Calibrating, extending, and applying the Nueces Delta Hydrodynamic Model

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Goals

- Model that can predict time-space changes in the salinity distribution from Calallen dam out to the Nueces Bay Causeway
- Understanding of pumping effects for different flow rates under different tide/wind conditions
Tasks

- Calibrate Nueces Delta hydrodynamic model
- Add Nueces Bay to model
- Evaluate freshwater pumping scenarios
Data for Calibration

Instrumentation deployed by TWDB
Calibration

Initial conditions for salinity (by kriging)
Salinity field after 10 day pumping event
Calibration

Nueces 2
Nueces 2
Calibration

Nueces 2

![Graph showing salinity changes over time for Nueces 2]
Calibration

Nueces 4
Calibration

Nueces 4
Calibration

Nueces 4

Not surprising – the present model does not include evaporation
We noted a discrepancy between 2007 lidar and 2011 field data for bottom elevation at this station.
Calibration

Nueces 7

Nueces7-surface elevation

- Surface Elevation [m]
- Field data
- Model result

01/22 02/13 03/06 03/28 04/18 05/10

[Map showing Nueces 7 location]
Calibration

Nueces 10
Calibration

Nueces 10

Nueces10-salinity

Field data
Model result

Salinity [psu]

04/21
05/14
06/04
Calibration

Nueces 11
Calibration

Nueces 11

Nueces11-surface elevation

Surface Elevation [m]

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

01/22 02/13 03/06 03/28 04/18 05/10

Field data
Model result
Nueces 11

![Graph showing salinity data with model results and field data.](Graph.png)
Summary of work to date

• Calibration completed on 30 x 30 m grid.
• Bathymetry for complete system (including Nueces Bay) finished.
• Model runs on complete system are in progress.
• Model runs for pumping scenarios on Nueces Delta are in progress.
My thanks to TWDB, CBBEP, NEAC, and the Nueces BBASC for funding and the opportunity to continue this work.

And also to TWDB and the USACE for the great data collection program.

...and that’s all, folks!