

Strategic Placement Project Key Stakeholders Presentation

**June 7, 2016
9:30 AM – 12:00 PM**

US Army Corps of Engineers, San Francisco District
1455 Market Street, Lobby Conference Room
San Francisco, CA 94103

Meeting Purpose:

- Develop a shared understanding of the Strategic Placement Project;
- Explore opportunities for sediment placement and constraints; and
- Identify opportunities for future engagement through the project's completion.

AGENDA

9:30 Presentation

Introduction and Purpose of the Project

Drivers for Increasing Sediment at Salt Marshes

Concepts Investigated for Strategic Placement

Developing a Framework for Strategic Placement

Three Scenarios for Discussion

Logistics and Permitting Considerations

10:45 Discussions

Breakout Groups

Group Discussion and Questions

11:50 Wrap-up

12:00 Adjourn

List of invitees, driving directions and public transportation options are described on the back page.

Meeting Invitees

Name	Organization	Name	Organization
Arn Arreberg	California Department of Fish and Wildlife	John Lazorik	Valero
Sara Azat	NOAA Fisheries	David Lewis	Save the Bay
John Bourgeois	State Coastal Conservancy	Carol Mahoney	Zone 7 Water Agency
Beth Christian	San Francisco Bay Regional Water Quality Control Board	Anne Morkill	U.S. Fish and Wildlife Service
John Coleman	Bay Planning Coalition	Becky Ota	California Department of Fish and Wildlife
Naomi Feger	San Francisco Bay Regional Water Quality Control Board	Al Paniccia	U.S. Army Corps of Engineers, San Francisco District
Matt Gerhart	State Coastal Conservancy	Brian Ross	U.S. Environmental Protection Agency
Mike Giari	Port of Redwood City	Barbara Salzman	Marin Audubon Society
Brenda Goeden	San Francisco Bay Conservation and Development Commission	Tim Sloane	Institute for Fisheries Resources
Andy Gunther	Center for Ecosystem Management and Restoration	Kim Squires	U.S. Fish and Wildlife Service
Jim Haussener	California Marine Affairs and Navigation Conference	Jim Starr	California Department of Fish and Wildlife
Carin High	Citizens Committee to Complete the Refuge	Gary Stern	NOAA Fisheries
Marc Holmes	The Bay Institute	Caitlin Sweeney	San Francisco Bay Regional Water Quality Control Board
Chris Huitt	California State Lands Commission	Kim Turner	U.S. Fish and Wildlife Service
Beth Huning	San Francisco Bay Joint Venture	Ian Wren	San Francisco Baykeeper

Driving Directions ([map](#))

From 80 East/Bay Bridge: Take Exit 1C toward Civic Center. Slight left on to Harrison Street. Right on 9th Street. Left on Market Street.

From 101 South/Golden Gate Bridge: Stay on 101 into the city. Right on Scott Street. Left on Bush Street. Right on Gough Street. Left on Fell Street. Right on Market Street. (Multiple alternate routes exist, also.)

From 101 North/South Bay: Take exist 434A toward Golden Gate Bridge. Continue on to 101N/Mission Street. Slight left on to South Van Ness Avenue. Right on Market Street.

Parking is available at a number of nearby lots.

Public Transit ([511 Transit Trip Planner](#))

From BART: On southbound Daly City/Millbrae train, exit at Civic Center station and walk southwest on Market Street to destination. ([BART Schedules by Line](#))

From Muni: Closest stop is Market Street and South Van Ness Avenue.

Framework for Strategic Placement of Dredged Sediment to Naturally Accrete in Salt Marsh Systems

Key Stakeholders Presentation

June 7, 2016

Welcome & Introductions

- * Craig Conner, USACE (Technical Point of Contact)
- * Barbara McDonnell, MWH
- * Alex Biering, MWH
- * Tasmin Brown, MWH
- * Jeremy Lowe, San Francisco Estuary Institute
- * Amy Richey, San Francisco Estuary Institute

Agenda

- * **Presentation** **9:30 AM**
 - * Introduction and Purpose of the Project
 - * Drivers for Increasing Sediment at Salt Marshes
 - * Concepts Investigated for Strategic Placement
 - * Developing a Framework for Strategic Placement
 - * Three Scenarios for Discussion
 - * Logistics and Permitting Considerations
- * **Discussions** **10:45 AM**
 - * Breakout Discussions
 - * Group Discussion and Questions
- * **Wrap Up** **11:50 AM**
- * **Adjourn** **12:00 PM**

Meeting Goal

- * Develop a shared understanding of the Strategic Placement Project;
- * Explore opportunities for sediment placement and constraints; and
- * Identify opportunities for future engagement through the project's completion.

Definition of “Strategic Placement”

“Increasing sediment accretion on marshes by purposefully placing sediment in strategic locations.”

Why Consider Strategic Placement?

We must find a sustainable and feasible method to use Bay-wide to meet the needs of marshes and other functional landscapes.



Sediment is a valuable resource that can improve/restore marsh functionality and resiliency to sea level rise.



Dredging is necessary for the economic vitality of the San Francisco Bay Area.



Strategic placement of dredged material is one potential method for beneficially using dredged material to sustain marshes and mudflats.

Overarching Question of the Project

Whether, where, when, and how could placement of dredged sediment allow natural processes to augment accretion of marshes in an ecologically and economically prudent manner?

Purpose of the Strategic Placement Project

Goals:

- * Identify methods and locations that will help restore and enhance the sustainability of salt marsh systems.
- * Identify potential impacts on SF Bay ecosystems and dredging operations.
- * Characterize compliance, permitting, and planning issues.
- * Develop a Framework Document to guide future efforts.

Key Project Information

- * Initiated October 2015.
- * Consultant team includes MWH and the San Francisco Estuary Institute.
- * Supports the LTMS target goal to achieve 40 percent beneficial reuse of dredged material.
- * Leverages lessons learned from similar projects in Southern California, the Gulf Coast, and the East Coast.
- * Follows recommendations made by the Science Update of the Baylands Ecosystem Goals Project.

Project Participation

Long Term Management Strategy Agencies



Resource Agencies



Scientific
Expertise
and Input

Key Stakeholders
and
General Public

Technical
Understanding,
Perspectives,
and Feedback

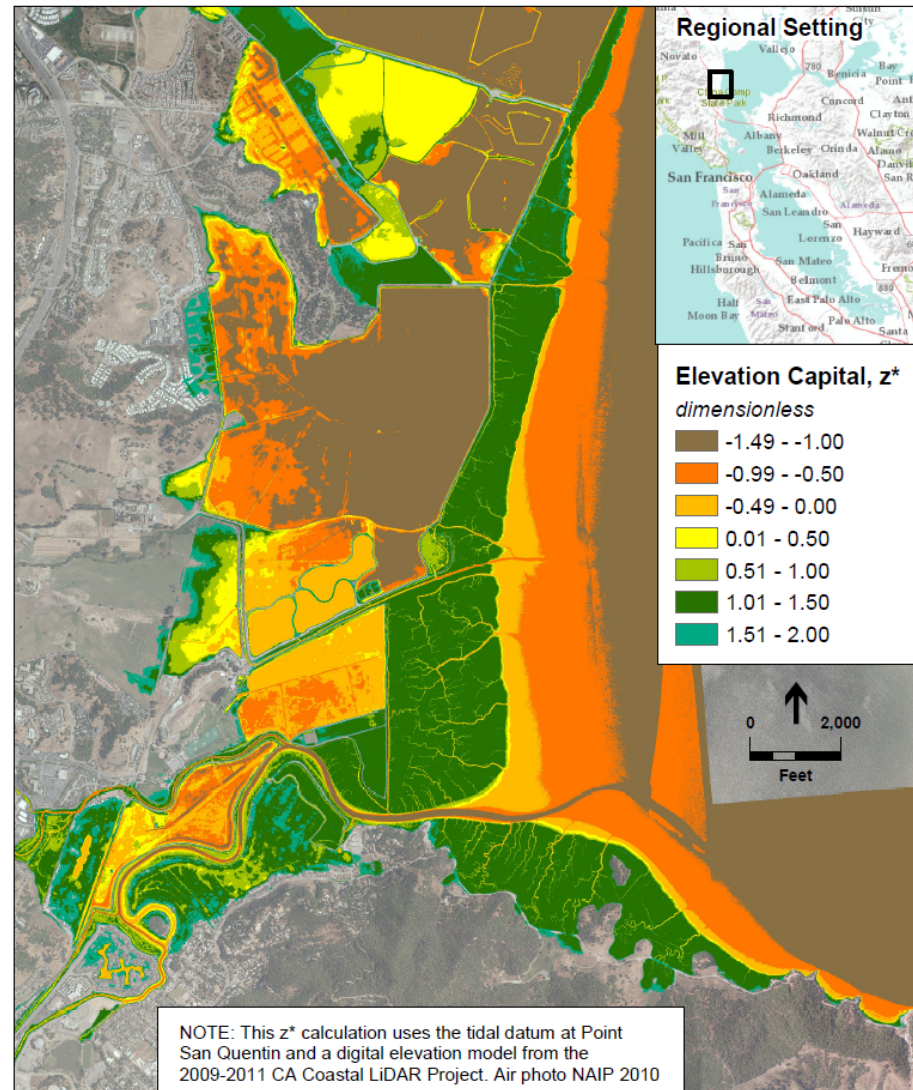
Drivers for Increasing Sediment at Marshes

Key Drivers

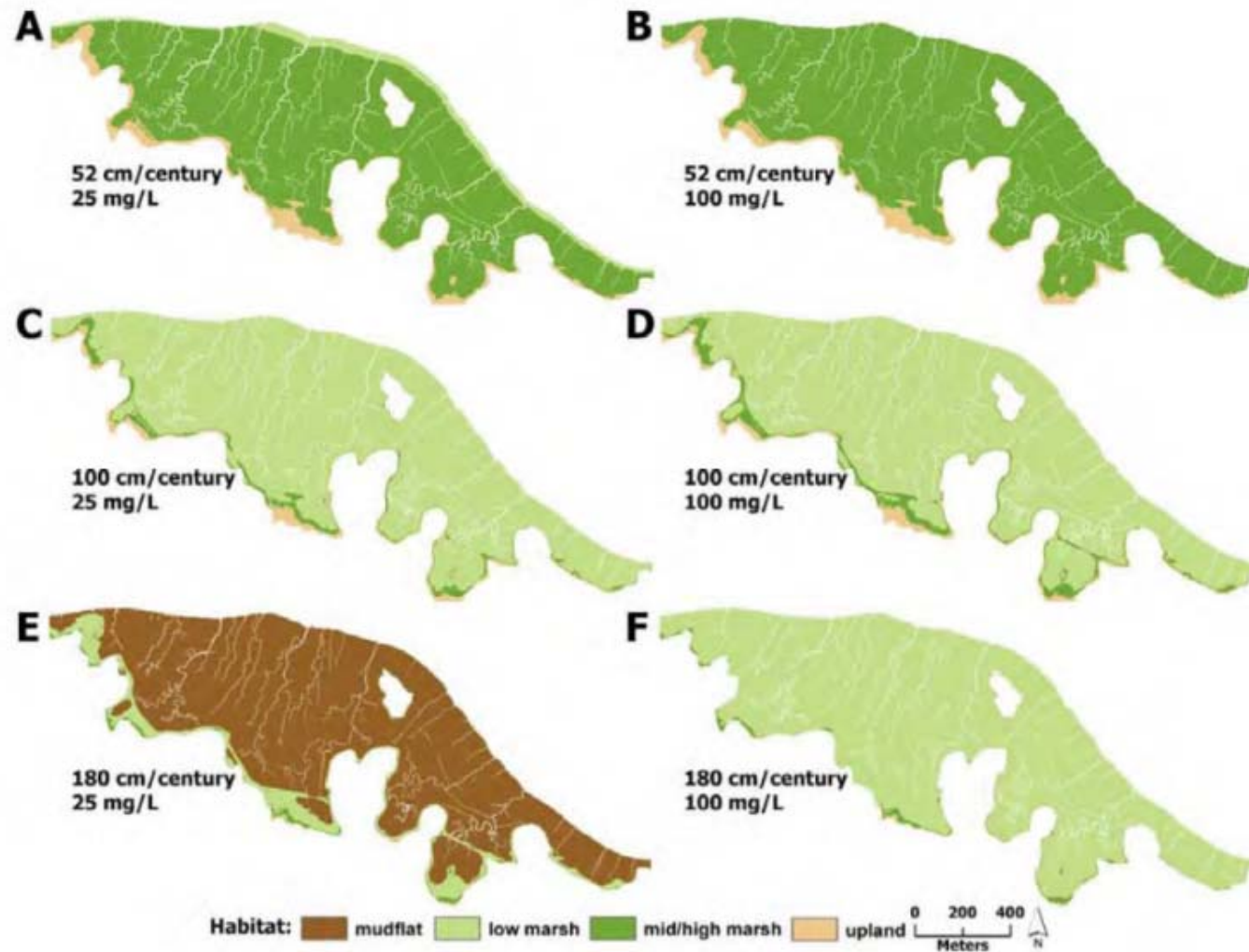
- * Trends anticipated by century's end suggest the supply of sediment to marshes will not keep pace with sea level rise.
- * The Baylands Goals Ecosystem Habitat Project identified the problem, solutions, and a timeline.
- * Resiliency planning is, increasingly, a region-wide focus in the Bay Area.

Elevation Capital

- * Compare absolute elevation of a marsh with the local water levels and tide range.
- * Dark green are marsh elevations.
- * Yellow, orange and brown are below marsh elevation.



Elevation Trends at China Camp



From Schile et al. (2014)



Regional Recommendations

- 1 **Restore estuary-watershed connections.**
 - Realign some stream courses where necessary and feasible to restore natural sediment-delivery processes
 - **Identify ways to increase the availability of watershed sediment to tidal marshes and mudflats**
 - **Use suitable sediment from various sources (excavated or dredged) for baylands restoration and management**
 - Identify and implement opportunities for taking advantage of treated wastewater and stormwater to create salinity gradients and maximize peat accumulation in the baylands, while protecting water quality and minimizing nutrient loads.
- 2 Design complexity and connectivity into the Baylands landscape.
- 3 Restore and conserve complete tidal wetlands systems.
- 4 Restore Baylands to full tidal action prior to 2030.
- 5 **Plan for the Baylands to migrate.**

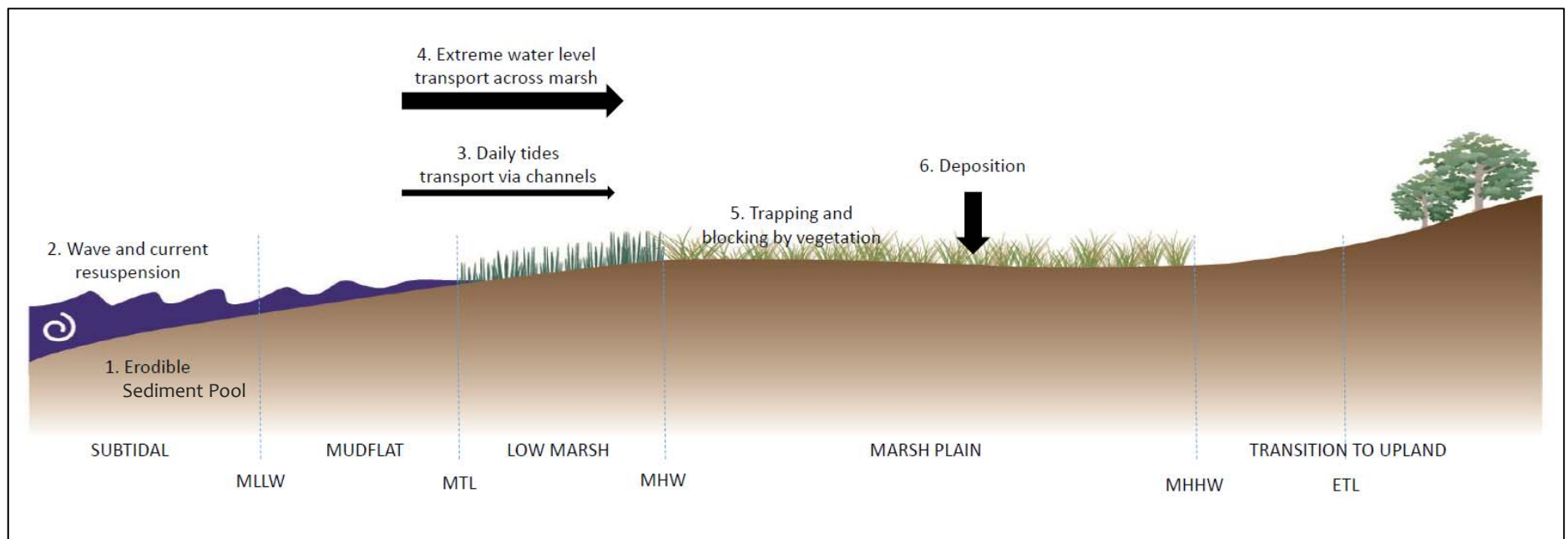
Increased Investments in Resiliency Planning

- * Regional dialogue – **BAECCC, CHARG**
- * Vulnerability and Adaptation Planning, e.g.
 - * BCDC's **Adapting to Rising Tides (ART)** Project
 - * Marin's **BayWAVE**
 - * San Mateo's **SeaChange**
- * City of San Francisco's **Sea Level Rise Action Plan**:
 - * **Accommodate** (raise or waterproof assets in place)
 - * **Protect** (create natural or engineered barriers)
 - * **Retreat** (relocate sensitive assets to low-risk areas)
- * Measure AA, "**Clean and Healthy Bay**":
 - * Parcel tax to fund \$500 million over 20 years



Concepts Investigated for Strategic Placement

Physical Processes



Spatial Impacts

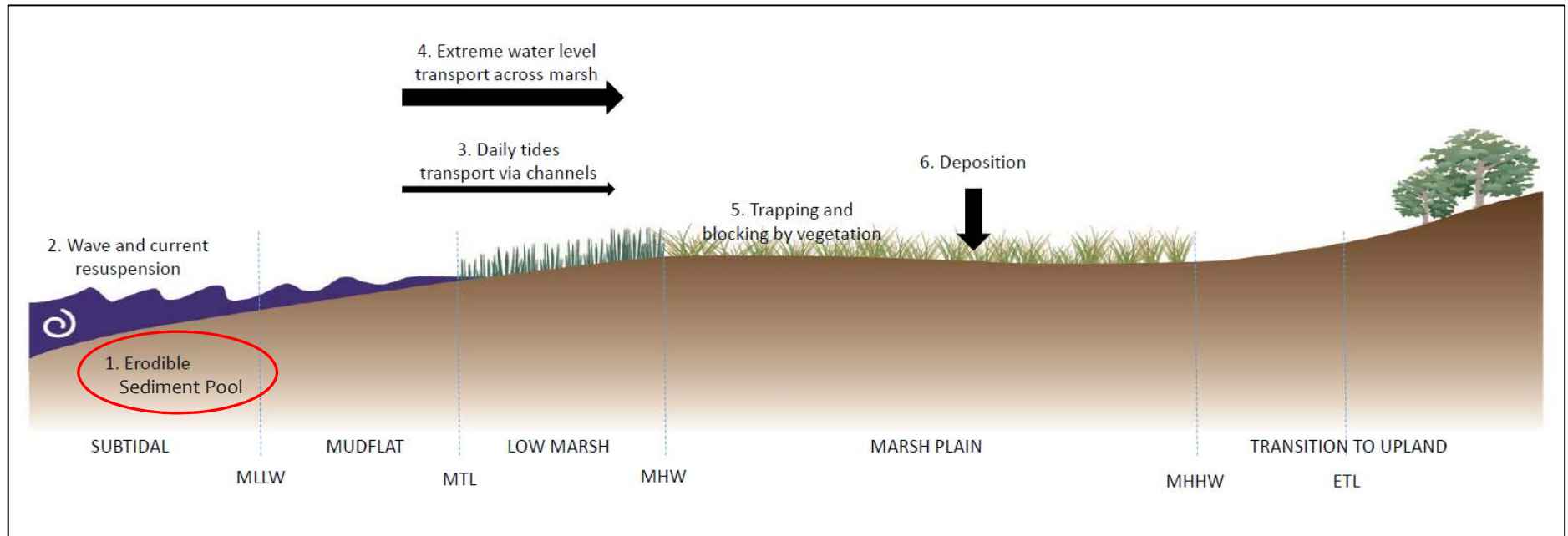
Actions	Channel Placement		
	Mudflat Placement		
			Rainbowing
			Piped Slurry
Effects	Increased Suspended Sediment Concentration and Turbidity		
	Contaminant Re-suspension		
	Inappropriate Sediment Type		
	Burial		
Consequences		least tern	
		shorebirds	
		diving ducks	dabbling ducks
	pelagic fishes		tidal marsh mammals
	demersal fishes		tidal marsh rails
	phytoplankton		tidal marsh passerines
	eelgrass		marsh vegetation
	benthic macroalgae		
		benthic microalgae	
		benthic macrofauna	
Location	Water Column/Subtidal	Intertidal/Mudflat	Marsh

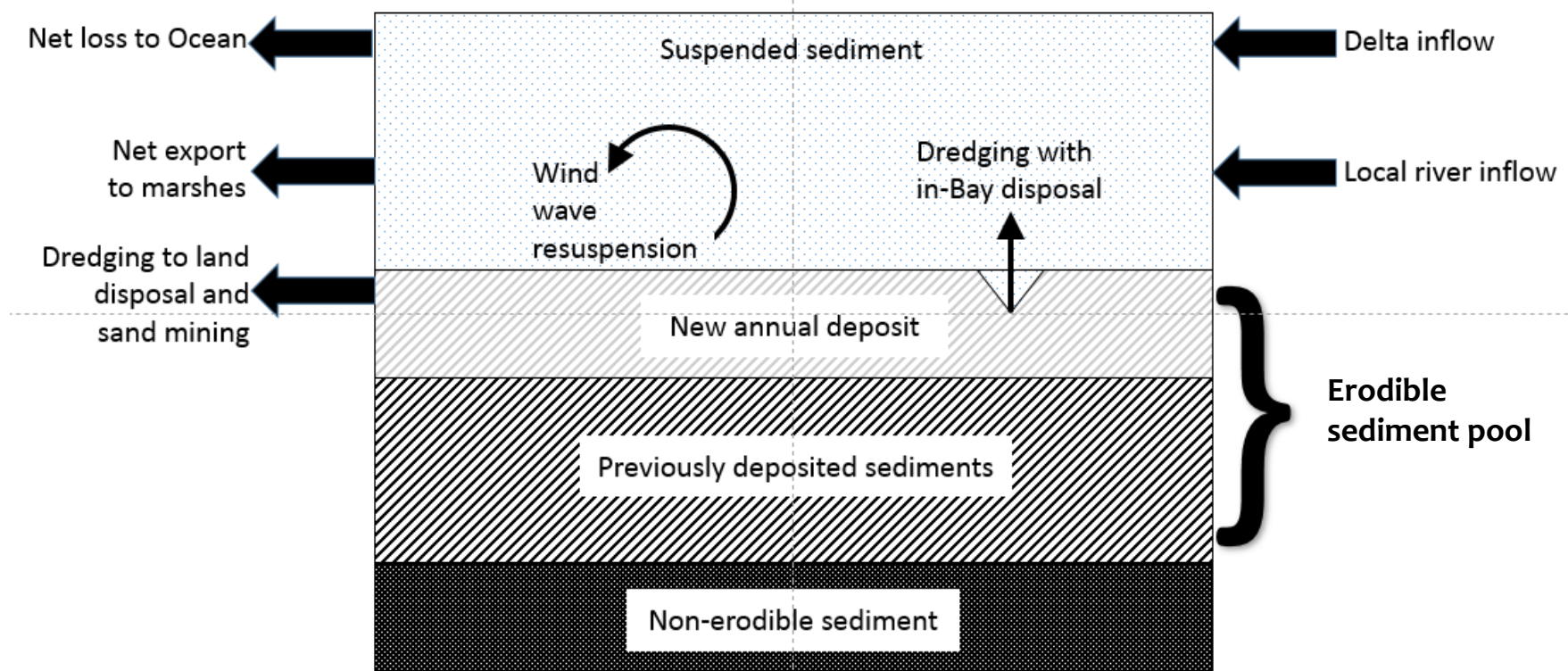
Temporal Impacts

	Species	Sensitive life history stage	J	F	M	A	M	J	J	A	S	O	N	D
<i>Birds</i>	California Least Tern	Breeding season												
	Northern pintail	wintering habitat use												
	Canvasback	wintering habitat use												
	Ruddy duck	wintering habitat use												
	Surf scoter	wintering habitat use												
	Mallard	Flightless period during molt												
	Mallard	Juvenile flightless period												
	Gadwall	Flightless period during molt												
	Gadwall	Juvenile flightless period												
	Northern pintail	Flightless period during molt												
	Northern pintail	Juvenile flightless period												
	Lesser scaup	wintering habitat												
	Western sandpiper	spring migration stopover												
	American avocet	Breeding season												
	California Ridgway's Rail	Breeding season												
	Salt marsh song sparrow	Breeding season												
<i>Fishes and benthic invertebrates</i>	Chinook salmon	Peak adult migration												
	Chinook salmon	Peak juvenile estuarine emigration												
	Pacific herring	Spawning												
	Pacific herring	Larval hatching and development												
	Delta smelt	Juvenile development occurs in brackish water including Suisun												
	Longfin smelt	Spawning season												
	Green sturgeon	Juvenile presence in bay												
	Native oysters	Larval disbursement period												
<i>Mammals</i>	Salt Marsh Harvest Mouse	Reproductively active period												

	Benthos	Eelgrass Beds	Water Column/Subtidal	Mudflat	Marsh
--	---------	---------------	-----------------------	---------	-------

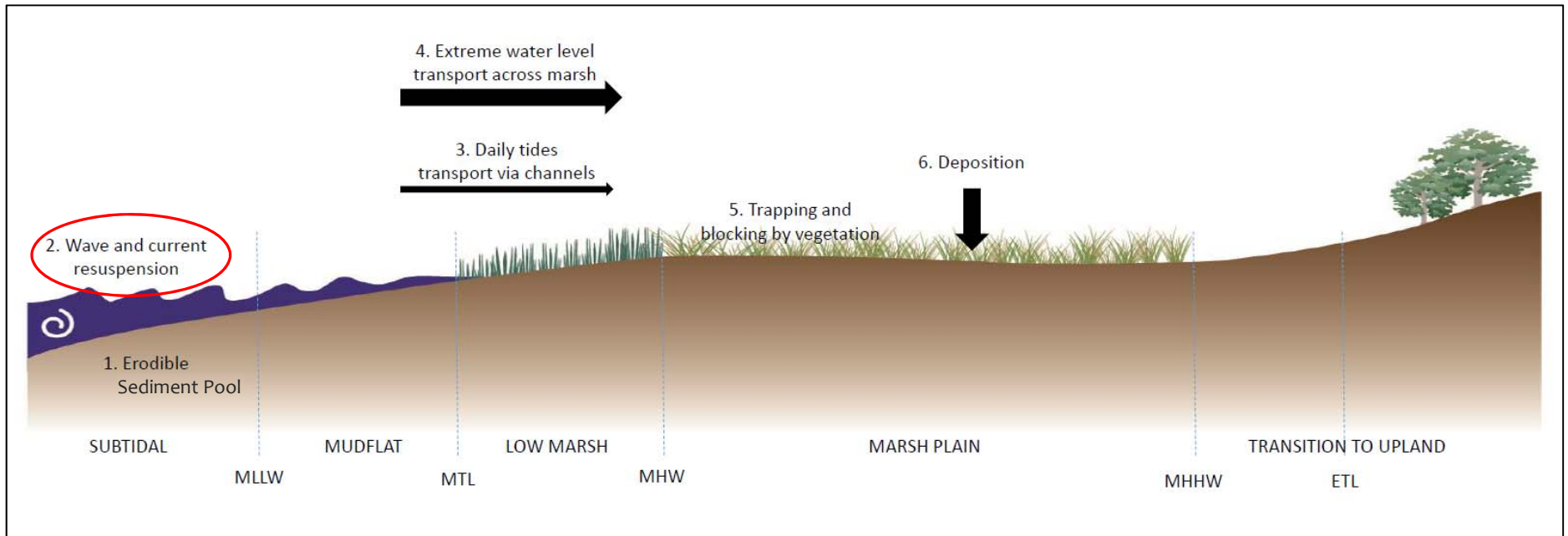
1. Erodible Sediment Pool

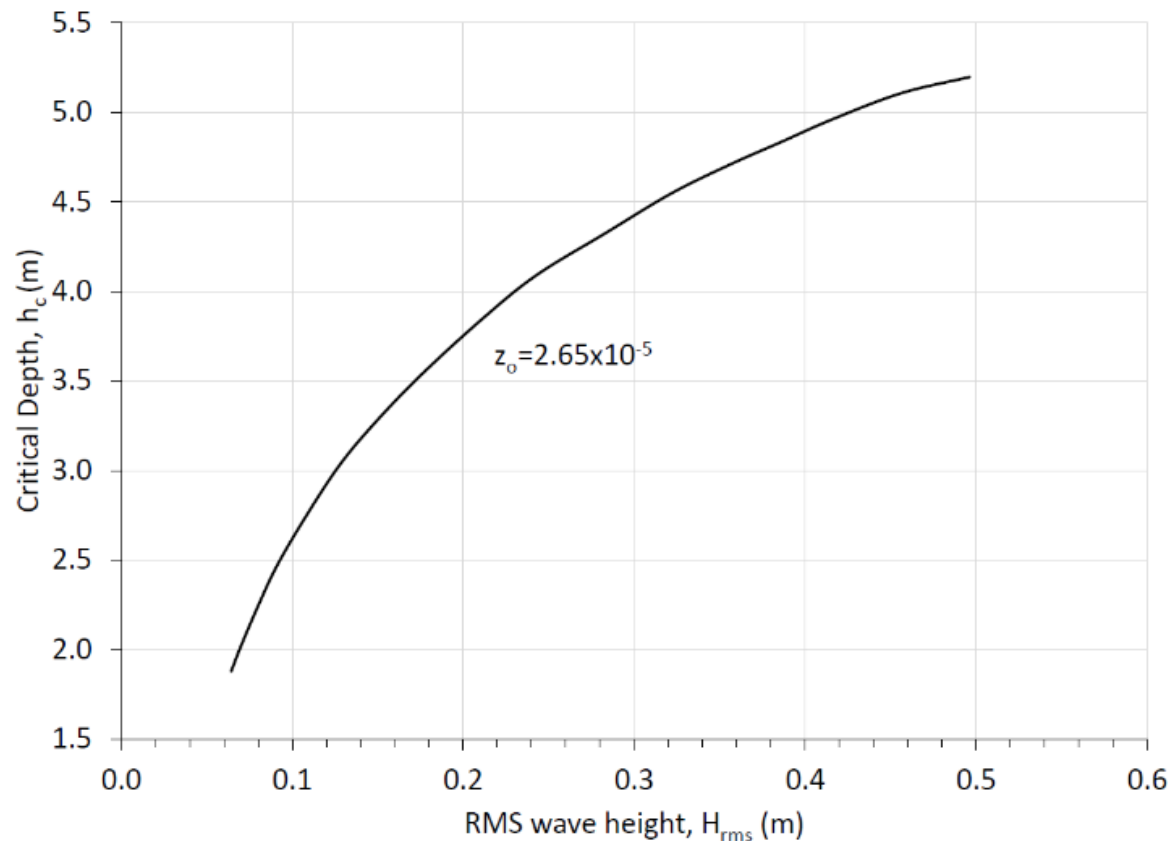




- * **Opportunities:** Replenish the erodible sediment pool; timing and volume less restricted
- * **Constraints:** Placement impacts in shallow water: burial, sediment texture, turbidity and SSC
- * **Uncertainty:** Connection between erodible sediment pool and marsh

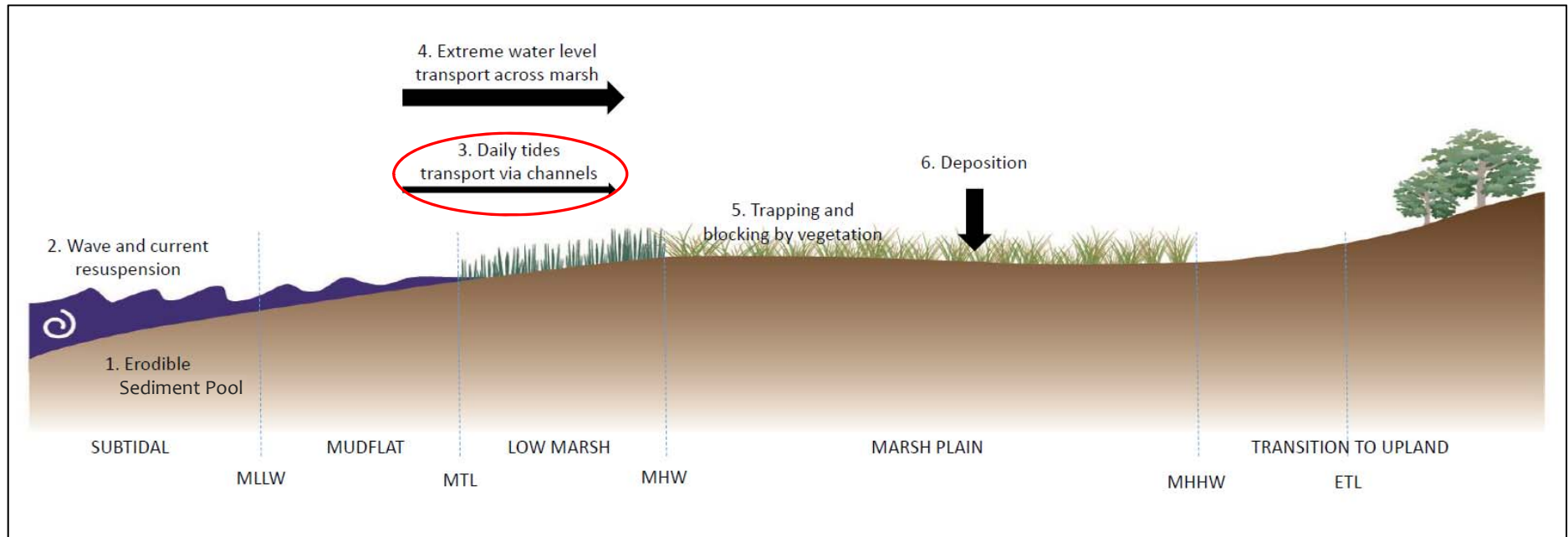
2. Wave and Current Resuspension

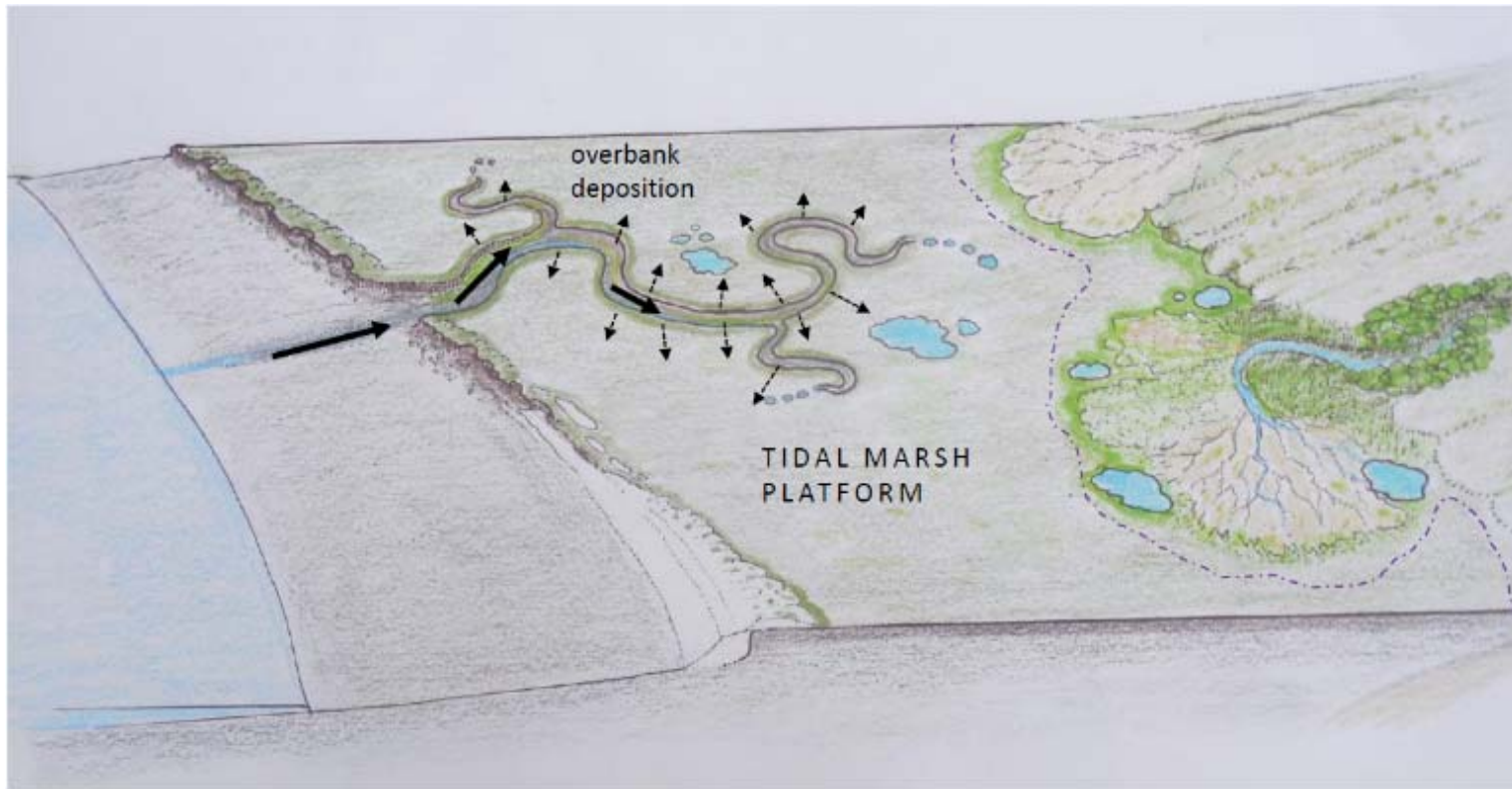




- * **Opportunities:** Place sediment at subtidal locations where there is sufficient wave energy for resuspension
- * **Impacts:** May increase the local SSC and turbidity but limited by wave energy
- * **Uncertainty:** Prediction of resuspension events

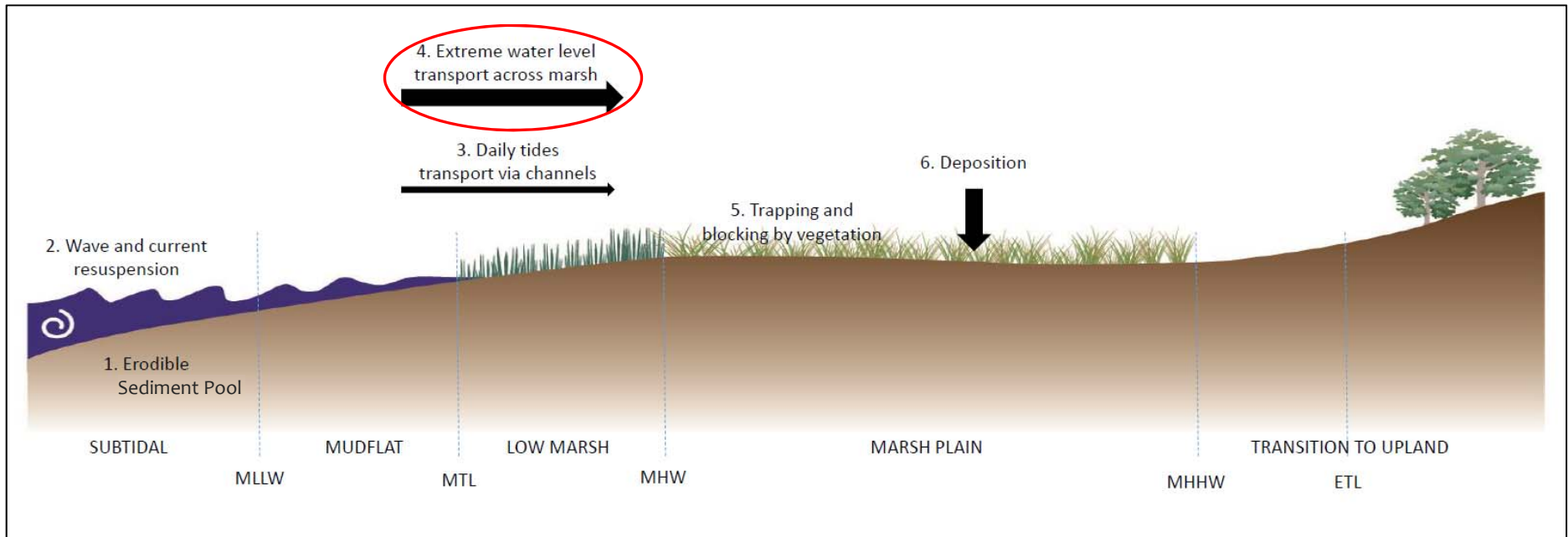
3. Transport by Daily Tides

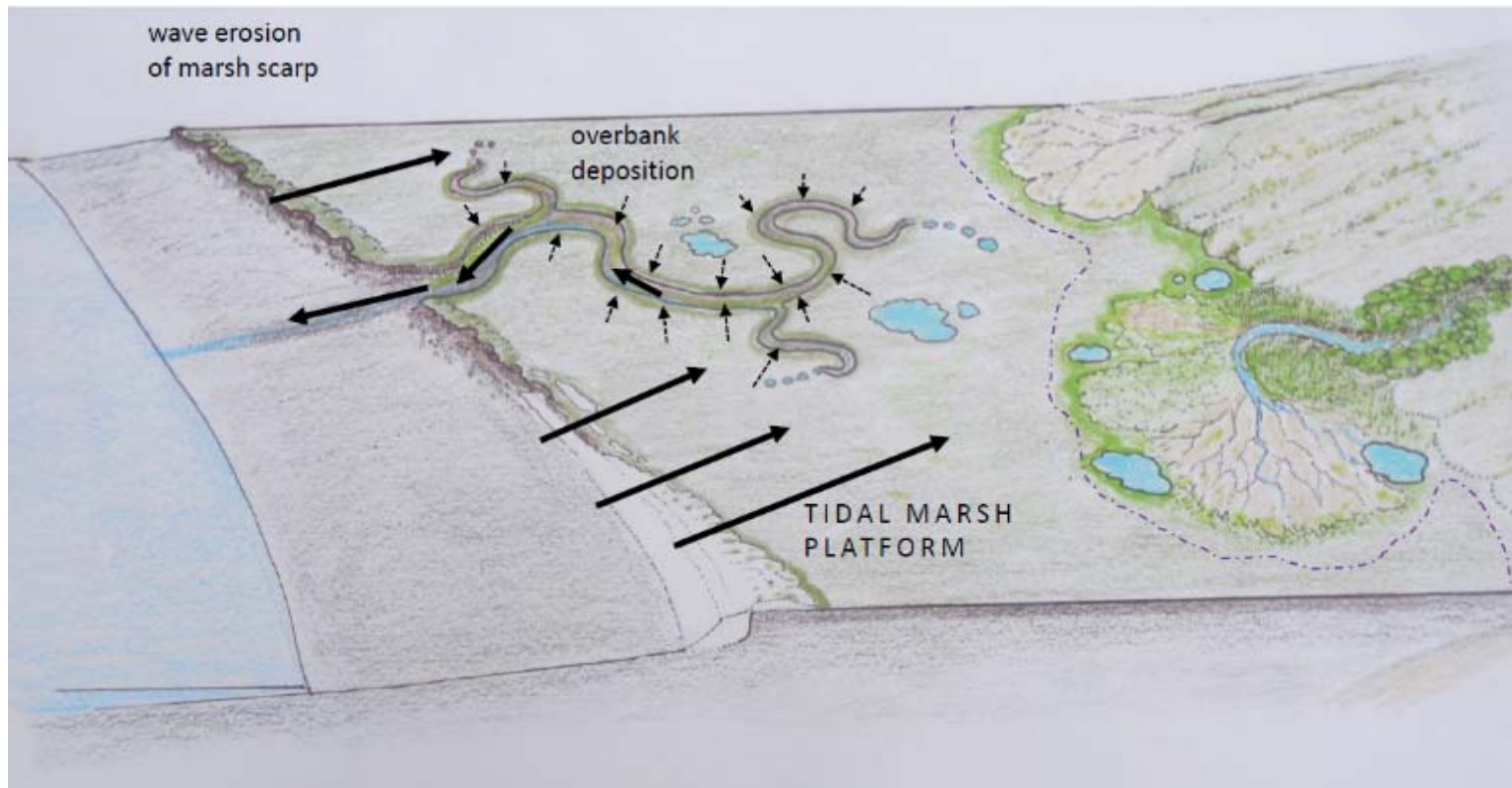




- * **Opportunities:** Place close to channel mouths; supports topographic diversity
- * **Impacts:** Higher SSC more often, lasting longer in the year; channel filling
- * **Uncertainty:** Excursion length for individual tidal channels

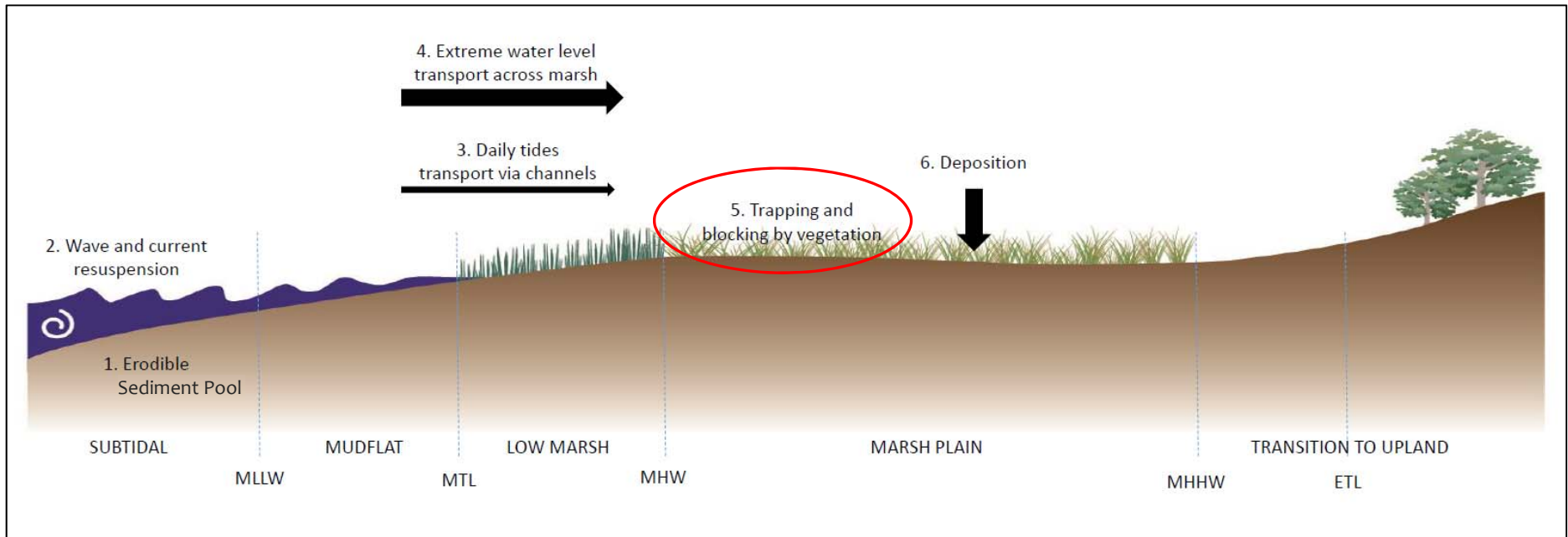
4. Transport by Extreme Tides





- * **Opportunities:** Resuspension over a larger area; events associated with higher accretion rates; reaches all parts of the marsh
- * **Impacts:** Higher SSC more often, lasting longer in the year
- * **Uncertainty:** What is the critical storm surge that separates marsh erosion and accretion?

5. Trapping and Blocking

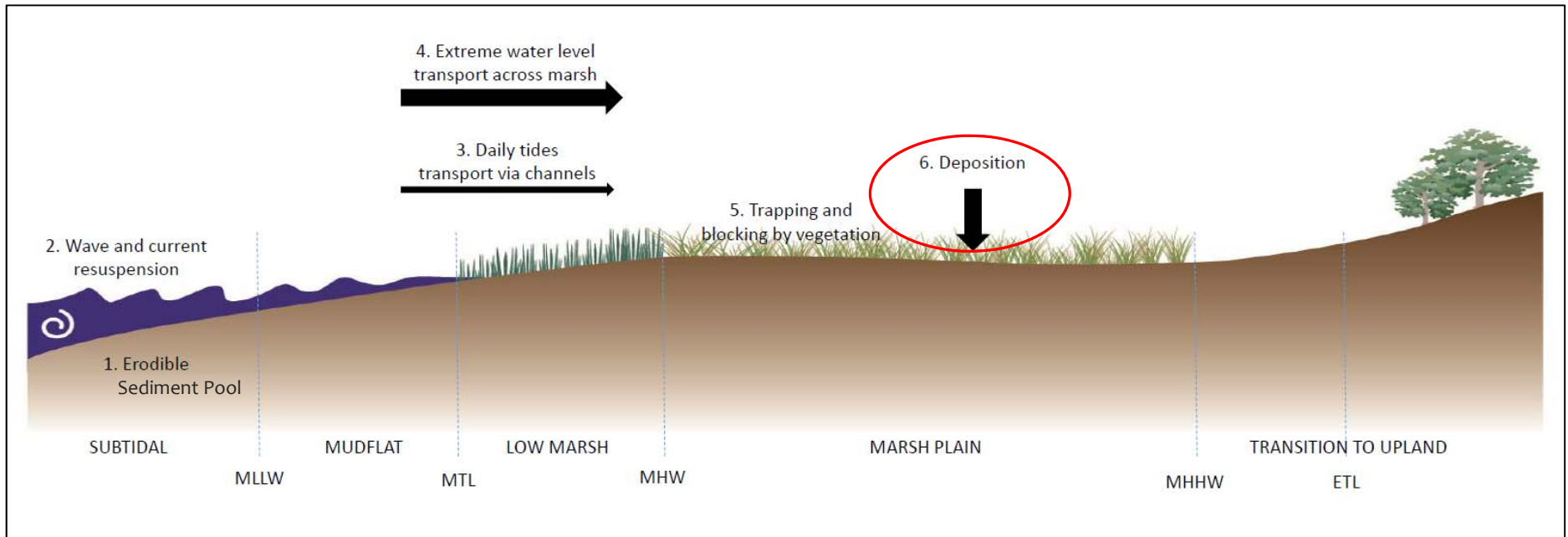


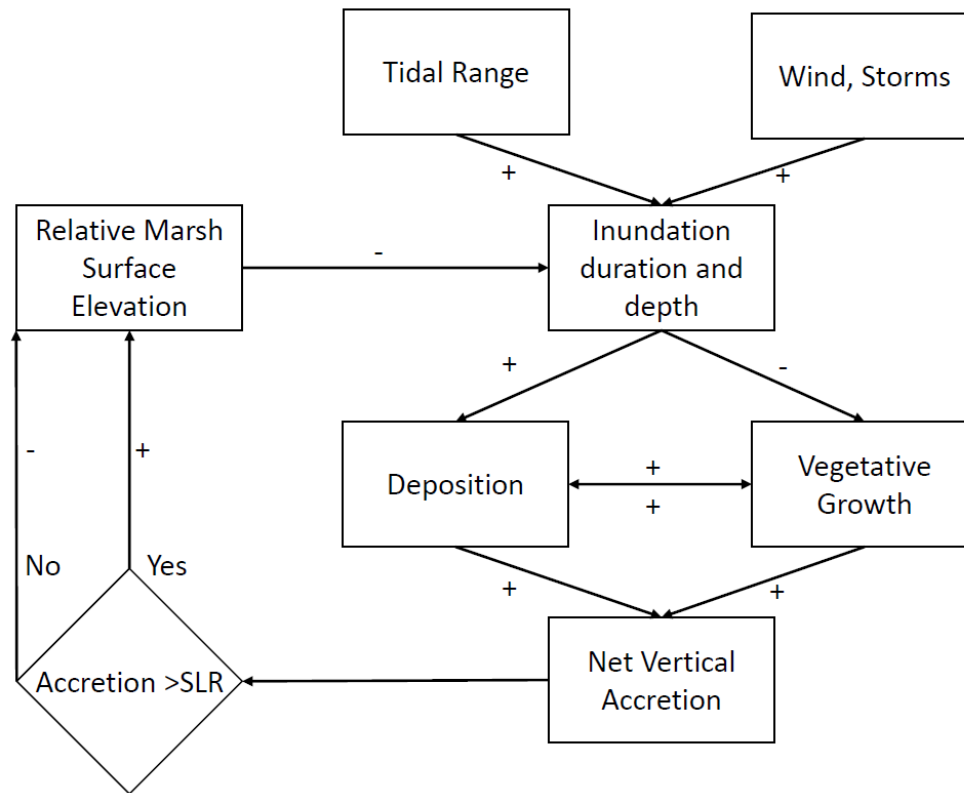


Mark C. Marvin-DiPasquale, USGS

- * **Opportunities:** Marsh vegetation is good at trapping and retaining sediment; structures to increase trapping only necessary if poor vegetation cover
- * **Impacts:** Structures may have long term impacts on marsh
- * **Uncertainties:** How to determine the trapping efficiency of an unvegetated area

6. Deposition





- * **Opportunities:** Use thin-layer placement if the marsh has a low equilibrium elevation or sparse vegetation cover
- * **Impacts:** Burial of marsh vegetation; flattening of topography
- * **Uncertainties:** Equilibrium elevation of marshes? Where, how much and how often to place?

Developing a Framework for Strategic Placement

Framework Document

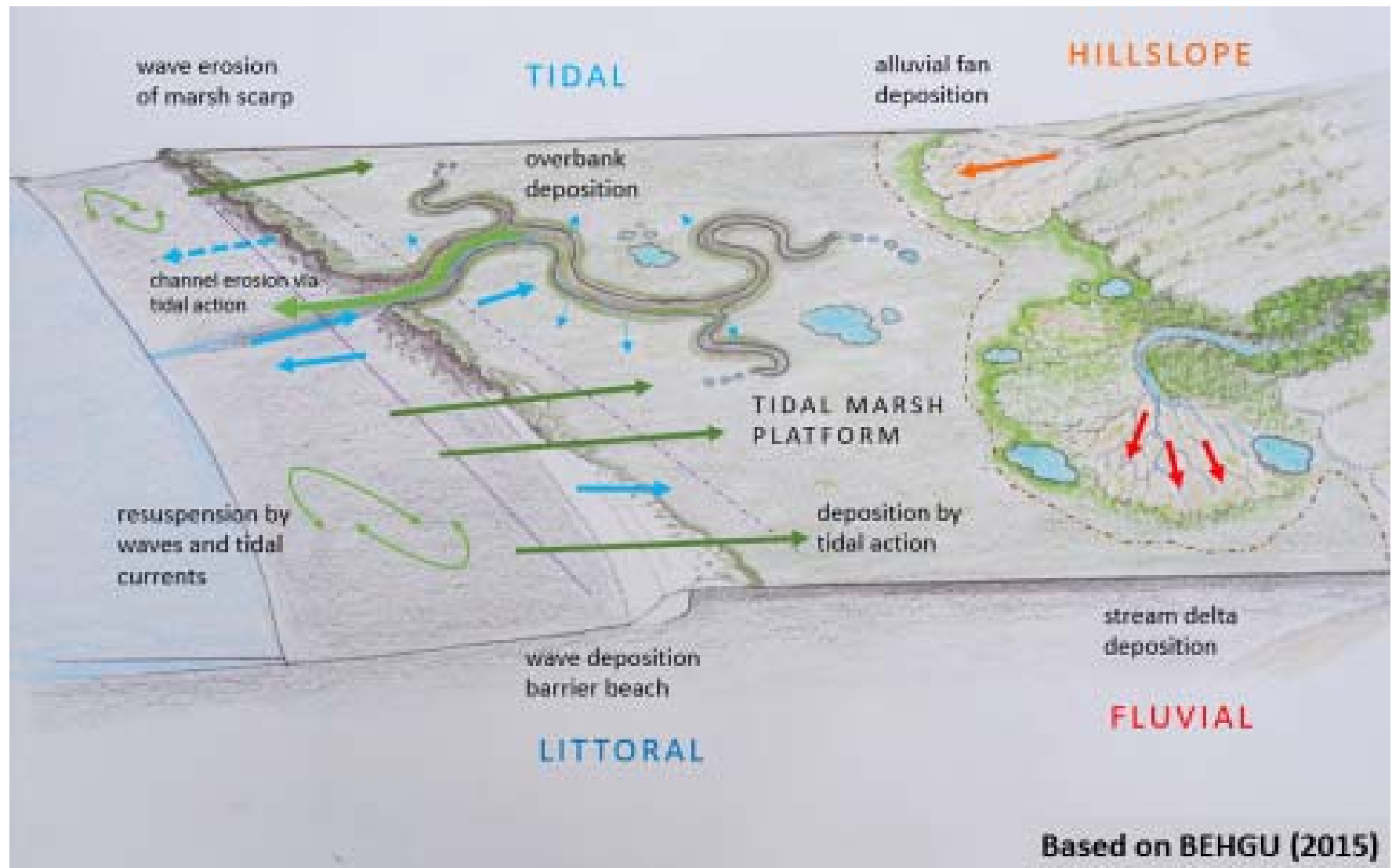
- * Describes what's necessary to incorporate shallow water or thin-layer placement in the Bay.
- * Identifies unknowns needing research to reduce uncertainty.
- * Addresses critical questions:
 - * Where can this be done in the Bay?
 - * What are the potential adverse effects?
 - * What are the compliance issues?
 - * How much of the sediment need can be met?
 - * How much of the dredged material can be handled this way?
 - * How could this affect dredging operations?

Three Scenarios for Discussion

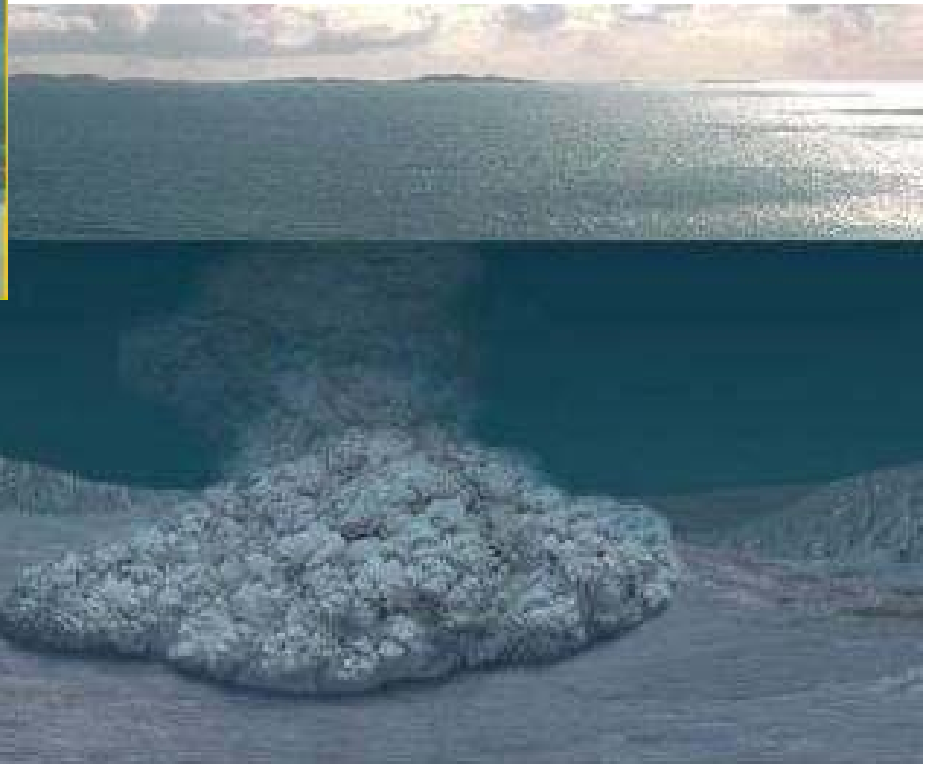
Questions for Each Scenario

- * What can we learn from physical and ecological processes to help design projects to augment or emulate accretion?
 - * Identify opportunities and constraints
 - * Identify unknowns and uncertainties
 - * Identify potential placement sites, timing, frequency, quantities
 - * Scaling up issues – frequency, volumes

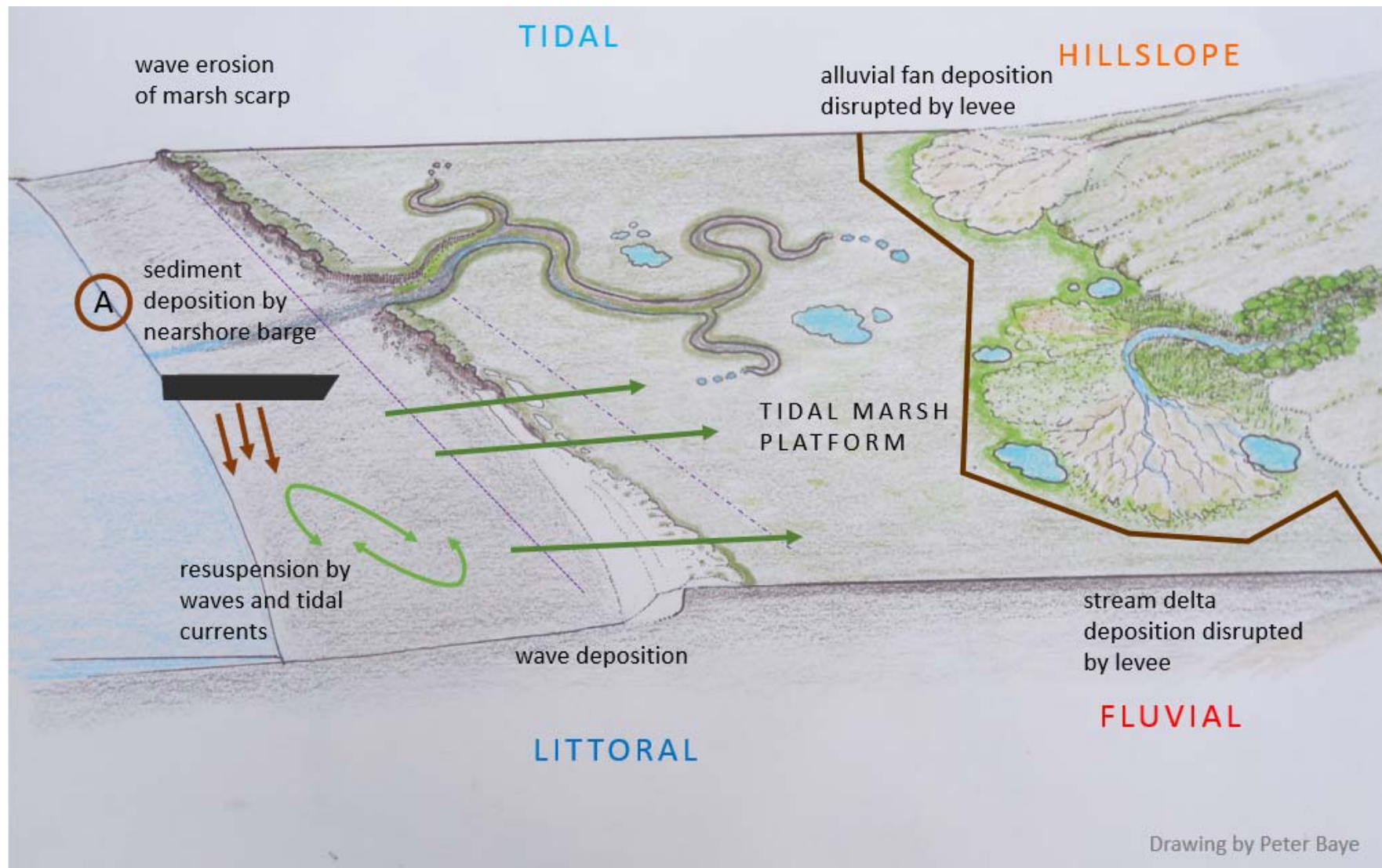
Natural Placement



A. Shallow Water Placement



A. Shallow Water Placement





- * Place sediment in adjacent shallows any time of year from low water to wave base; large volume dispersed over a large area
- * Remobilized during periods of wave activity, especially at low water; SSC limited by wave energy
- * Transported into marsh by flood tides through breaches

B. Thin-layer Placement: Water Column Seeding



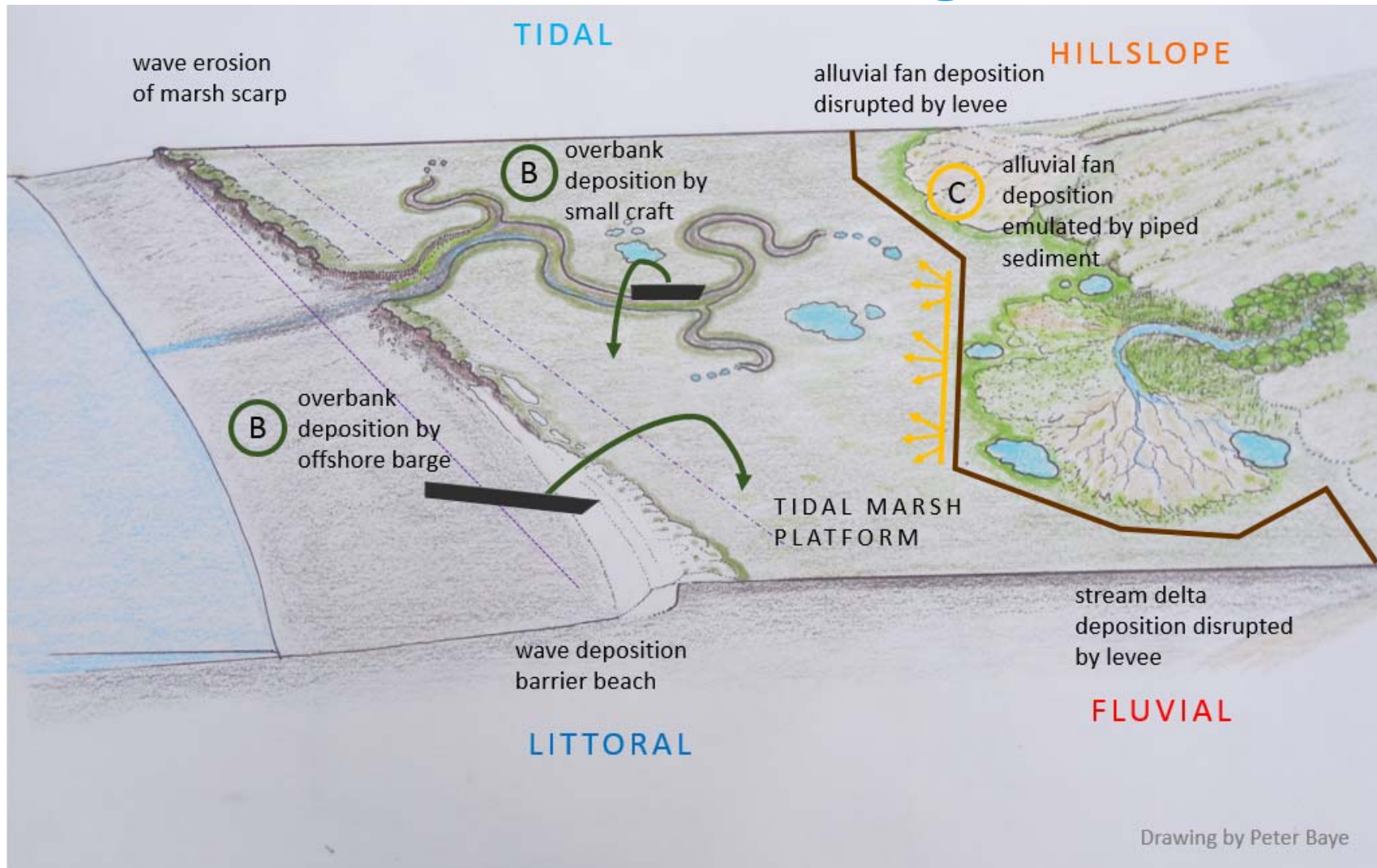


- * Mix sediment into water column on marsh; SSC managed by volume mixed
- * Offloading has to be coordinated with flood tides
- * Two alternatives to distribute over marsh: manifold or tidal flows

C. Thin-layer Placement: Marsh Spraying



C. Thin-layer Placement: Marsh Spraying

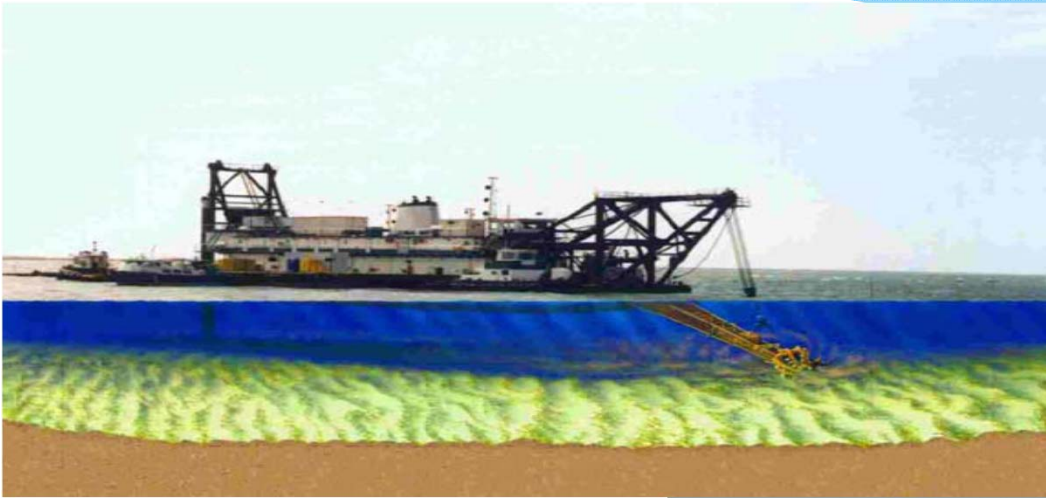




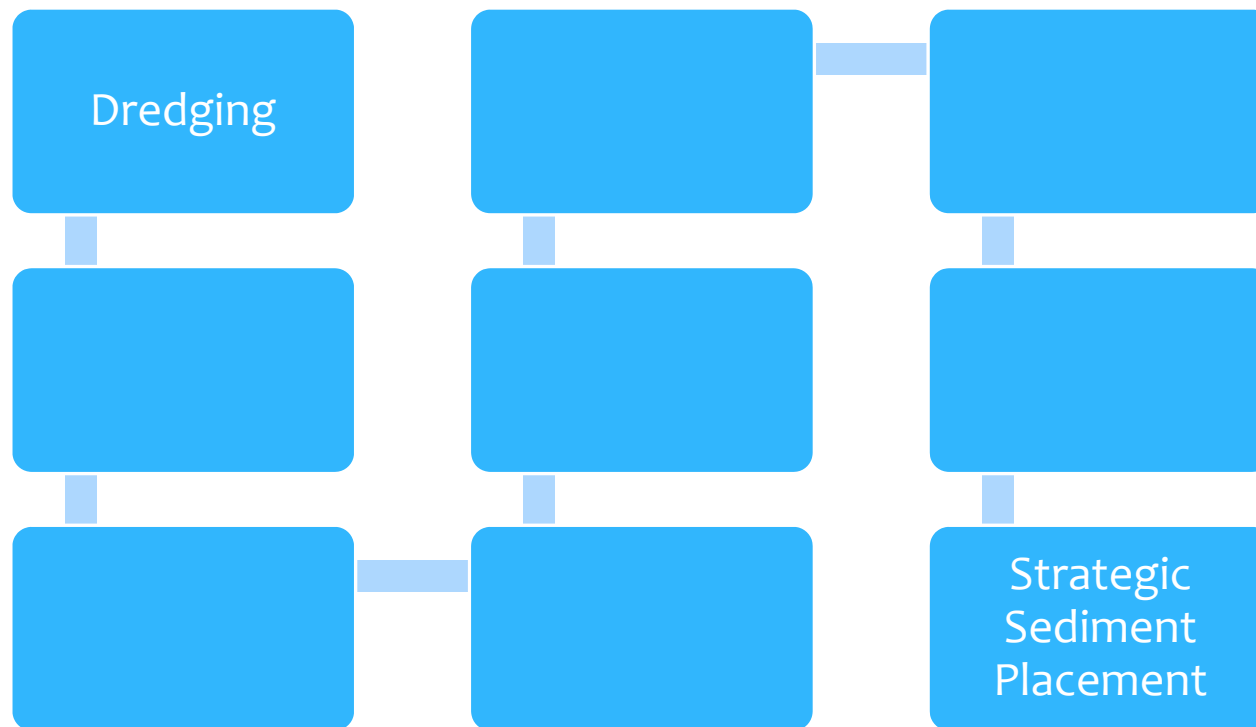
- * Spray sediment directly on to marsh
- * Offloading does not have to be coordinated with flood tides
- * Two alternatives to distribute over marsh: from pipe or from barge depending upon access

Logistics and Permitting Considerations

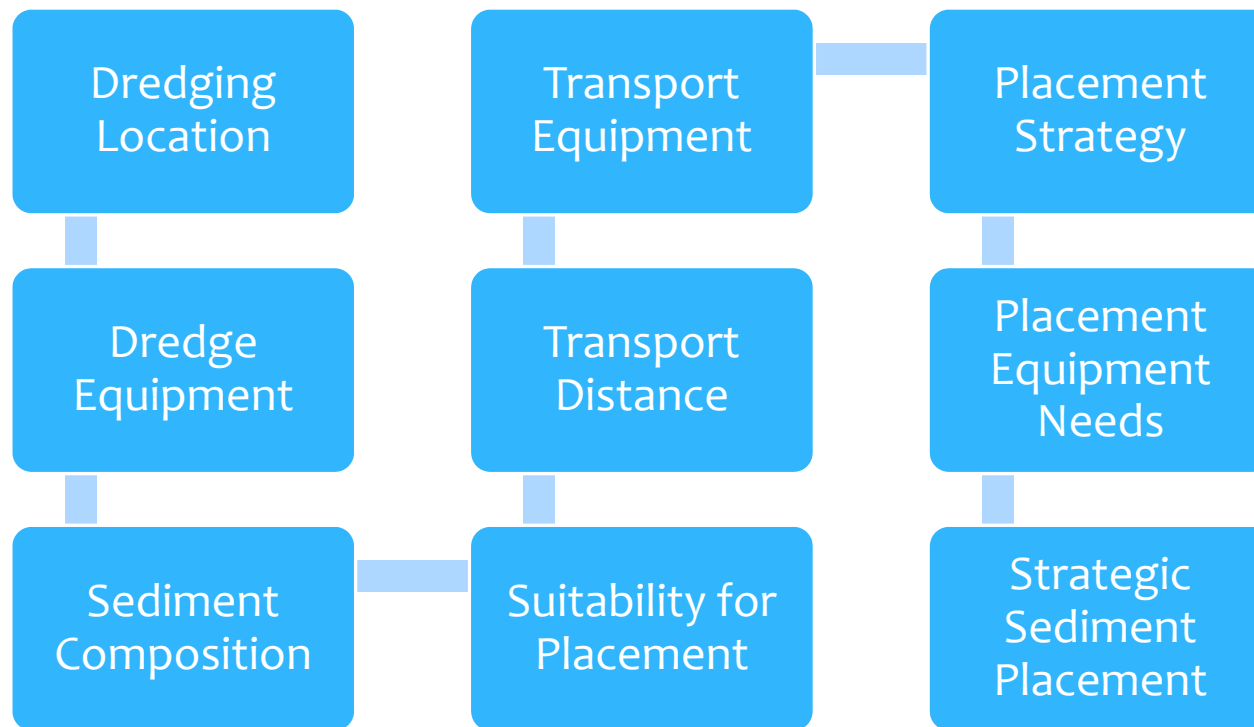
Logistics and Permitting



Logistics: Getting from Dredging to Placement



Sediment Placement Pathway



Clamshell Dredger



Cutterhead Dredger



Floating Pipeline and Booster Pump



Sediment Slurry from Pipeline



Spraying Operation



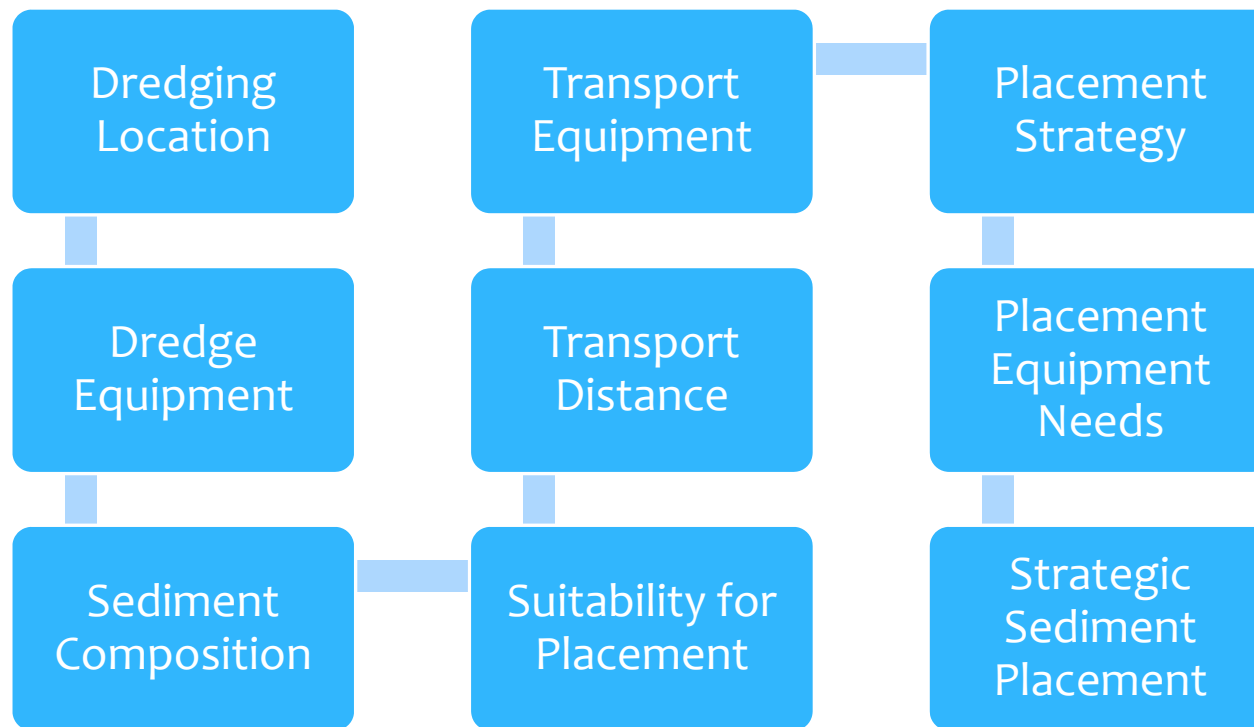
USACE Essayons Hopper Dredge



Hopper Dredge Outfitted with Spray Nozzle



Logistics Summary



Permitting Strategy

- * Dredging and placement are typically permitted separately
- * We are developing only the placement permitting strategy
- * Placement permitting will need to resolve potential impacts to benthic, intertidal, water quality, and fish and wildlife resources
- * Short-term impacts versus long-term benefits
- * Passing the LEDPA test

Breakout Discussions

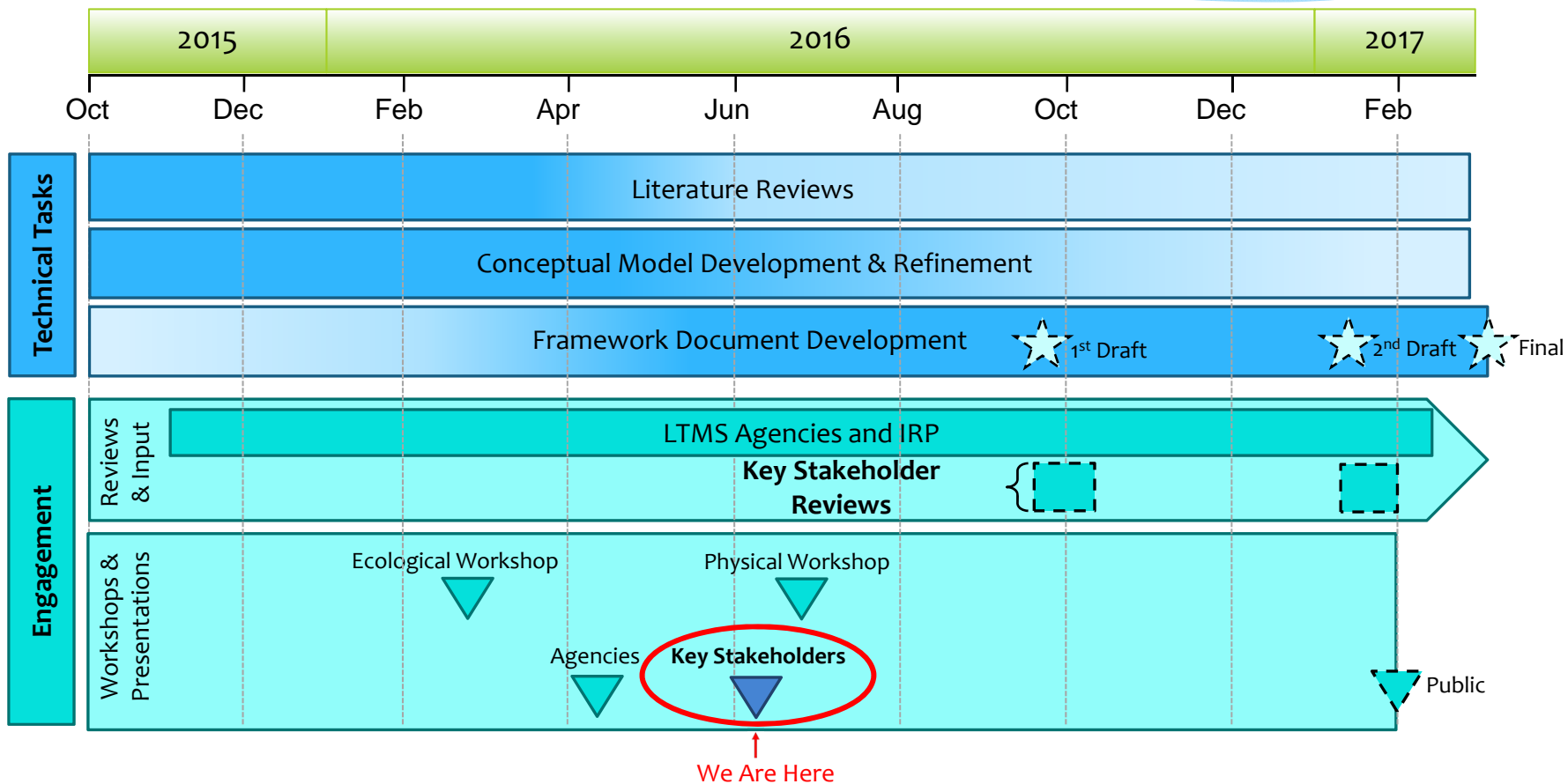
Breakout Instructions

- * Begin at any of the three discussion stations (one for each scenario)
- * Rotate to another station after 15 minutes
- * Use key questions to guide the discussion
- * Use post-its to make notes on the map
- * Facilitators will record comments on flip charts

Questions for Each Scenario

- * In which setting(s) would this scenario be appropriate?
- * What are the likely impacts you would be concerned about?
- * When and how often could sediment be placed to reduce impacts?
- * Would dispersed placement be better than focused placement?
- * Which regions should be prioritized?

Wrap Up



[- -] Indicates dates are not finalized and are subject to change.

Project Team Contacts

Craig Conner
Technical Point of Contact
(415) 503-6903
Craig.S.Conner@usace.army.mil

Barbara McDonnell
Consultant Team Lead
(925) 627-4707
Barbara.J.McDonnell@mwhglobal.com

Jeremy Lowe
Technical Lead
(510) 746-7372
jeremyl@sfei.org

Alex Biering
Stakeholder Engagement
(916) 418-8320
Alexandra.Biering@mwhglobal.com

Thank You!