



Hydraulics | Hydrology | Geomorphology | Design

Floodplains Reimagined

Rice field and wetland winter flood management

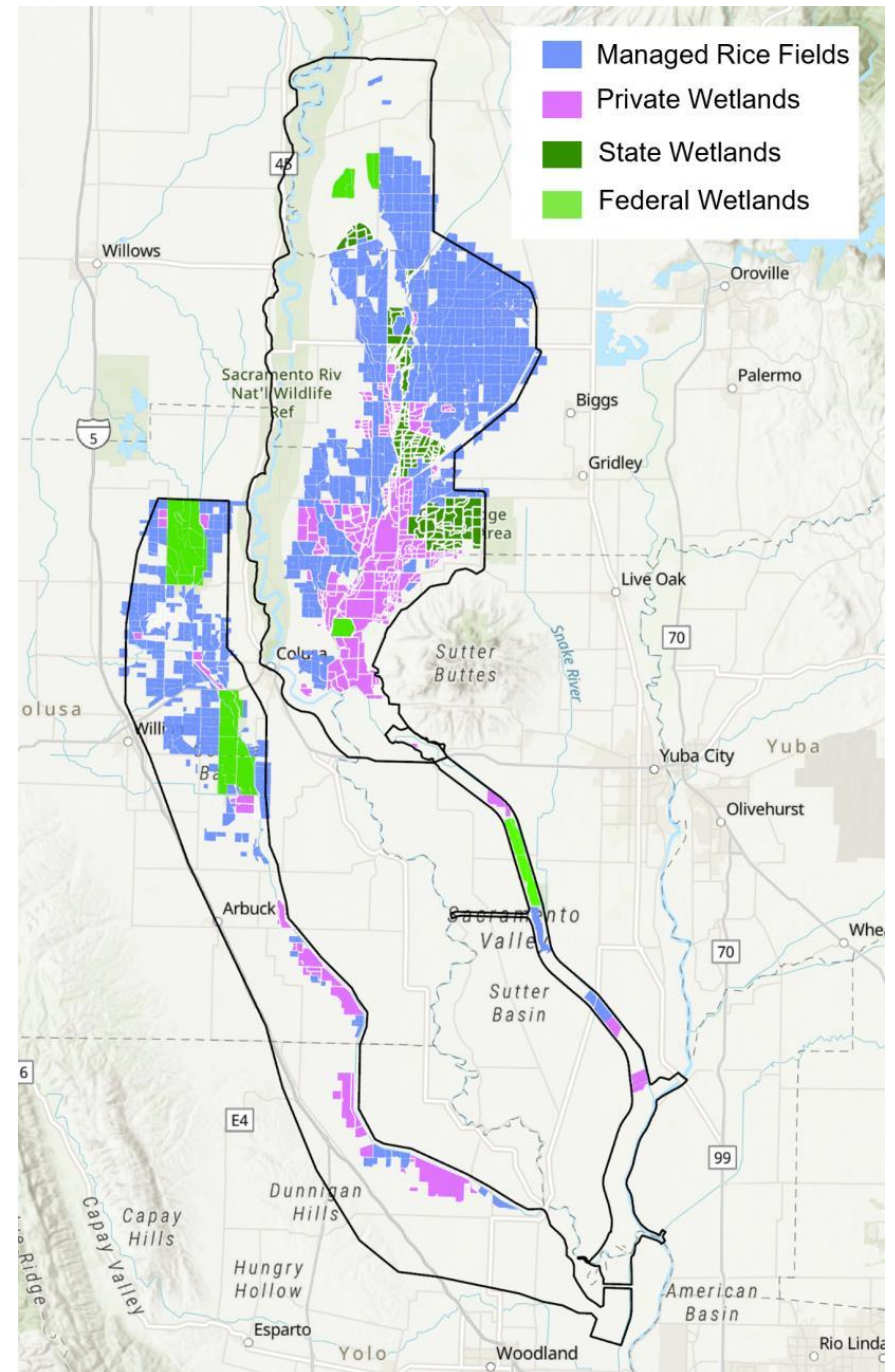
Oct 14, 2022

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Environmentally sustainable solutions for the water resources industry

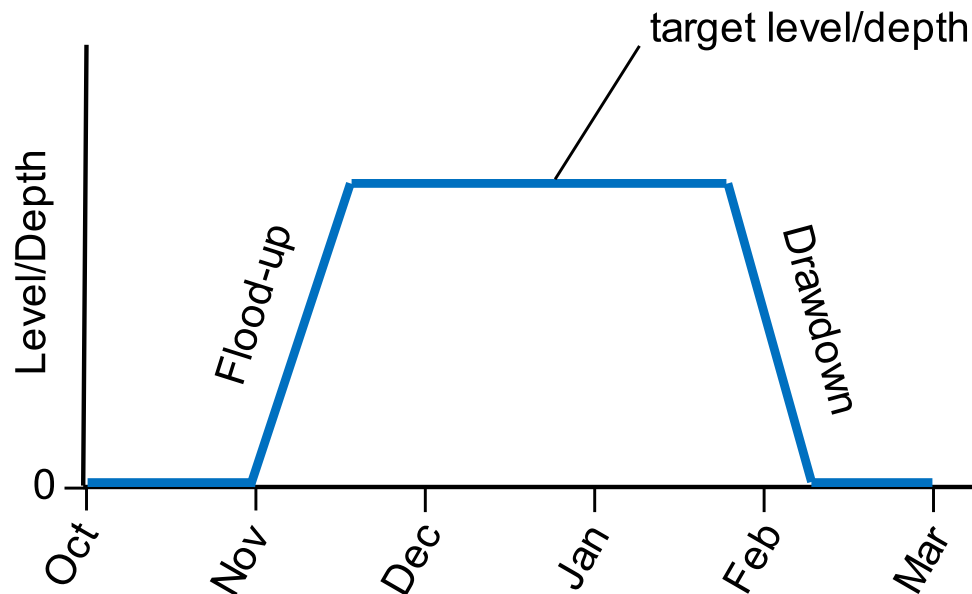
Wetland Types

- Rice fields
- Private wetlands
- Public wetlands
 - State
 - Federal



Objectives

- Specify typical flood-up and drawdown schedules for all wetland types
- Specify target depths and/or water levels
- Adjust areas with bad LiDAR based on target water levels and depths

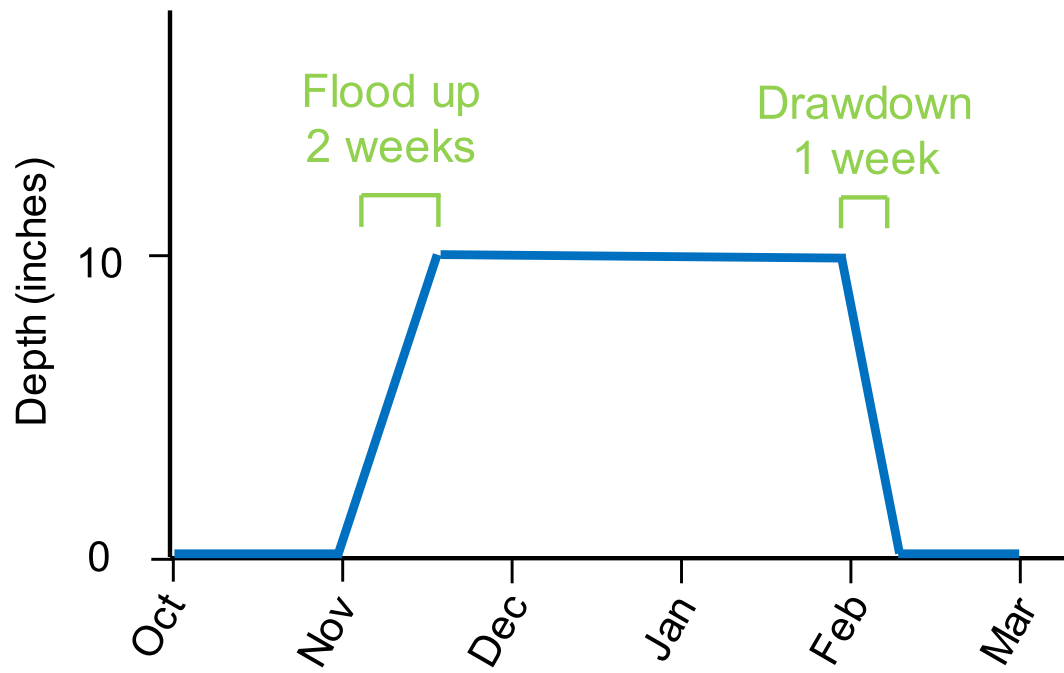


Simplifications

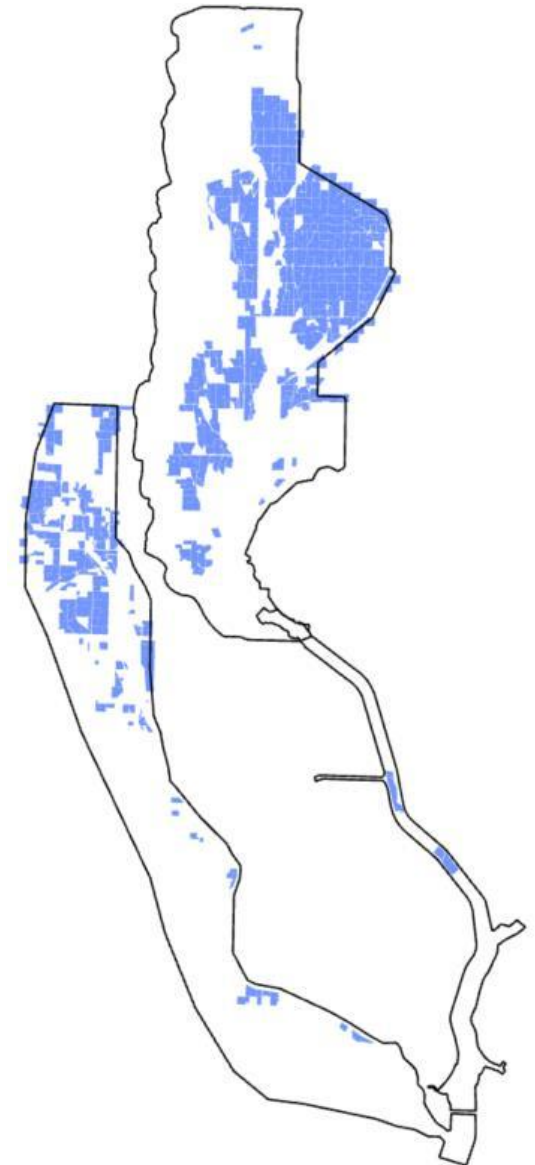
- Not modeling the details of the field water delivery system, instead rice fields and wetlands are assumed to have a local water source
- Not representing year-to-year variability in managed inundation extents due to water availability (average managed inundation)
- Imposing typical flooding schedules, that are appropriate for baseline conditions, on every year for the inundation
- Representing natural hydrologic variability in the river inflows
- Rice fields with water management were identified through multiple years of inundation extent remote sensing

Flooding Schedule

Winter Managed Rice Fields

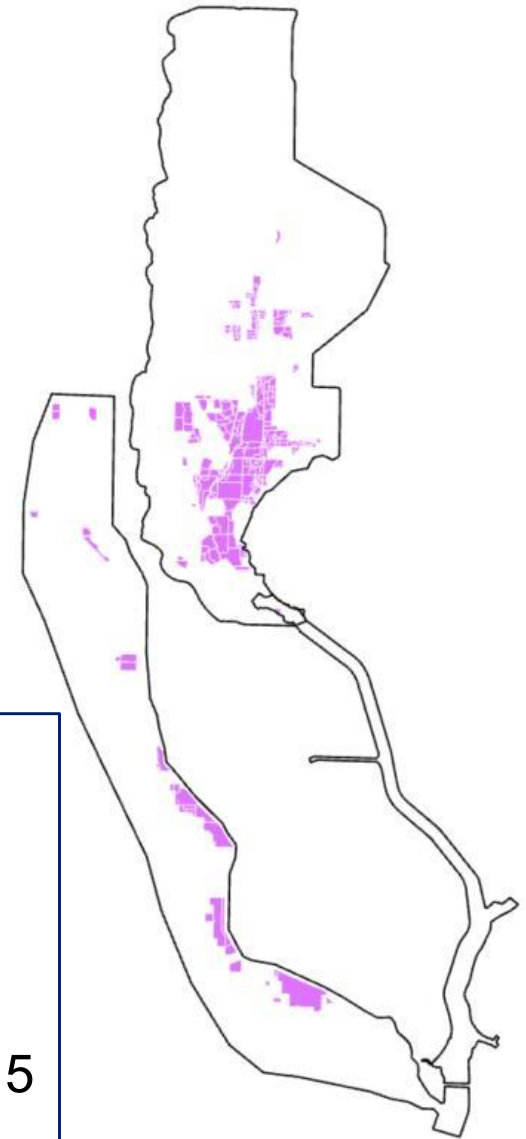
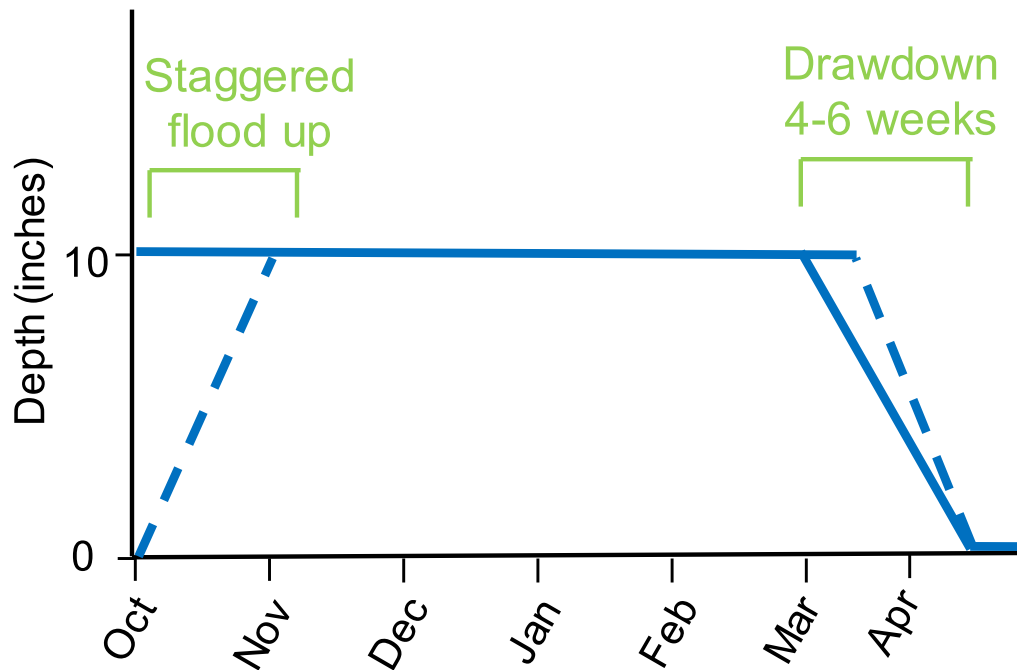


- Flood-up starting Nov 1
 - 2-week flood-up
- Target depth: 10 inches
- Drawdown beginning Feb 1
 - 1 week drawdown



Flooding Schedule

Private Wetlands – Butte Sink Clubs, Wetland Reserve Program



Butte Sink Duck Clubs

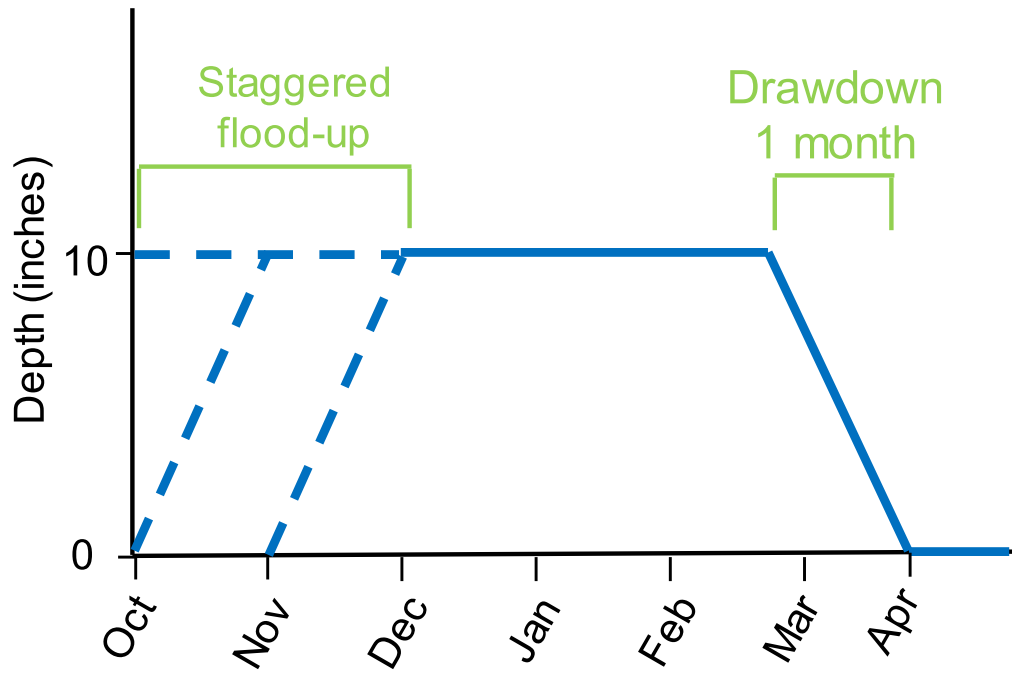
- Simulations begin Oct-1 with wetlands flooded-up
- Target depth: 10 inches
- Drawdown beginning Mar 1
 - 6 week drawdown

Wetland Reserve Program

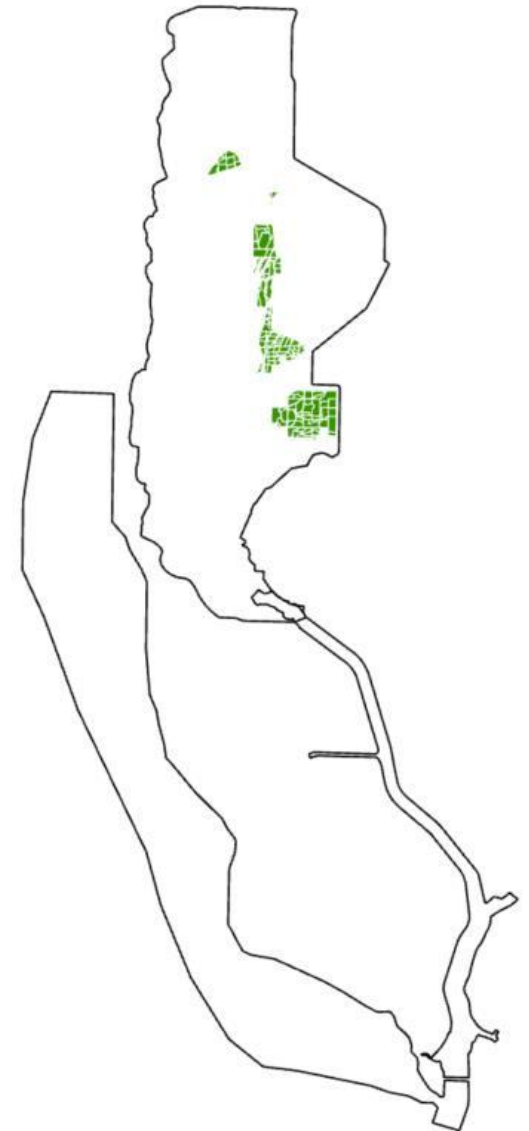
- Flood-up starting Oct-01
 - 4-week flood-up
- Target depth: 10 inches
- Drawdown beginning Mar 15
 - 4 week drawdown

Flooding Schedule

Public Wetlands – Gray Lodge and Upper Butte Basin Wildlife Area



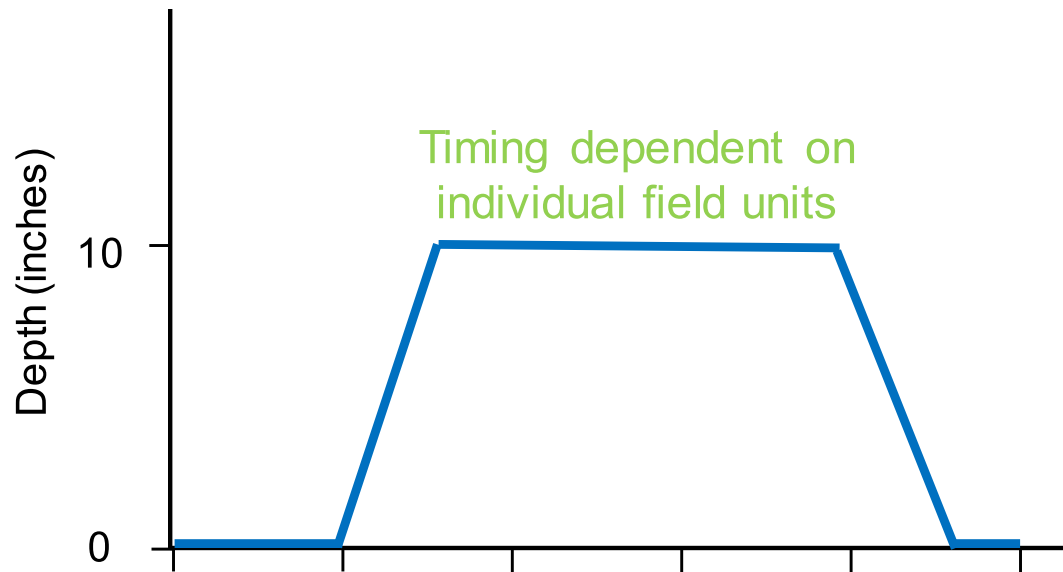
- Staggered flood-up depending on field location
- Target depth: 10 inches
- Drawdown beginning Mar 1
 - 1 month drawdown



Flooding Schedule

Public Wetlands – Federal NWR

Flood-up and drawdown dates from USFWS Habitat Management Plans



- Flood-up variable (Aug-Dec)
 - \pm 2-week flood-up
- Target depth: 10 inches (unless stated otherwise)
- Drawdown variable (Mar-May)
 - \pm 2-week drawdown



LiDAR DEM Adjustments

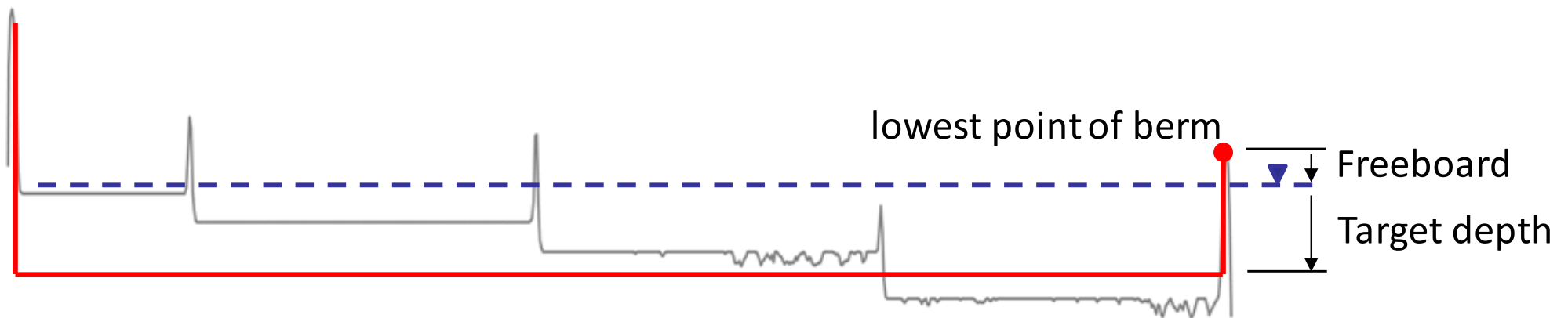
- Land elevations are unknown in areas inundated during LiDAR acquisition (many rice fields and wetlands)
- Elevations must be approximated to provide reasonable depth and volume characteristics for hydrodynamic and habitat modeling

LiDAR DEM Adjustments

Rice Fields

Set the field elevation based on the lowest elevation of the field berm, this method generally represents the volume of the rice fields with checks

Field bottom = berm low point – freeboard (4") – target depth (10")



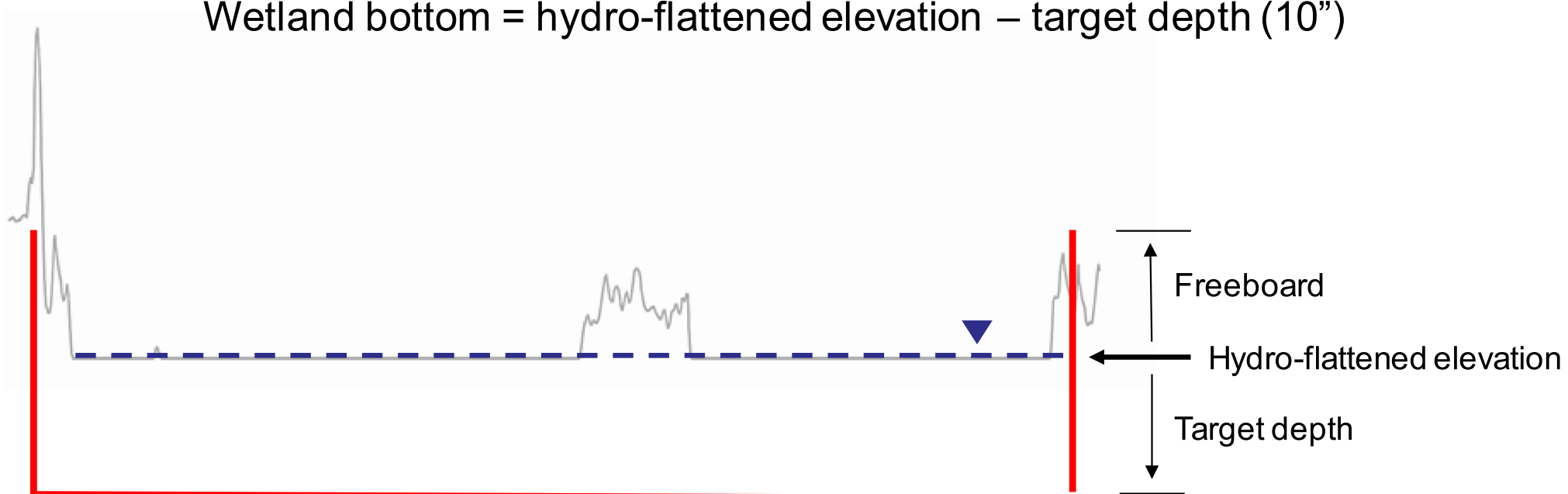
- LiDAR terrain
- Corrected terrain
- - Management water surface

LiDAR DEM Adjustments

Wetlands

Target water level from hydro-flattened LiDAR

Wetland bottom = hydro-flattened elevation – target depth (10")



- LiDAR terrain
- Corrected terrain
- - Management water surface