

# Ebey Island Restoration Project Hydraulic Modeling Assessment

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Ebey Island Advisory Committee  
November 16, 2010



## Hydraulic modeling objectives

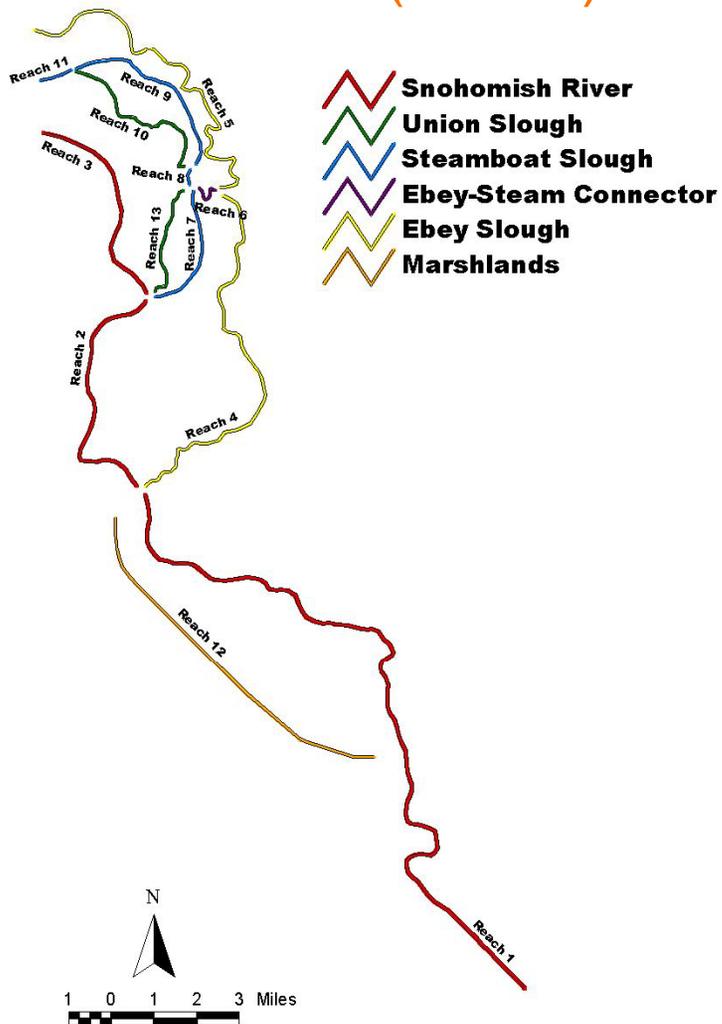
Hydraulic response to restoration  
as compared to existing conditions

- Habitat conditions
  - Hydraulic structure design
  - Interior dike design
- Potential impacts
  - Tidal water levels
  - Scour
  - Flooding

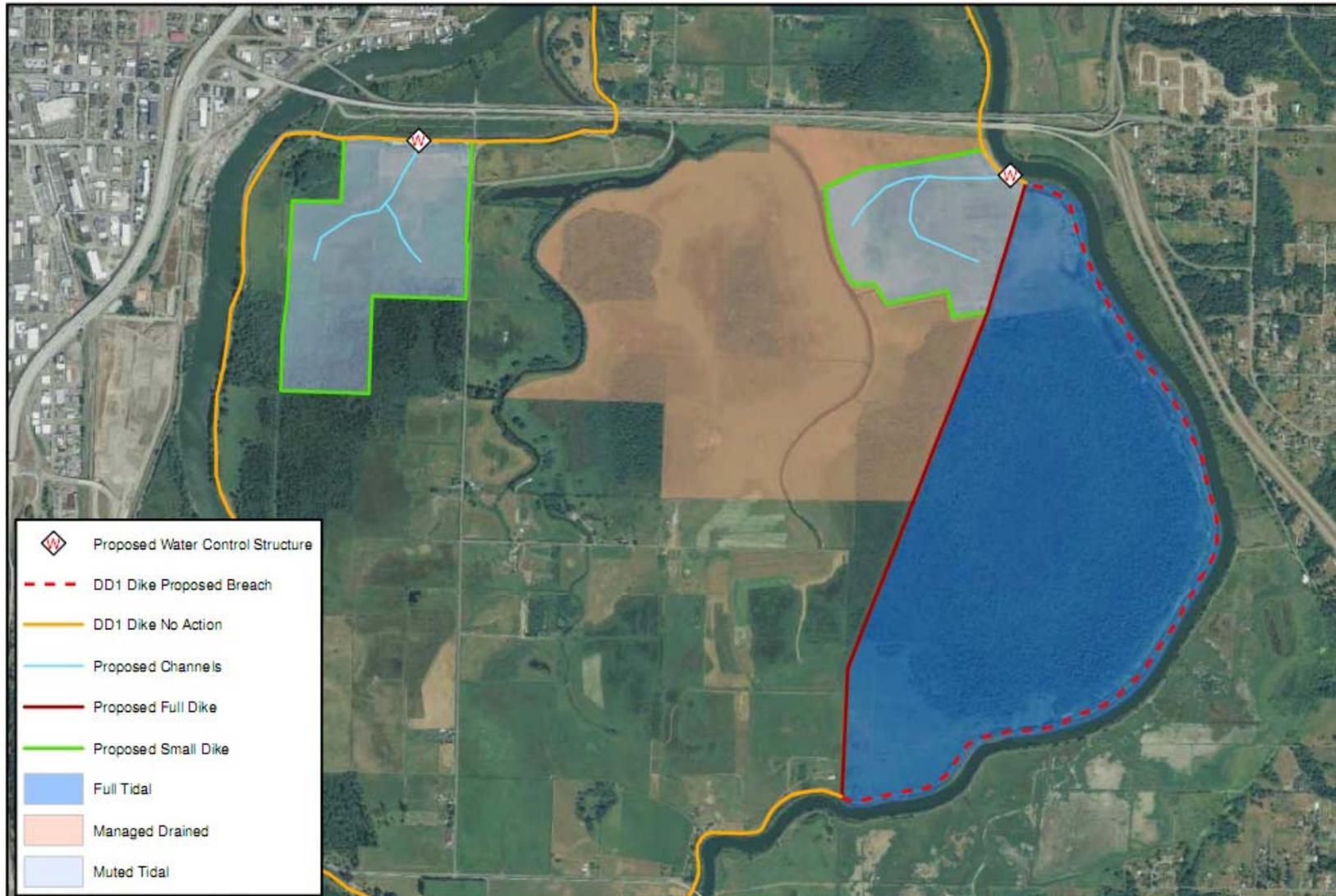
# Modeling tools

UNET (FEMA)

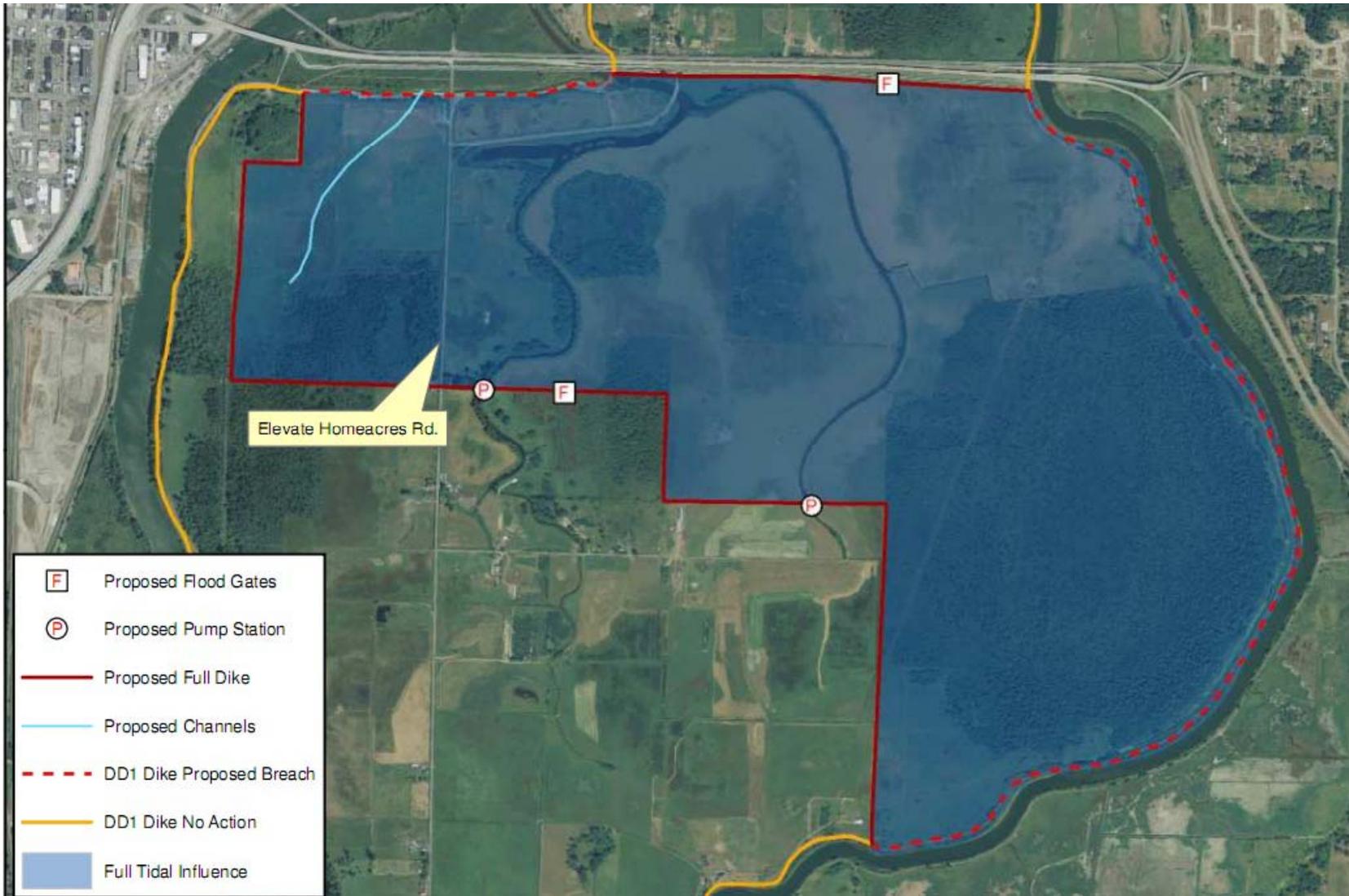
HEC-RAS (ESA PWA)



# Near Term Alternative

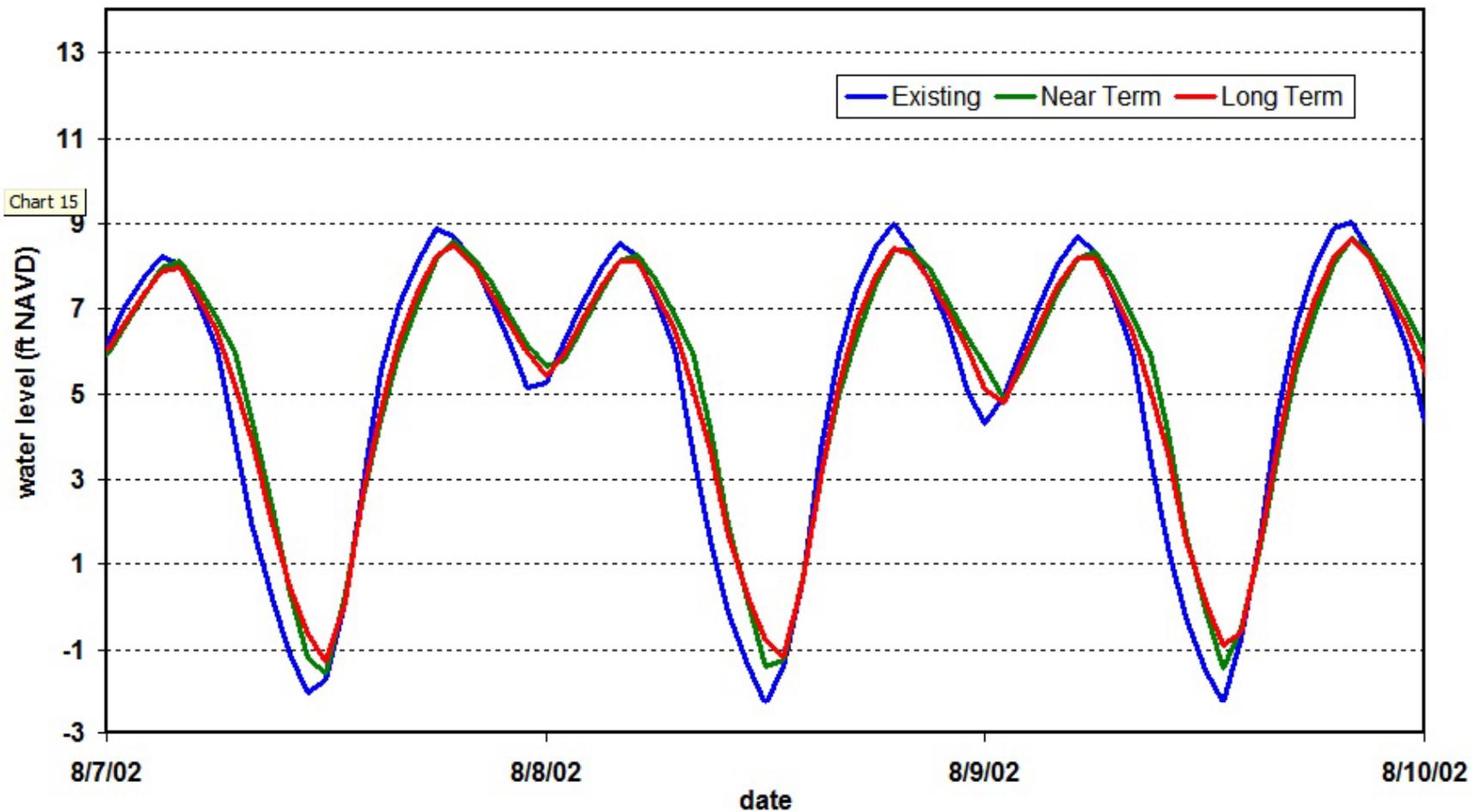


# Long Term Alternative

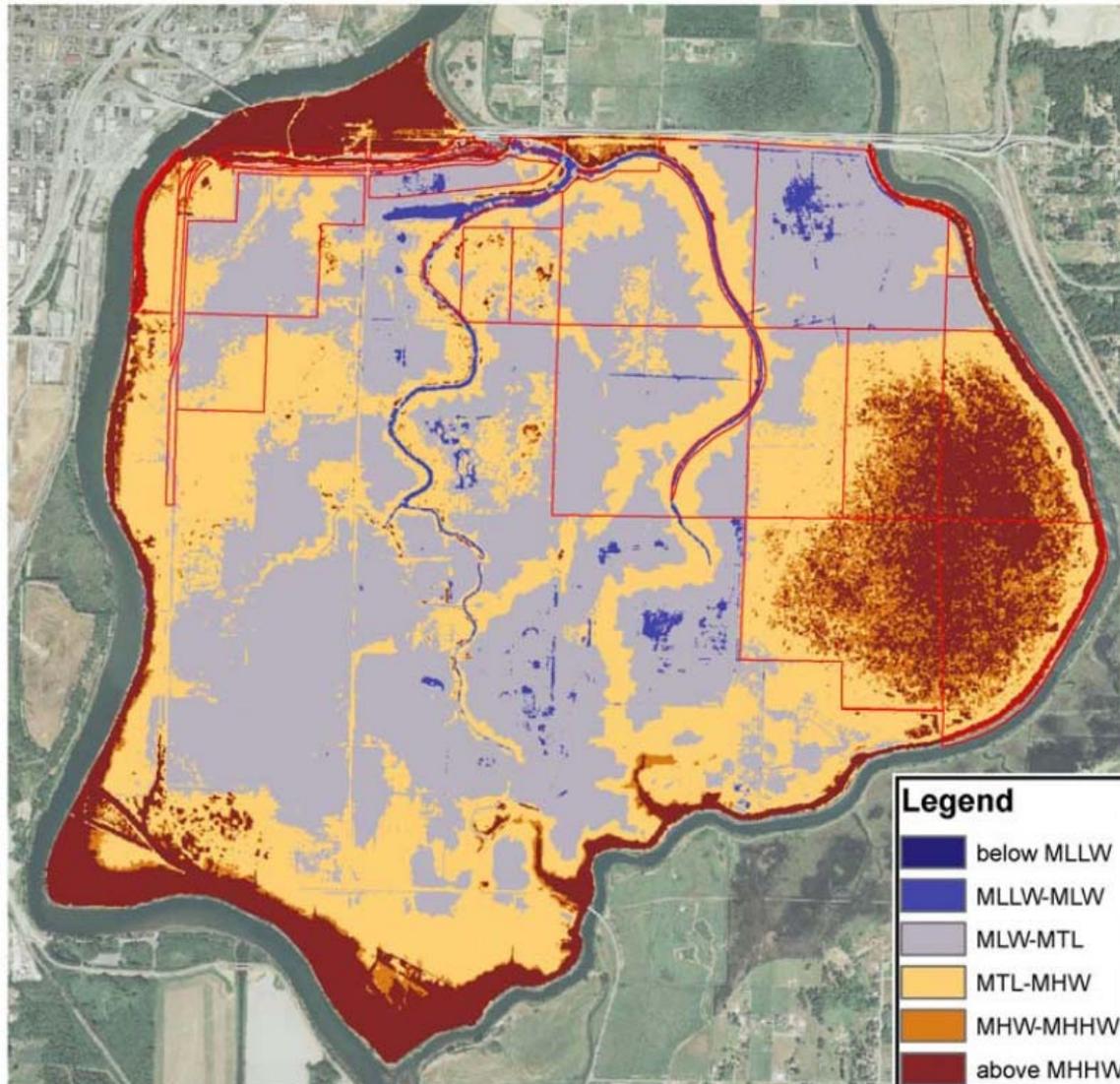


# Full tidal habitats

## Ebey Slough water levels, August 2002



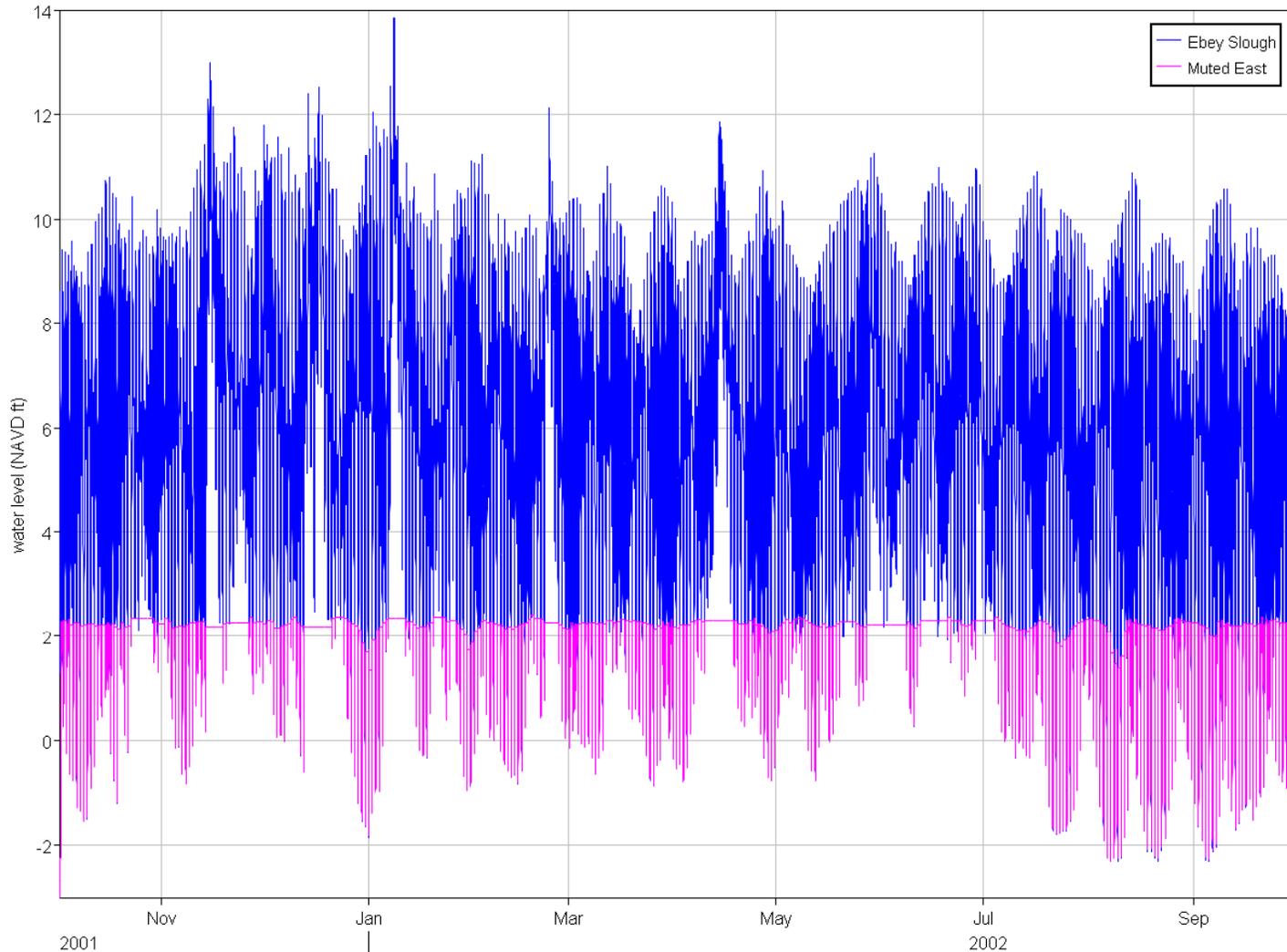
# Existing ground surface elevation



## Near Term Alternative Muted areas (HEC-RAS)

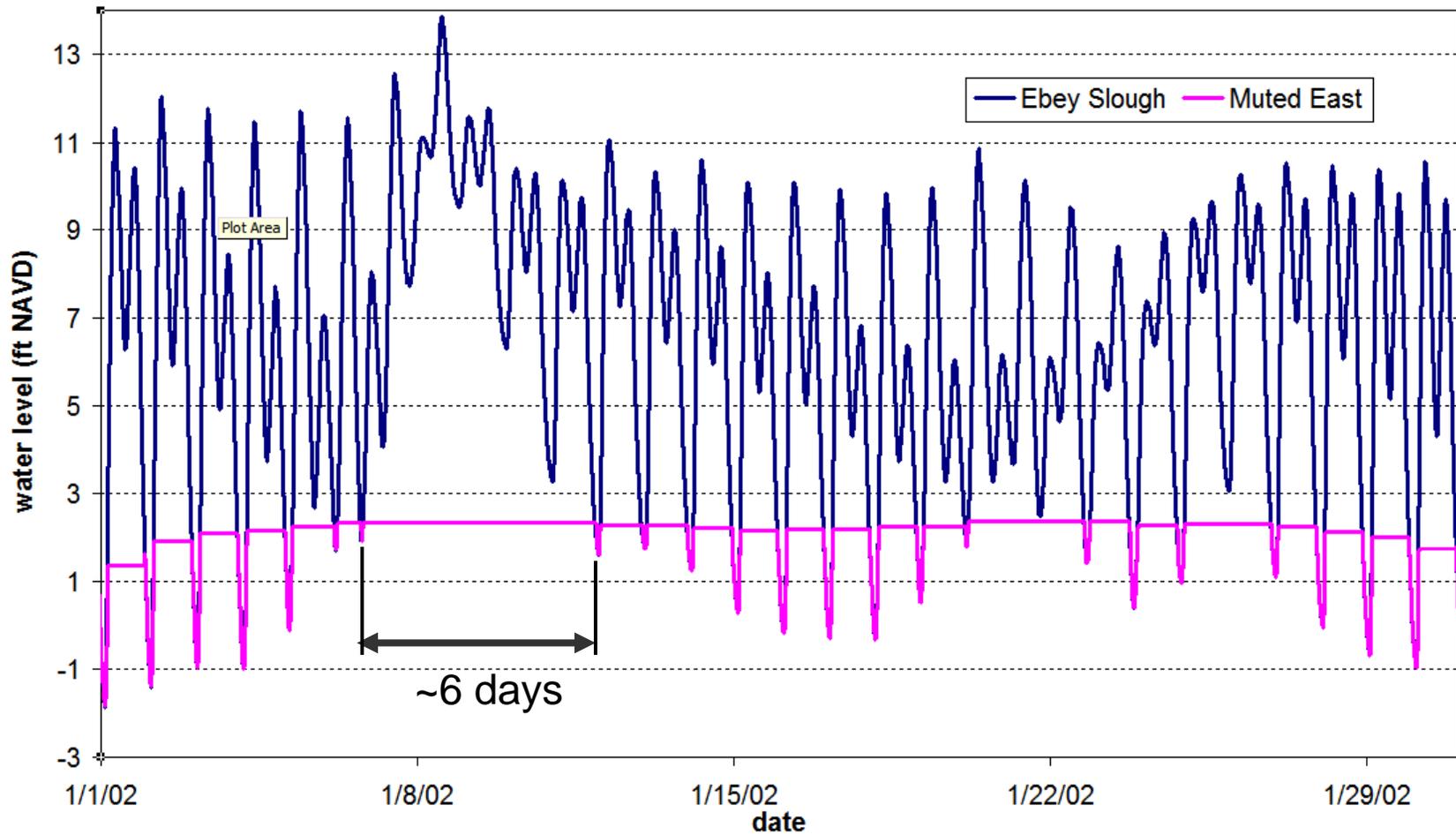


# Muted tidal area habitat WY2002 water levels

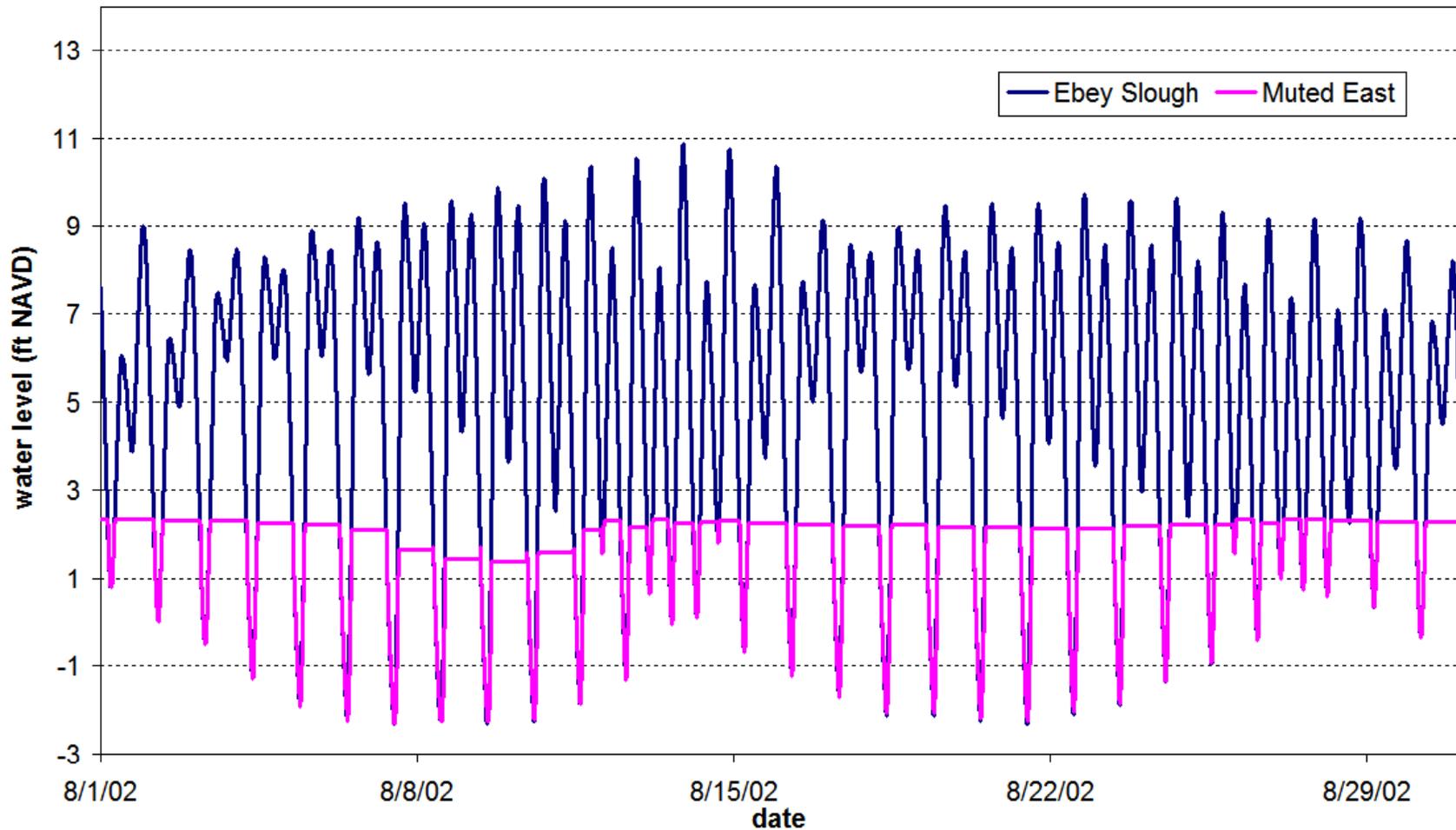


# Muted tidal area habitat

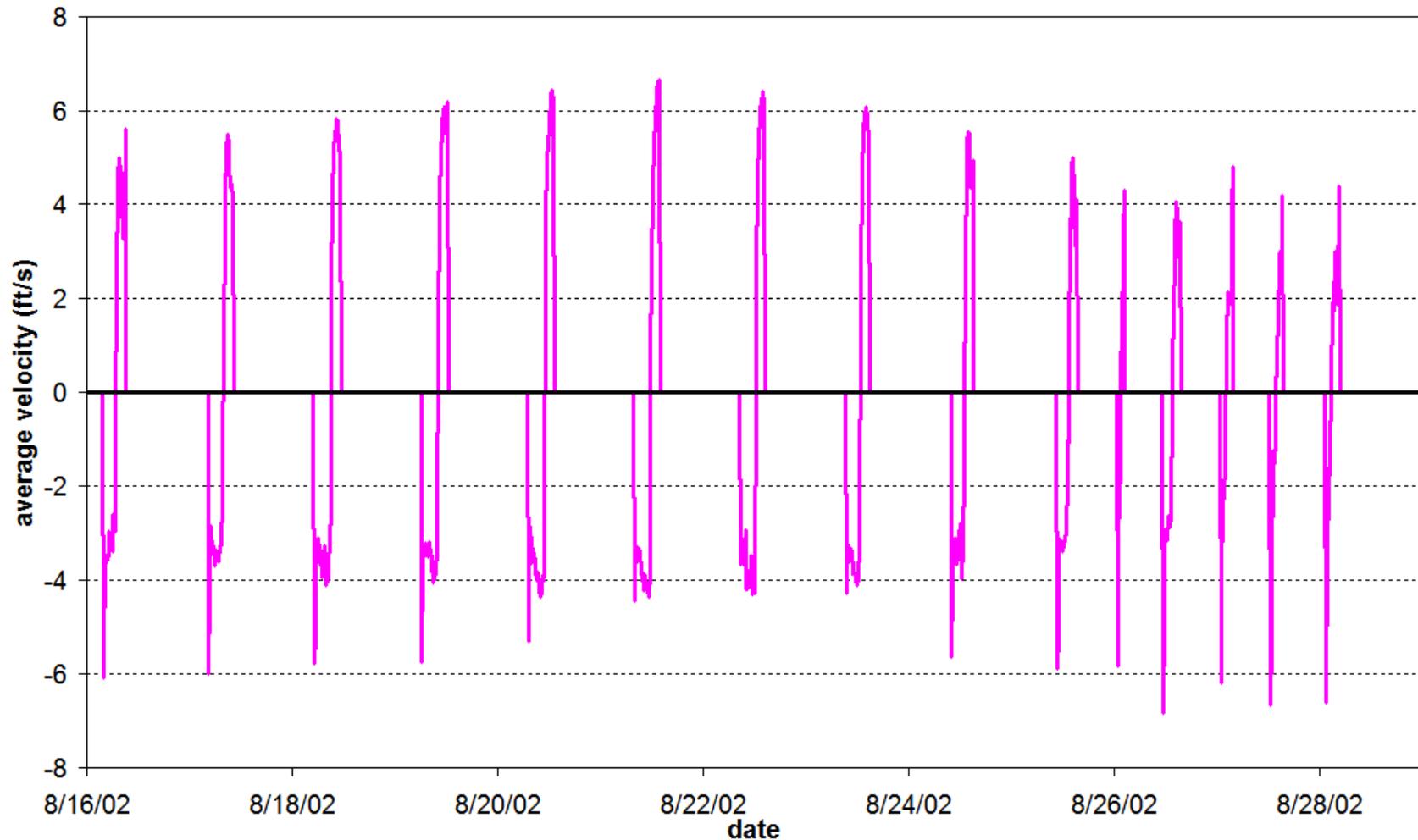
Water levels for 'typical' (~Q2) winter discharge



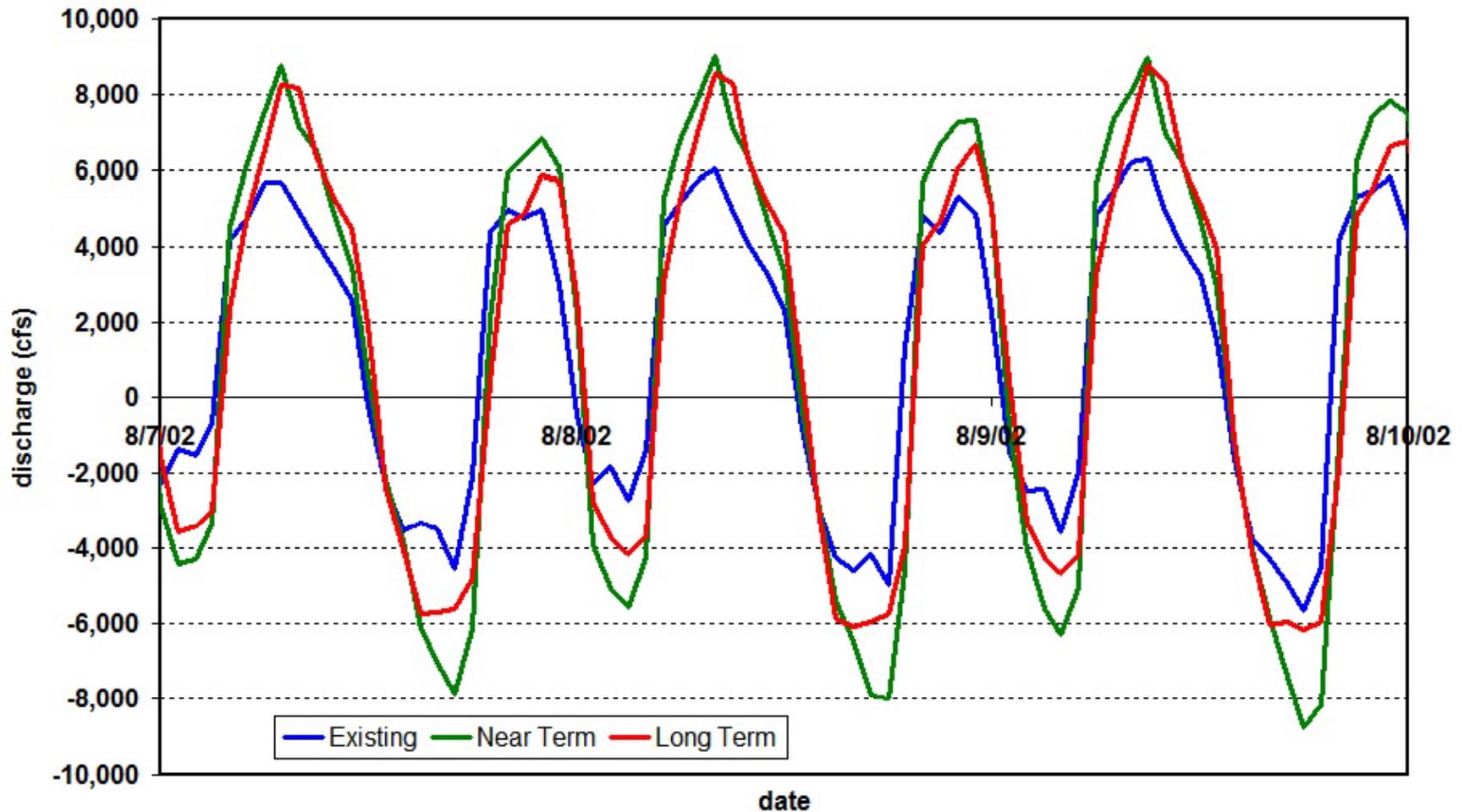
# Muted tidal area habitat Dry season water levels



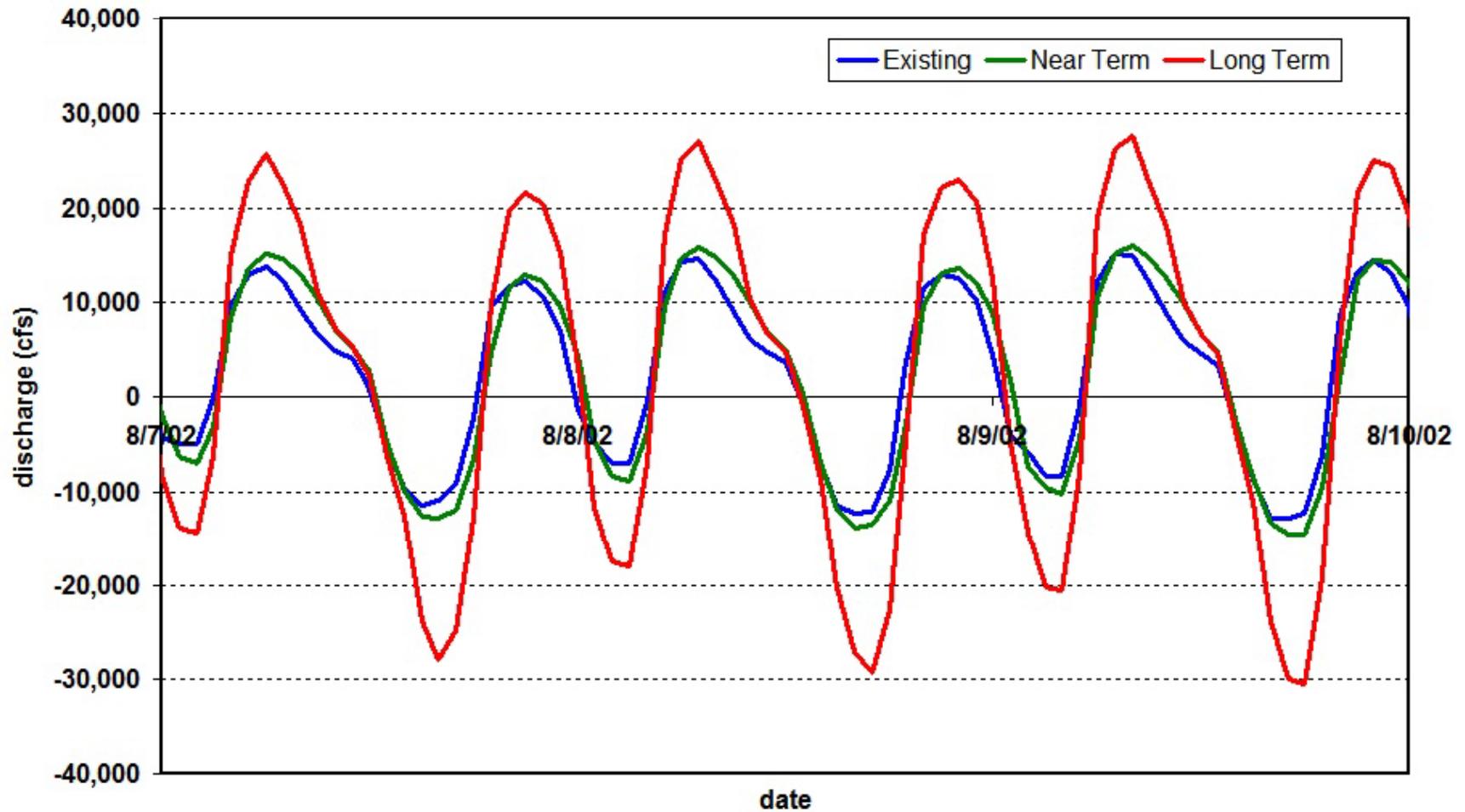
# Muted tidal area habitat Hydraulic structure flow conditions



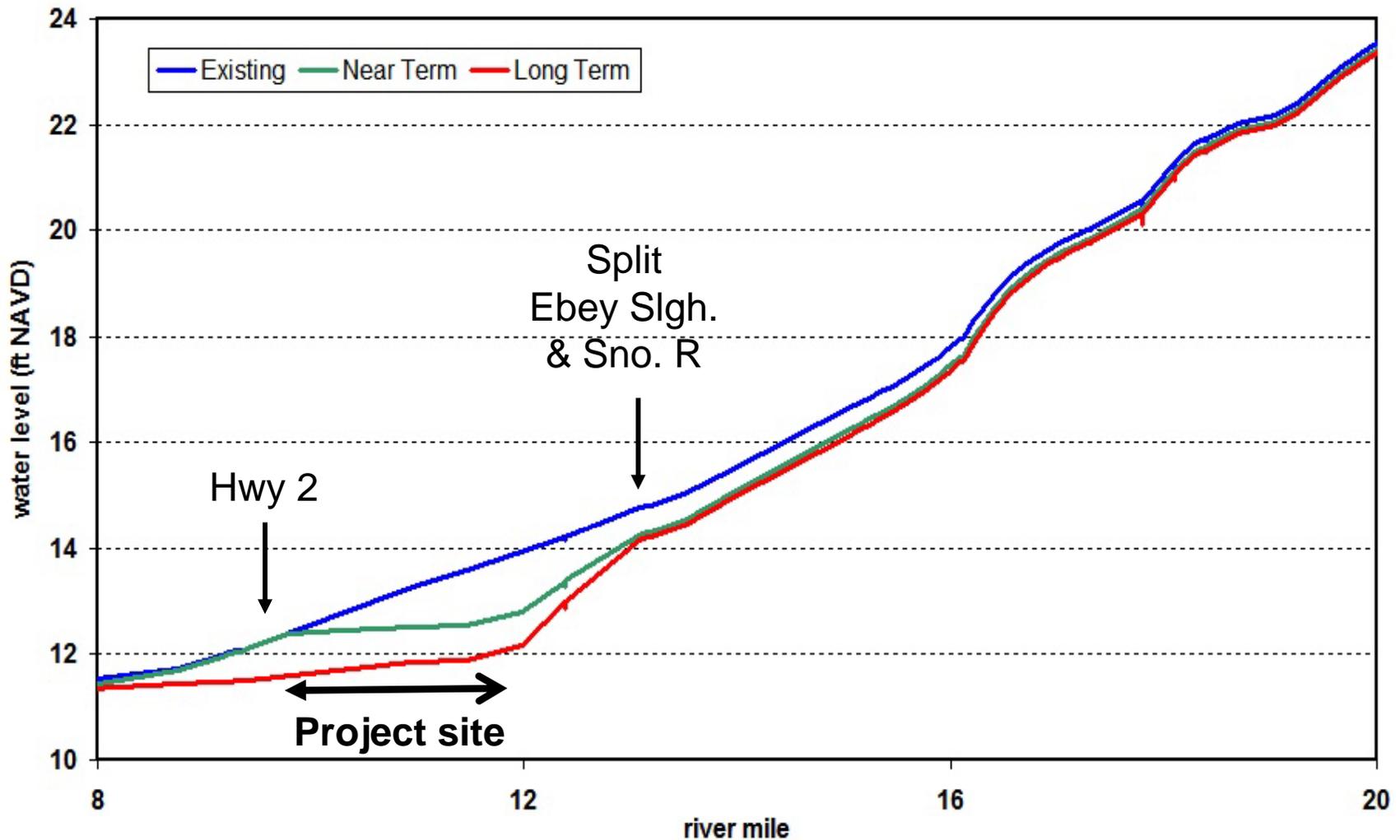
# Tidal discharge in Ebey Slough Downstream of restoration



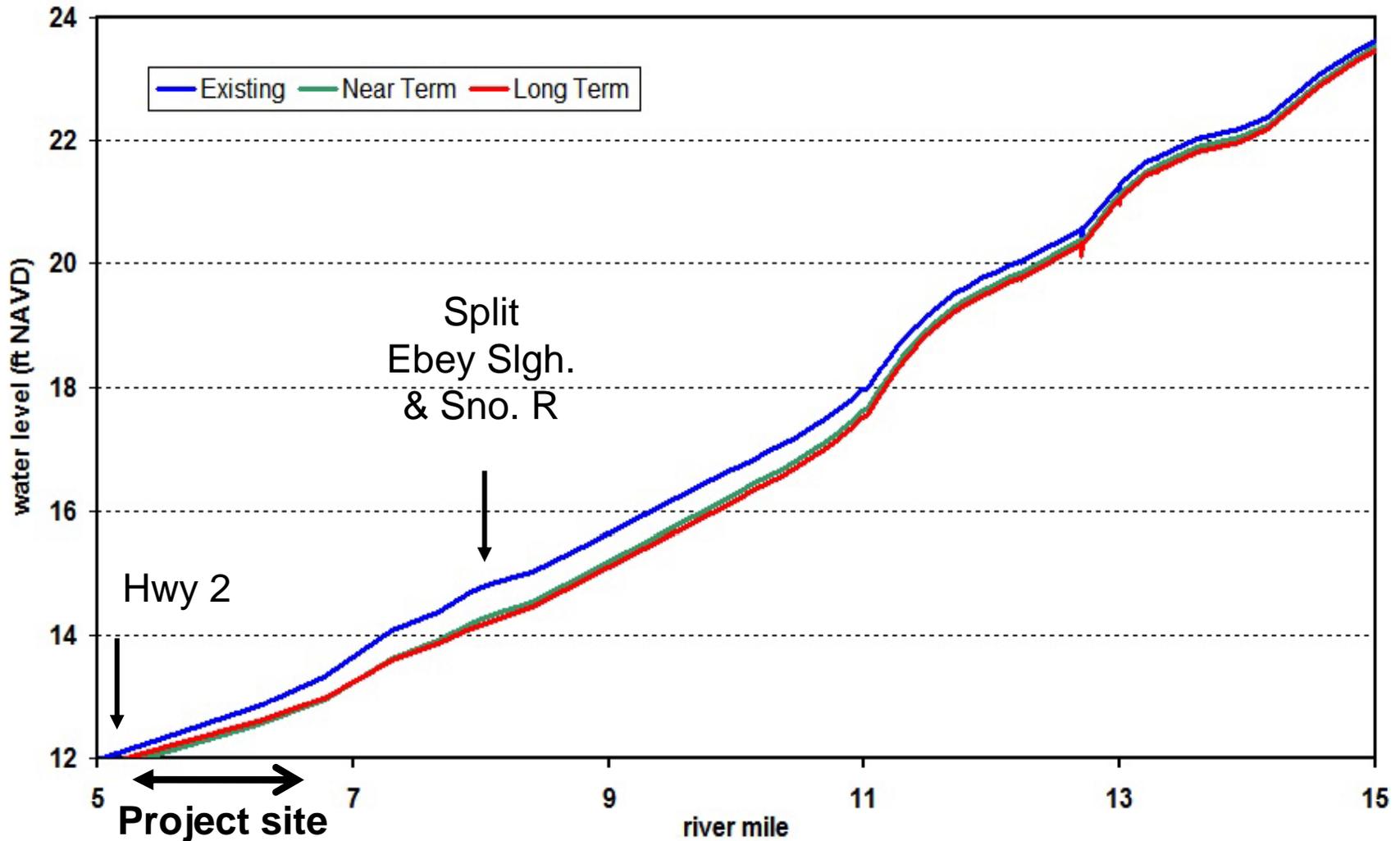
# Tidal discharge in Snohomish River Downstream of restoration



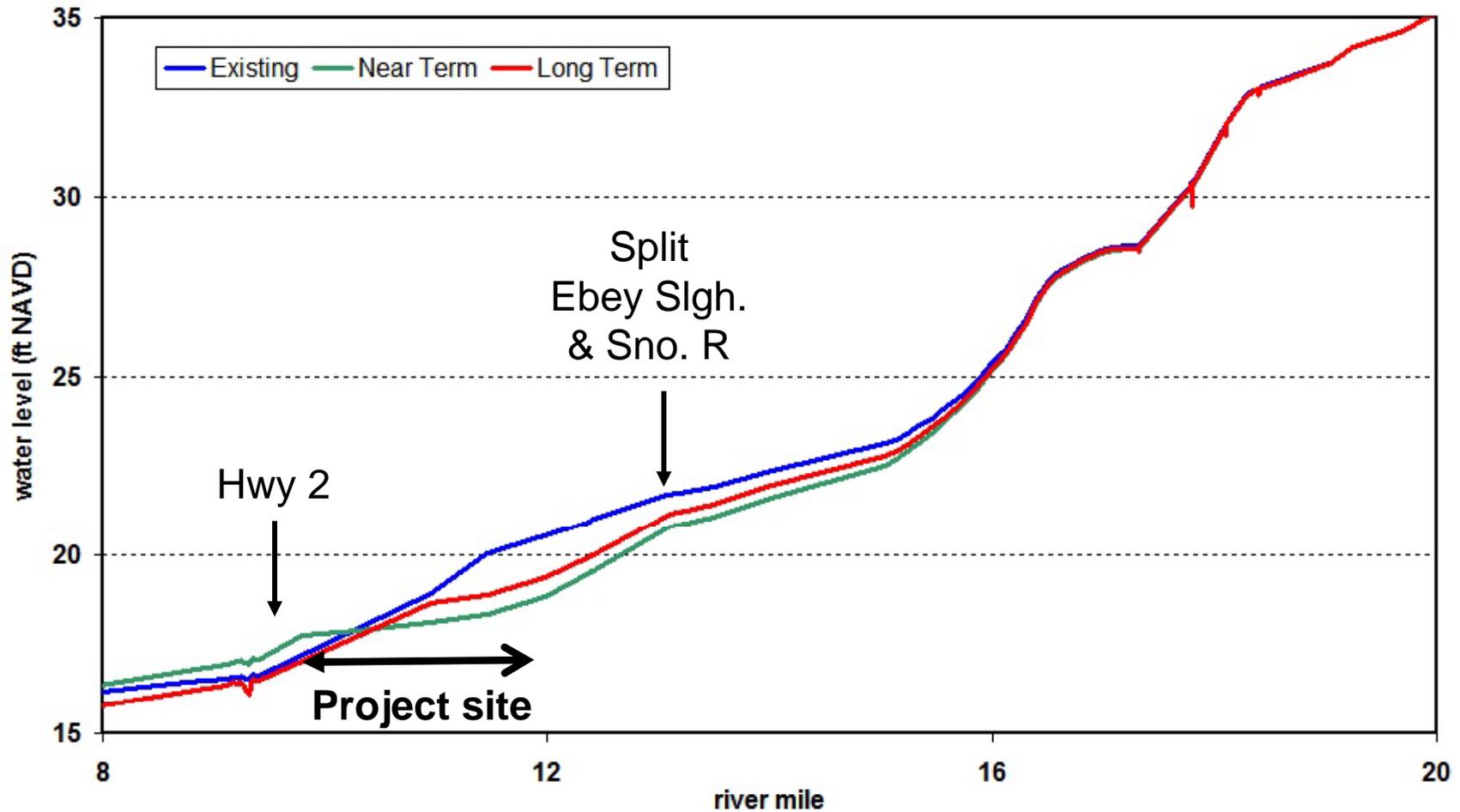
# Peak water levels – Ebey Slough ‘Typical’ (~Q2) winter discharge



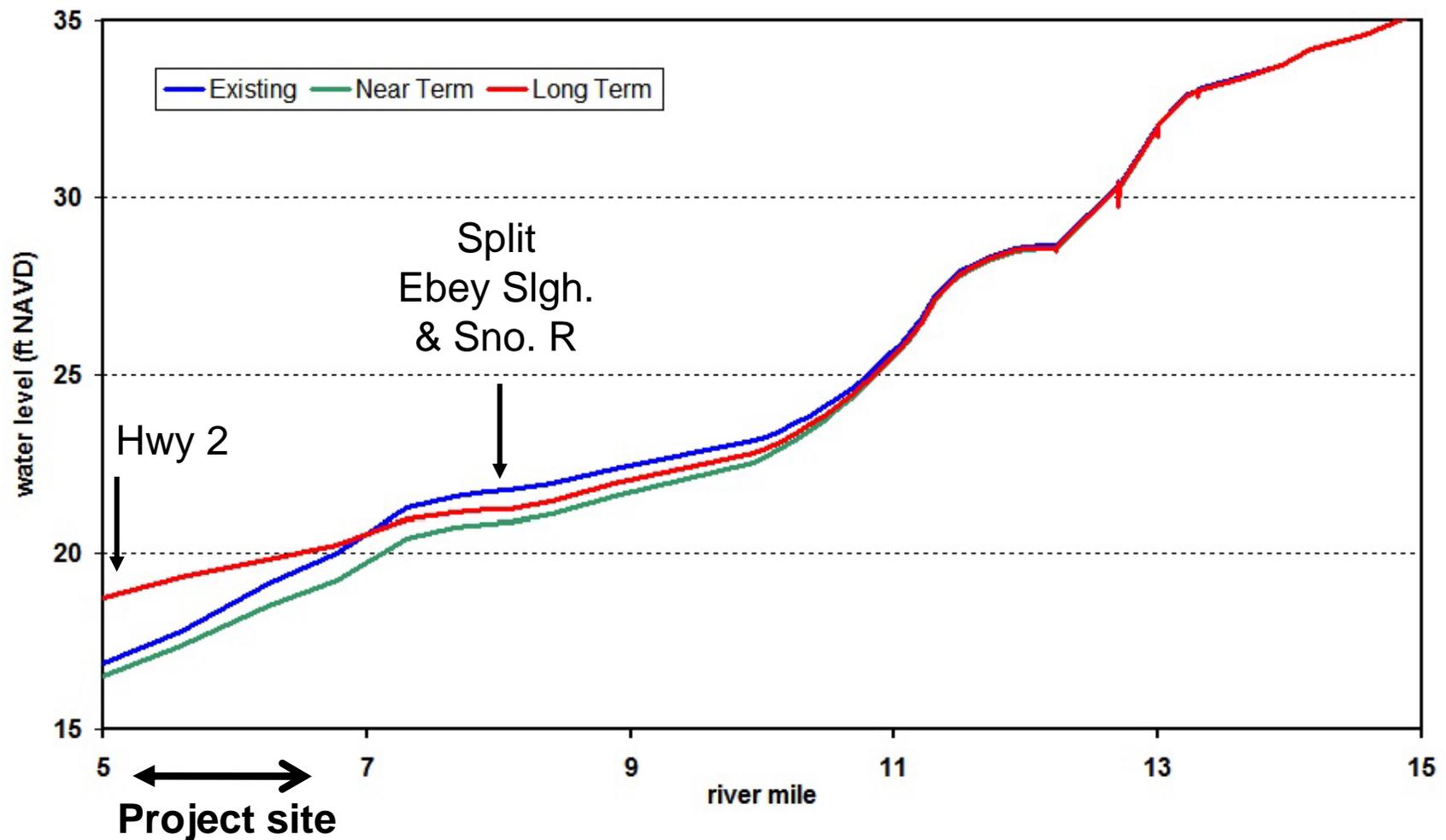
# Peak water levels – Snohomish River ‘Typical’ (~Q2) winter discharge



# Peak water levels – Ebey Slough 100-year discharge



# Peak water levels – Snohomish River 100-year discharge



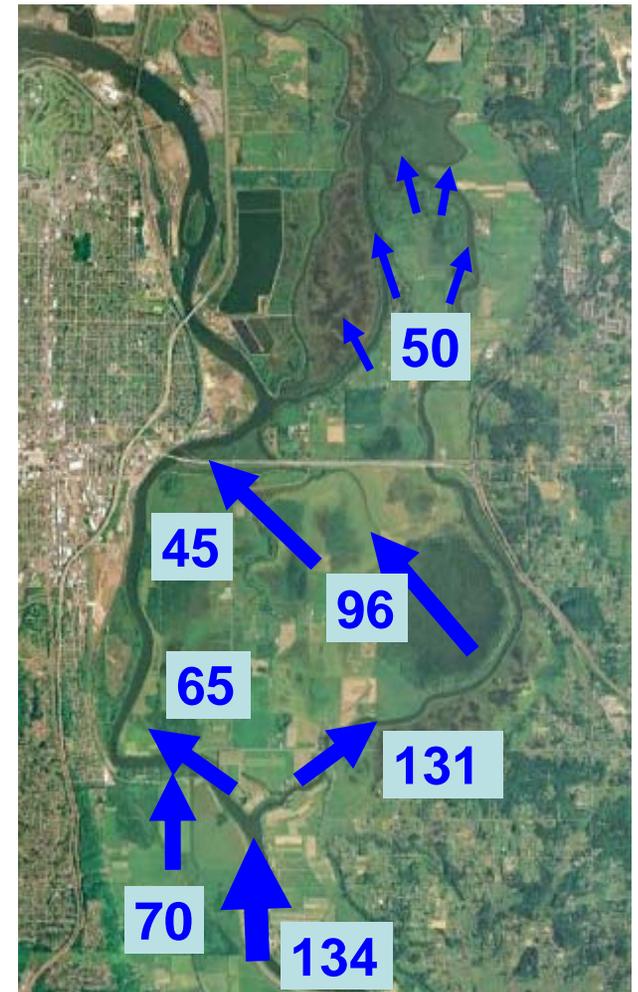
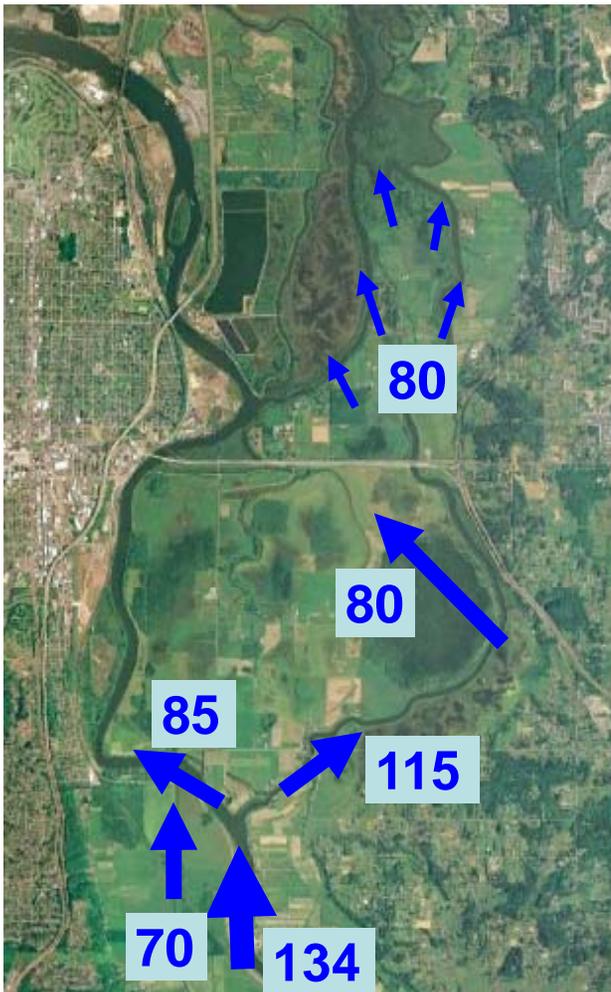
# Model's flood pathways – 100-year event

**XX** = 1,000 cfs

Existing

Near Term

Long Term



## Conclusions

### Habitat

- Full tide range in fully connected restoration areas
- Muted tide characteristics
  - 3-4 ft tide range
  - Minimum structure flow area approximately 70 ft<sup>2</sup>
  - Disconnected from tides for ~ 1 week during winter runoff

### Potential impacts

- Increased tidal discharge
- Improved conveyance of 2-year flood
- Variable impacts on 100-year flood (model uncertainty)