



# Marsh Analysis and Planning Tool Incorporating Tides and Elevations (MAPTITE): A Geospatial Tool for Estuary Restoration

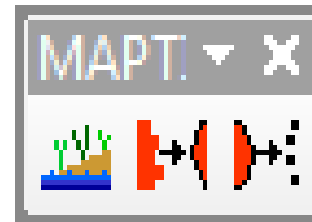
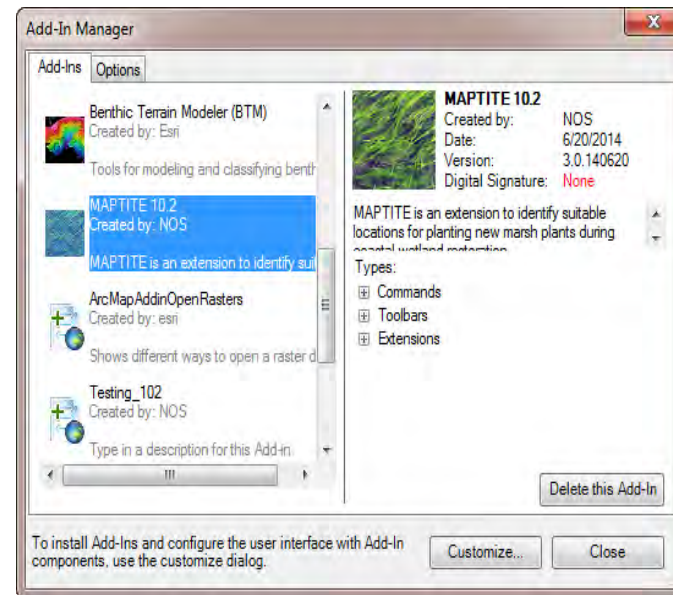
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Restore America's Estuaries 2014 Summit

November 3, 2014

# MAPTITE 10.2 – What is it?

## Marsh Analysis & Planning Tool Integrating Tides & Elevations



An ESRI ArcGIS add-in that automates the process of connecting tidal datums and land elevations to produce planting zones.

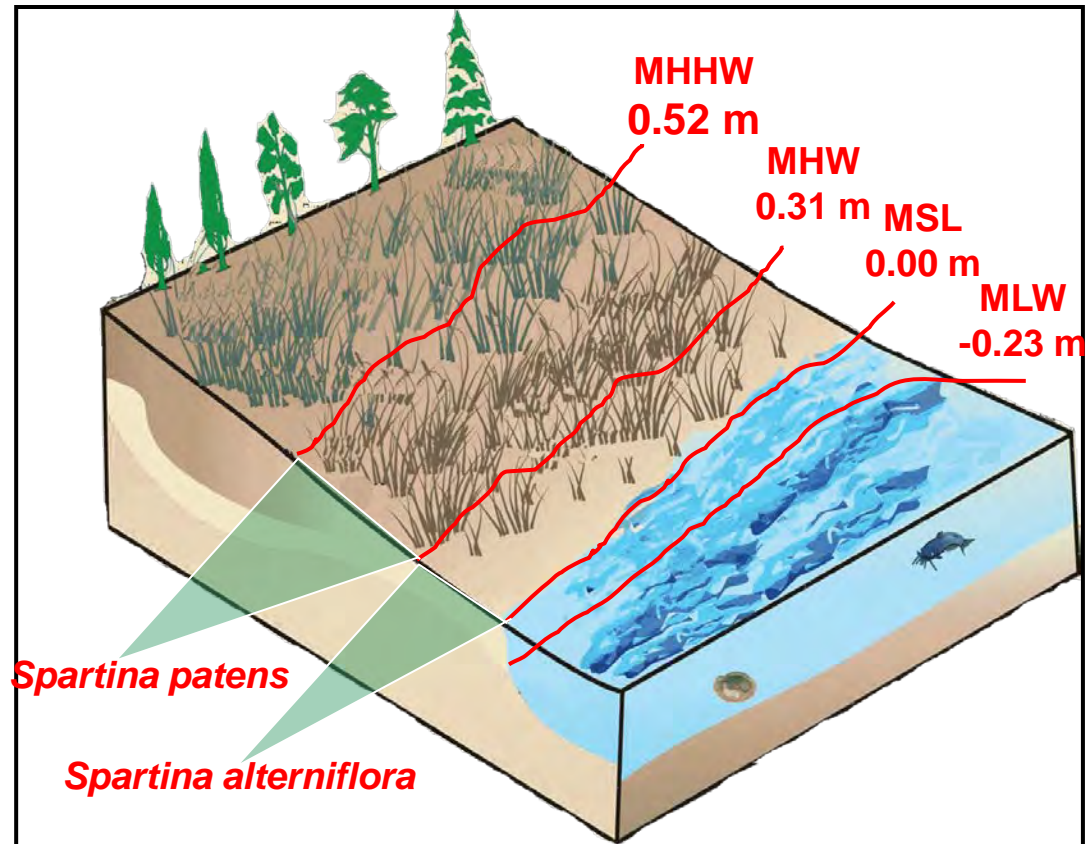
# Planting Zones by Tidal Datums

## **Frequency of Inundation:**

- How often the water reaches a spot on the marsh surface

## **Duration of Inundation:**

- How long the water stays on that spot on the marsh surface



# MAPTITE Input

MAPTITE Selection Form

DEM Layer: niwb\_sp.img

DEM Ground Units: Meter

MSL Adjustment: 0.009

Clip Polygon Layer: [Empty]

DEM Z Units: Meter

Default Spacing: 1.5

Elevation Uncertainty: 0.060960

Clip output to polygon

Output Raster: C:\MAPTITE\niwbgrd

Add output to map

Upland: 5, MHHW: 0.745, MHW: 0.639, MSL: 0, MLW: -0.758, MLLW: -0.816

Buttons: Load Parameters, Save Parameters, Get Datum Info

Plant	Plant Spacing	Upper Limit	MHHW to Upland	MHW to MHHW	MSL to MHW	MLW to MSL	MLLW to MLW	OW to MLLW	Lower Limit	Delete
Spartina alteriaflora	1.5	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-0.816	Delete
Spartina patens	1.5	0.639	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Delete
**			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Buttons: Run, Cancel

- **Digital Elevation Model**–Vertical adjustment to MSL
- **Tidal Datum Elevations** –MHHW, MHW, MSL, MLW, MLLW relative to NAVD88
- **Plant Species Data** –Elevation ranges and plant spacing



# Vertical Datum

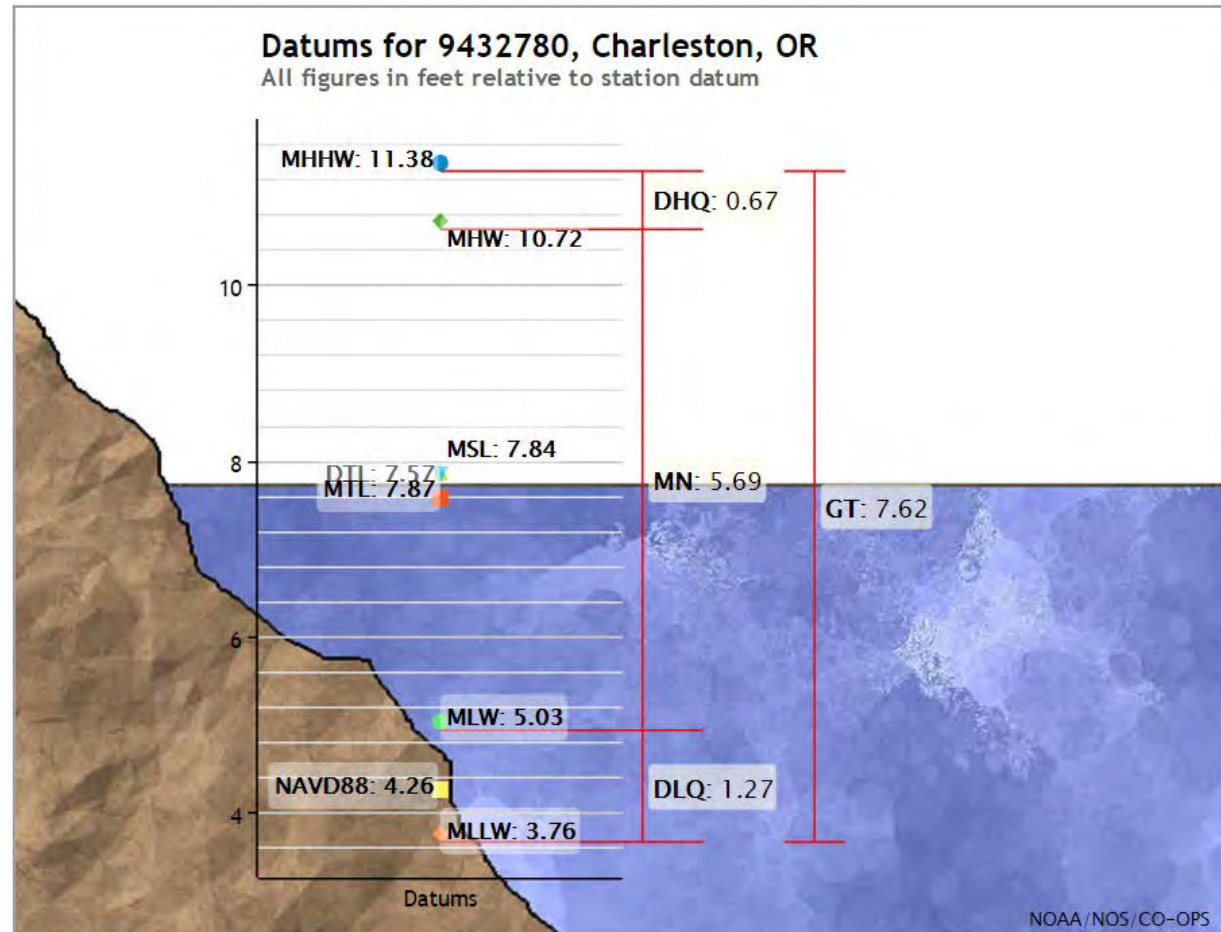
**Datum** – base elevation used as a reference from which to reckon heights or depths

## Geodetic Datum

- Use NAVD 88

## Tidal Datum –

- Based on 19-year period, 1983 – 2001



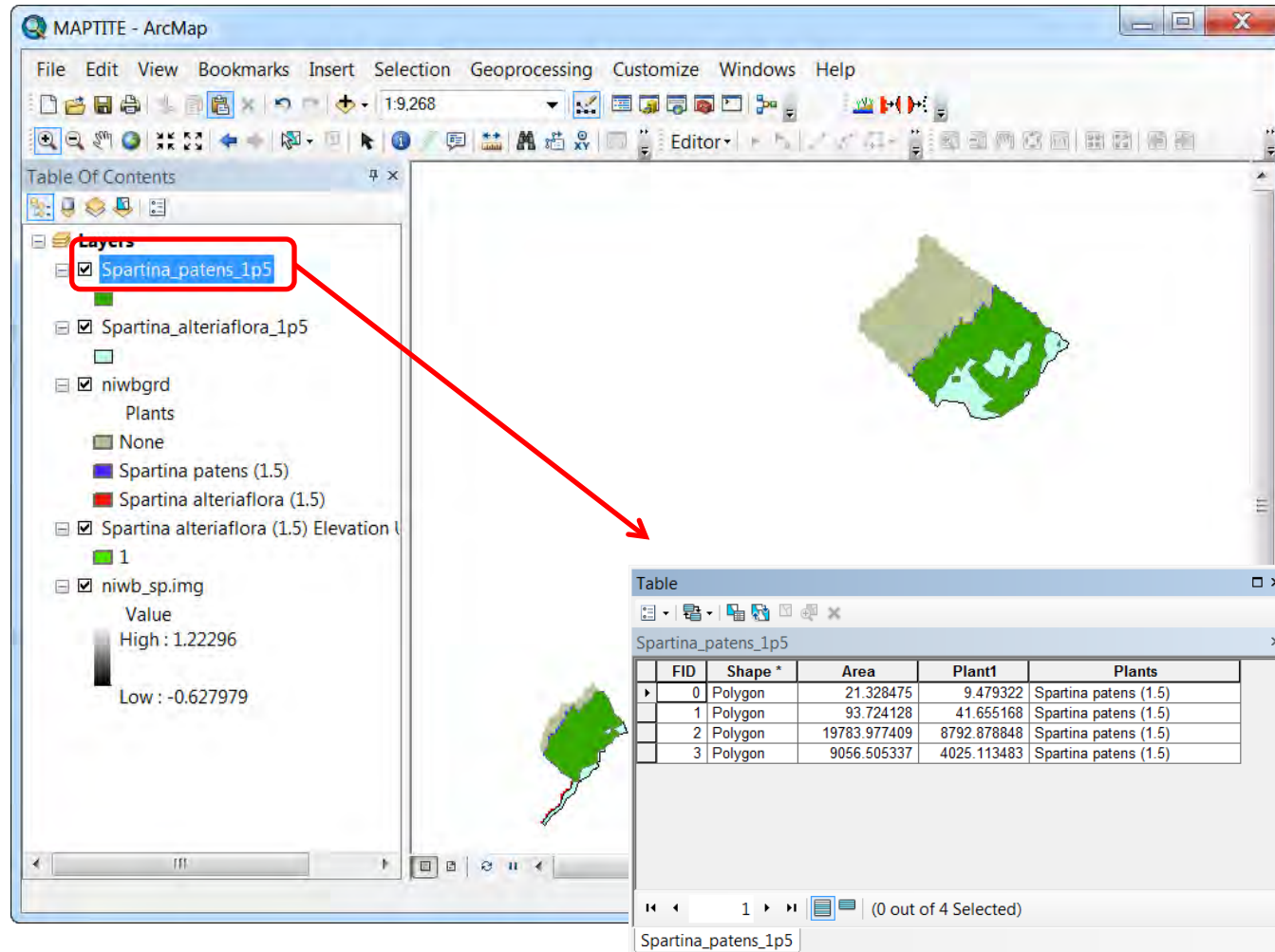
# MAPTITE Output

## Planting Zones for each grass species

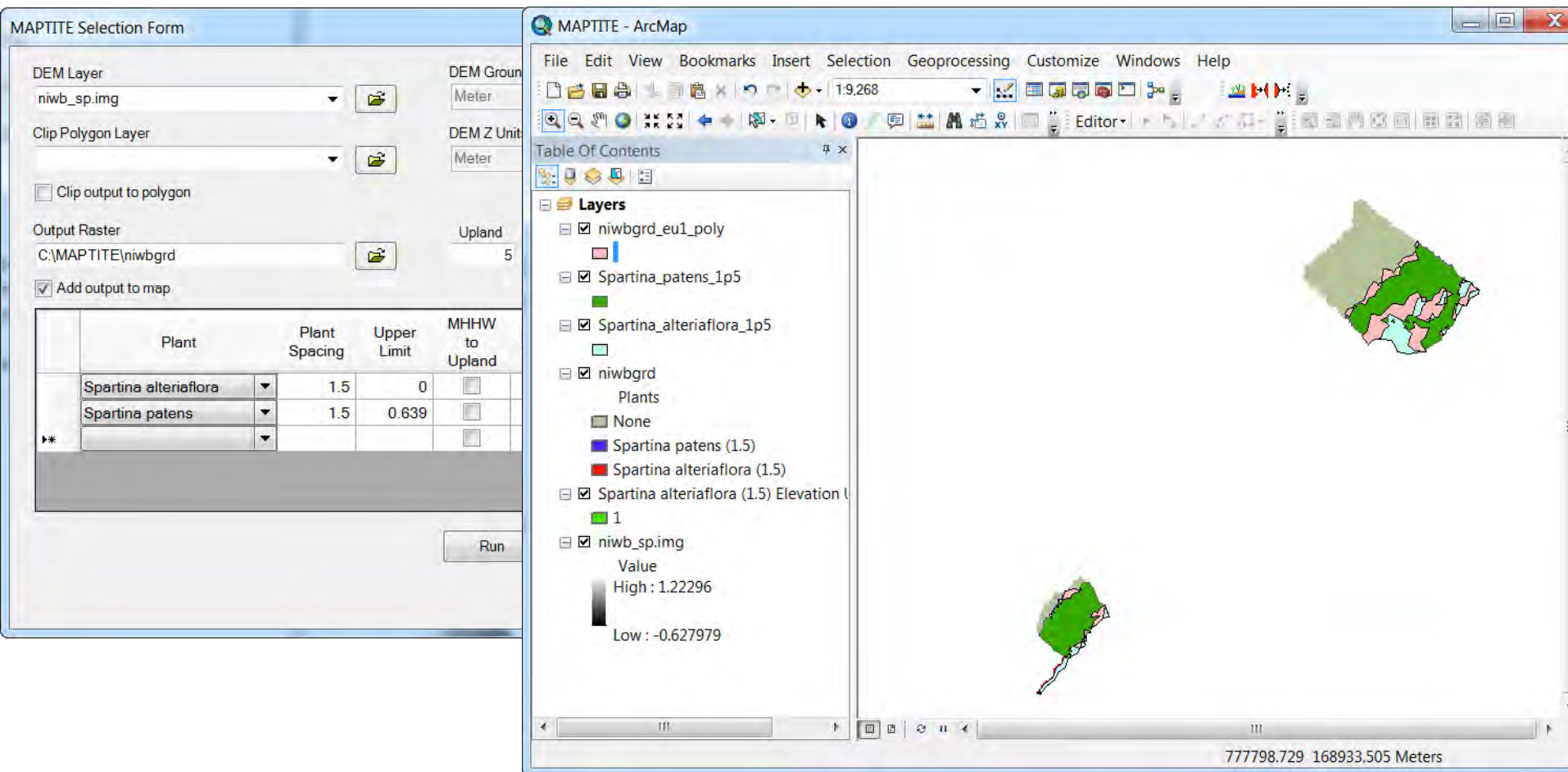
- Individual layers and overlapping zones
- Area statistics for planting zones

## GPS Point Files

- Longitude and Latitude for planting points



# Be Aware of the Uncertainties



The image shows two windows from the MAPTITE software. The left window is the 'MAPTITE Selection Form' and the right window is 'MAPTITE - ArcMap'.

**MAPTITE Selection Form:**

- DEM Layer: niwb\_sp.img
- DEM Ground: Meter
- DEM Z Unit: Meter
- Clip Polygon Layer: (empty)
- Clip output to polygon:
- Output Raster: C:\MAPTITE\niwbgrd
- Upland: 5
- Add output to map:

	Plant	Plant Spacing	Upper Limit	MHHW to Upland
	Spartina alteriaflora	1.5	0	<input type="checkbox"/>
	Spartina patens	1.5	0.639	<input type="checkbox"/>
▶*				<input type="checkbox"/>

**MAPTITE - ArcMap:**

- Table Of Contents:
- Layers:
  - niwbgrd\_eu1\_poly
  - Spartina\_patens\_1p5
  - Spartina\_alteriaflora\_1p5
  - niwbgrd
    - Plants
      - None
      - Spartina patens (1.5)
      - Spartina alteriaflora (1.5)
    - Spartina alteriaflora (1.5) Elevation U
    - 1
  - niwb\_sp.img
    - Value
      - High: 1.22296
      - Low: -0.627979

777798.729 168933.505 Meters

Uncertainty Source: 1). DEM elevation 2). Tidal datum 3). Geodetic Datum

# Application

## Fort McHenry Wetland Restoration



Before

Helping to turn this ...

Using:

- DEM
- Tide gauge
- Datums
- Native Plant Species
- Hard work &
- MAPTITE

... into this!



After



# Where to Access to MAPTITE

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- NOAA ArcGIS Online  
(<http://noaa.maps.arcgis.com/home/item.html?id=d750d3ee608c4e2394e19e79208d01d0>)
- CO-OPS  
(<http://www.tidesandcurrents.noaa.gov/maptite.html>)
- National Centers for Coastal Ocean Science
- Coastal Service Center
- QGIS version will be available soon

Questions? Please contact [co-ops.userservices@noaa.gov](mailto:co-ops.userservices@noaa.gov)



# MAPTITE Partners

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– Methodology, Tides and Tidal Datums



– Elevations & Geodetic Datums



– ArcGIS scripting and software development



– Restoration and plant ecology

