Integrated Management :

SUISUN MARSH PROGRAM

California
DEPARTMENT OF WATER RESOURCES

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Federal Agencies Announce Signing of Record of Decision for Suisun Marsh Habitat Management, Preservation and Restoration Plan

For Release: April 24, 2014

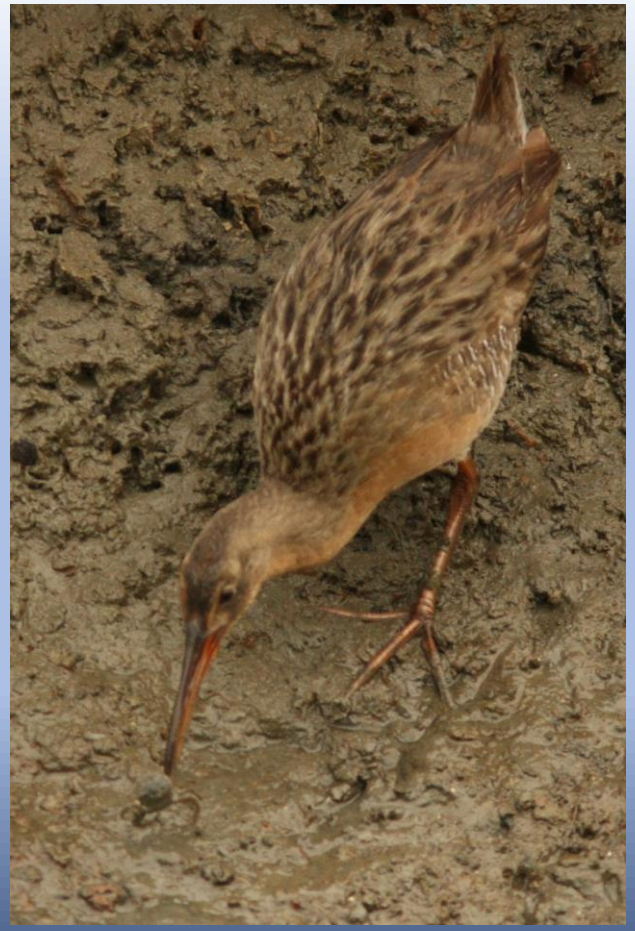
“The marsh plan creates a framework for a broad partnership to restore 5,000 to 7,000 acres of the marsh to tidal wetlands and enhance and protect more than 40,000 acres of managed wetlands.”

“The plan’s objectives include improving habitat for multiple special-status species, maintaining the heritage of waterfowl hunting and other recreational opportunities, improving water quality to assist fish migration and spawning, and improving and maintaining the levee system to protect property, infrastructure and wildlife habitats from flooding.”

Discussion:

- What is Integrated Management?
- What are the benefits?
- Drawbacks?
- What does success look like?

Northern Pintail



Ridgway's Rail

Delta Smelt

Western Pond Turtle

Salt Marsh Harvest Mouse

What is Integrated Management?

Managing for **multiple species**:

- Understanding the habitat requirements of species and taking advantage of overlapping species needs.
- Understanding environmental and physical conditions and their effect on resident populations and habitat (salinity, flooding regime, marsh elevations, etc.)
- Requires a multi-tiered approach that includes some cost/benefit analysis of management effort and desired outcome.

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What is Integrated Management?

Managing for **multiple habitats**:

- Managed Marsh
  - Seasonal Marsh (food for wintering ducks, timing of draw-down and flood-up for shorebirds)
  - Brood water
  - Molting habitat
  - Permanent Ponds
  - Uplands
- Muted Marsh
  - Residence time of inundation
  - Aquatic resource production
- Tidal Marsh
- Upland habitats

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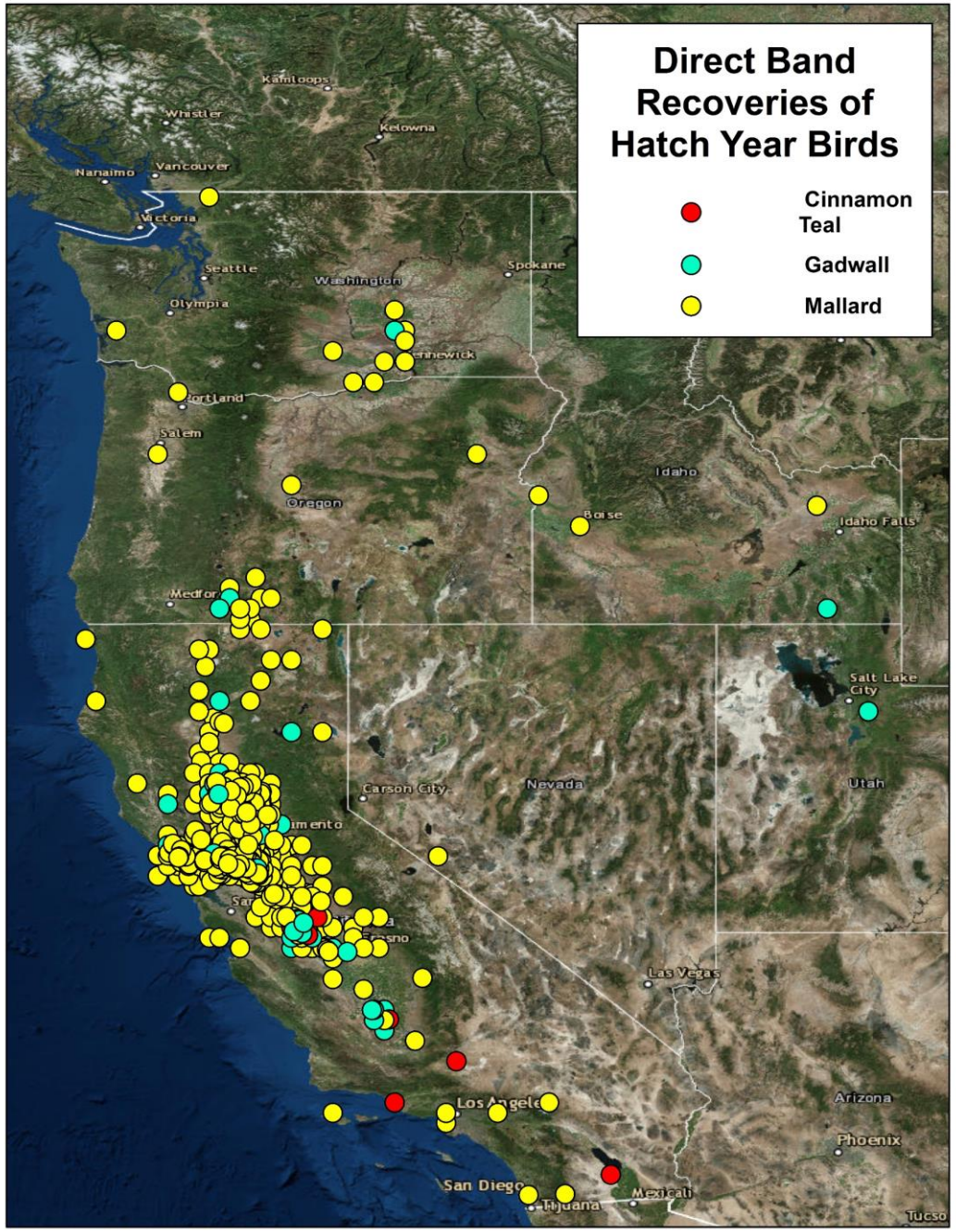
Ultimately a mosaic of habitat types meeting multiple species needs

What are some of the Benefits of Integrated Management?

Increased Recreational Opportunity

- Managed Marsh
  - Seasonal Marsh
  - Brood water
  - Molting habitat
  - Nesting habitat

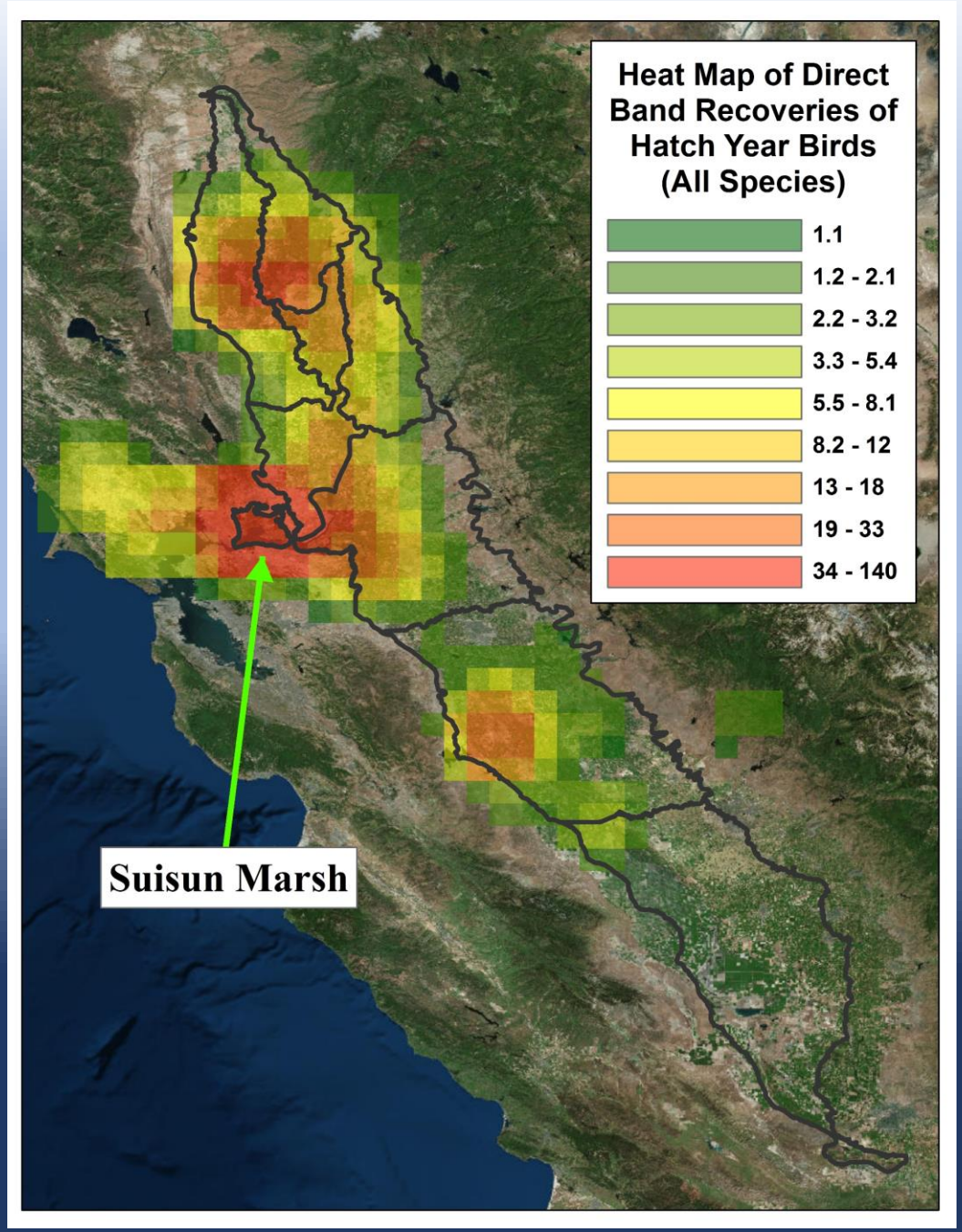
Using a simple waterfowl example of managing for multiple habitat types



Direct Band Recoveries of Hatch Year Birds – Cinnamon Teal, Gadwall, Mallards

Number of hatch year Cinnamon Teal, Gadwall, and Mallards banded from 1990-2017 in Suisun Marsh.

Year	Cinnamon Teal	Gadwall	Mallard	Total
Number of Birds Banded 1990-2017	511	1496	36517	38524
Number of Banded Birds Harvested 1990-2017	33	124	3831	3988



Direct Recovery Rates of Hatch Year Birds

- This heat map shows the direct recovery rates of hatch year birds shot the following hunting season. All birds were banded in Suisun Marsh from 1990-2017.

Providing nesting, brood and molting habitat can improve hunting opportunity and outcomes

Additional Benefits:

- Economy of scale
- Providing evidence of multiple benefits provides incentive to help maintain and sustain those beneficial activities.
  - Cost share programs
  - Levee maintenance
  - Salinity control
  - Invasive plant control

Examples (special status species):

Western Pond Turtle: response to salinity, sea level rise, drought, other factors. Maintaining salinity levels, levees, and managed habitats important to turtle populations – also to duck clubs

Original Article | Full Access

Salinity tolerances and use of saline environments by freshwater turtles: implications of sea level rise

Mickey Agha, Joshua R. Ennen, Deborah S. Bower, A. Justin Nowakowski, Sarah C. Sweat, Brian D. Todd

First published: 25 March 2018 | https://doi.org/10.1111/brv.12410

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Examples (special status species):

Fish Habitat: Managing brood habitat for waterfowl can provide food resources for fish…

UC Davis Fish Study:

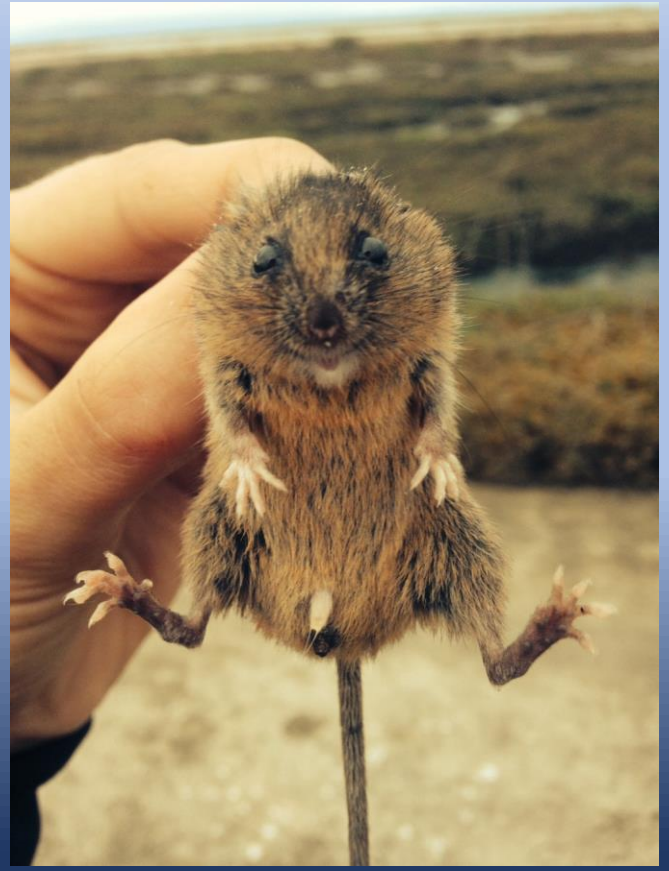
- Salmon at the Wings Landing Brood Pond outlet grew significantly faster and larger than fish in other locations
- Results attributed to high food production in the Wings Landing Brood Pond

Muted Tidal Brood Pond:

- Muted tidal Brood Pond will increase residence time and food production
- Brood Pond designed to export food production to marsh during high tides
- Particle Tracking shows food web effects reach throughout marsh and bay

Examples (special status species):

Salt Marsh Harvest Mouse:



- A 2 year study was conducted to examine the effect of different wetland types and microhabitats on SMHM dynamics.
- SMHM don't just rely on microhabitats dominated by pickleweed (*Salicornia sp.).*
- Microhabitats dominated by mixed vegetation support similar SMHM densities.
- SMHM densities were higher in diked wetlands, and post-winter persistence was higher in tidal wetlands.

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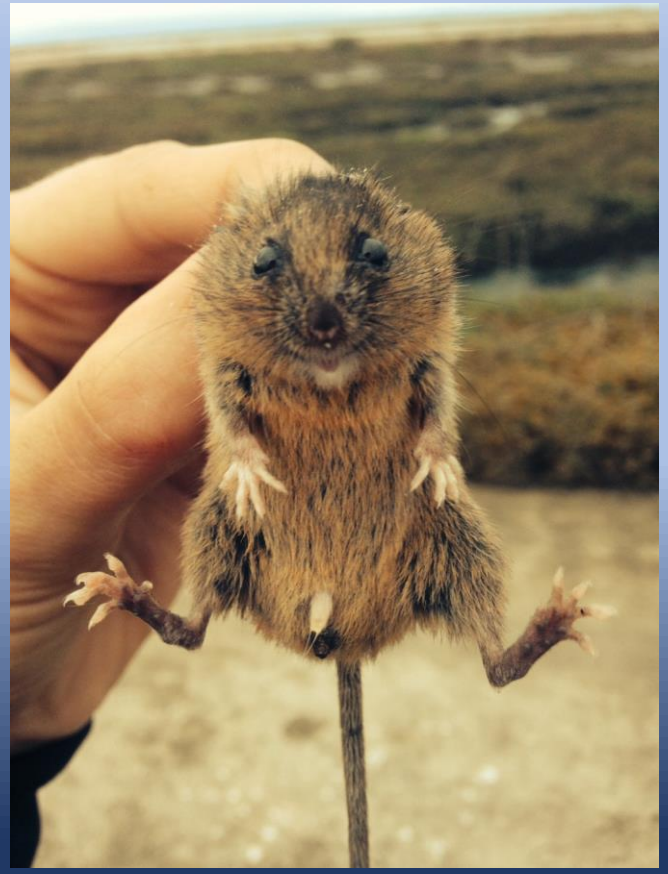

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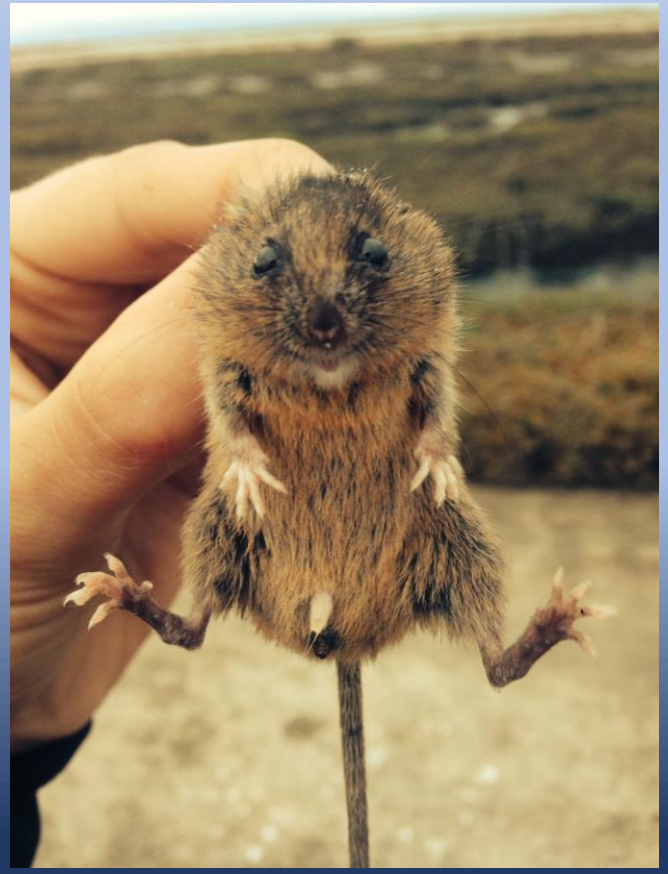

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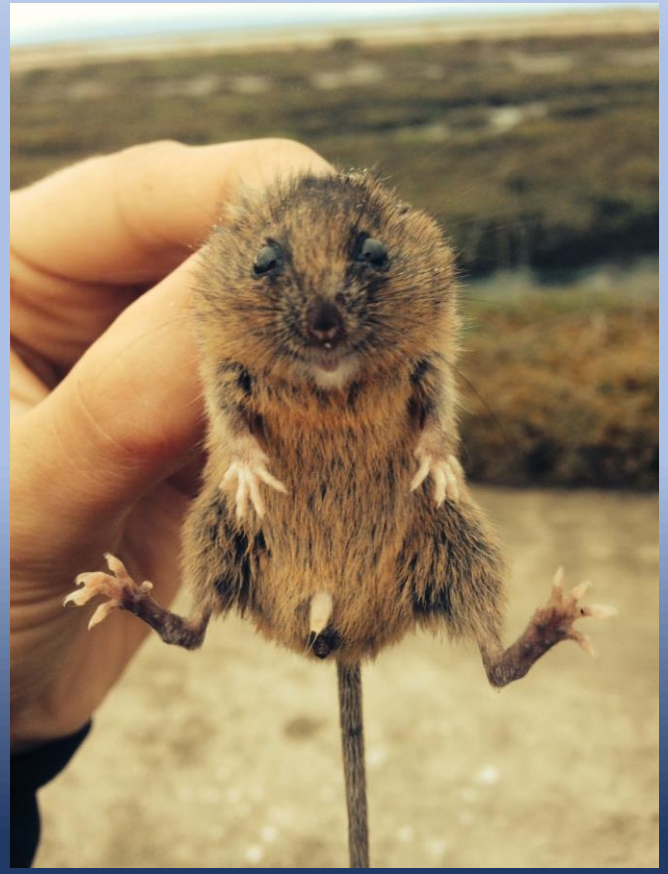

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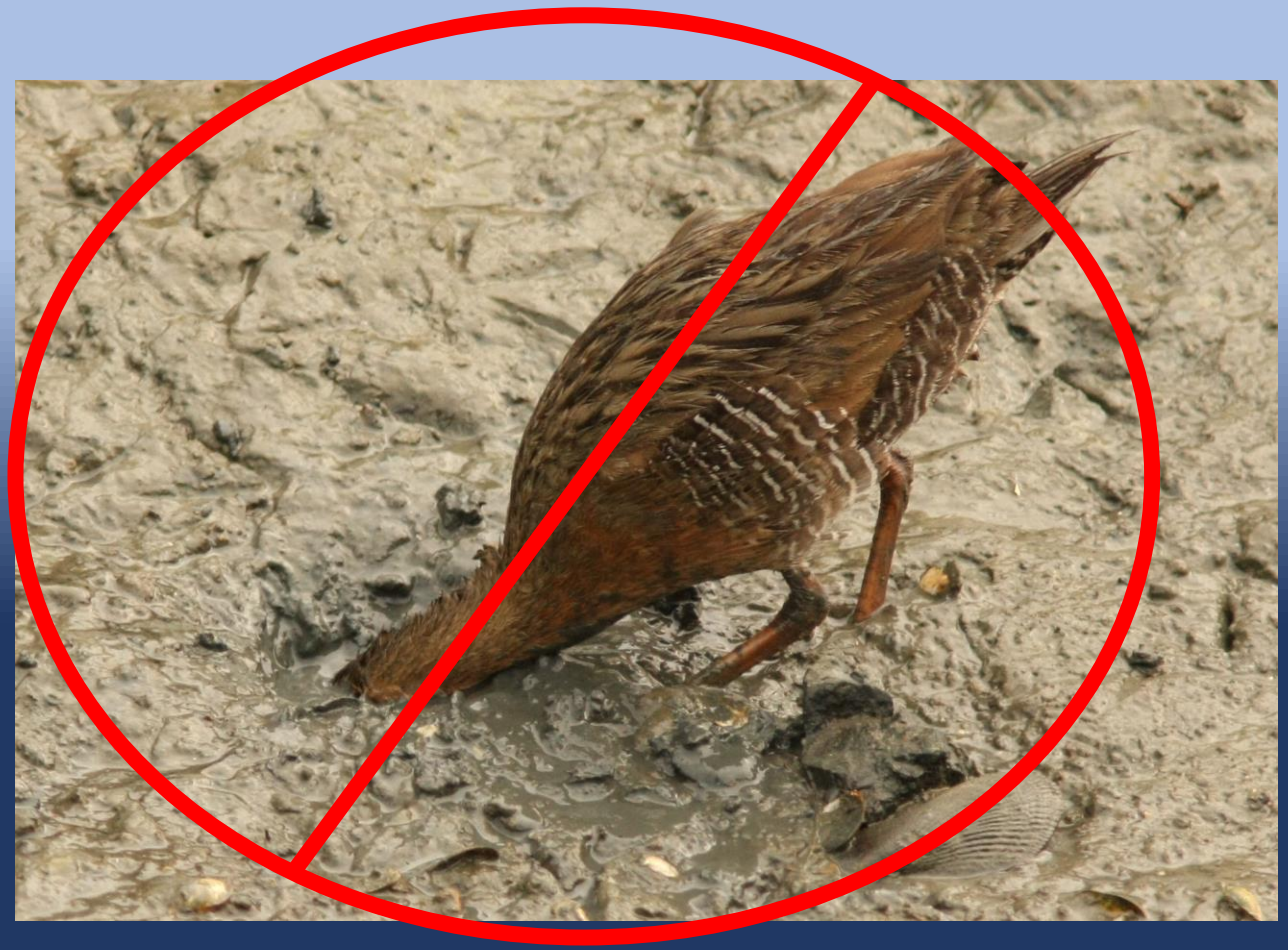
Drawbacks?

- Complicated and needs detailed study… much of which is ongoing!
- Needs collaboration from all the stakeholders



What does success look like?

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Sunrise in Suisun Marsh