



# Restoration of Fluvial Processes, Floodplains, and Habitat in Lower Butano Creek

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# Study Area





# What's the problem?



Credit: Half Moon Bay Review

# Peaceful Coastal Rural Community





# Peaceful Coastal Rural Community



# Safety Concern



Credit: Tom Clifford

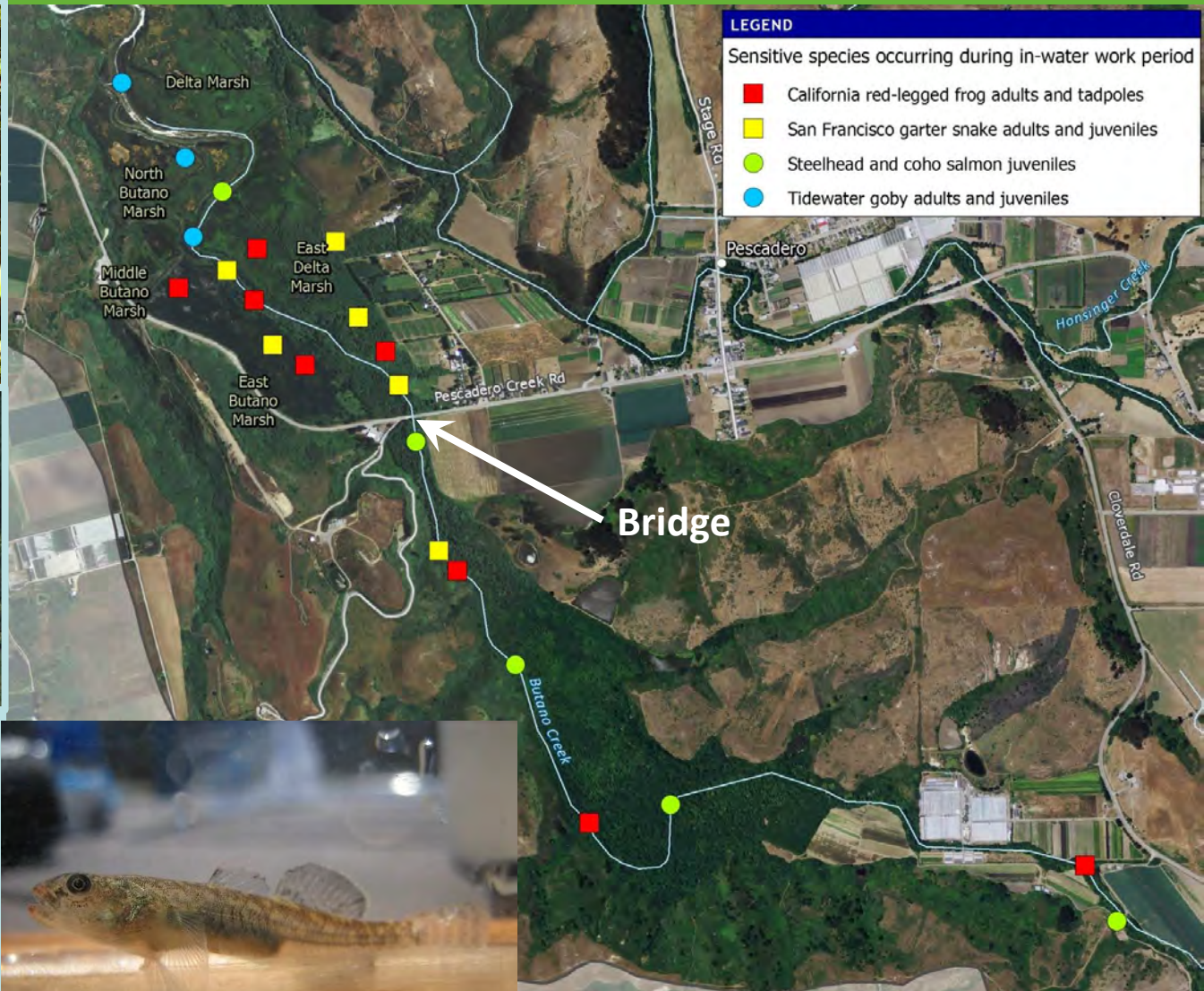


# So Just Dredge Already!





# Sensitive Species in the Project Area





# Goals

- Identify feasible long term solutions to the flooding of the road, while minimizing negative impacts to sensitive species
- Enhance or restore species and habitat within the project area





# Sediment Budget Conclusions

**Credit:** Setenay Frucht - SF Bay Regional Water Quality Control Board  
Martin Trso - contractor to UC Berkeley

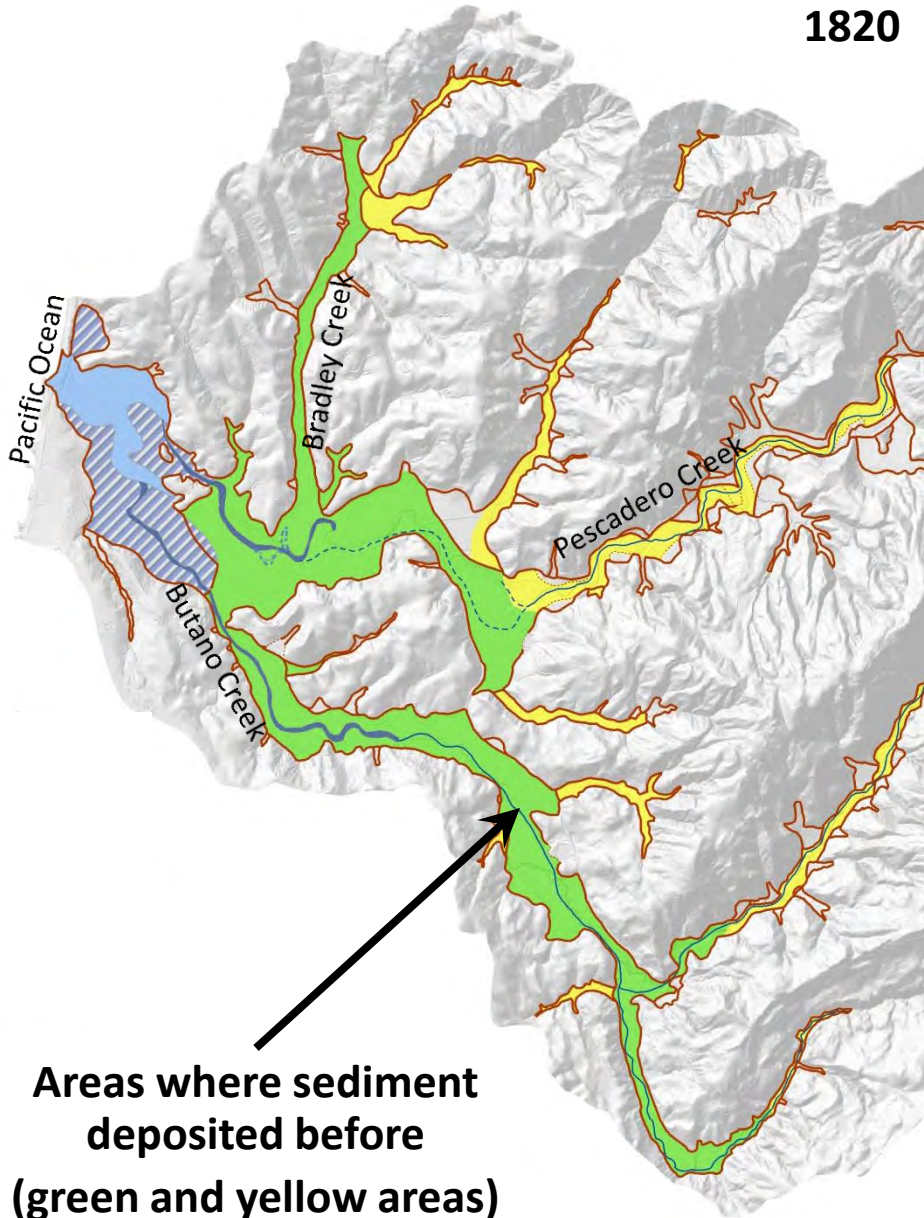
## Key findings regarding Butano Creek:

- Over the last **200 years** changes in land use combined with channel management have altered the amount of sediment delivered to and moving through the creeks and the marsh
- Sediment delivery to Butano Creek has **increased by 2.5 times**
- **Channel incision** is the largest sediment source of increased sediment load
- Historical **floodplains are disconnected** from the creek and are no longer able to store sediment, instead they are a source
- Butano is providing the majority of the sediment to the marsh
- Elevated sediment loads are expected to continue



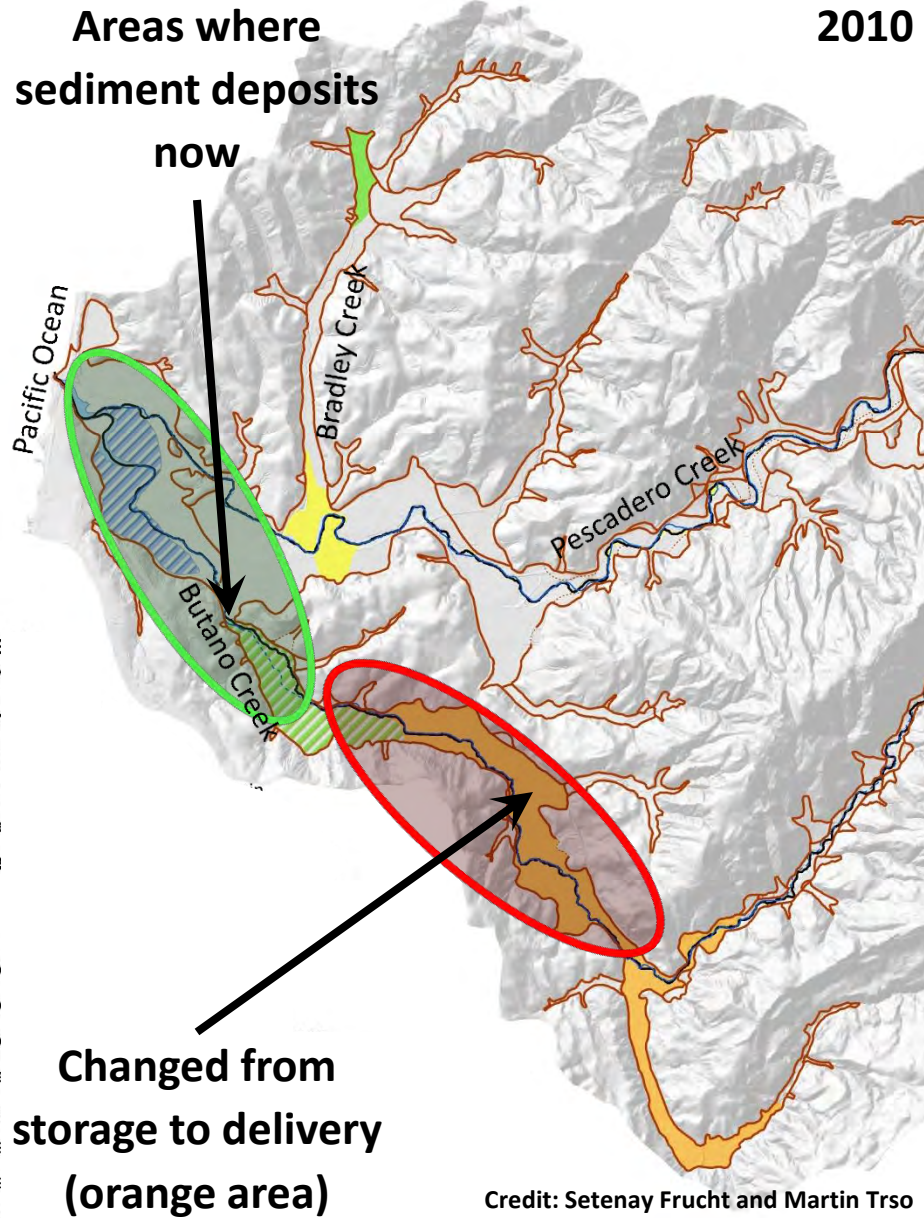
# Change in Areas Where Sediment Gets Deposited

1820



Areas where sediment deposited before  
(green and yellow areas)

2010



Changed from storage to delivery  
(orange area)

Credit: Setenay Frucht and Martin Trso

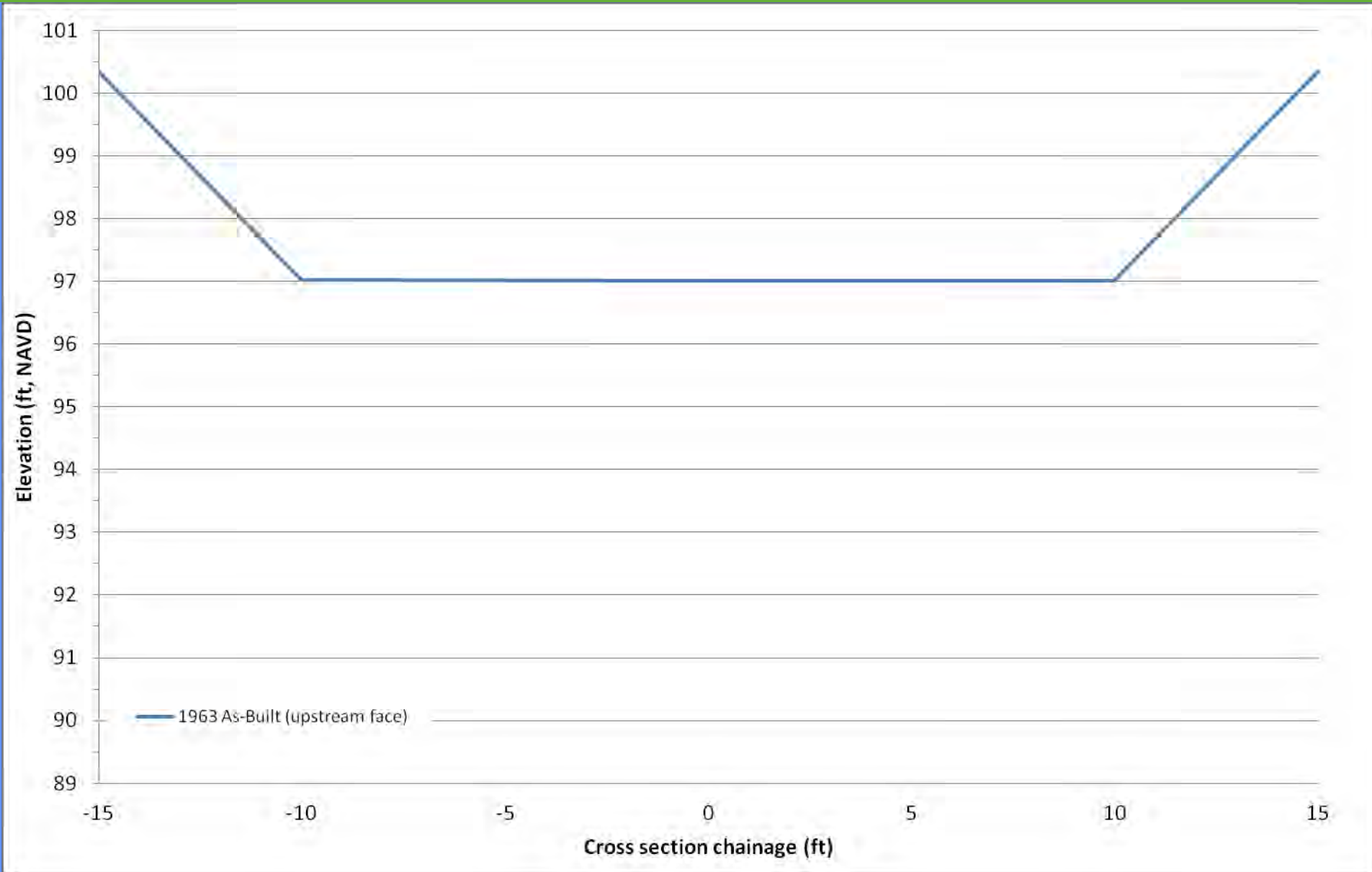


# Cross Section at Cloverdale Road Bridge



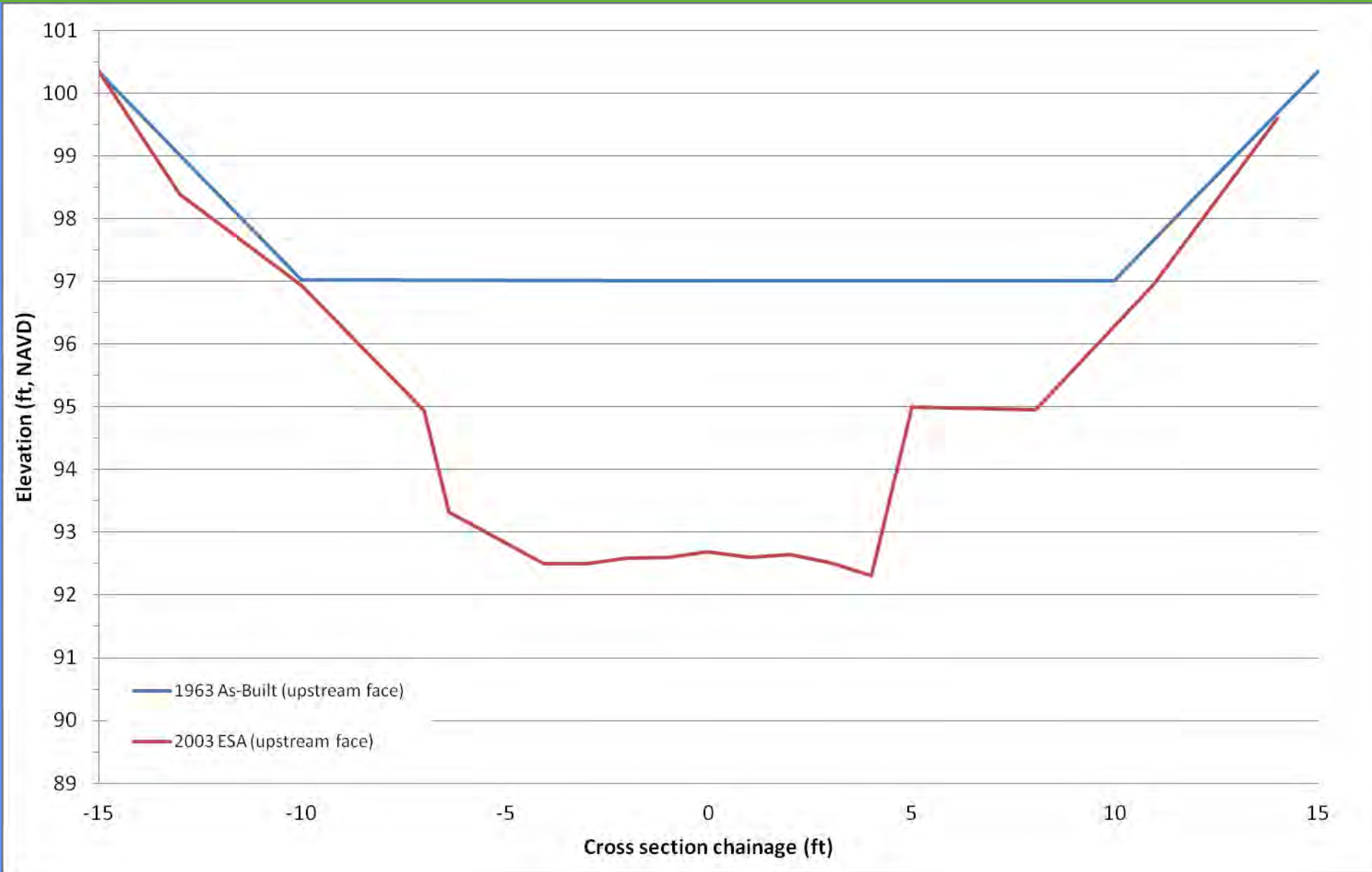
Looking downstream  
at the channel at this  
location

# Cross Section at Cloverdale Road Bridge

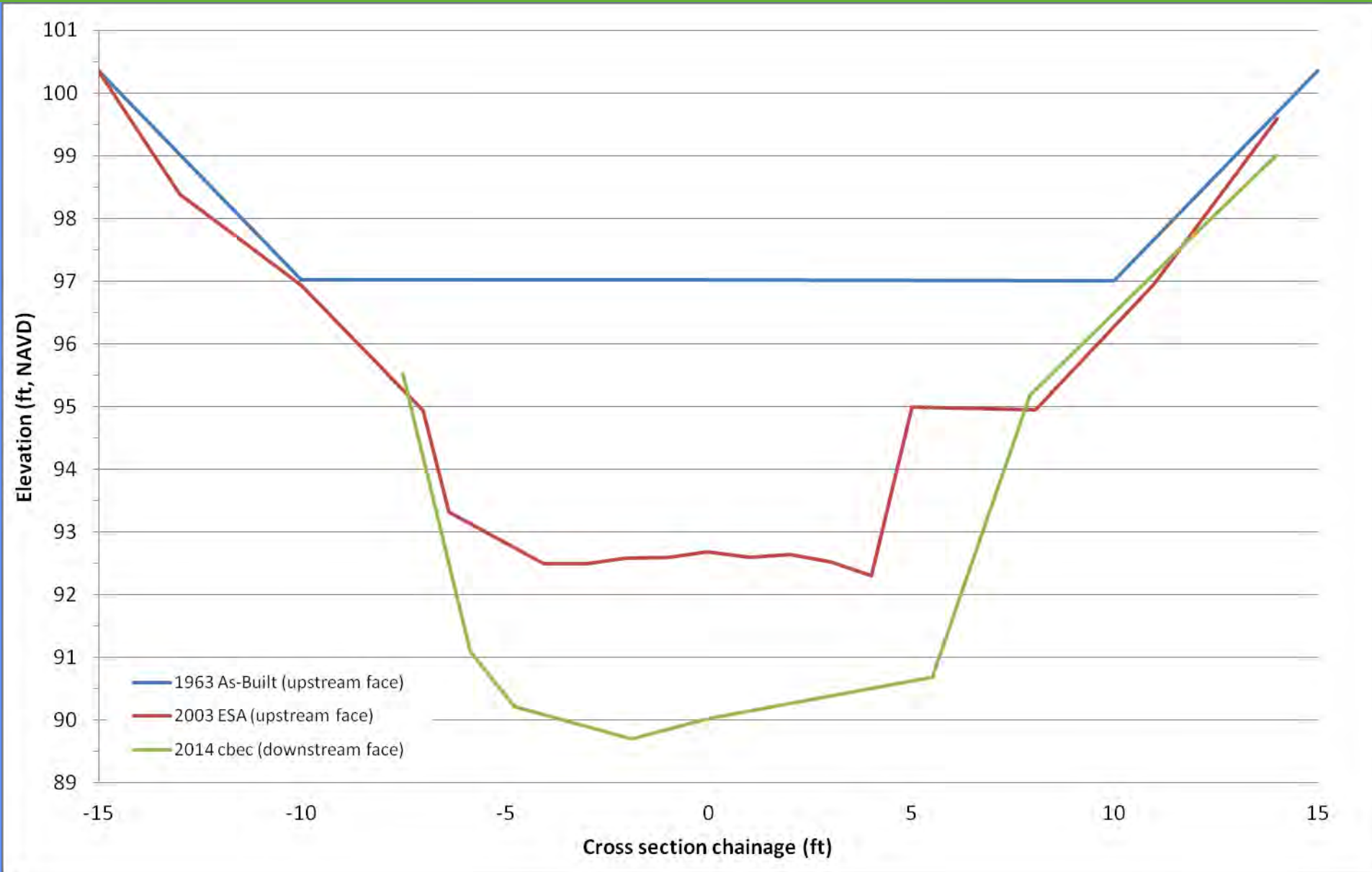




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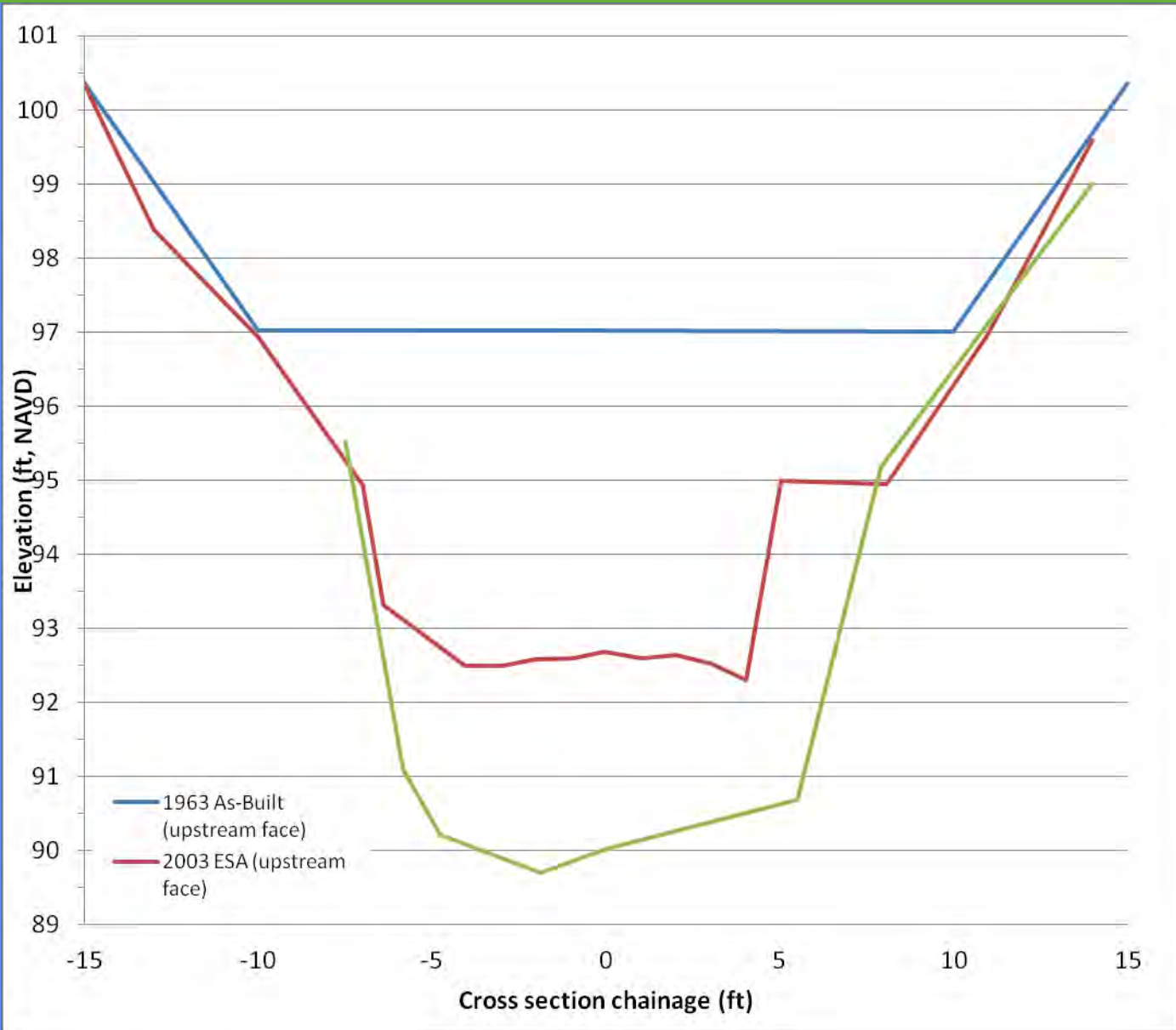


Photo credit: Setenay Frucht and Martin Trso

# Cross Section at Pescadero Road Bridge

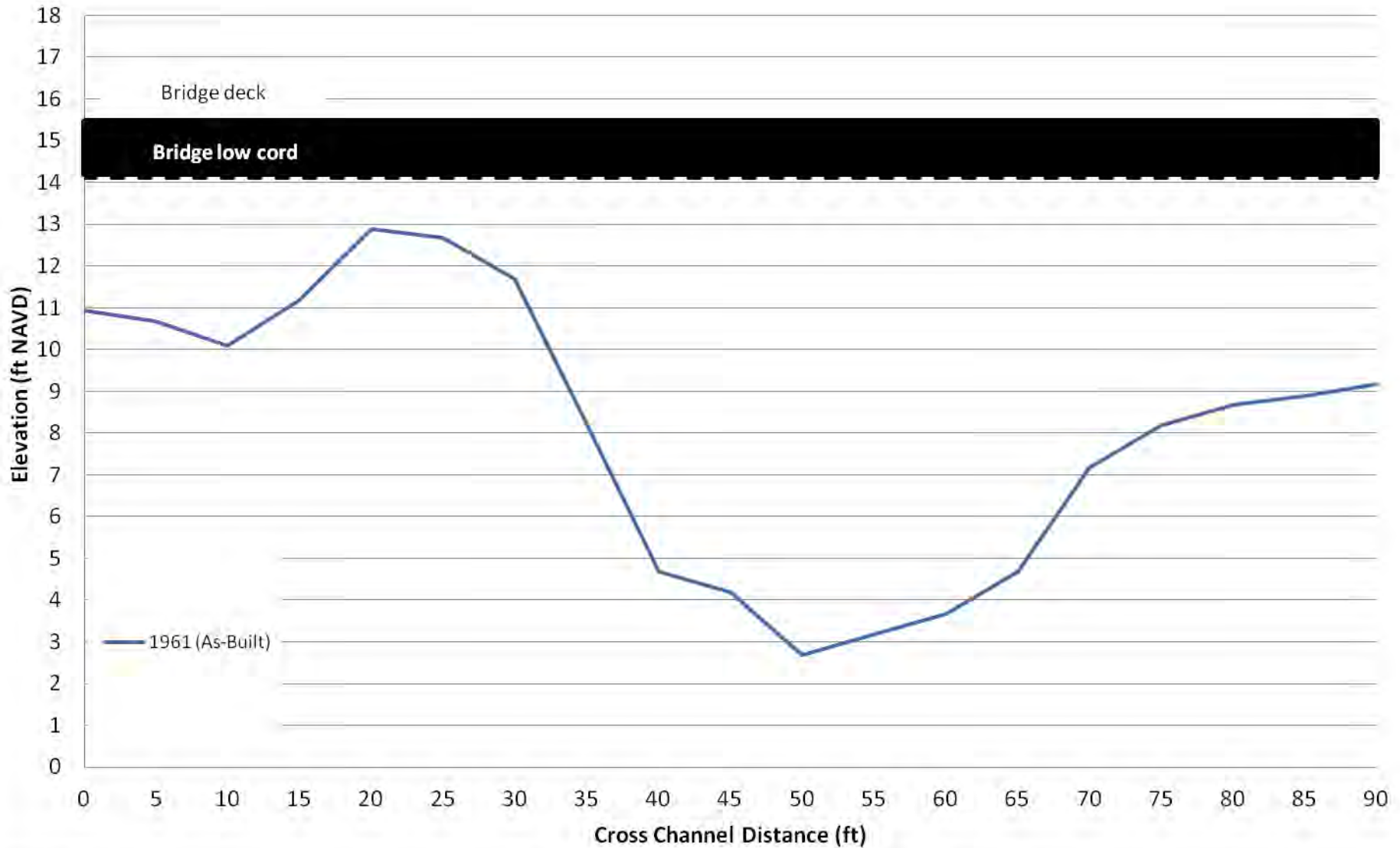


Looking downstream at the channel at this location

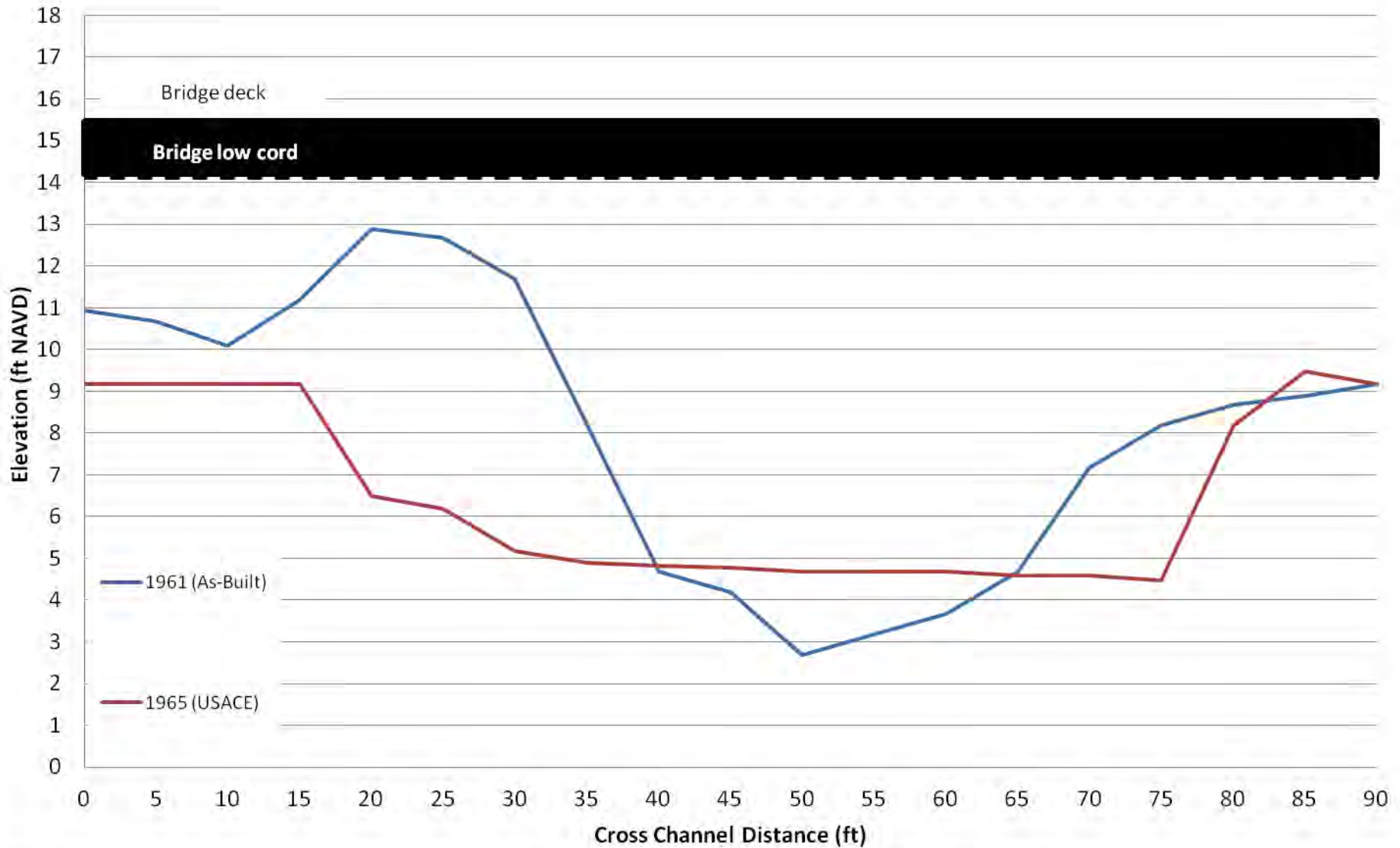




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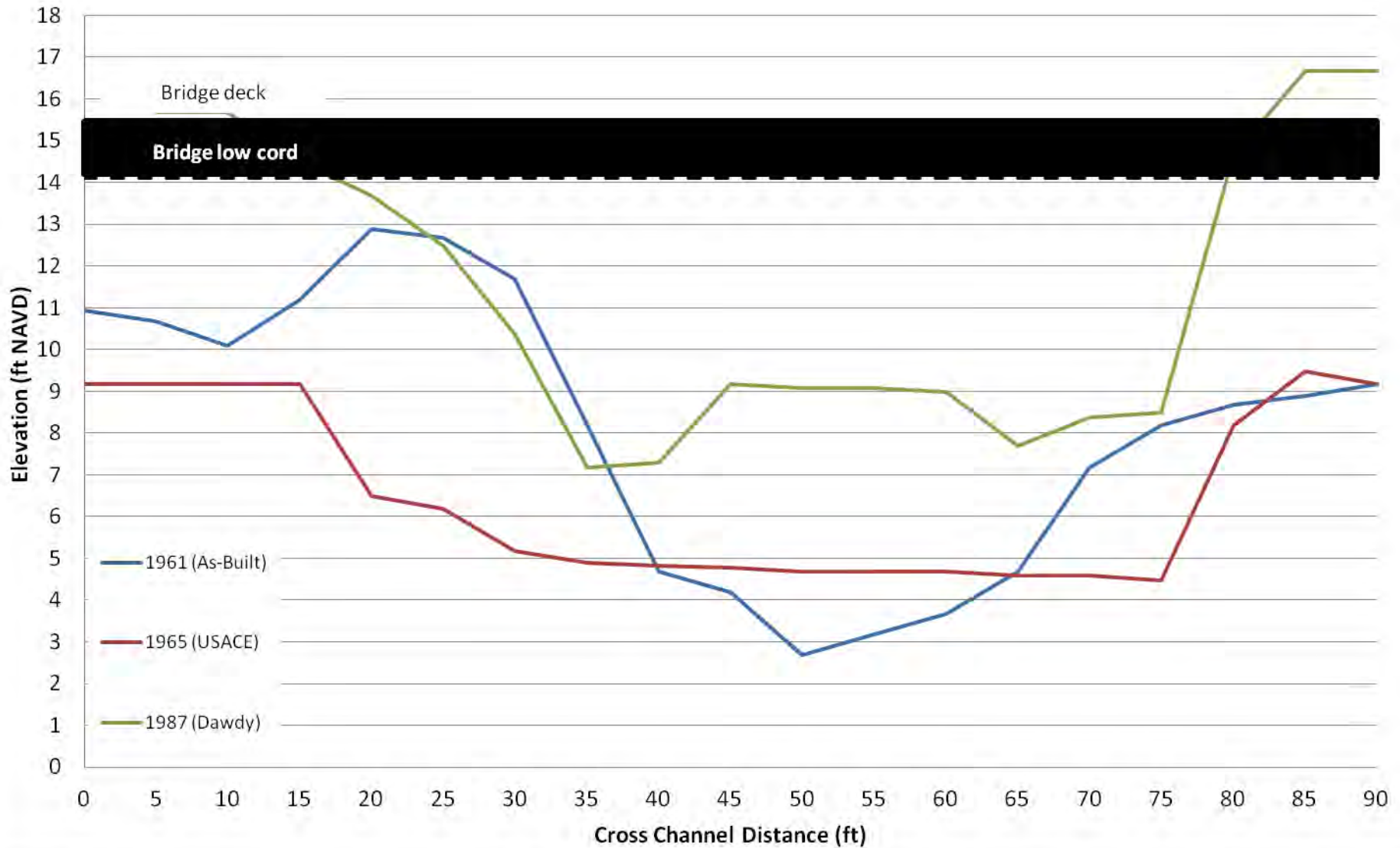


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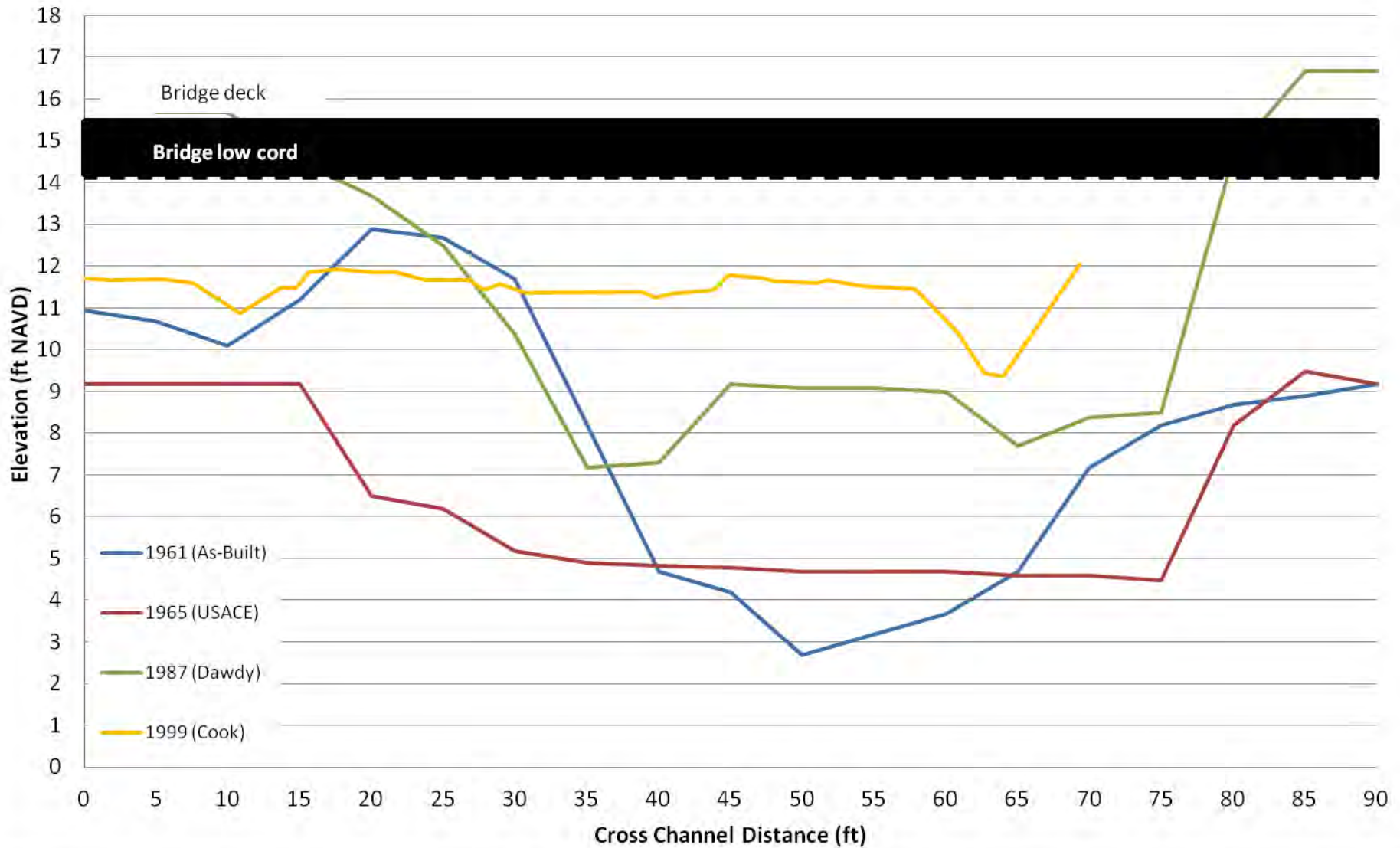




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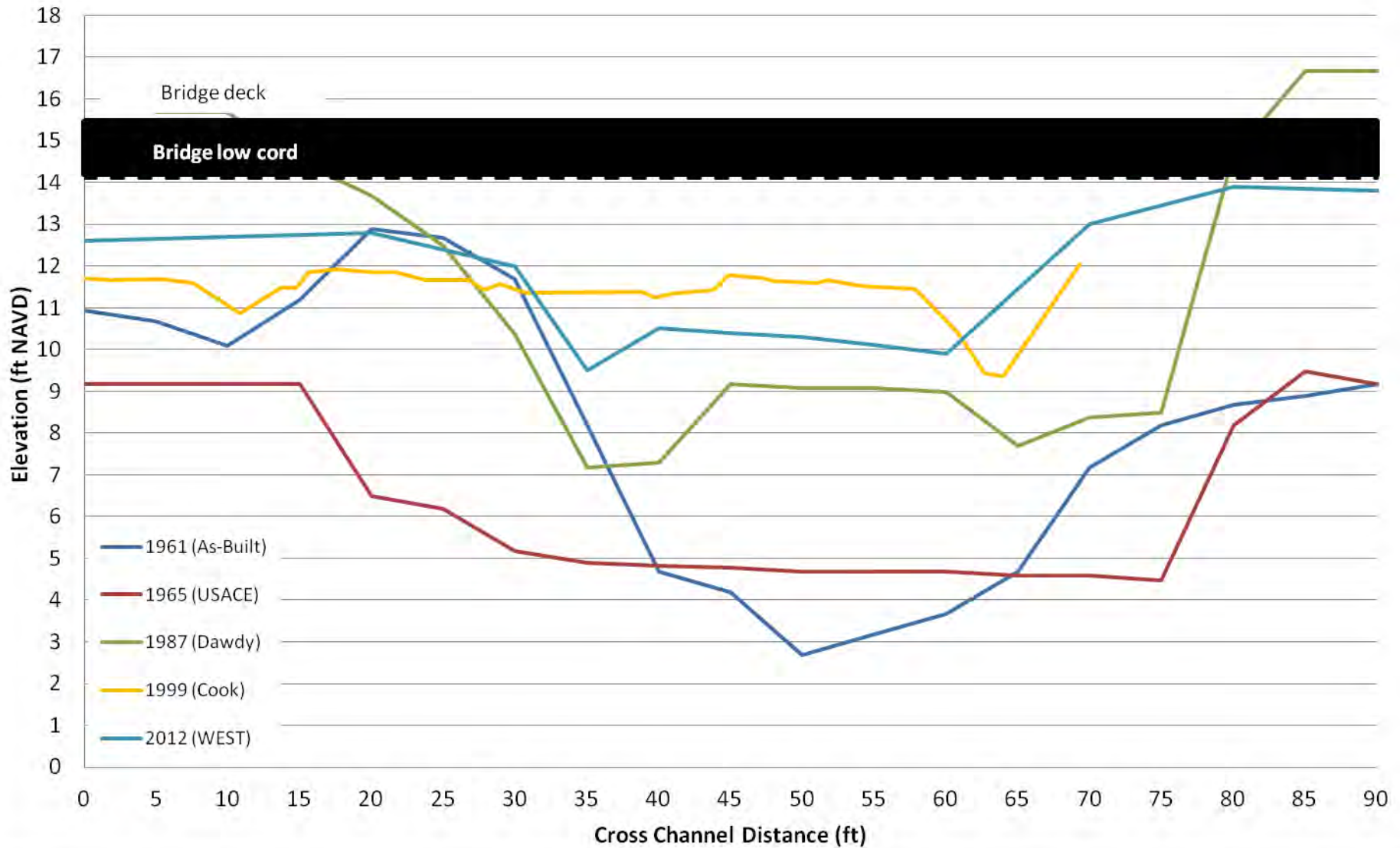


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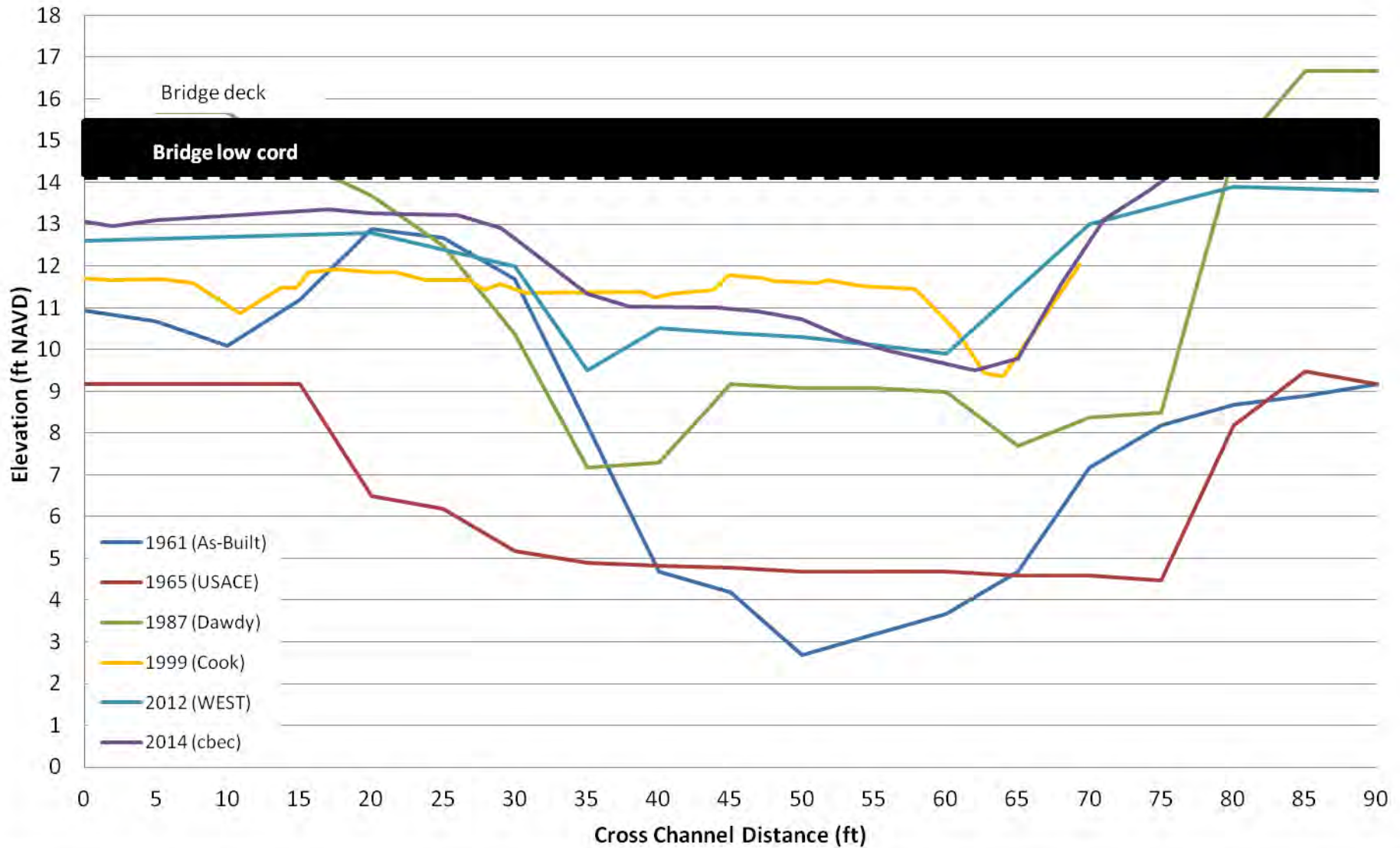




# Cross Section at Pescadero Road Bridge

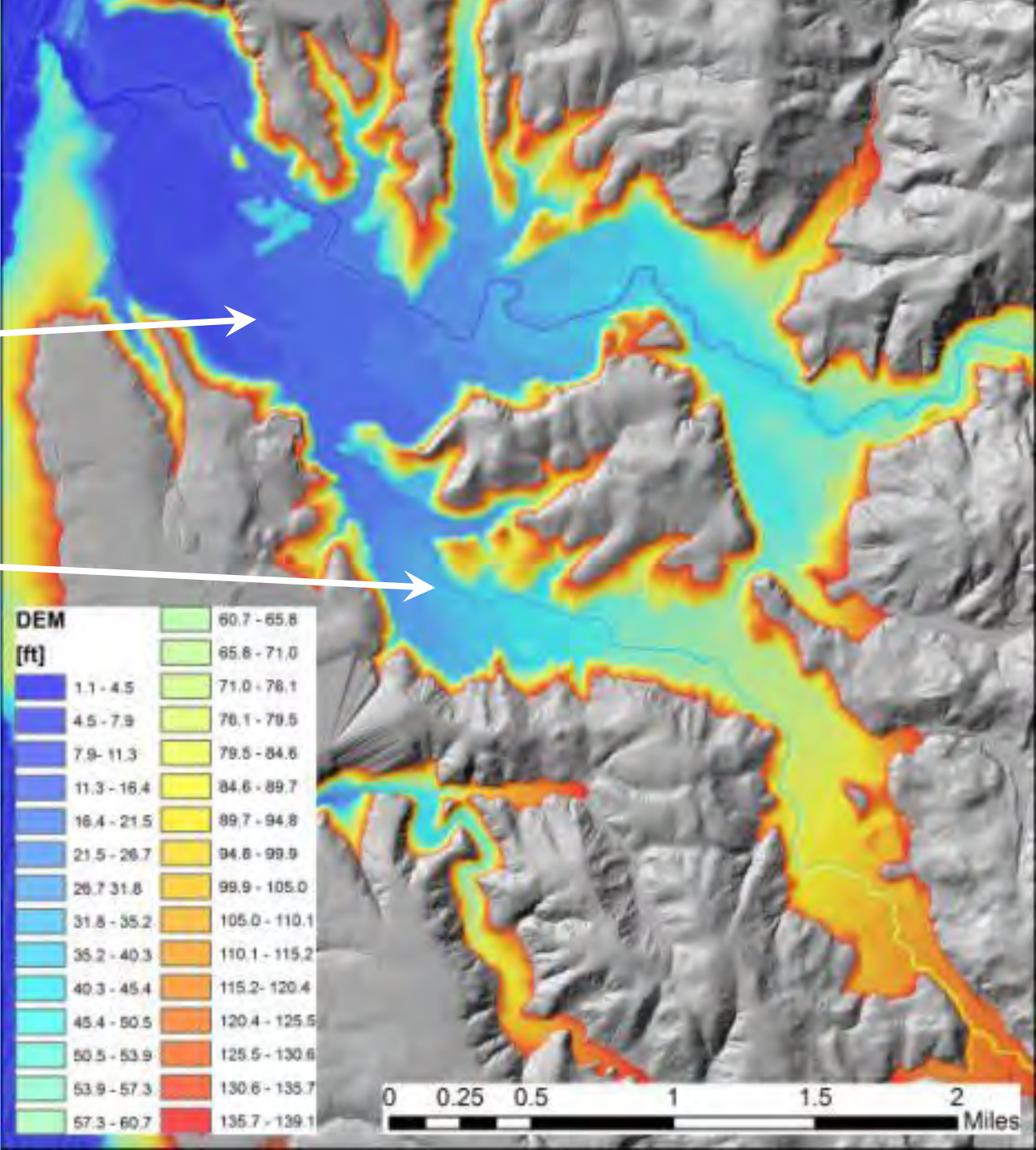


# Cross Section at Pescadero Road Bridge





# DEM



No Channel

Incised Channel

DEM [ft]	
1.1 - 4.5	60.7 - 65.8
4.5 - 7.9	65.8 - 71.0
7.9 - 11.3	71.0 - 76.1
11.3 - 16.4	76.1 - 79.5
16.4 - 21.5	79.5 - 84.6
21.5 - 26.7	84.6 - 89.7
26.7 - 31.8	89.7 - 94.8
31.8 - 35.2	94.8 - 99.9
35.2 - 40.3	99.9 - 105.0
40.3 - 45.4	105.0 - 110.1
45.4 - 50.5	110.1 - 115.2
50.5 - 53.9	115.2 - 120.4
53.9 - 57.3	120.4 - 125.5
57.3 - 60.7	125.5 - 130.6
	130.6 - 135.7
	135.7 - 139.1



# Sediment Impacts and Degraded Fish Habitat

- Channel Incision and simplification
  - Disconnected floodplains
  - Deep, straight, clean channels (canals)
  - No wood in the channel
- Increase in sediment supply
  - Overwhelming the channels that now lack pools
- Shrinking lagoon
  - Critical estuary habitat is growing smaller
  - Mouth is closing for longer durations
- Barriers to upstream habitat

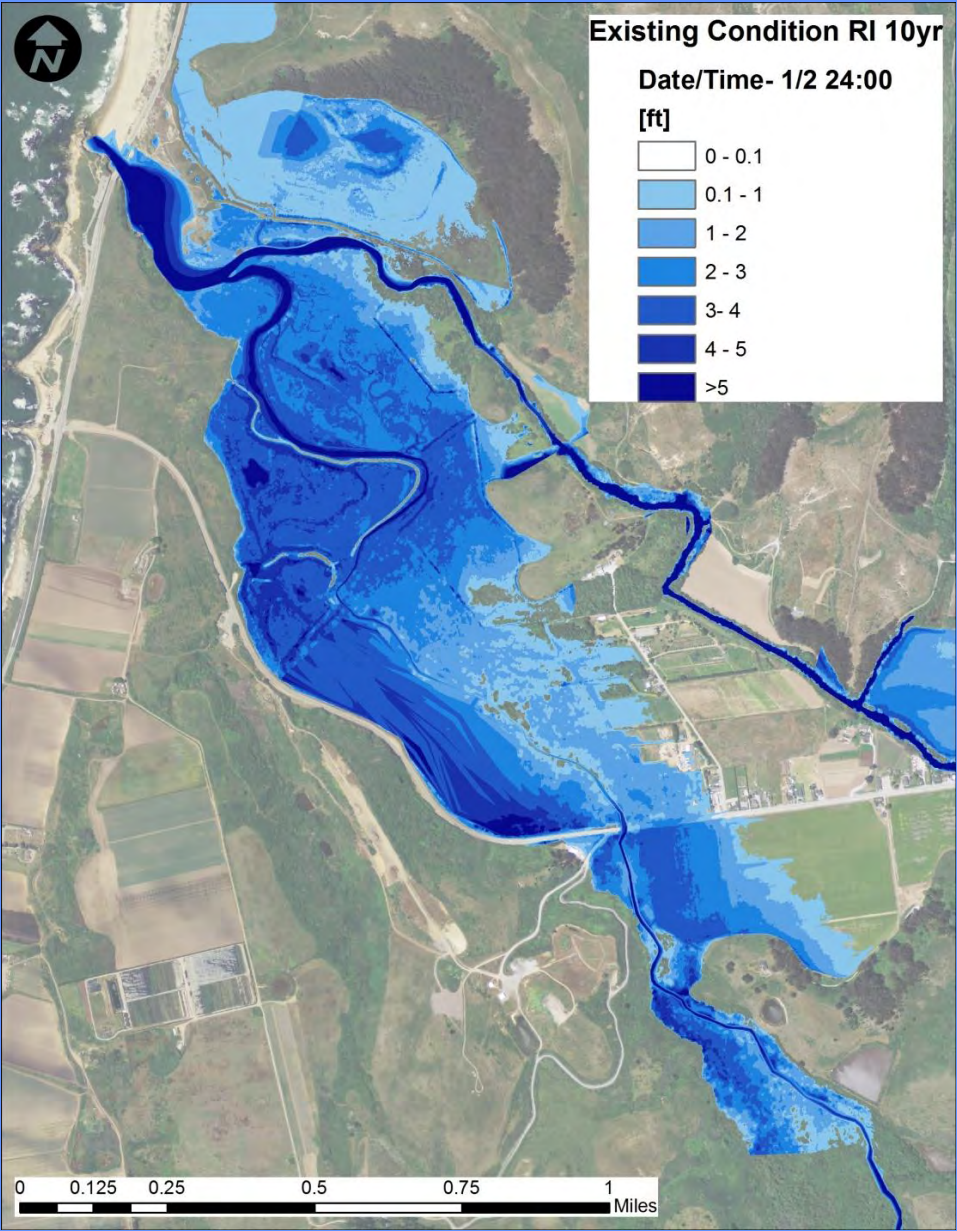


# Components of a Solution (for fish and flooding)

- Reduce sediment load from the watershed
- Restore system's ability to store sediment on floodplains
- Provide more capacity at the bridge:
  - dredge frequently or build a causeway
- Restore a channel to the lagoon to improve fish passage



# Inundation During a 10-year Event

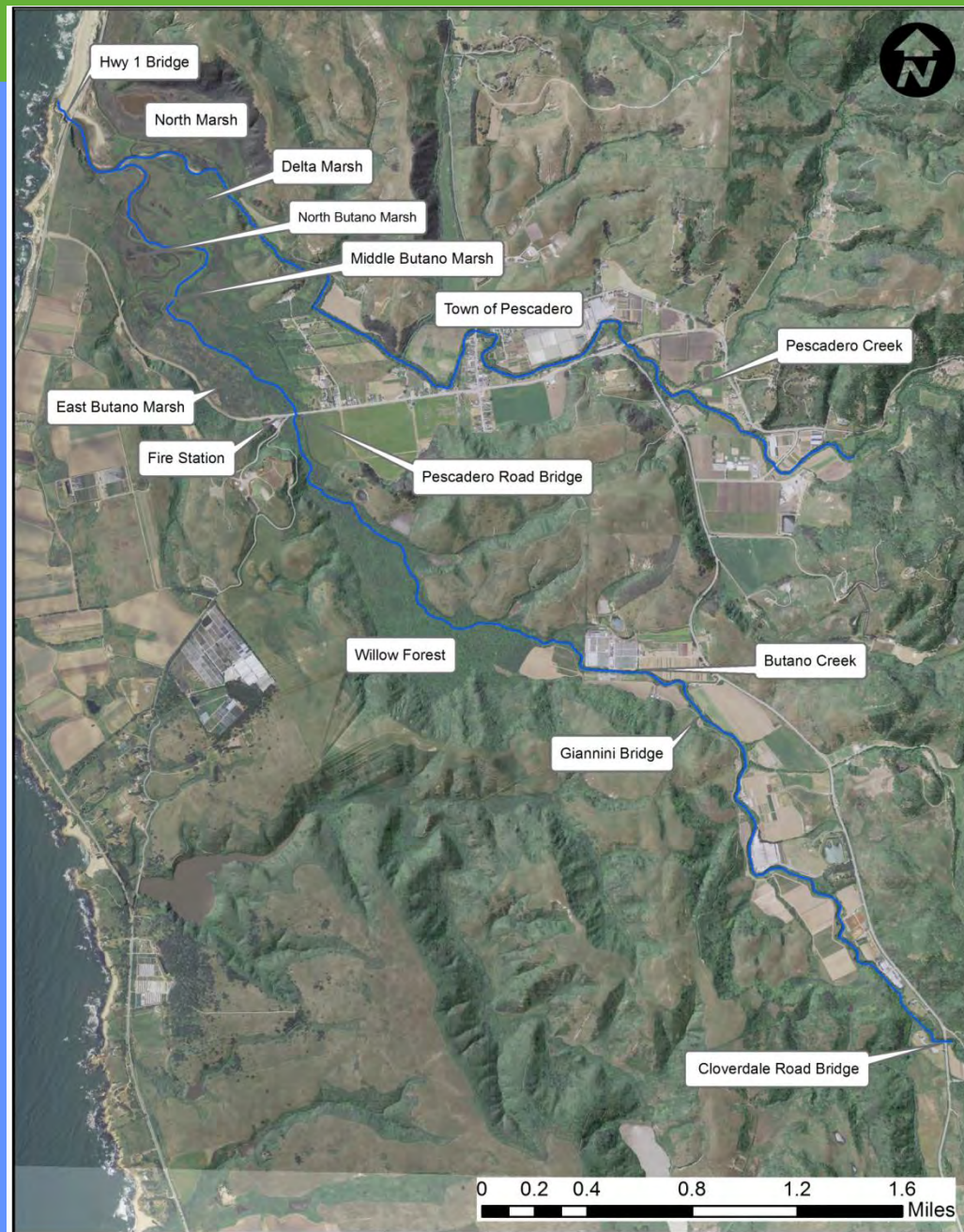




# Floodplain Restoration

## Options

- Lower existing floodplain
- Raise the channel

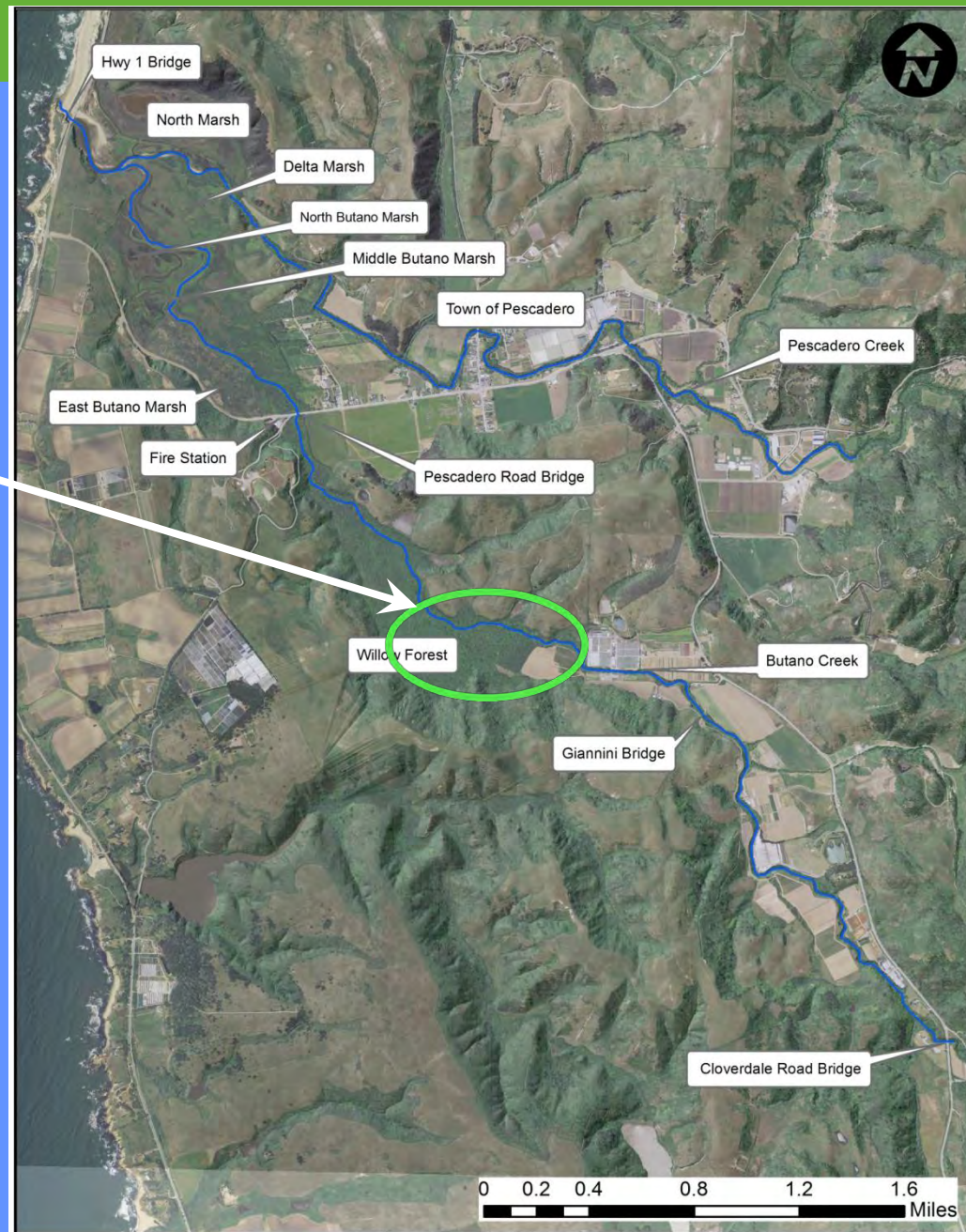




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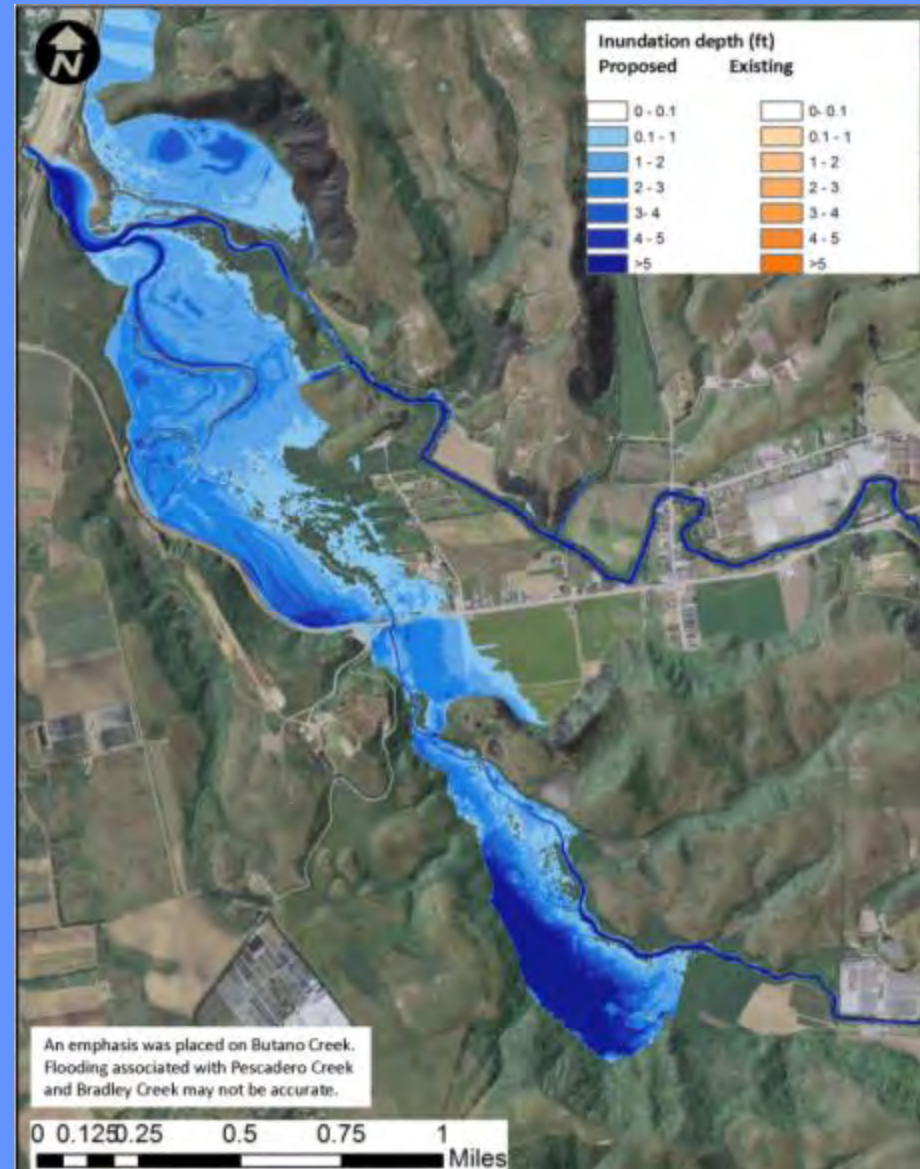
## Options

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# Floodplain Reconnection & Restoration



# Thanks!

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