

PRELIMINARY BREAKDOWN OF HYDROLOGIC DATA OF DITCHED CHESAPEAKE BAY MARSH, MARYLAND EASTERN SHORE

Dorothea J. Lundberg, Brian A. Needelman, Karen Prestegaard
(dotlundberg@gmail.com), University of Maryland



HISTORY

- 1912- Extensive ditching of coastal marshes began in New Jersey to control mosquitoes by draining pooled water
- 1933- Ditching was originally restricted to low metropolitan areas then expanded with relief labor as an organized result of the economical depression.
- 1938- Similar mosquito control activities comparable to in New Jersey begun in other coastal States.
- Harvesting and production of salt marsh hay

SITE CHARACTERISTICS_OVERALL PROJECT

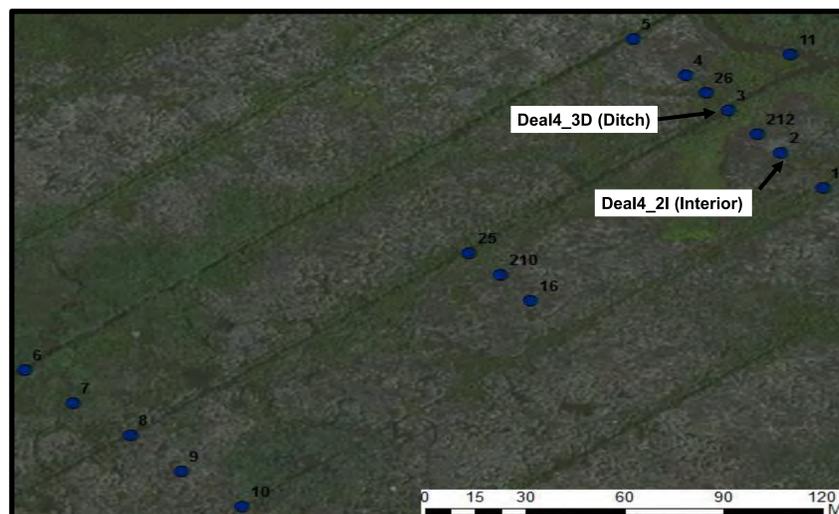
- 3 paired sites of ditched/unditched and 1 reference site
 - 4 sites at Deal Island, Somerset County, MD
 - 2 sites at EA Vaughn, Worcester County, MD
 - 1 site at Monie Bay, Somerset County, MD
- Hydrology
 - Frequently flooded; ditches have constant surfacewater
- Vegetation
 - Dominant: black needlerush (*Juncus roemerianus*), smooth/saltmarsh cordgrass (*Sp. alterniflora/patens*)
- Soils
 - Submerged uplands; Typical profile: peat, sandy loam, loam

METHODS

- Well loggers record every 15 minutes
- Weather station records every 15 minutes
- Piezometers grab samples for salinity
- Soil cores taken once a year to 90 cm



Ditch at Deal Island. Vegetation: black needlerush (right) & cordgrass (left)



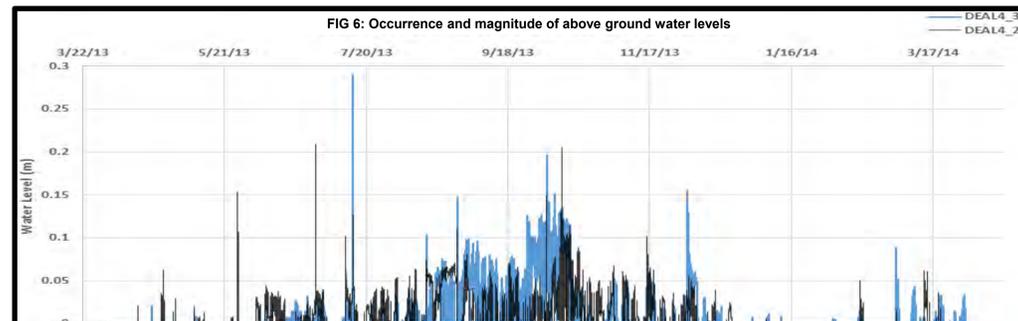
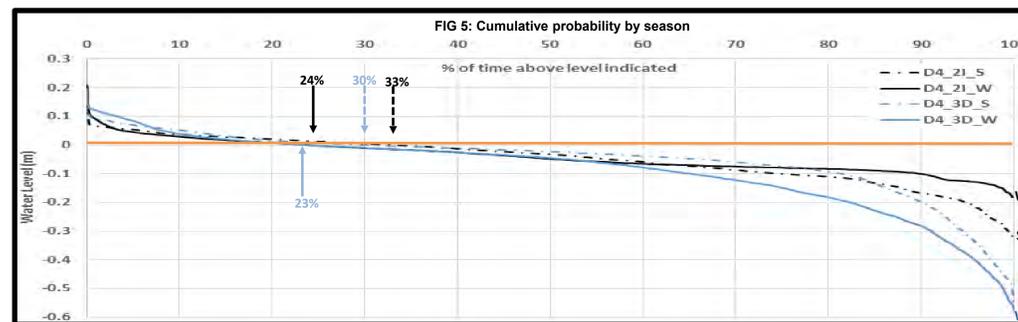
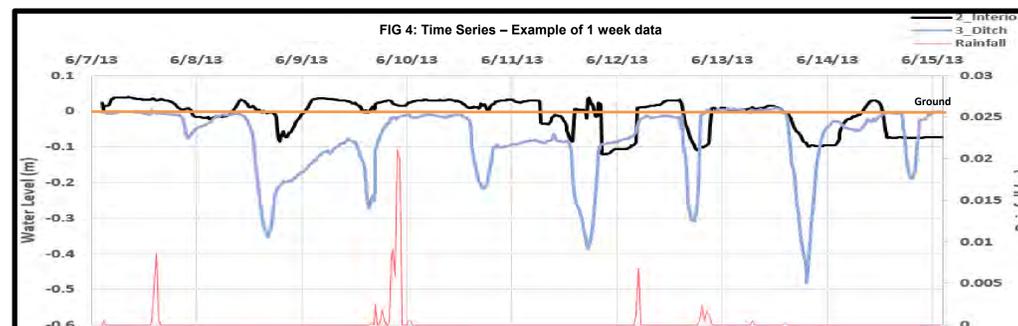
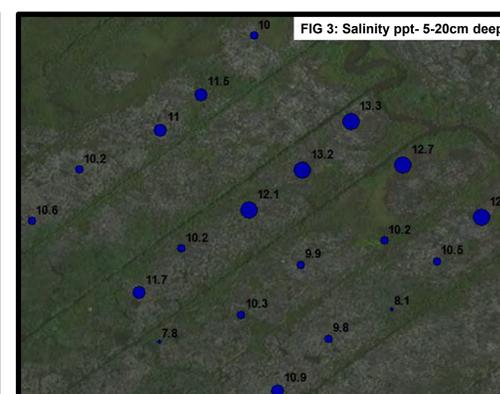
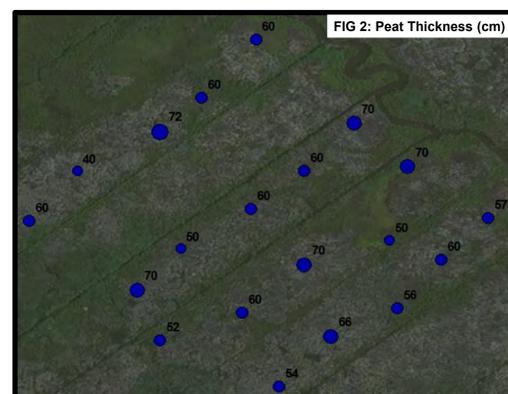
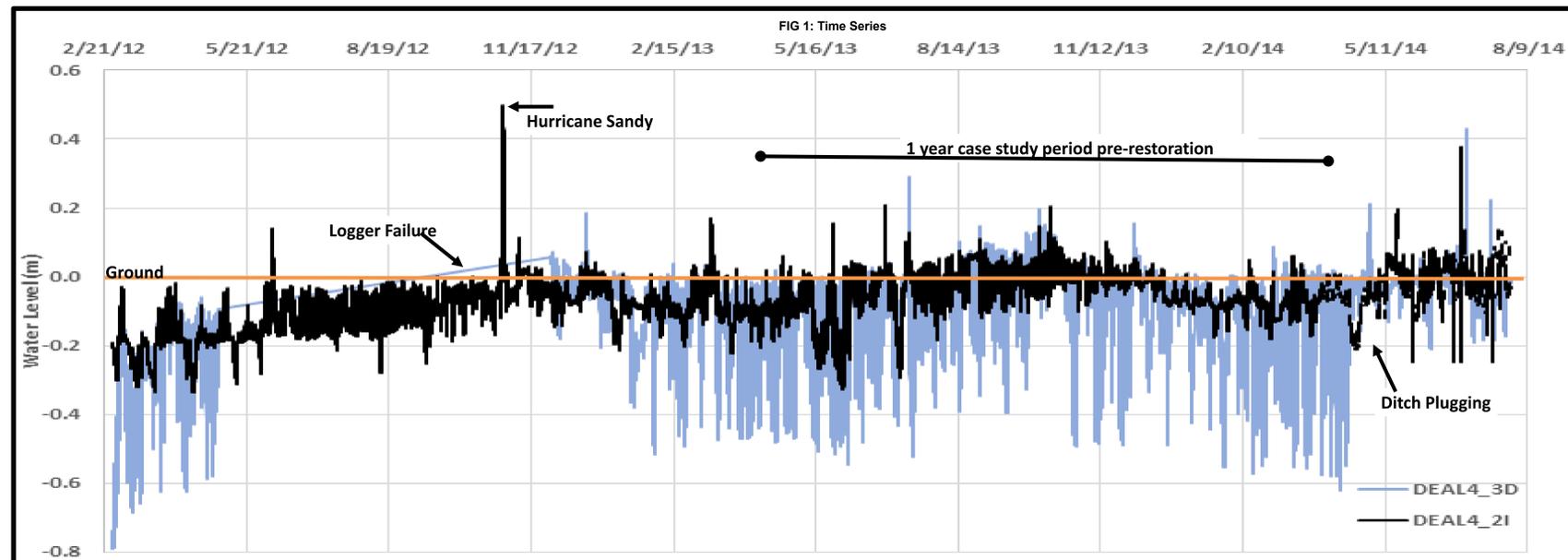
Deal Island site showing ditched site well locations. Note vegetation changes.

ACKNOWLEDGEMENTS

- NOAA National Estuarine Research Reserve System Science Collaborative Program, USGS, Maryland Water Resources Research Center, Garden Club of America Wetlands

OBJECTIVE

- To identify relations among tidal flows, geomorphic surfaces, salinity, and sedimentation pre/post ditch restoration.



RESULTS

- Time Series- Figure 1
 - Shows increases from ~4/1/13 to 10/1/13
 - Ditch well more variable; lowest minima
 - Shows 2 main seasons; summer and winter
 - Summer shows a recharge period
 - Winter shows a discharge period
 - Higher water levels in the interior marsh indicates a draining system towards ditches
 - Hurricane Sandy highest event to date
 - Ditch plugging raises minima which inhibits draining
- Peat Thickness- Figure 2
 - Peat layer is 50-70 cm (average = 66 cm)
- Salinity - Figure 3
 - Salinities range from 7.8 to 13.3 ppt
 - Salinities are highest near tidal creek and decrease with distance away
 - Salinities are highest surrounding dominant ditch
- Time Series 1 week- Figure 4
 - Ditch well shows a dampened tidal influence
 - Interior well only shows tidal influence during low tides
 - Rainfall doesn't seem to be a strong direct influence on water levels in either well
- Probability Cumulative- Figure 5
 - Water level is at or above the surface a similar percentage of time at both wells. Ditch well has lower minima.
- Above ground occurrence- Figure 6
 - Above ground water level occurs at both sites between June and November
 - Ditch above ground events are more concentrated in time

DISCUSSION

- Ditch plugging affects water level minima
- Annual variation in water levels may be forced by tidal amplitudes variations