

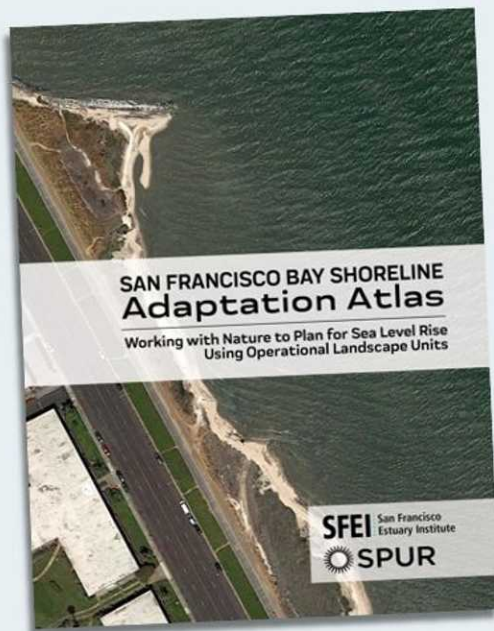
# San Leandro Bay Working Group

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# Adaptation Atlas

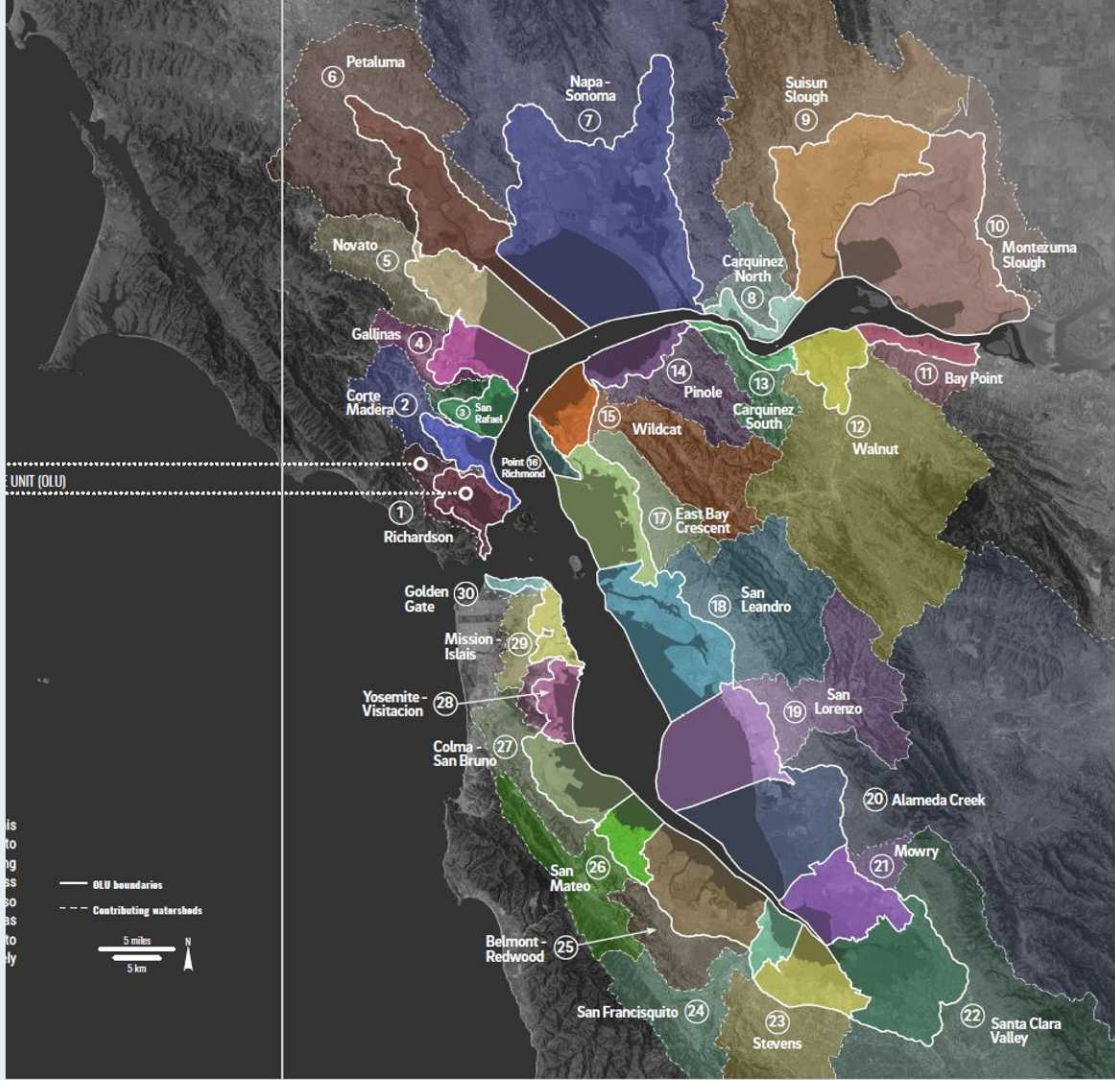


# OLU

## Operational Landscape Unit

Shared geophysical and  
land use characteristics  
suited for similar  
nature-based measures.

From the watershed to  
subtidal





# Adaptation Measures

## Nature-based measures

- Nearshore reefs
- Submerged aquatic vegetation (eelgrass)
- Beaches (sand, cobble, shell)
- Tidal marshes
- Polder management
- Ecotone levees
- Migration space preparation
- Creek-to-bayland reconnections
- Green stormwater infrastructure

## Regulatory, financial, policy tools

- Zoning and overlay zones
- Setbacks, buffers, and clustering
- Building codes and building retrofits
- Rebuilding and redevelopment restrictions
- Conservation easements
- Tax incentives and special assessments
- Geologic Hazard Abatement District
- Transfer of Development Rights
- Buyouts

# San Leandro OLU

Conditions suitable for:

- Tidal marshes
- Mudflat augmentation
- Ecotone levees
- Beaches
- Eelgrass



# Adaptation Atlas next steps

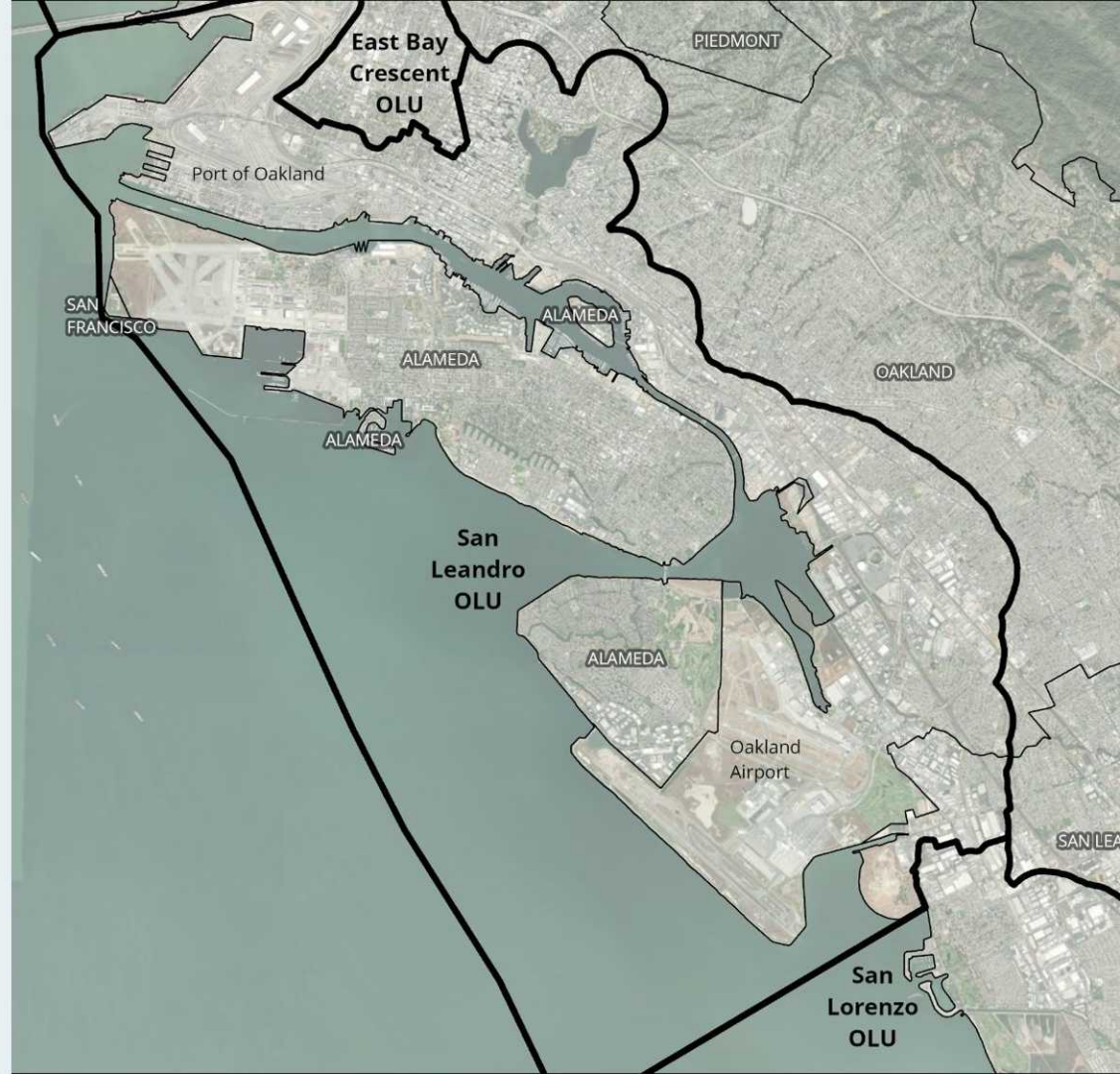
- Move from regional to local scale
- Refine a series of nature-based adaptation measures into a strategy
- Develop adaptation pathways to implement the strategy
- Ensure that the effort fits in with longer-term planning efforts

## Benefits

- Bigger picture collaborative thinking at the more logical OLU scale
- More integrated infrastructure protection, public access, habitat restoration

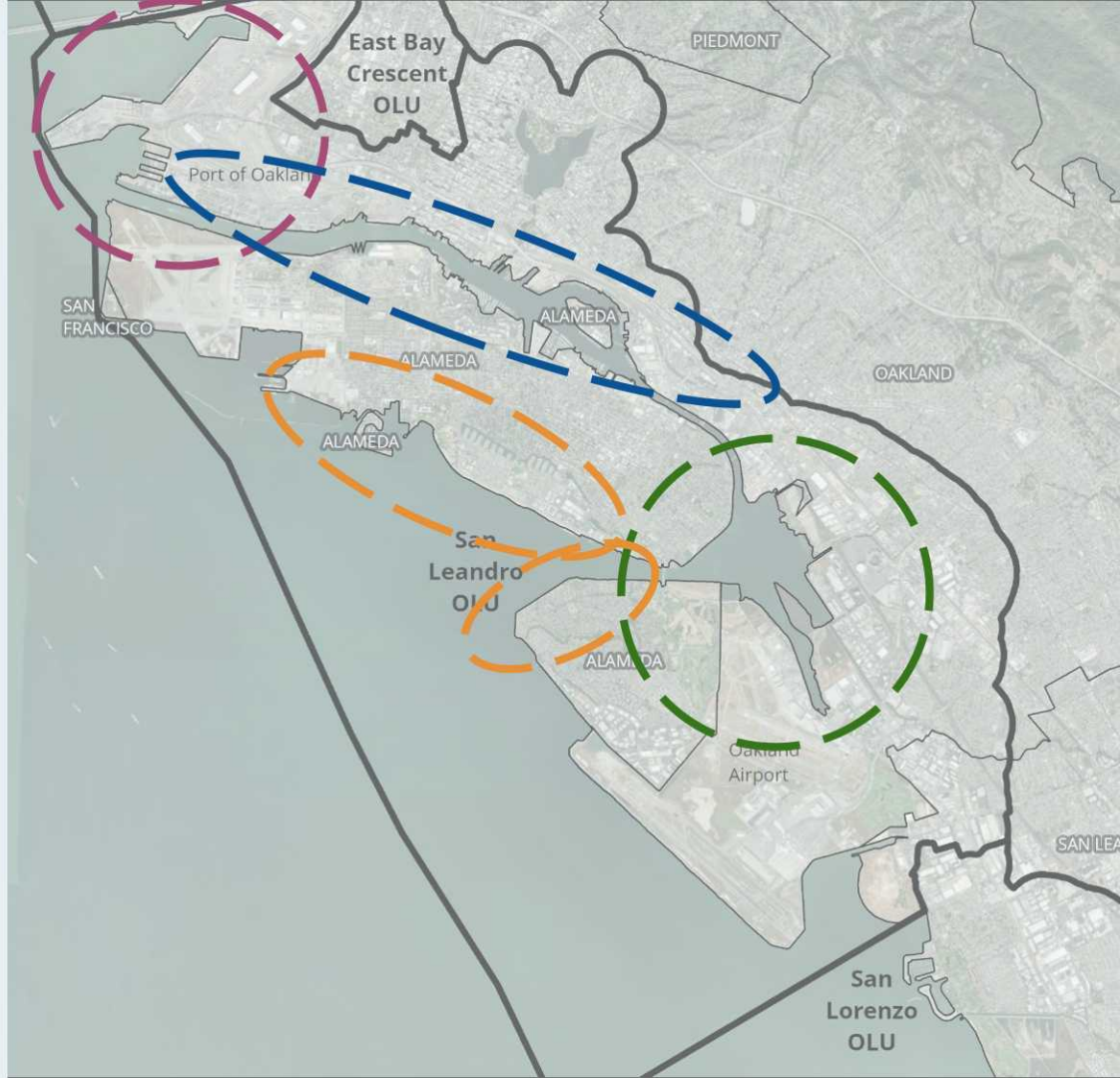


- Alameda County Flood Control District
- Bay Conservation and Development Commission (BCDC)
- Baykeeper
- California State Coastal Conservancy
- Caltrans
- City of Alameda
- City of Oakland
- City of San Leandro
- East Bay Municipal Utility District (EBMUD)
- East Bay Regional Parks District
- East Oakland Collective
- Greenbelt Alliance
- Port of Oakland/Oakland International Airport
- San Francisco Bay Trail
- San Francisco Estuary Partnership (SFEP)
- San Francisco Bay Regional Water Quality Control Board
- Sogorea Te' Land Trust
- UC Berkeley
- US Army Corps of Engineers
- US Coast Guard
- West Oakland Environmental Indicators Project



# 4 Focus Areas

- Port - vertical walls, dredged channels, beaches, little marsh/transition zone
- Oakland Estuary and Lake Merritt - narrow, highly modified urban estuary
- San Leandro Bay - marsh habitat, little transition zone, creek mouths, watersheds
- Alameda Beaches - wave-dominated bayfront shoreline







**TOTAL WATER LEVEL: 36-inches**

Printed from:  
[explorer.adaptingtorisingtides.org](http://explorer.adaptingtorisingtides.org)

Sea Level Rise	+	Storm Surge
0"		50-year
6"		25-year
12"		5-year
18"		2-year
24"		King Tide
36"		No Storm Surge

Depth of Flooding

- 0 - 2 feet
- 2 - 4 feet
- 4 - 6 feet
- 6 - 8 feet
- 8 - 10 feet
- 10 - 12 feet
- 12+ feet

Shoreline Overtopping

- Overtopping
- No Overtopping

Legal Delta

- Legal Delta

*At the regional scale, these scenarios present average water levels that are representative of what could occur along the entire Bay shoreline. The mapped scenarios are based on binning the water levels with a tolerance of  $\pm 3$  inches.*

Icons by Icons8. Map tiles by ESRI.



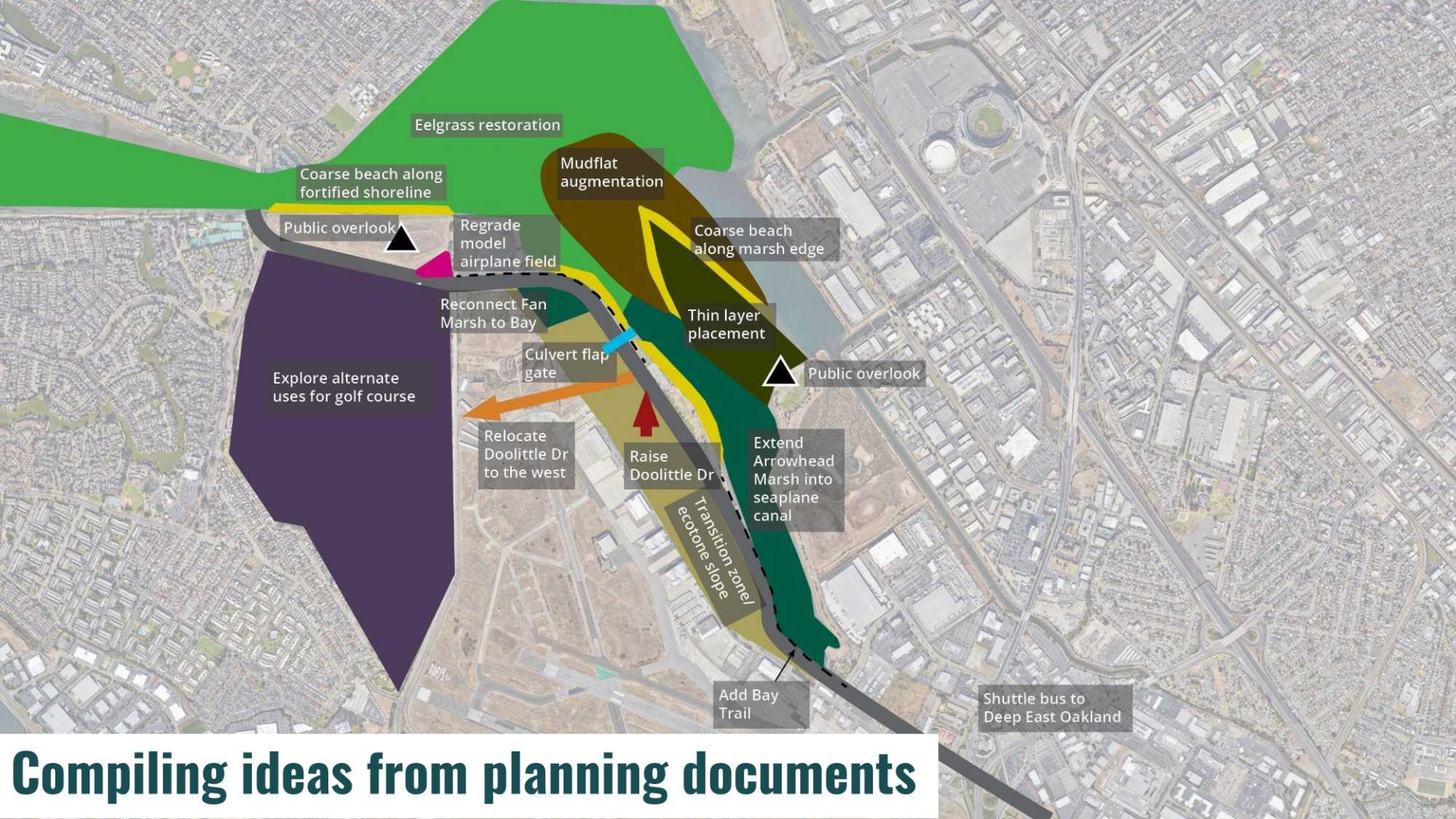
# Goals and objectives for coordinated strategy

- Continue to manage flood risk with rising sea levels
- Maintain and improve ecological value
- Maintain functional transportation corridor
- Improve public access

# Doolittle Drive: Existing ideas

	Port SLR Assmt	Alameda CARP	ART O-A	Estuary Commons	Adaptation Atlas
Regrade model airplane field @ intersection with Harbor Bay Pkwy		x			
Add flap gates to discharge points for backflow prevention	x				
Use mudflat augmentation or coarse beaches to reduce overtopping		x			x
Eelgrass restoration					x
Add Bay Trail along Doolittle Drive			x		
Caltrans transfers Doolittle Dr to local control			x		
Extend Arrowhead Marsh into seaplane canal		x		x	
Place sediment to increase resilience of Arrowhead Marsh	x				
Raise Doolittle Dr	x	x	x	x	
Relocate Doolittle Dr to the west		x		x	
Restore Doolittle Pond				x	
Connect Fan Marsh to the Bay				x	
Incorporate transition zone habitat with an ecotone slope		x		x	x
Public access overlooks at Arrowhead Marsh & Doolittle Landfill				x	
Explore alternate uses for golf course including tidal, upland habitat, housing				x	





Eelgrass restoration

Coarse beach along  
fortified shoreline

Mudflat  
augmentation

Coarse beach  
along marsh edge

Public overlook

Regrade  
model  
airplane field

Thin layer  
placement

Public overlook

Reconnect Fan  
Marsh to Bay

Culvert flap  
gate

Explore alternate  
uses for golf course

Relocate  
Doolittle Dr  
to the west

Raise  
Doolittle Dr

Extend  
Arrowhead  
Marsh into  
seaplane  
canal

Transition zone/  
ecotone slope

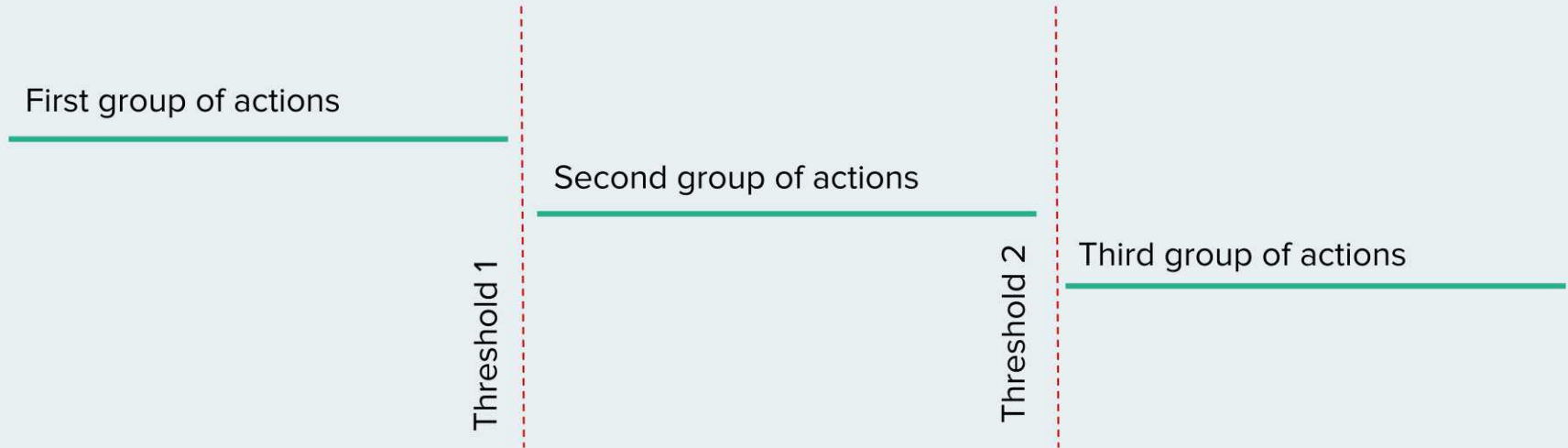
Add Bay  
Trail

Shuttle bus to  
Deep East Oakland

# Compiling ideas from planning documents

# Developing an adaptation pathway

- Incorporate ideas from existing planning efforts
- Develop timing ideas / explore contingencies
- Show pathway spatially with a series of maps
- Find synergies and adding elements that can enhance multiple benefits



# Example pathway

- Install culvert flap gates
  - Regrade model airplane field
  - Enhance Fan Marsh
- 

Threshold

- Reroute Doolittle Drive
  - Restore Fan Marsh
  - Eelgrass planting
  - Thin layer placement at Arrowhead Marsh
- 

Threshold

- Raise levee
  - Expand marsh
  - Add ecotone levee transition zone
  - Add coarse beach
-





Regrade  
model  
airplane field

Prep Fan Marsh  
restoration

Culvert flap  
gates

1<sup>st</sup> group of actions

# Our ask of you

- Are you interested in helping SFEI develop adaptation pathways?  
By help we mean:
  - Share existing projects and plans
  - Join a call to discuss draft maps and pathways
  - Review deliverables
- If you are interested, please put your name and email in the chat.

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