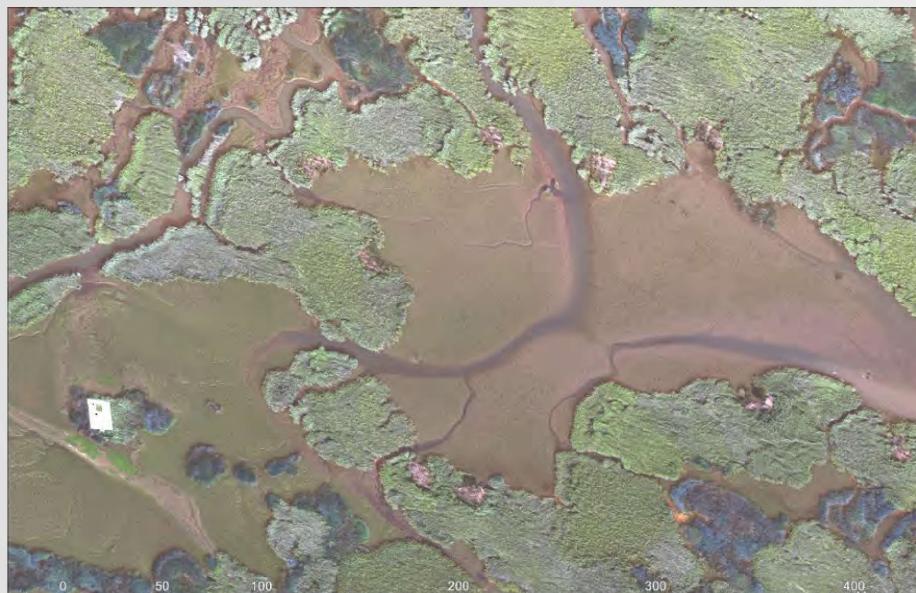
Frequent UAV
Monitoring



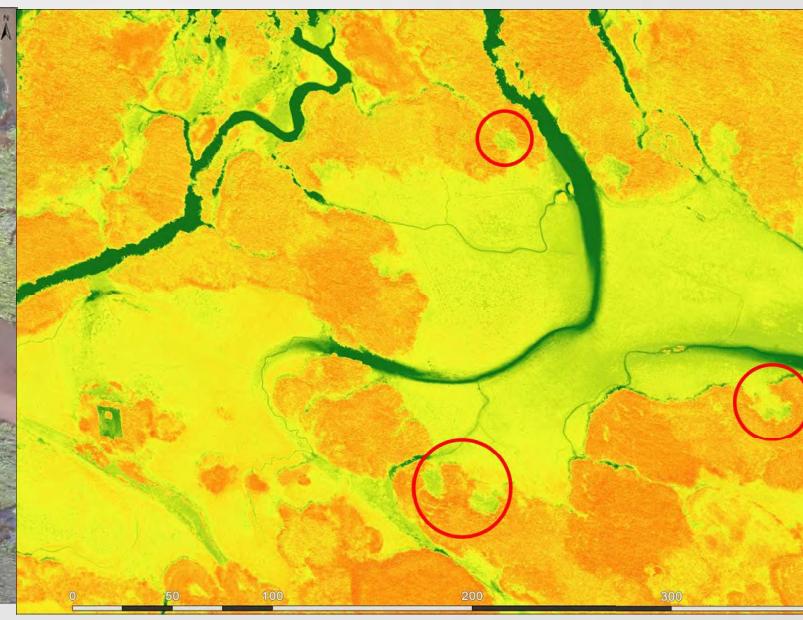
Implementing Management Actions

Treatment Timeline: 2019, 2020, 2021 with Adaptive adjustments made annually

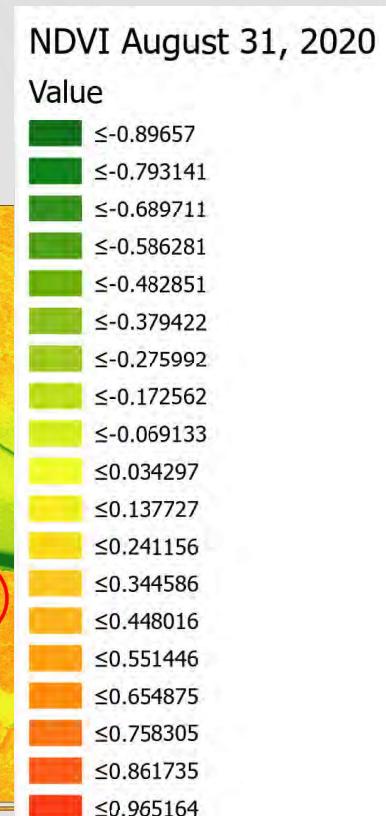
Blacklock Imagery



Multispectral (RGB) Orthomosaic
4.2cm x 4.2cm



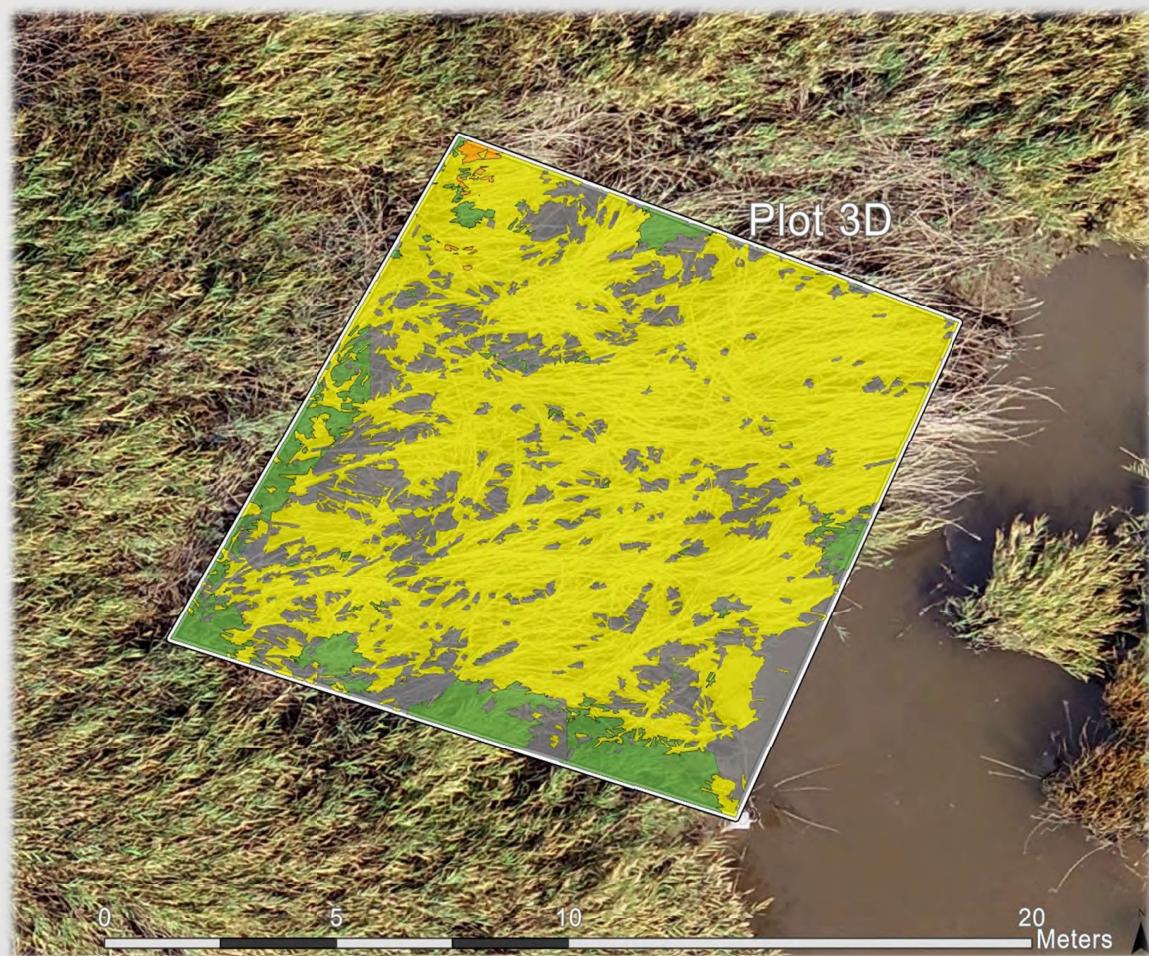
Normalized Difference Vegetation Index (NDVI) Filter



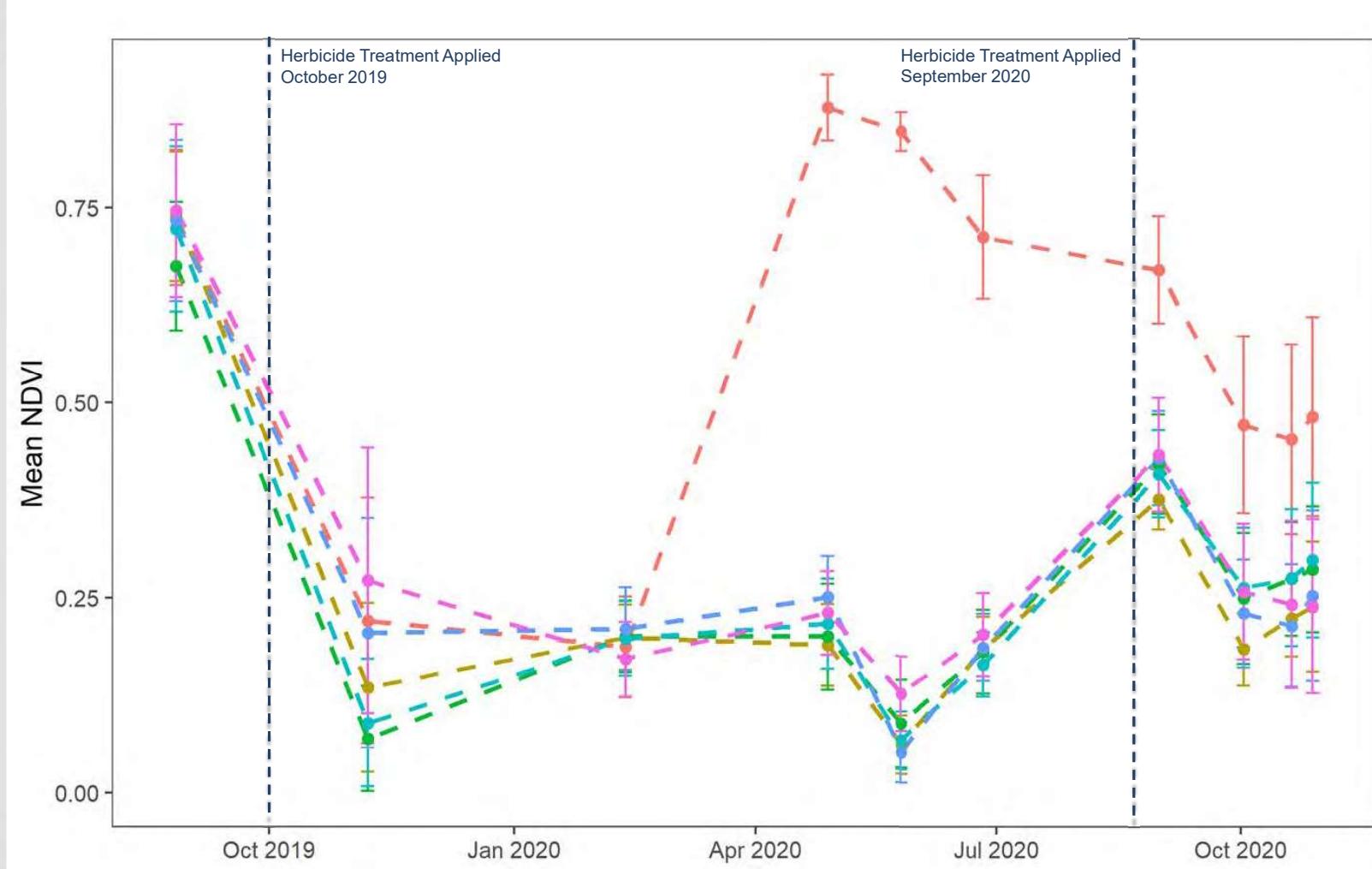
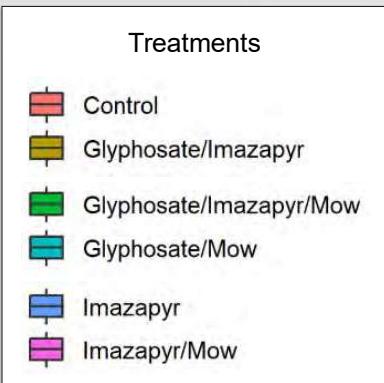
Evaluating Outcomes

Results

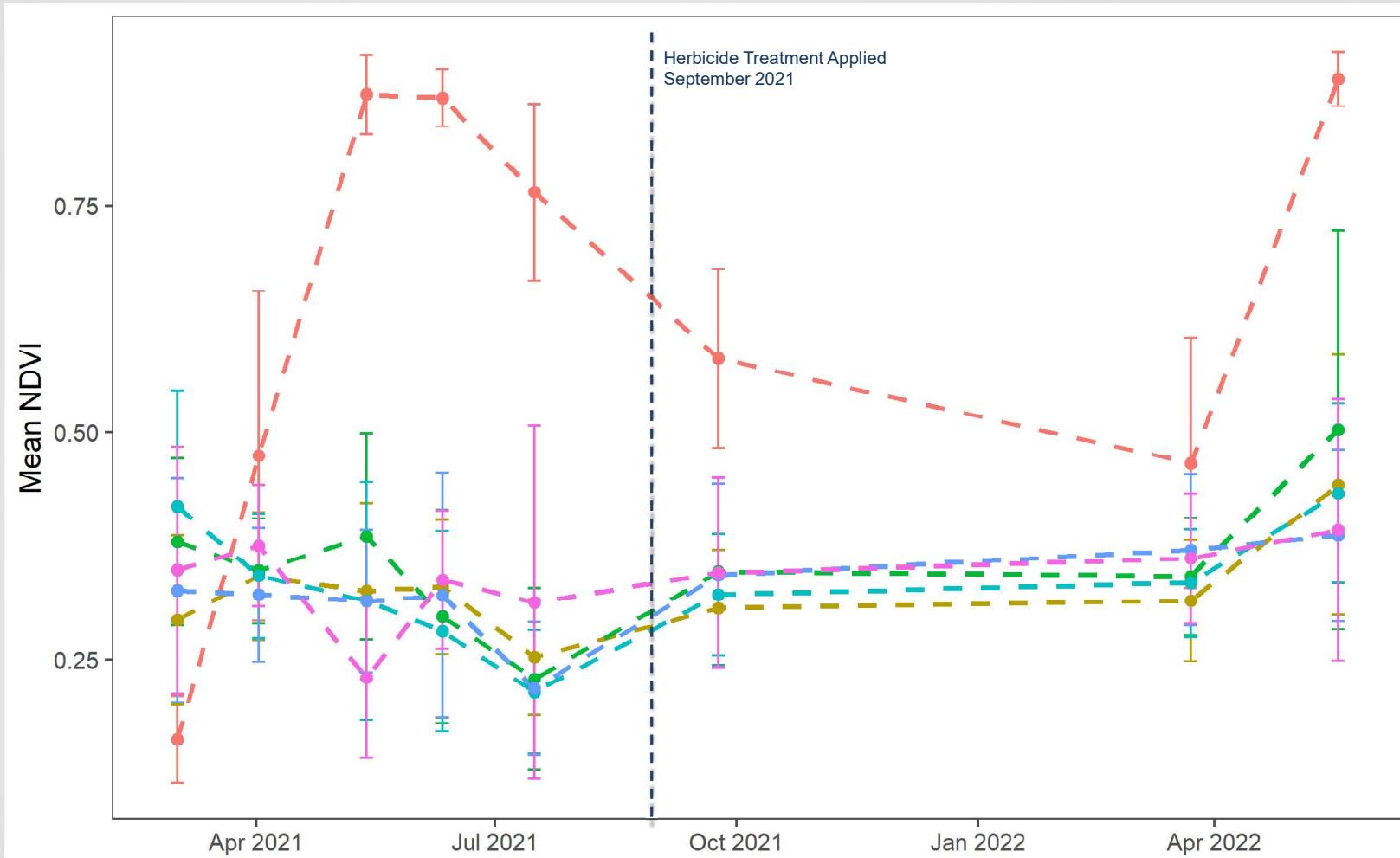
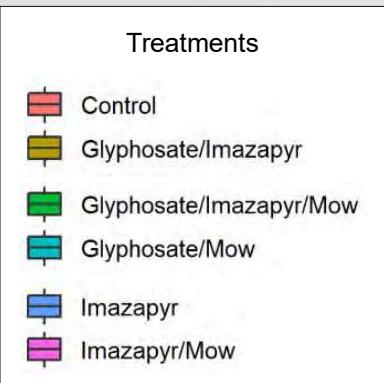
- Significant phragmites reduction from every treatment
- Minimal WQ Impact
- Native recruitment observed



Efficacy Results (NDVI)



NDVI Results (continued)

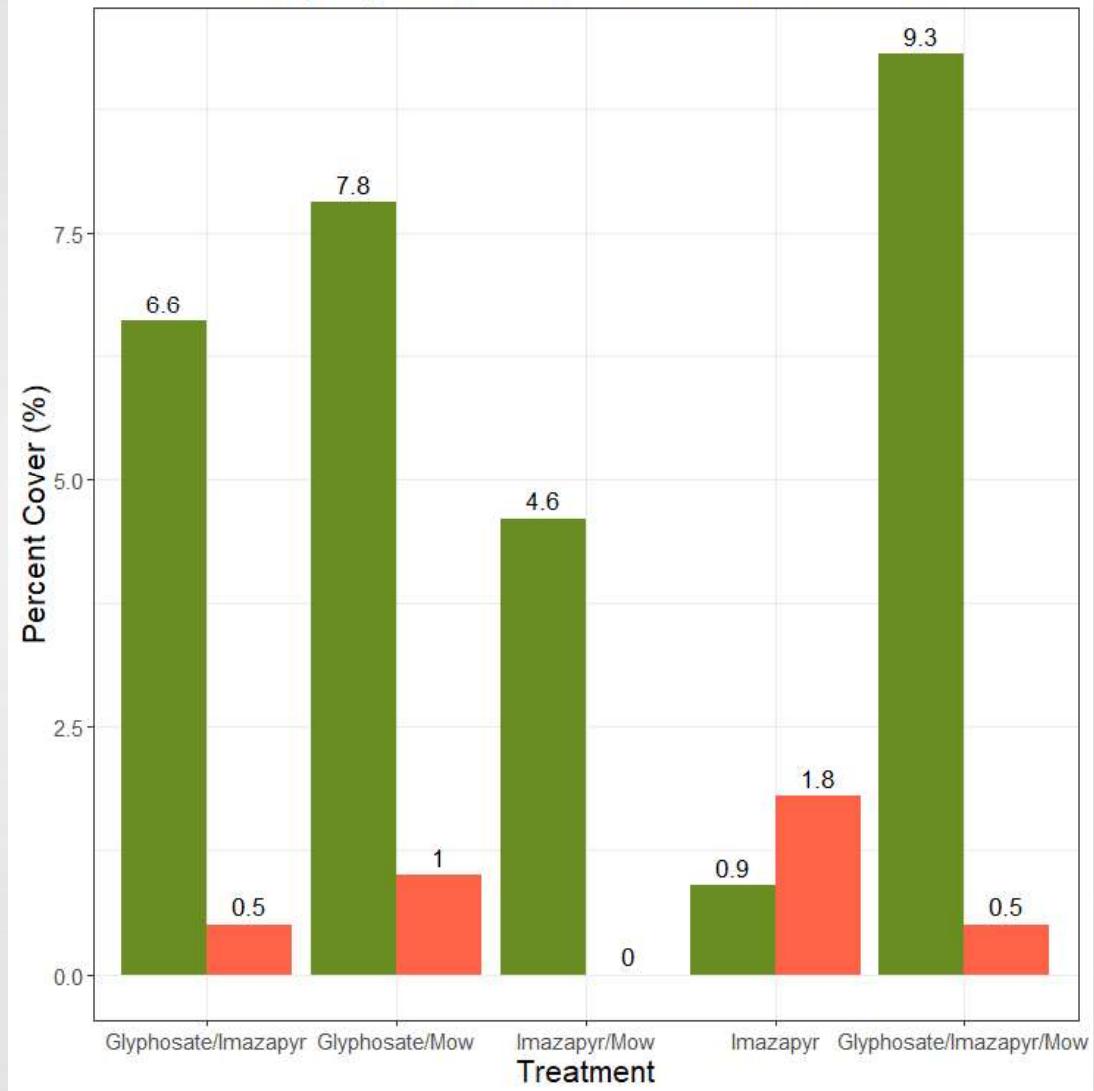


Non-target Results

Native Vegetation
Phragmites australis



Average Vegetation Percent Cover in Treatment Plots, 2022



Recruitment of Native Vegetation



Water Quality Results



Herbicide	Total samples taken (2019-2021)	Positive Detections (2019-2021)	Maximum Detection (mg/L)	Average Detection (mg/L)	NPDES Receiving Water Limit/Monitoring Trigger (mg/L)
Glyphosate	196	0	NA	NA	0.7
Imazapyr	210	30	0.013	0.00127	11.2

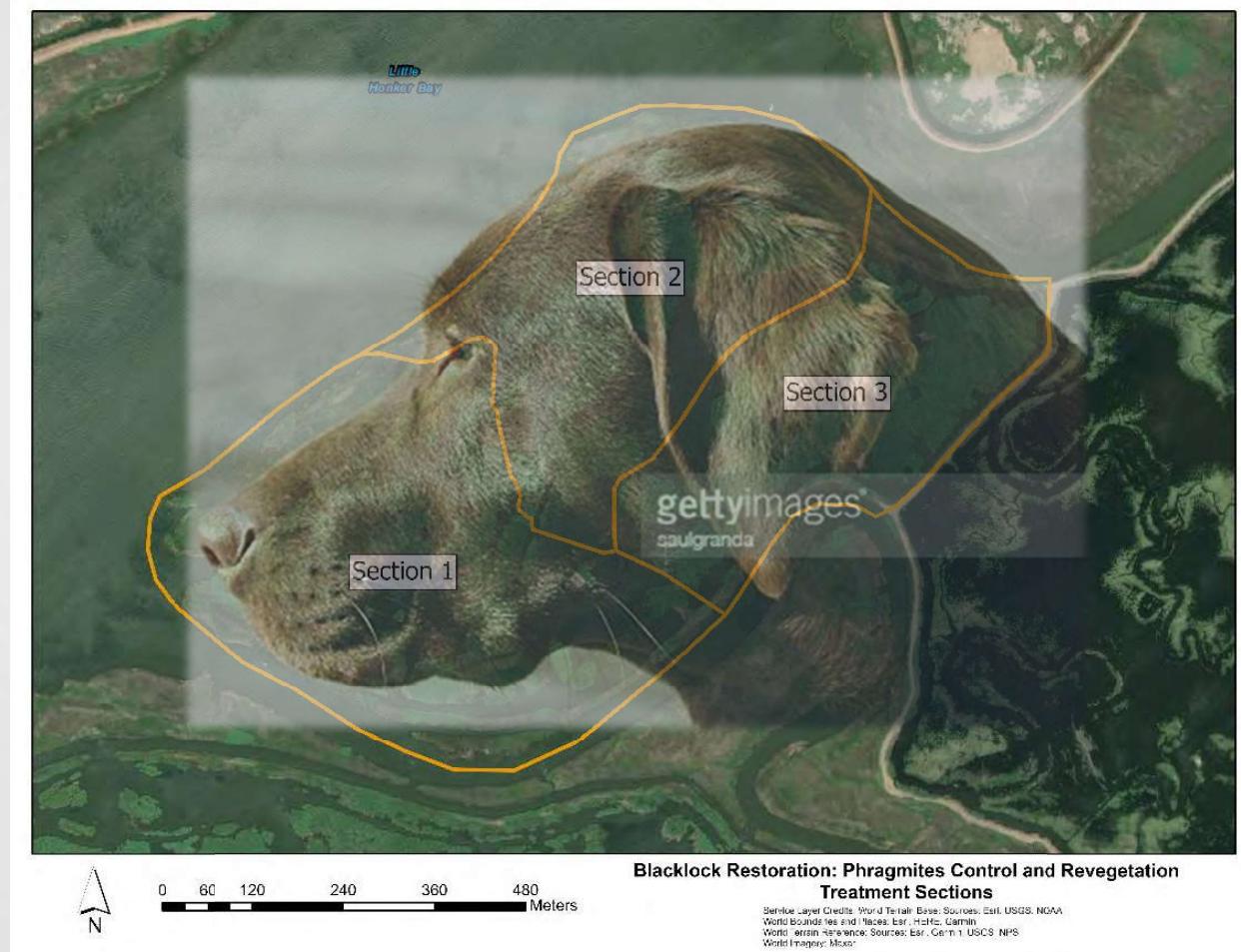
Communicating Understanding

- **Final Report** to SSJDC Prop 1 Grant Program
- **Shared Lessons learned** from Blacklock Study with DWR, SRCD, and partners
- **Re-initiated consultation** with USFWS and USBR for sitewide implementation
- **Lots of presentations:** IEP, ECAT, AMAT, CINIPC, SWCs, Cal-IPC, CDFW IPM, Yolo WMA, SF IPM, SRCD Landowners, DSC Adaptive Mgmt Forum, etc...



Sitewide Treatment: Phased approach

- Permits in hand as of Aug 2025
- Buffer Mason's *lilaeopsis*
- UAV herbicide application of glyphosate, Aug 8
- Mowing, as needed
- Spot spray in future years
- Active revegetation, if necessary
- Monitoring, always



Aug 8 Treatment

- Success!
- Lessons learned
- Spray Map
- WQ Analysis





- Special Status Plants
- Special Status Plants
- Sprayable Phragmites
- Blacklock Section 1 Boundary



Division of Integrated Science
and Engineering
Tidal Habitat Restoration Section

1:3,928
0 0.05 0.1 Miles

Blacklock Phragmites Treatment Plan

Data Sources: World Imagery (ESRI 2025), DWR
Author: CA Dept of Water Resources, 2025

Plan vs. Reality

Blacklock Section 1 WQ Results



NPDES WQ Compliance Sample Name	Sample Date	Analyte	Result (mg/L)	NPDES Receiving Water Limit/Monitoring Trigger
Blacklock Pre-event	8/7/2025	Glyphosate	ND	0.7 mg/L
Blacklock Pre-event	8/7/2025	Nonylphenol	ND	0.0066 mg/L
Blacklock Event	8/8/2025	Glyphosate	ND	0.7 mg/L
Blacklock Event	8/8/2025	Nonylphenol	ND	0.0066 mg/L
Blacklock Post-event	8/12/2025	Glyphosate	ND	0.7 mg/L
Blacklock Post-event	8/12/2025	Nonylphenol	ND	0.0066 mg/L

Thank you!

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Any Questions?