MSiT Workshop 2

Note, slides do not reflect all activities, and select slides and images were removed.


What is
this marsh?

Browns Island

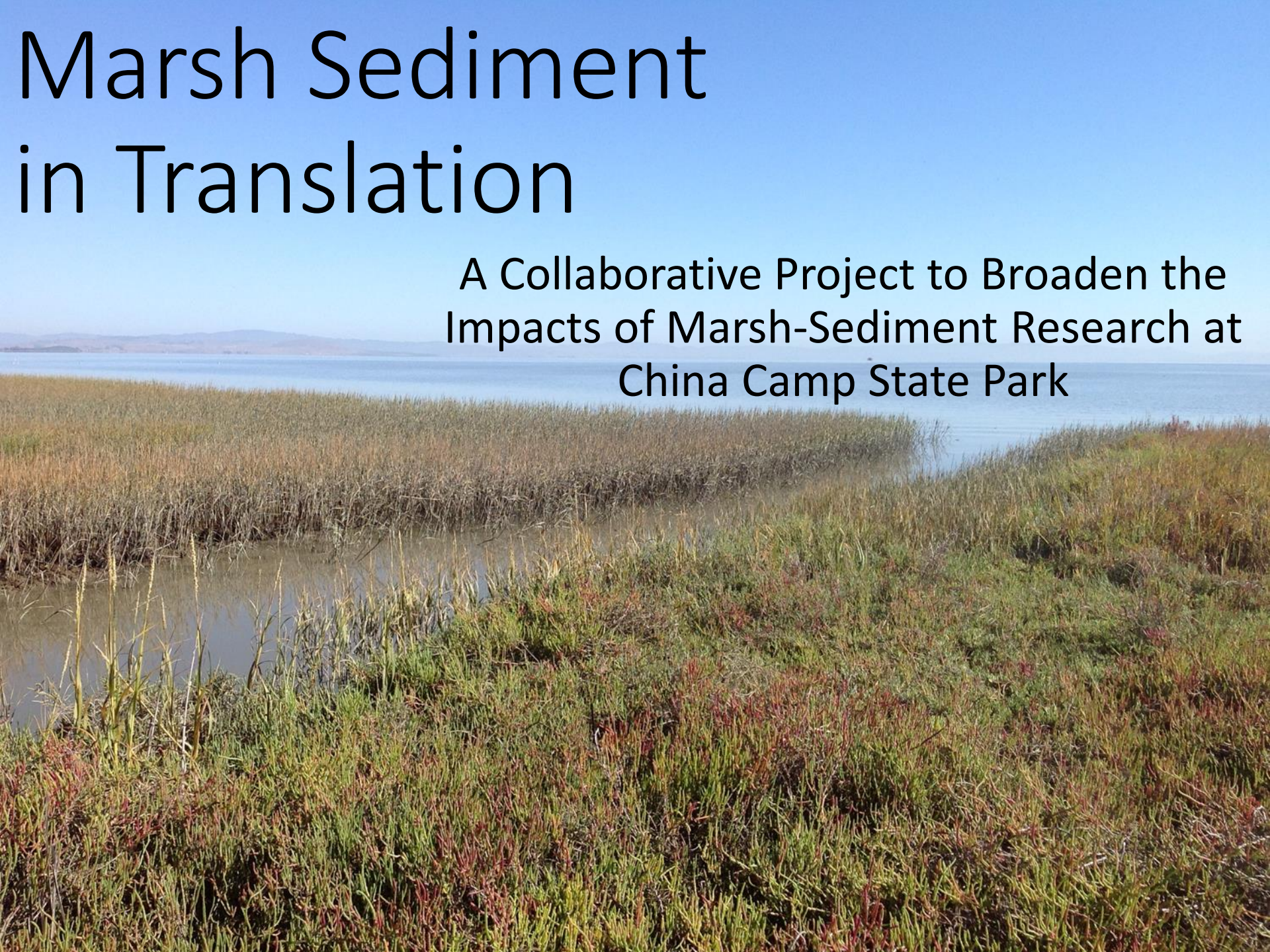
Google


What is
this marsh?


Miwok Meadows

Marsh Sediment in Translation

A Collaborative Project to Broaden the Impacts of Marsh-Sediment Research at China Camp State Park




“Sediment transport in nearshore environments is often misunderstood.”

Our hope is that by working together on this project we will:

- Generate substantial discussion of sediment transport and its importance to salt marshes
- Incorporate suggestions and requests of regional collaborators (= You!) into a draft product
- Develop an effective communication product based on the data collected at China Camp
- Increase understanding and awareness of sediment transport in the nearshore environment

MSIT project process and timeline

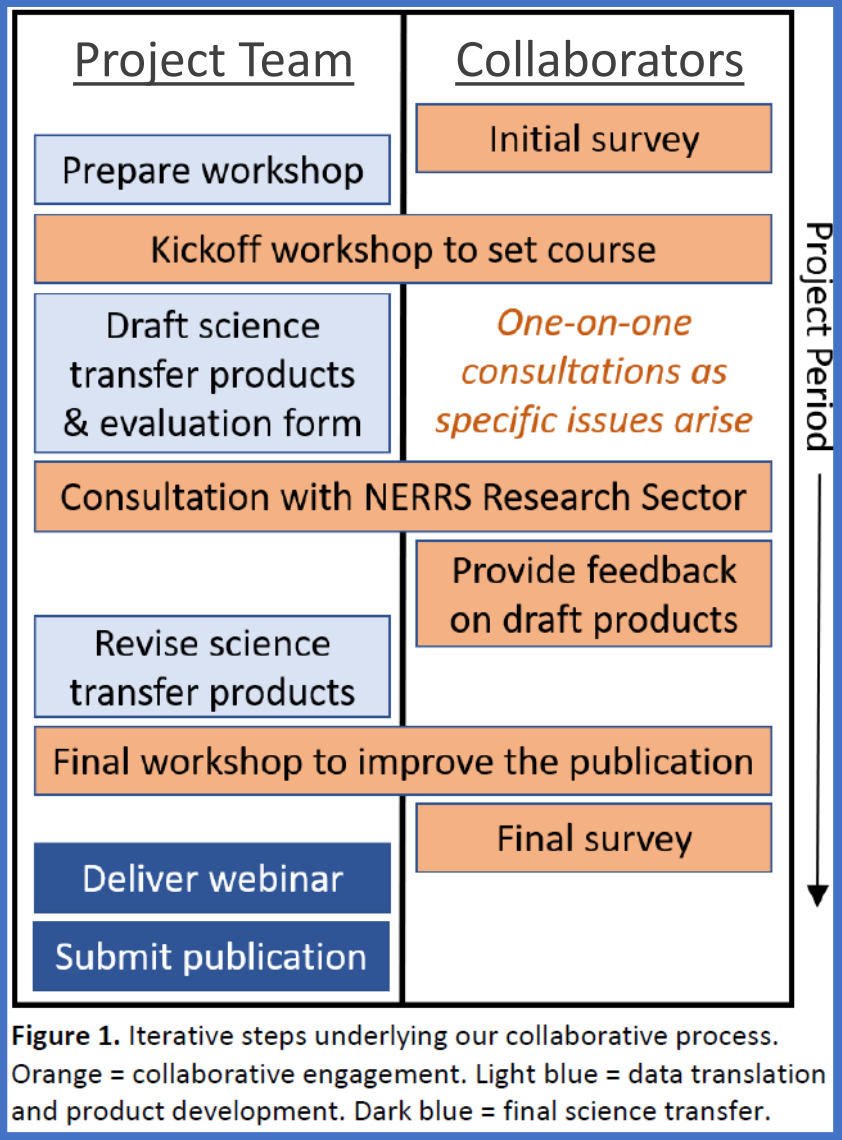


Figure 1. Iterative steps underlying our collaborative process. Orange = collaborative engagement. Light blue = data translation and product development. Dark blue = final science transfer.

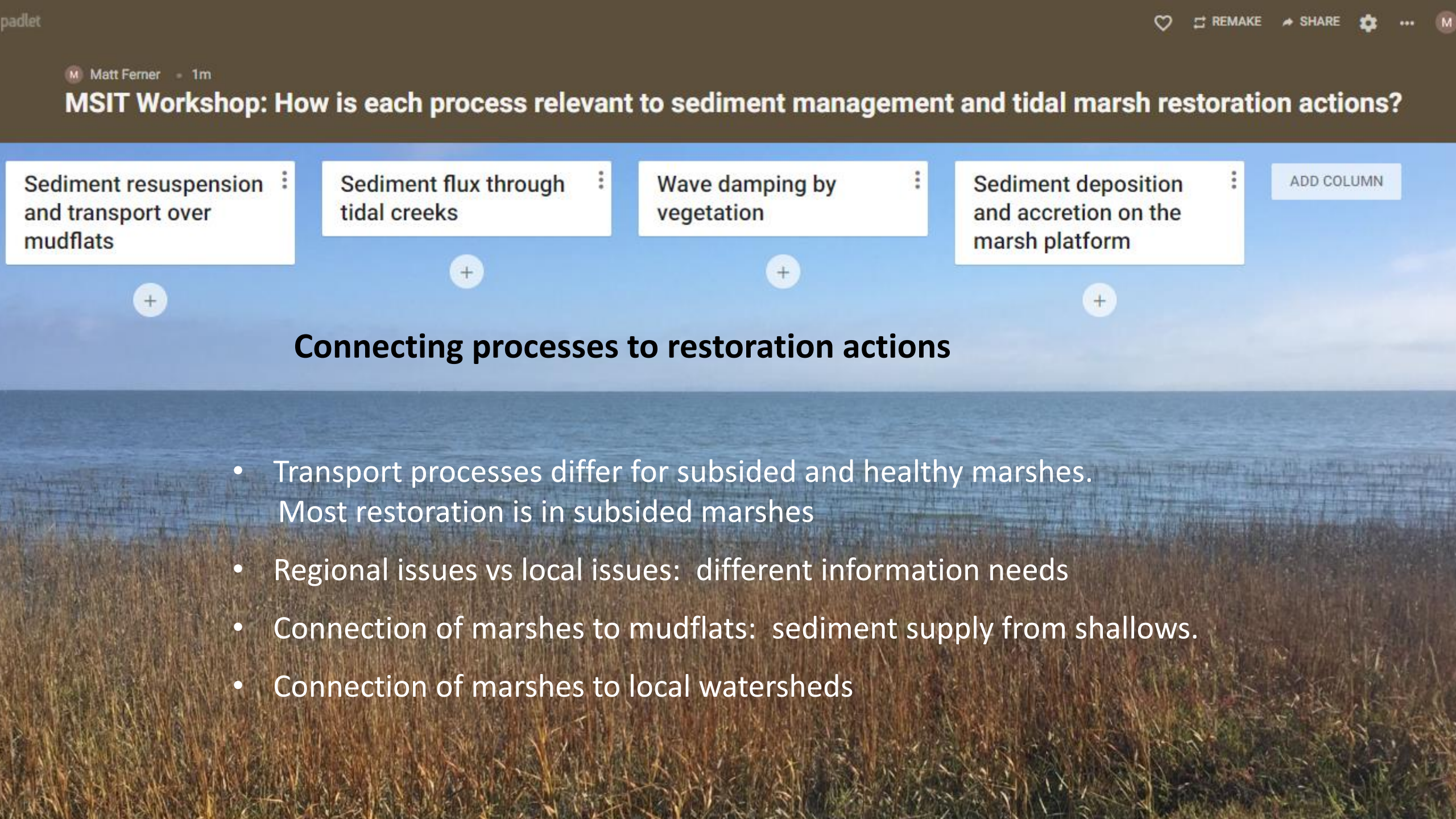
Marsh Sediment in Translation (MSiT) Workshop Part #2

Agenda

Welcome and project update
Examples of draft products and approaches
Break
Breakout group discussions
Full group discussion
Additional Q&A time

Today's Objectives

- Share potential data translation products and approaches
- Gather feedback from you on design and clarity
- Discuss steps and strategies for increasing usefulness of products and broadening the impact of marsh-sediment studies



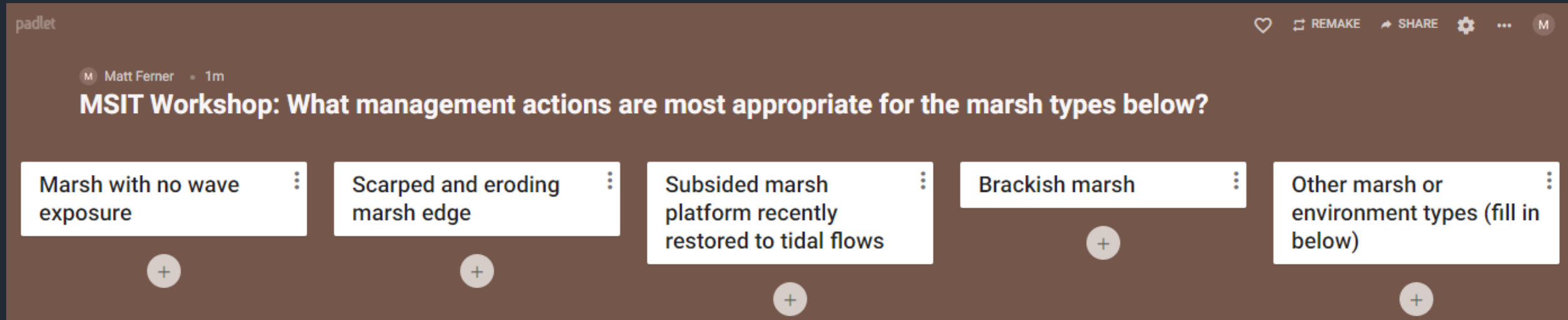
Connecting processes to restoration actions

- Transport processes differ for subsided and healthy marshes.
  Most restoration is in subsided marshes
- Regional issues vs local issues: different information needs
- Connection of marshes to mudflats: sediment supply from shallows.
- Connection of marshes to local watersheds

Connecting processes to restoration actions

- Spatial variation across estuary of SSC and sediment accretion: importance of regional monitoring
- Wave damping by vegetation: Use vegetation to support restoration: plant *S. foliosa* in low marsh zone. Vegetation health and density matter.
- If mudflats are providing sediment to marshes, what about mudflat depletion?
- Promote mudflat sedimentation through augmentation and offshore structures

- How do creek size, morphology, density affect sediment flux?
- How would coarser sediment influence sediment supply at the marsh edge?
- Temporary storage of sediment: on mudflats, in tidal creeks.



Evaluate and prioritize restoration sites based on:

- Sediment supply (ambient SSC, local watersheds)
- Aggrading or stable marsh edge (not eroding)
- Space for upland migration

Management actions across all marsh types:

- Allow for upland migration
- Smart use of vegetation: to attenuate waves at marsh edge, to accelerate sediment import, wide sloping transition zones (ramp)
- Can density or design of tidal creeks be optimized?

Matt Ferner • 1m

MSIT Workshop: What management actions are most appropriate for the marsh types below?

Marsh with no wave exposure

- thin lift placement
- reconnect to local creeks

Scarped and eroding marsh edge

- attenuate waves at marsh edge: coarse grained edge, vegetation wide sloping transition zone
- sediment augmentation
- need to identify mechanism of edge erosion

Subsided marsh platform recently restored to tidal flows

- direct placement, shallow water placement
- wave attenuation structures (promote sedimentation)
- marsh warping prior to breach
- watershed and tidal creek connections

Brackish marsh

- Consider and promote organic accumulation
- consider greenhouse gas and carbon sequestration benefits

Other marsh or environment types (fill in below)

Product Audience

- People who make decisions on marsh-sediment management and restoration
  - Land owners
  - Land & resource managers
  - Restoration practitioners
  - Their stakeholders and colleagues

- We hope it will be useful to those outside of the target audience

Draft data translation products (nuggets)

- The end product will contain an introduction and background

- Design best practices are not followed (just yet)
  → We welcome ideas and comments on both the content and form

Jamboards

- Add comment directly through sticky notes, text, doodles
- Try to keep notes in the margins
- Duplicate slides if they start to get crowded
- Ask question out loud. Notetakers will capture discussion.

Discussion Prompts:

1. Are the illustrations clear and understandable?

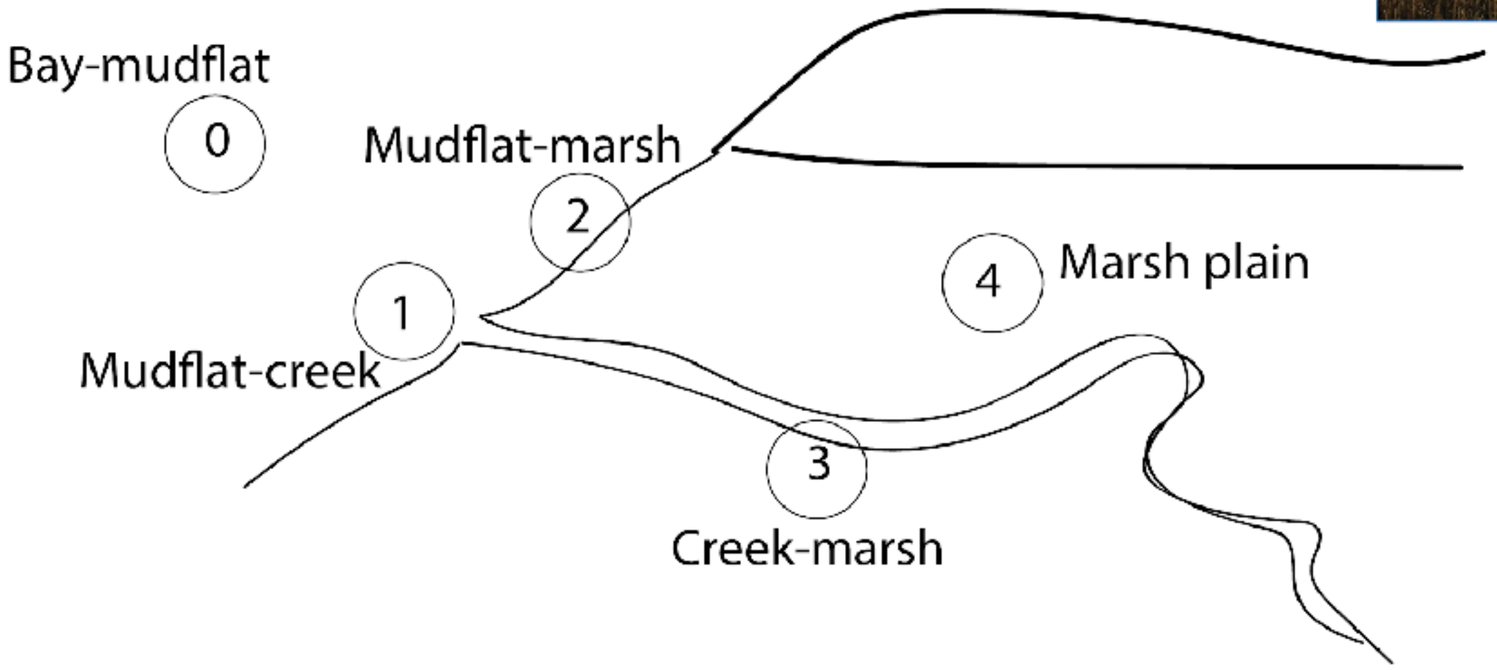
2. Do the illustrations aid the understanding?

3. Is more background material needed?

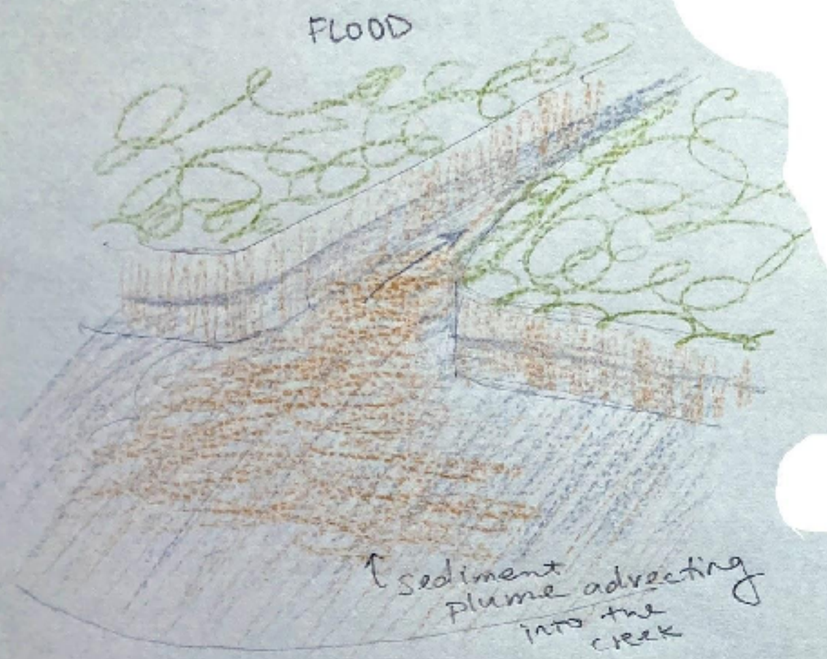
4. How much of the “why” a process occurs is needed?

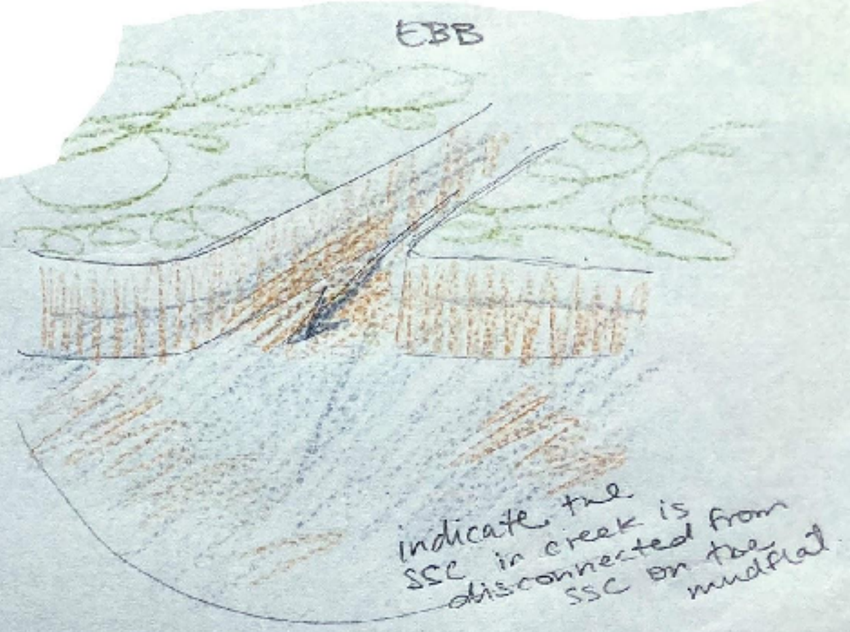
5. What additional information would you need (or would be helpful) to apply this information to another site or project?

6. Are direct connections to the original data graphs useful?


Bay-mudflat
0
Mudflat-marsh
2
1
Mudflat-creek
4
Marsh plain
3
Creek-marsh

1 OPTION 1





THE SEDIMENT CONCENTRATION ON THE MUDFLAT IS ABOUT THE SAME AS THE CONCENTRATION IN THE CREEK.

AND/OR

SEDIMENT IS MOVED FROM THE MUDFLATS TO THE CREEK AS WATER FILLS THE CREEKS AND MARSH.

THE SEDIMENT CONCENTRATION DOES NOT DEPEND ON THE VELOCITY IN THE CREEK. ($\hookrightarrow \tau_c$)

SEDIMENT CONCENTRATION ON THE MUDFLAT IS DISCONNECTED FROM THE CONCENTRATION IN THE CREEK.

SEDIMENT IS RESUSPENDED FROM THE CREEK BED. THERE IS MORE SEDIMENT WITH GREATER CREEK VELOCITY.

NOTE: THIS OPTION COULD MAKE A GOOD GIF.

1 OPTION 2

FLOOD

WAVES RESUSPEND SEDIMENT ON THE MUDFLAT

SUSPENDED SEDIMENT IS CARRIED INTO THE CREEK BY THE FLOOD TIDE. THE SUSPENDED SEDIMENT CONCENTRATION DOES NOT DEPEND ON THE VELOCITY IN THE CREEK.

EBB

WAVES RESUSPEND SEDIMENT ON THE MUDFLAT

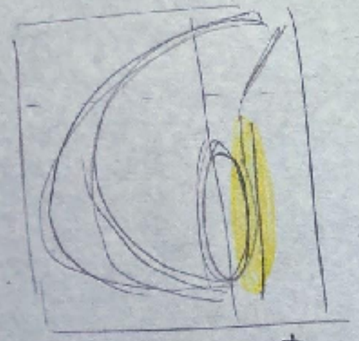
SUSPENDED SEDIMENT CONCENTRATION DEPENDS ON THE VELOCITY IN THE CREEK, WITH GREATER VELOCITY RESUSPENDING MORE SEDIMENT.

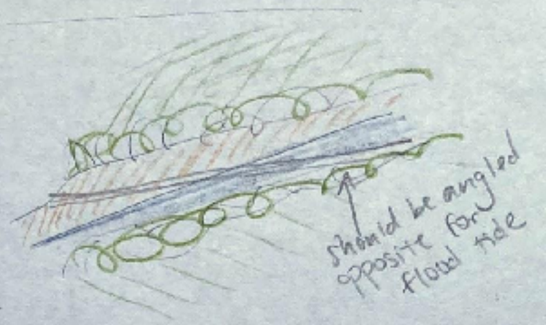
(3) Option 1

*

each of these (A, B, C, D, E) would pop up as you scroll over or click on the different highlighted portions of the plot

A

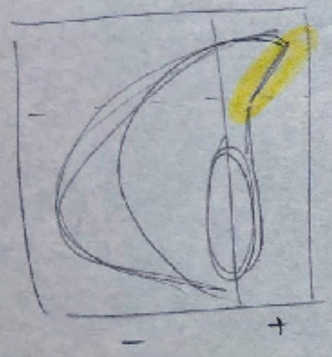




- THE VELOCITY IS RELATIVELY CONSTANT AS THE FLOOD TIDE FILLS THE CREEK.
- THE WATER SURFACE GRADIENT IS BALANCED BY THE FRICTION FROM THE CREEK.

insert → [E]

B

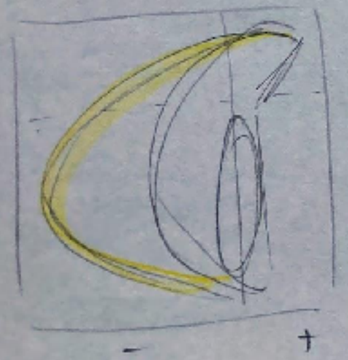


better sketches elsewhere on this view of the marsh + creek

- IF THE MARSH PLAIN IS FLOODED, THEN THINGS GET INTERESTING.
- ONCE THE CREEK OVERFLOWS INTO THE MARSH, THE VELOCITY IN THE CREEK INCREASES
- THE CREEK VELOCITY INCREASES BECAUSE THE VEGETATION BLOCKS THE FLOW AND CAUSES AN INCREASE IN THE WATER SURFACE GRADIENT.

↳ could expand the last bullet

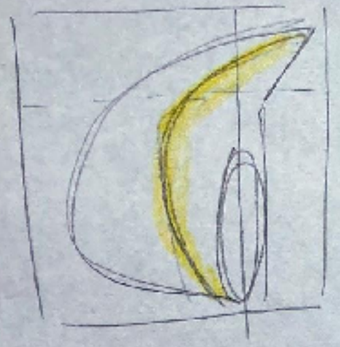
C



- AS THE EBB TIDE DRAINS THE MARSH PLAIN AND THE CREEK, THE VEGETATION AGAIN BLOCKS THE FLOW CAUSING AN INCREASE IN THE WATER SURFACE GRADIENT.
- THE GREATER WATER SURFACE ELEVATION DRIVES A LARGER VELOCITY IN THE CREEK.

Show different options for phrasing (cause : effect vs. effect : cause)

D

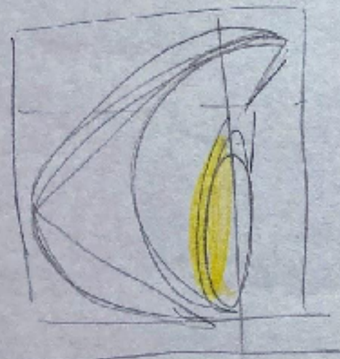


- IF THE CREEK DRAINS A SMALLER☆ AREA, THE SAME DYNAMICS ARE SEEN BUT TO A LESSER DEGREE.

☆ need to define "smaller"? Helps see if it applies to fringing marshes.

☐ Explanation needs to include the water imbalance (more going out on the ebb via creeks)

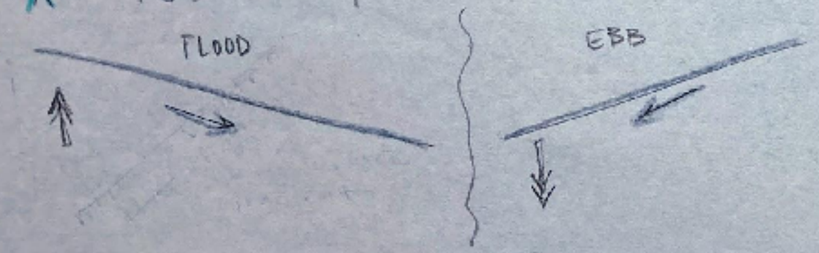
E



similar illustration as A → showing ebb

- IF THE MARSH PLAIN IS NOT FLOODED, THE SAME DYNAMICS OCCUR ON EBB.
- THE VELOCITY IS RELATIVELY CONSTANT AS THE EBB TIDE DRAINS THE CREEK.
- THE WATER SURFACE GRADIENT IS BALANCED BY FRICTION FROM THE CREEK
- THE TOTAL FLOW INTO AND OUT THE CREEK IS BALANCED / OR IS THE SAME

✳ Possible primer (could be called "Building Blocks") on FORCES AT WORK



WATER SURFACE GRADIENT DRIVES WATER INTO AND OUT OF THE MARSH. THE GREATER - OR STEEPER - THE GRADIENT, THE GREATER THE FORCE DRIVING THE WATER FLOW.

[illustration of water going through vegetation and creeks]

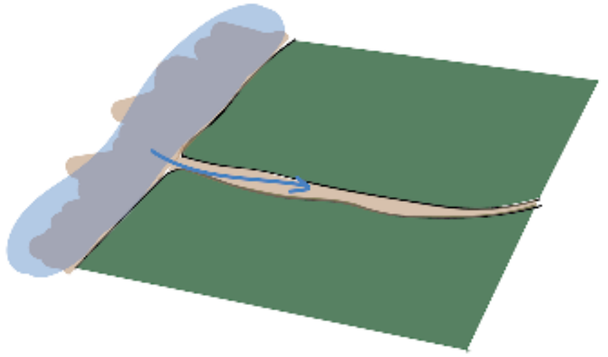
VEGETATION PROVIDES FRICTION AND BLOCKS WATER FLOW (or SLOWS?) ON EBB AND FLOOD TIDE.

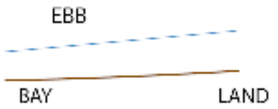
TIDAL CREEKS PROVIDE FRICTION ALSO ACTING AGAINST THE WATER FLOW.

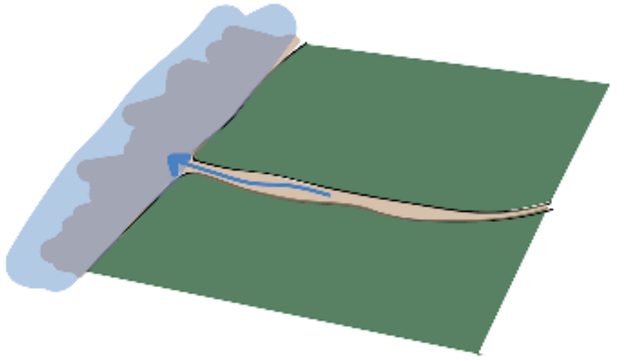
VEGETATION PROVIDES MORE FRICTION THAN THE TIDAL CREEKS.

Process 3, Option 2

A. NO MARSH PLAIN FLOODING

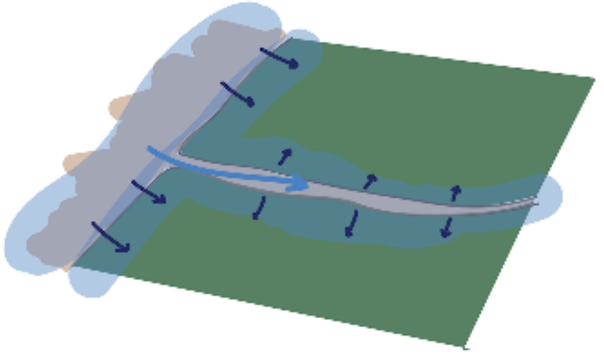




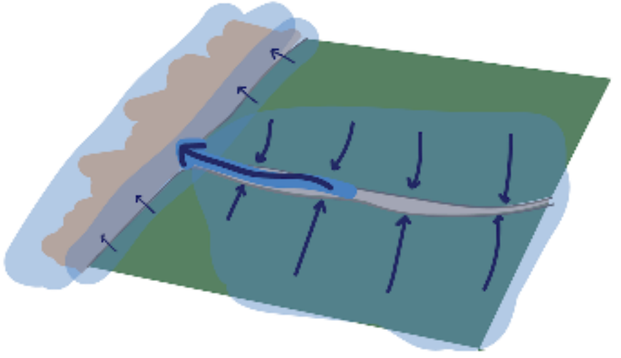


Channel velocity is relatively constant and the same amount of water that fills the creek on flood drains on ebb.

B. WITH MARSH PLAIN FLOODING



As the water overflows onto the marsh plain, there is much more available area for the water to go. The creek velocity increases as larger water volume must now pass through the creek to flood marsh plain.

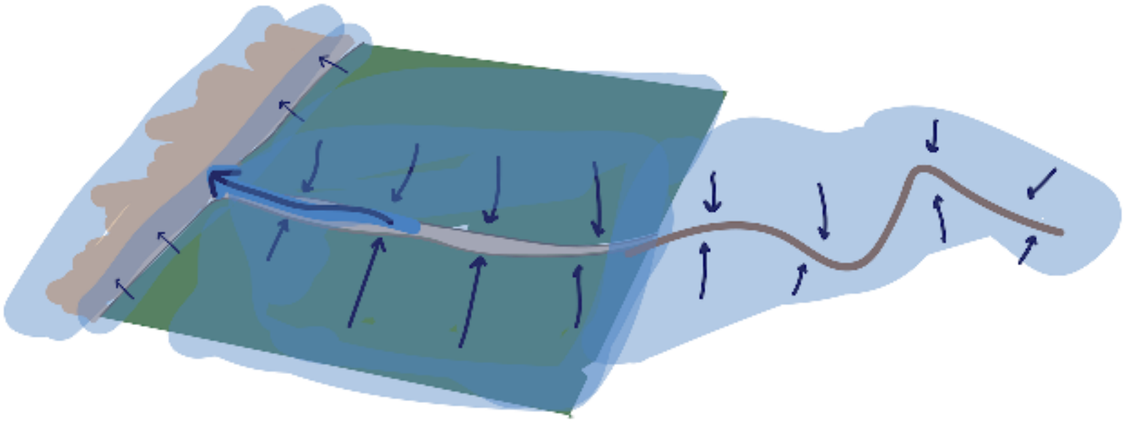


As the water drains from the marsh plain, the vegetation blocks the flow, causing an increase in the water surface gradient (low in the Bay and high in the marsh). The increased water surface gradient drives a faster velocity in the creek.

This velocity increase is greater than that on the flood tide because the vegetation effect impacts flow from the start of the ebb tide.

Process 3, Option 2 continued

C. SPATIAL DIFFERENCES WITH MARSH PLAIN FLOODING

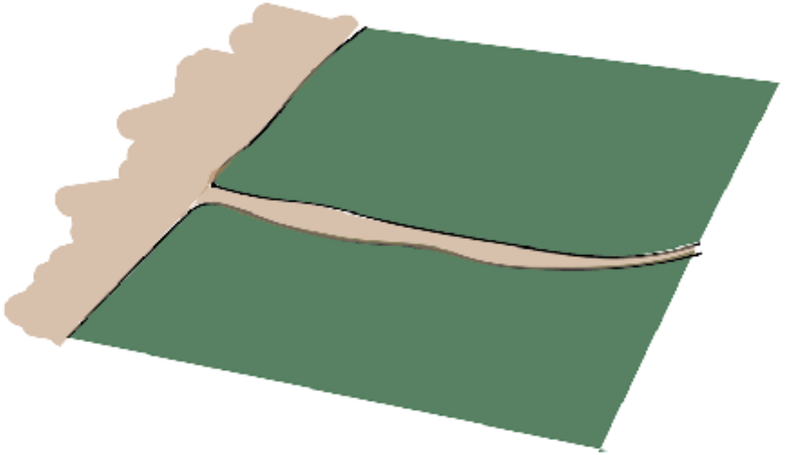


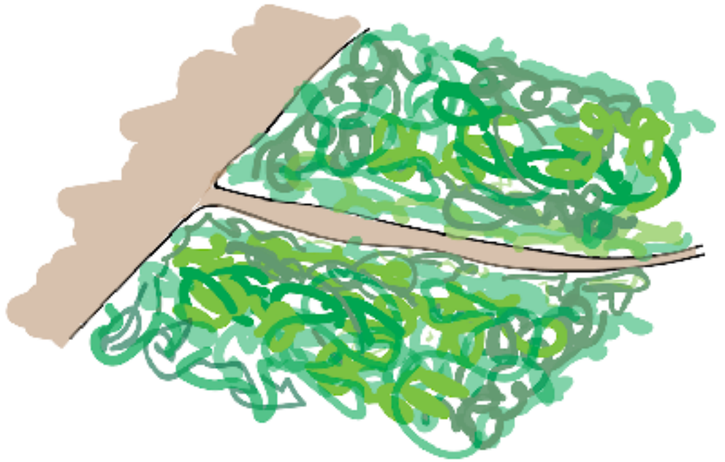
The increased velocity in the creek is greater near the creek mouth than in the upper creek because the lower creek drains a larger portion of the marsh. Some water that entered the marsh plain over the bay-marsh edge drains via the creek.

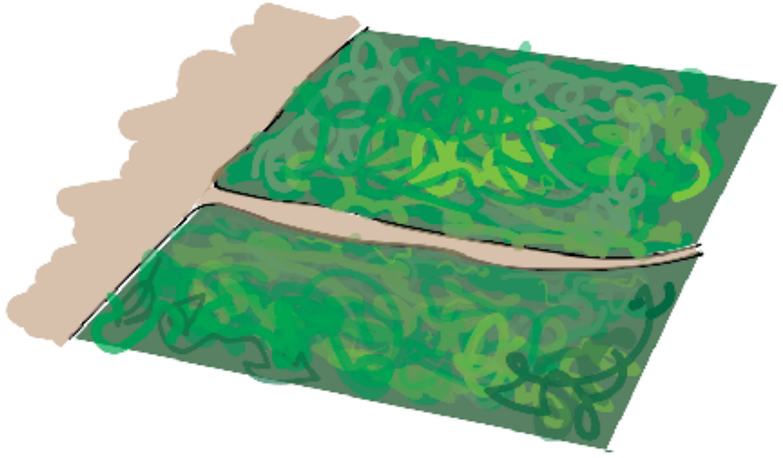
Marshes with smaller drainage areas will behave similarly to the upper creek.

For the marsh studied here, the inundation on the marsh plain did not greatly exceed the height of the vegetation.

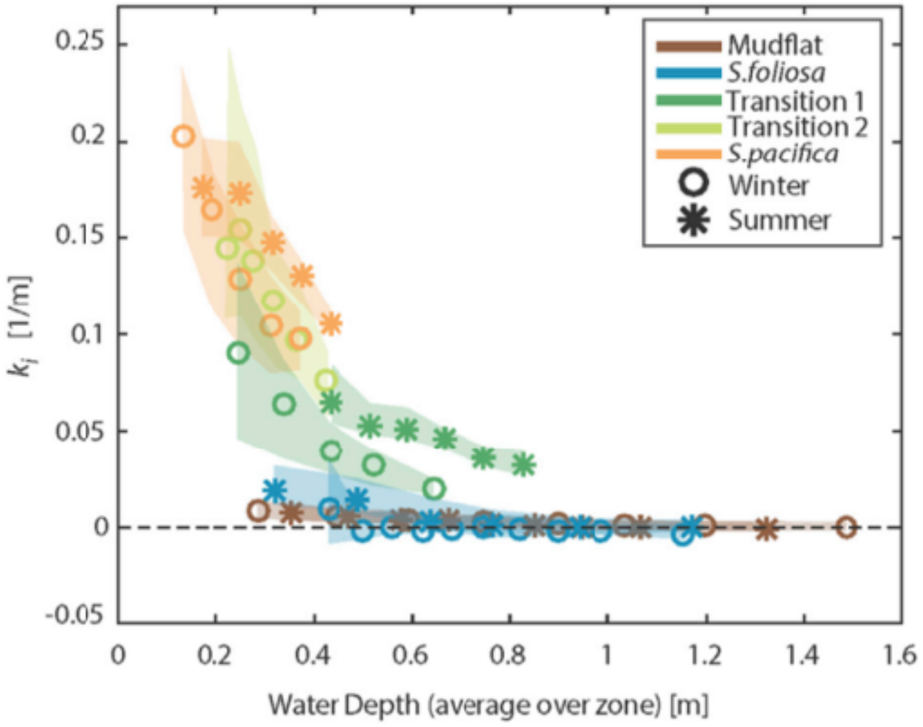
Does a vegetation sketch help or distract?







A.



B.

With a water depth of 40 cm,

≈ 6 m of pickleweed reduces wave heights the same as

≈ 40 m of cordgrass

⇦ data translation piece

What type of publication format might be best for this product?

draw a check and/or comment below. Other format suggestions are welcome.

journal article (e.g. SFEWS)

white paper

USGS report

story map

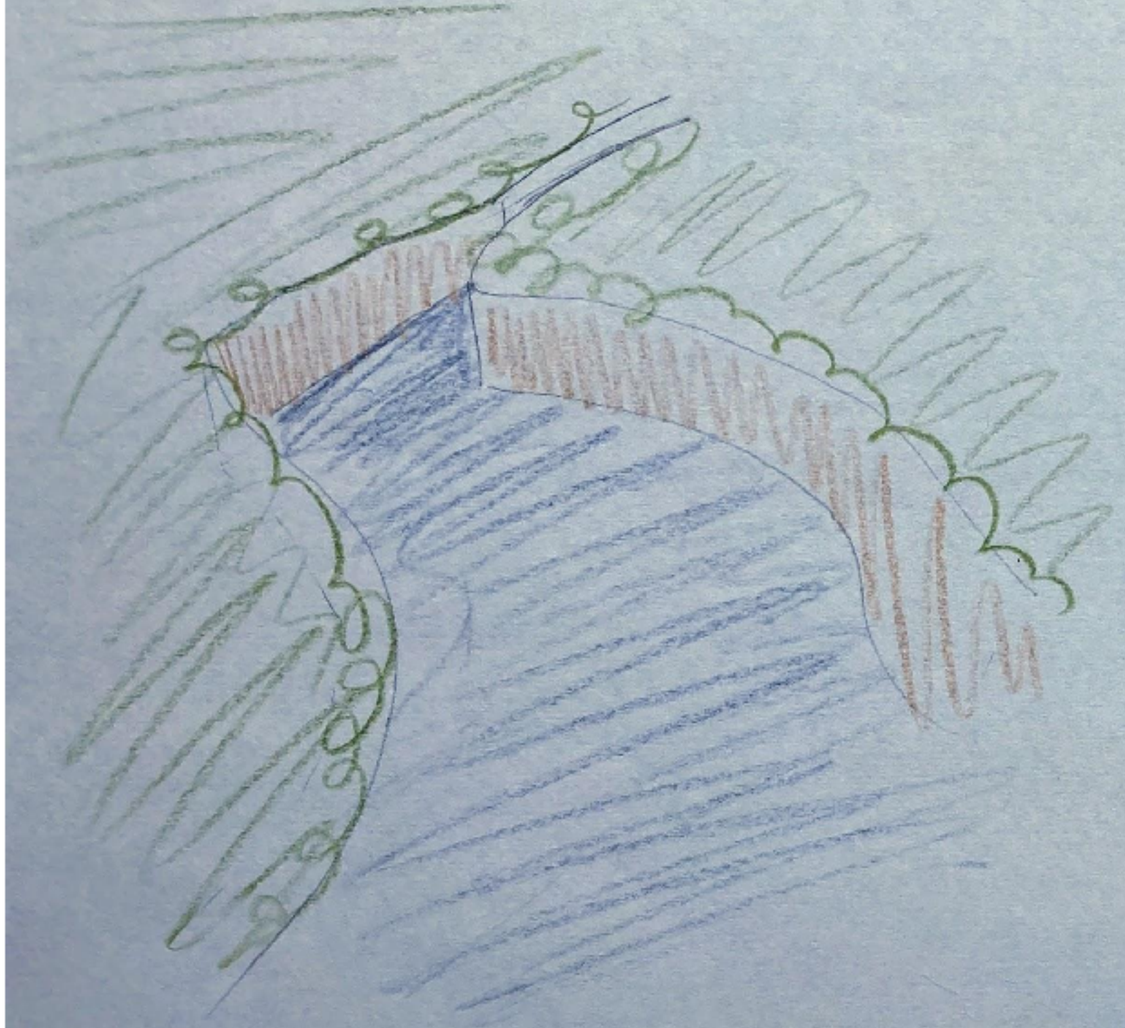
infographic bulletin

What terms should be included in a [expanded] glossary?

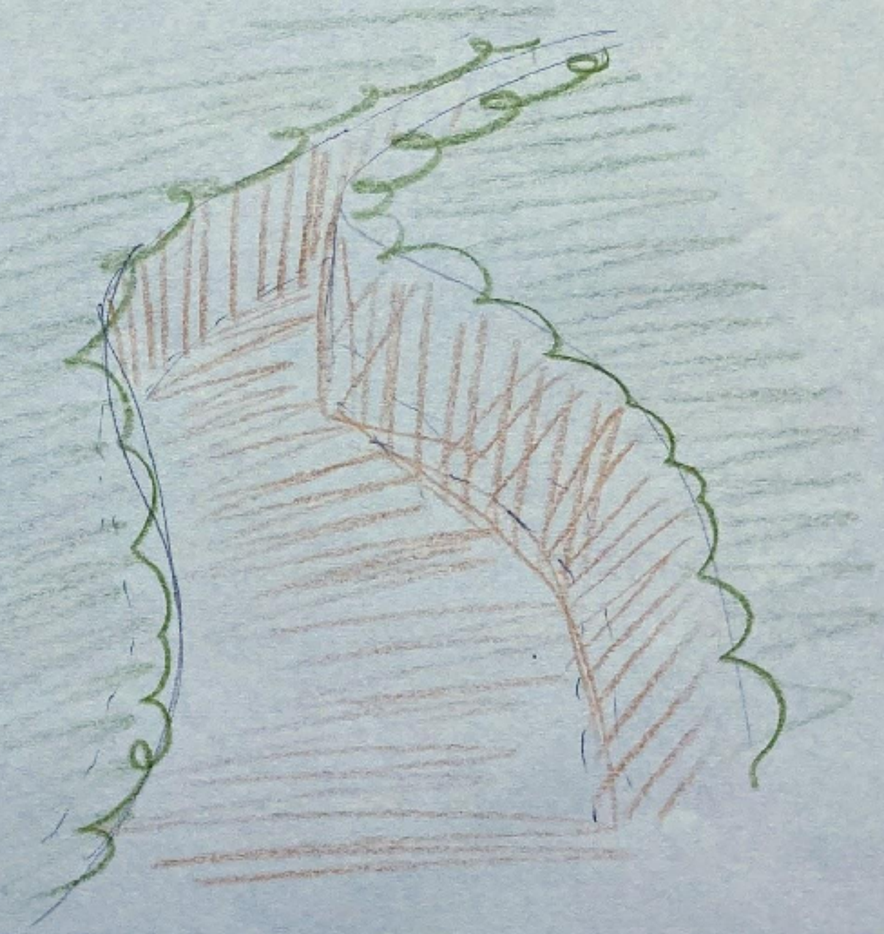
draw a check ✓ on existing terms and/or add more below

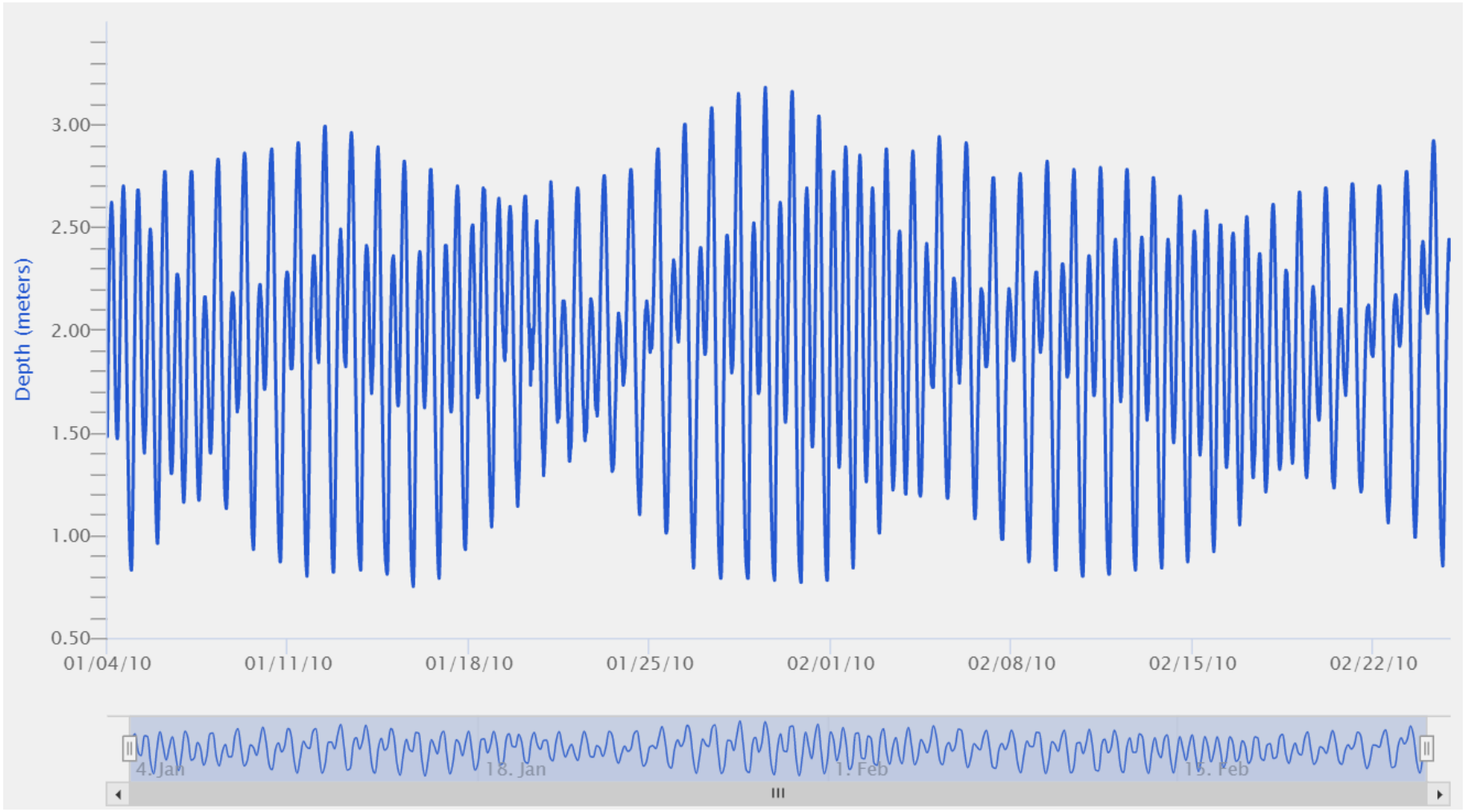
LOOKING UP CREEK MOUTH

PARTIALLY FILLED

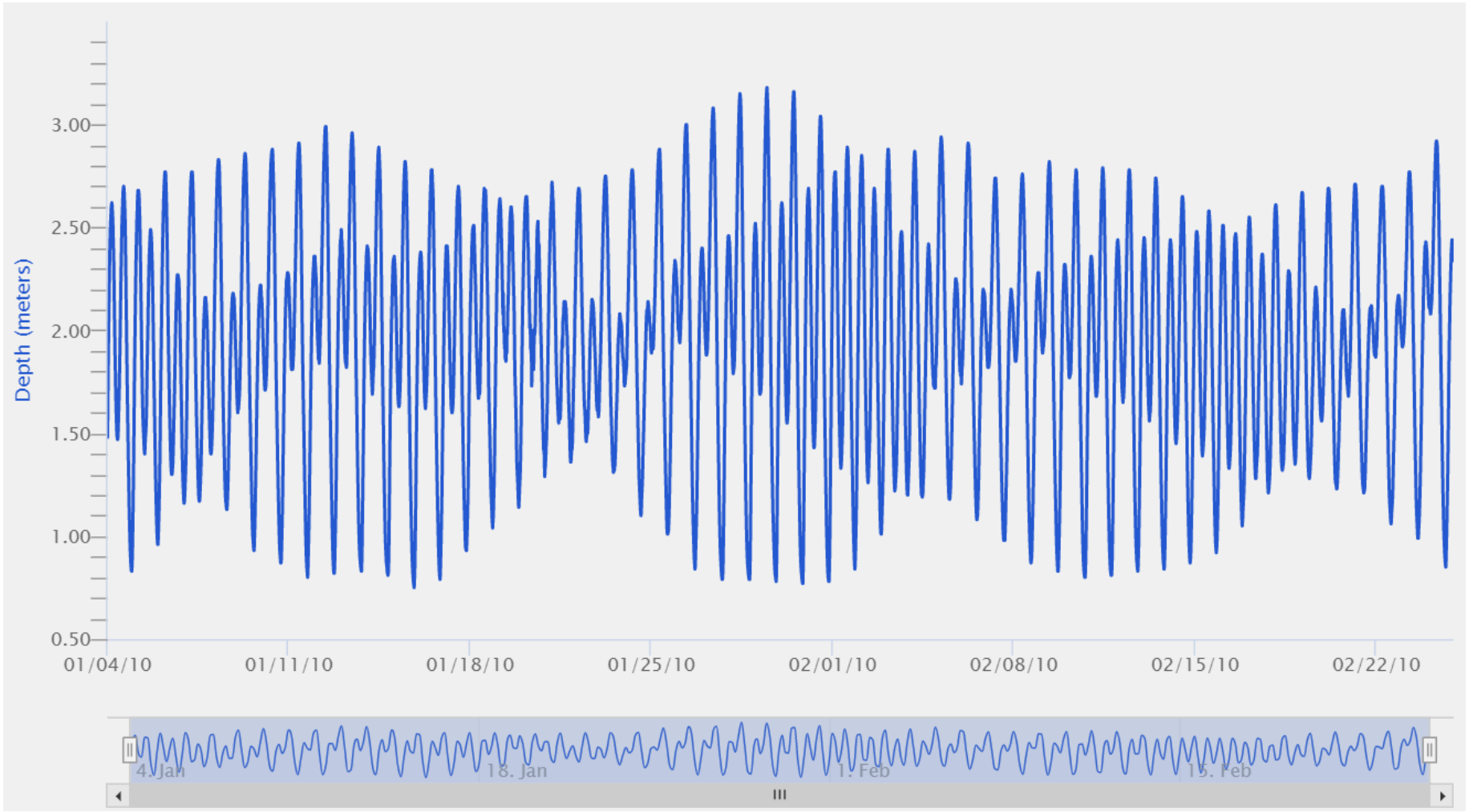


EMPTY

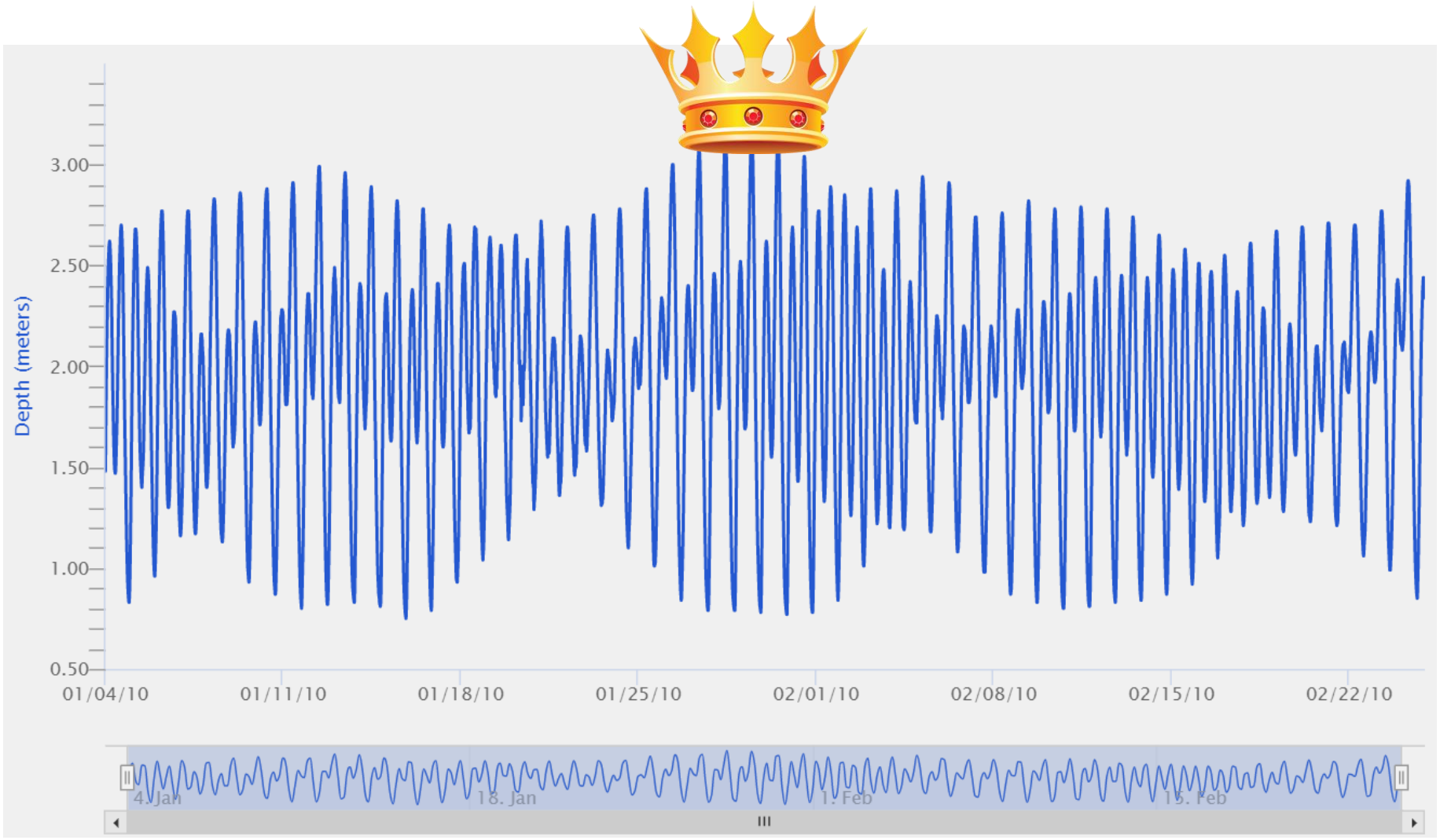




(Food for thought…)



Should the highest high tides be…



Should the highest high tides be… **King?**

Or could another word of distinction better represent the highest high tides?

Extreme tide

Super tide

Highest tide

Supreme tide

Maximum tide

_____ *Fill in the blank*

Monster tide

Cast your vote by following the link in the chat box