



BASIN WIDE DELFT3D MODEL DEVELOPMENT FOR DELTA MANAGEMENT STUDY

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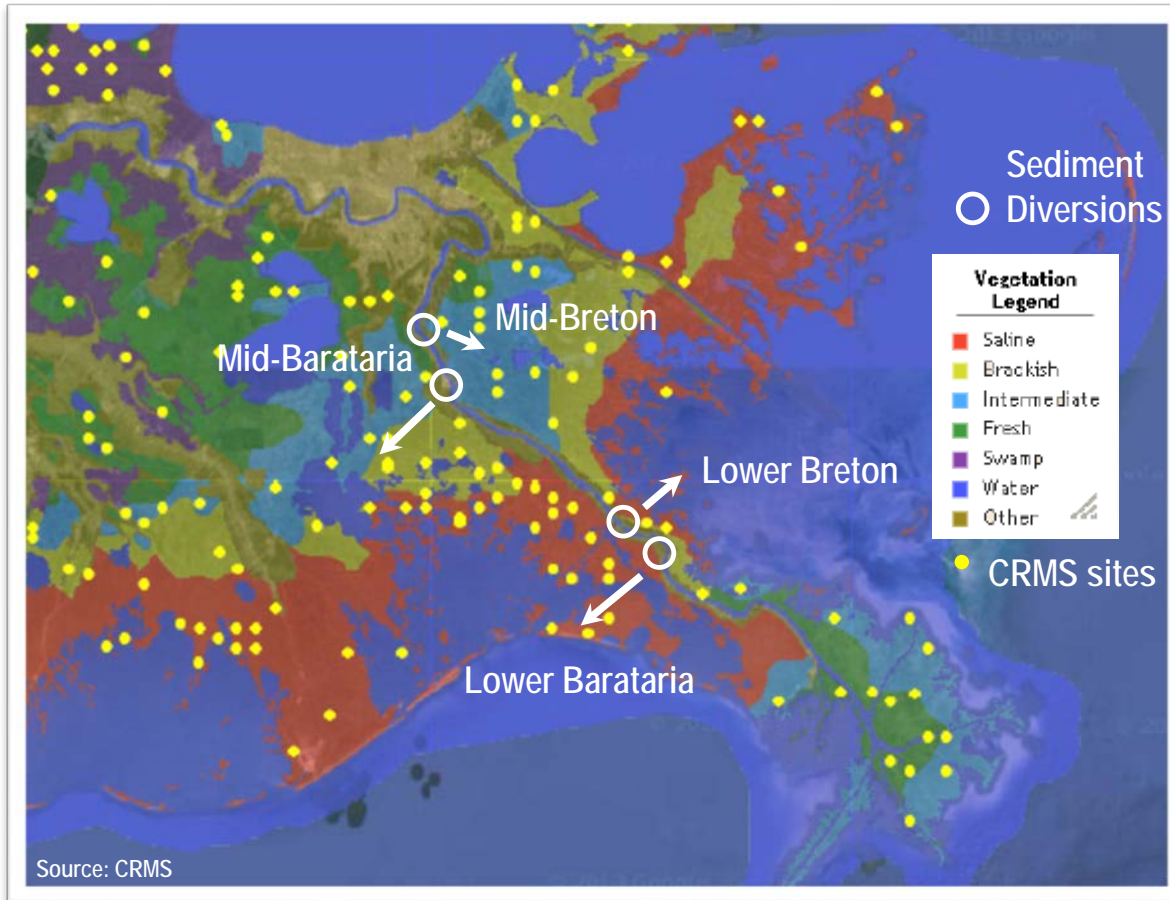


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 - Sibel Bargu and Jamal Mathurin
 - Dubrakvo Justic
 - John White
 - Sam Bentley
 - Tommy Blanchard



POTENTIAL SEDIMENT DIVERSIONS



Likely flow conditions:

- ~35-75,000 CFS (~ 1,000-2,100 CMS)



PROJECT GOAL

- ◆ Produce a calibrated and validated model capable of simulating:
 - ◆ Morphological evolution processes that occur during the creation of a new delta and wetland areas
 - ◆ Nutrient effects to the wetland vegetation, soil, and the estuarine primary producers of Breton Sound and Barataria Basin.

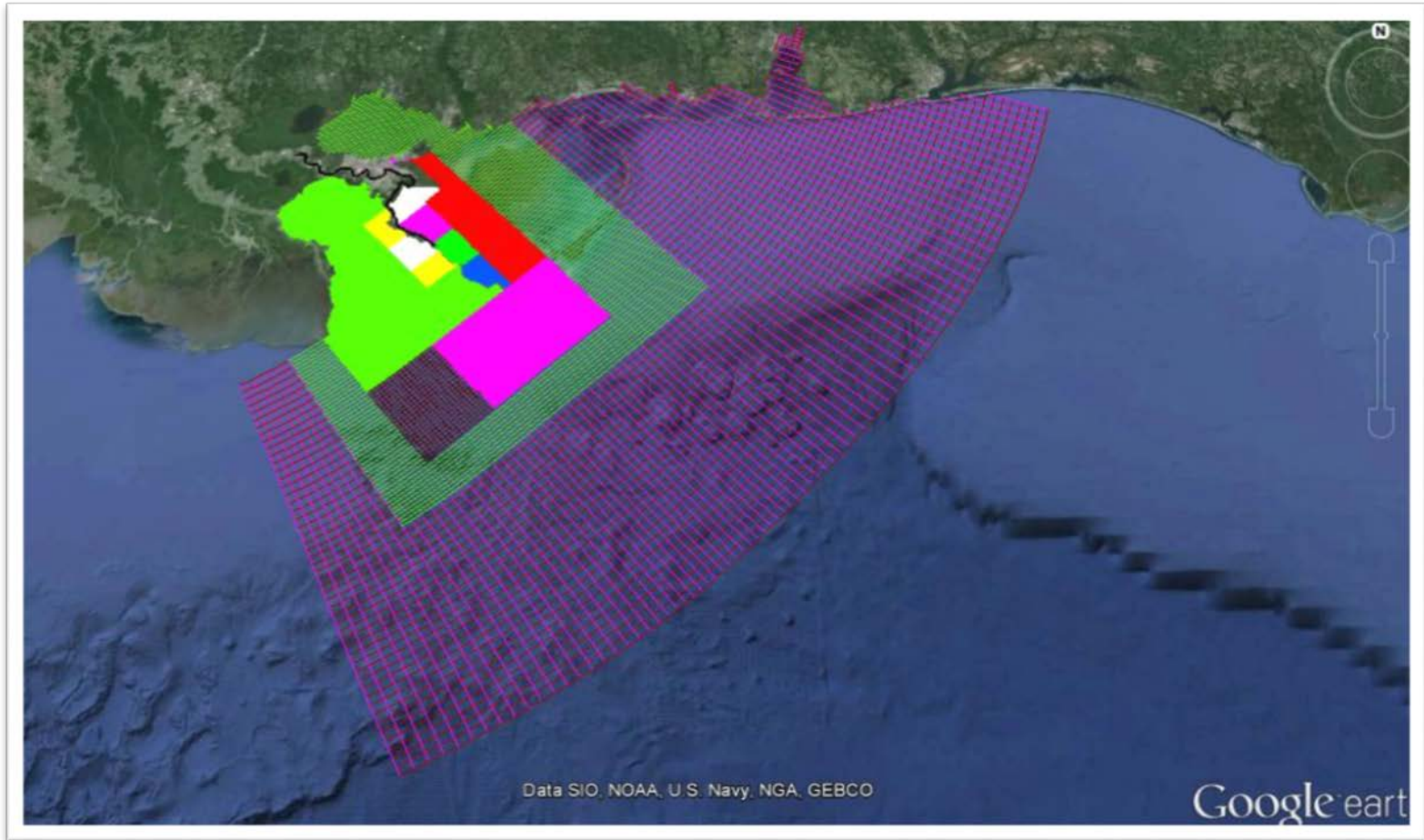


MODELING APPROACH

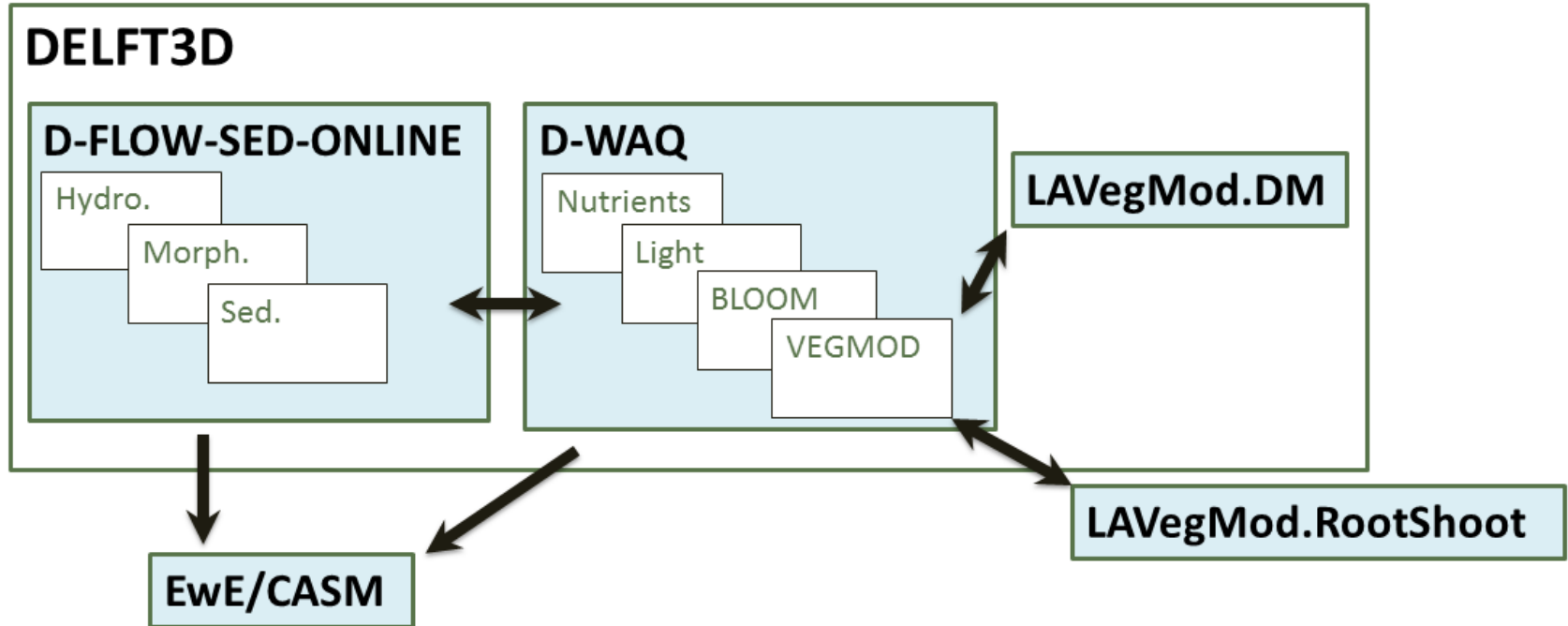
- Delft3D
 - Hydro-Morphodynamics (Delft3D-FLOW-SED-ONLINE)
 - Water quality (D-WAQ with sediment/soil layers)
 - Vegetation module (D-WAQ VEGMOD+ LAVegMod.DM + LAVegMod.RootShoot)



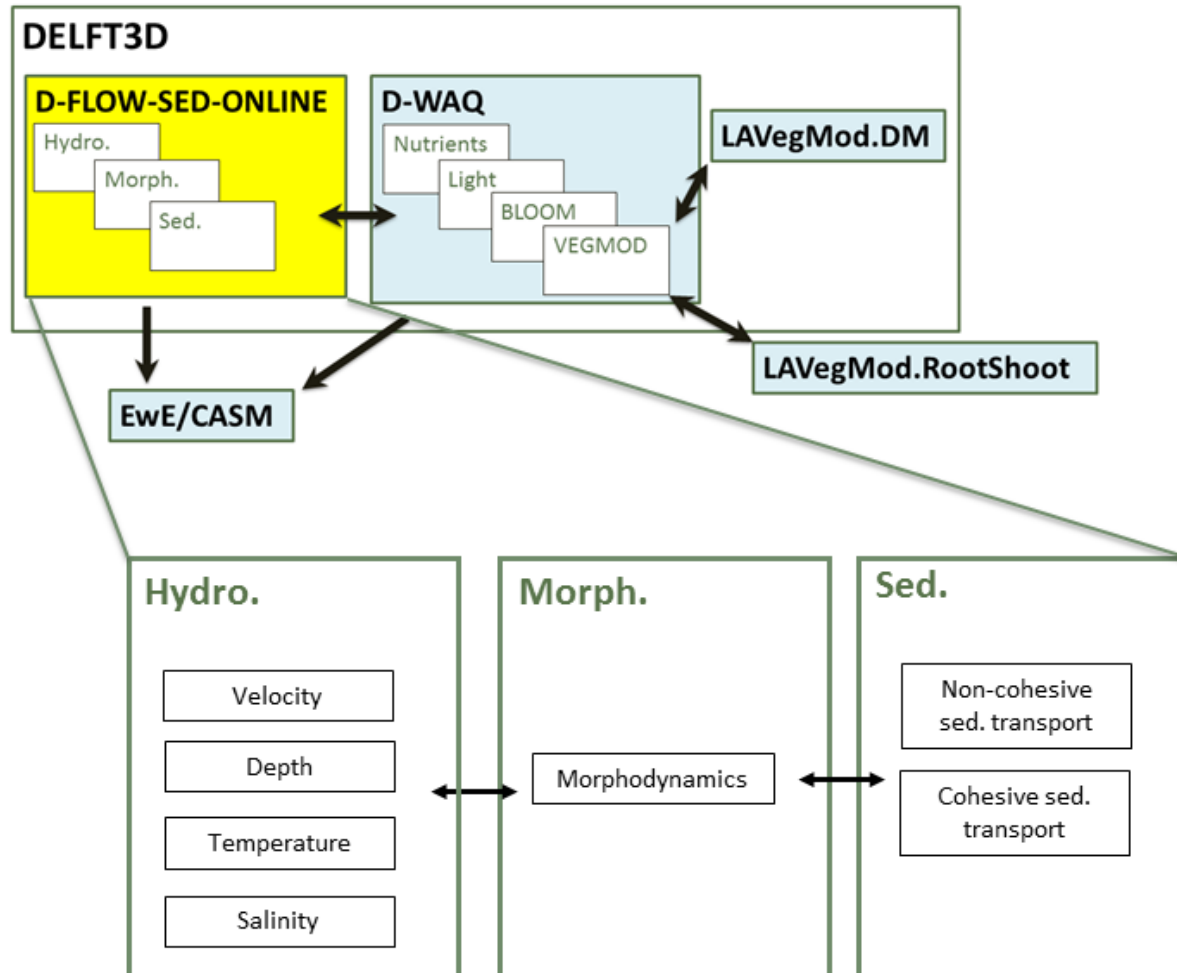
DELFT-3D MODEL DOMAIN AND GRID



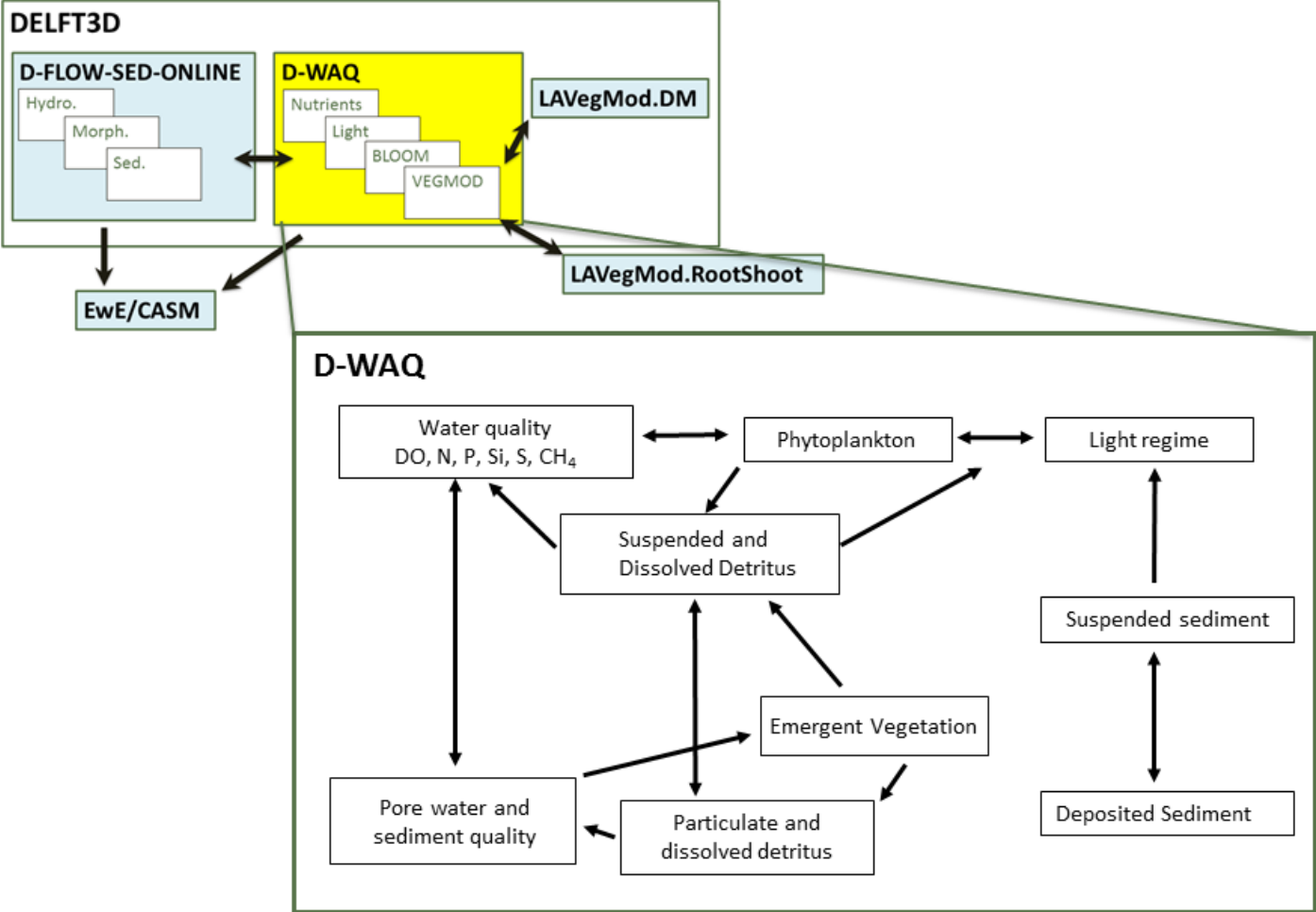
LINKING THE MODELS



D-FLOW: HYDRO- AND MORPHODYNAMICS

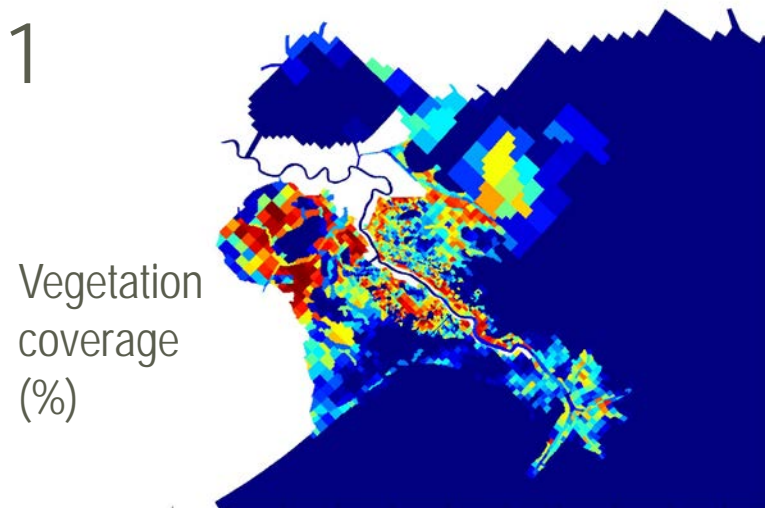
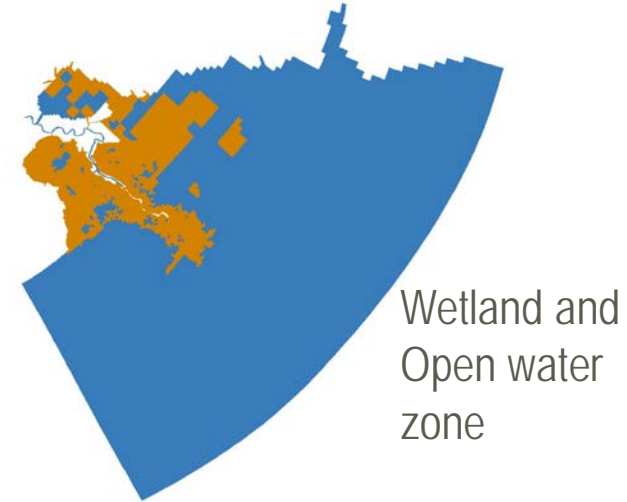


D-WAQ: WATER QUALITY



D-WAQ MODEL SETUP

- Designed initial soil composition of wetland and open water zones by using observed data set
- Considered 7 vegetation taxa
- Designed initial vegetation coverage based on year 2011



D-WAQ LOADING AND BOUNDARY

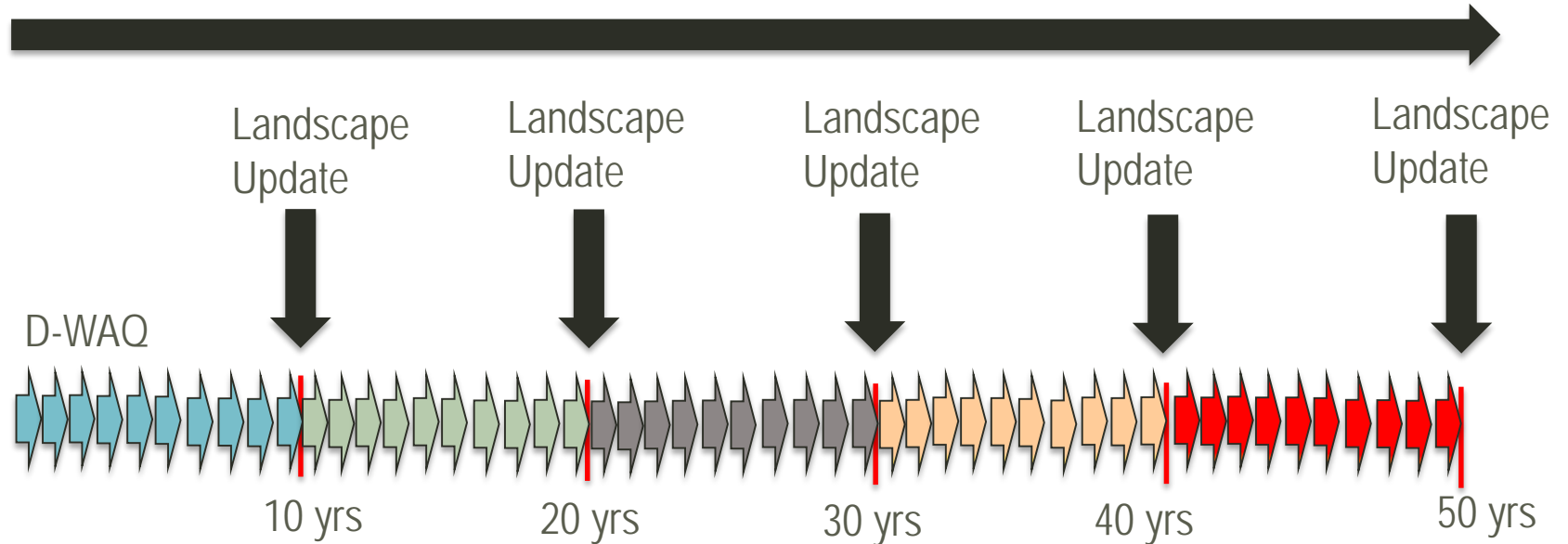
- Nutrient loading from 10 local rivers including Mississippi River
- Estimated loading using relationship between discharge and nutrients
- Two open boundaries for GOM based on NOAA data



LINKED MODELS FOR PRODUCTION RUNS

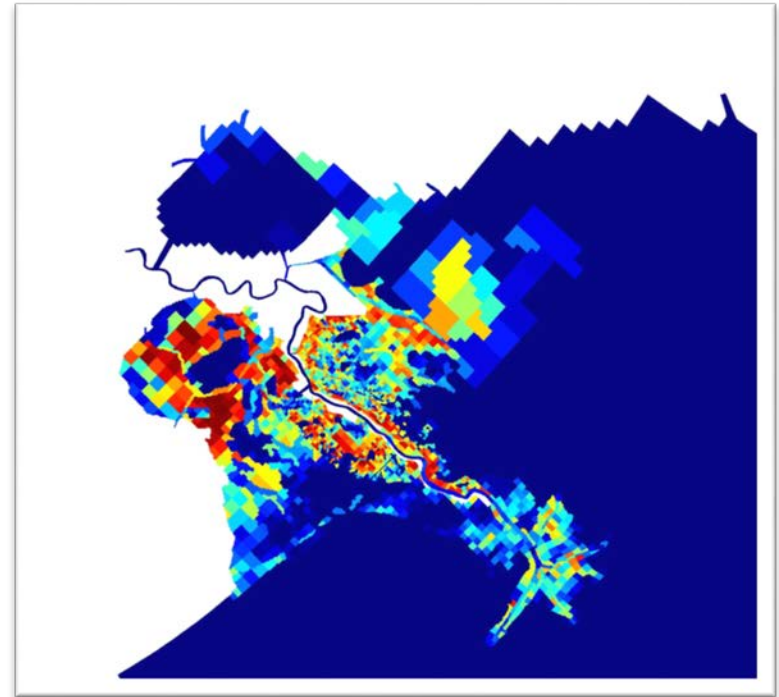
- Year 2020 – 2070
- Batch 1: seven production runs

D-FLOW-SED-ONLINE



50 YEAR OUTPUTS - EXAMPLES

- Land acres
- Water level/depth
- Salinity
- Temperature
- Total Suspended Sediments
- Phytoplankton biomass
- Vegetation/open water classification





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THANK YOU

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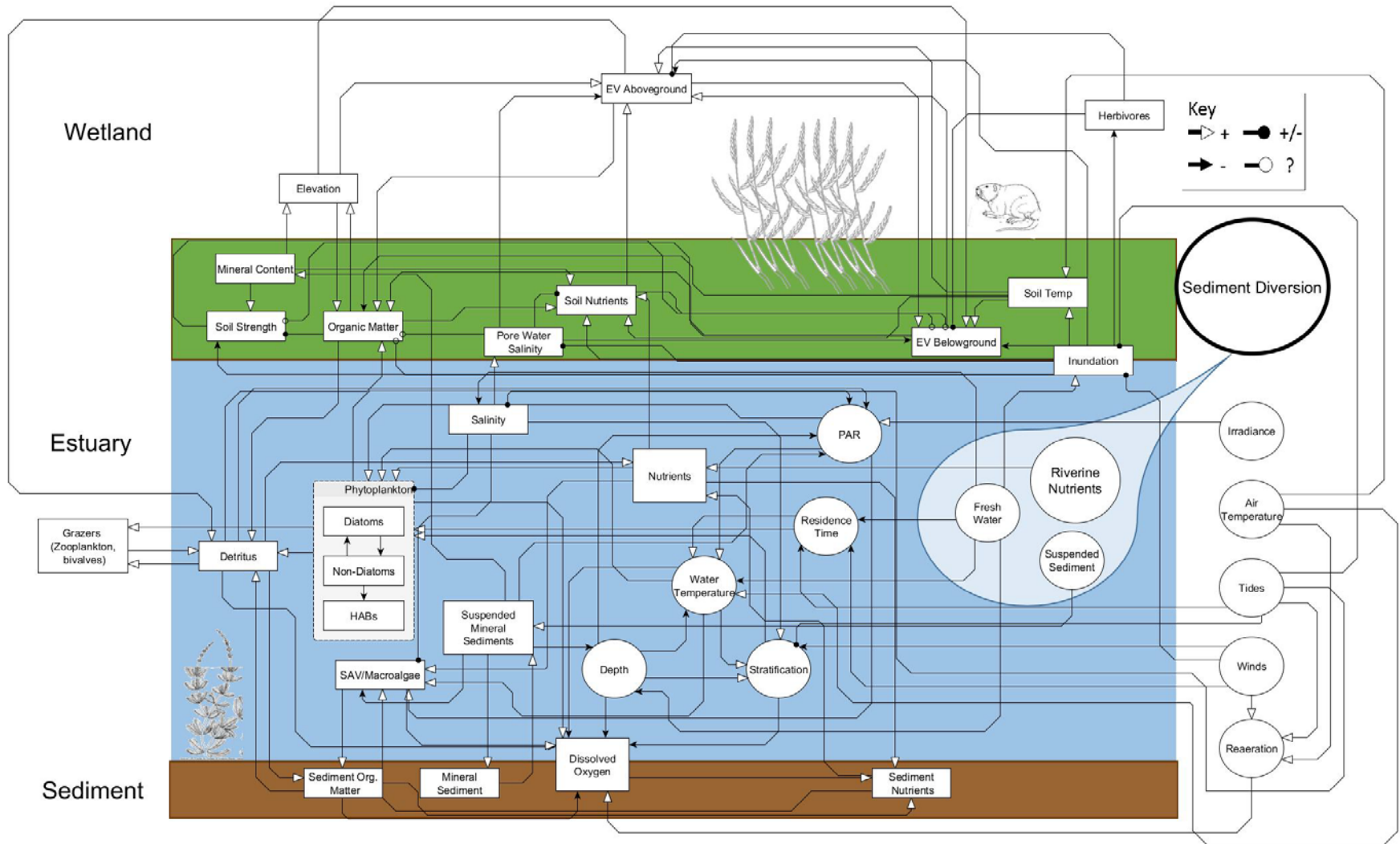


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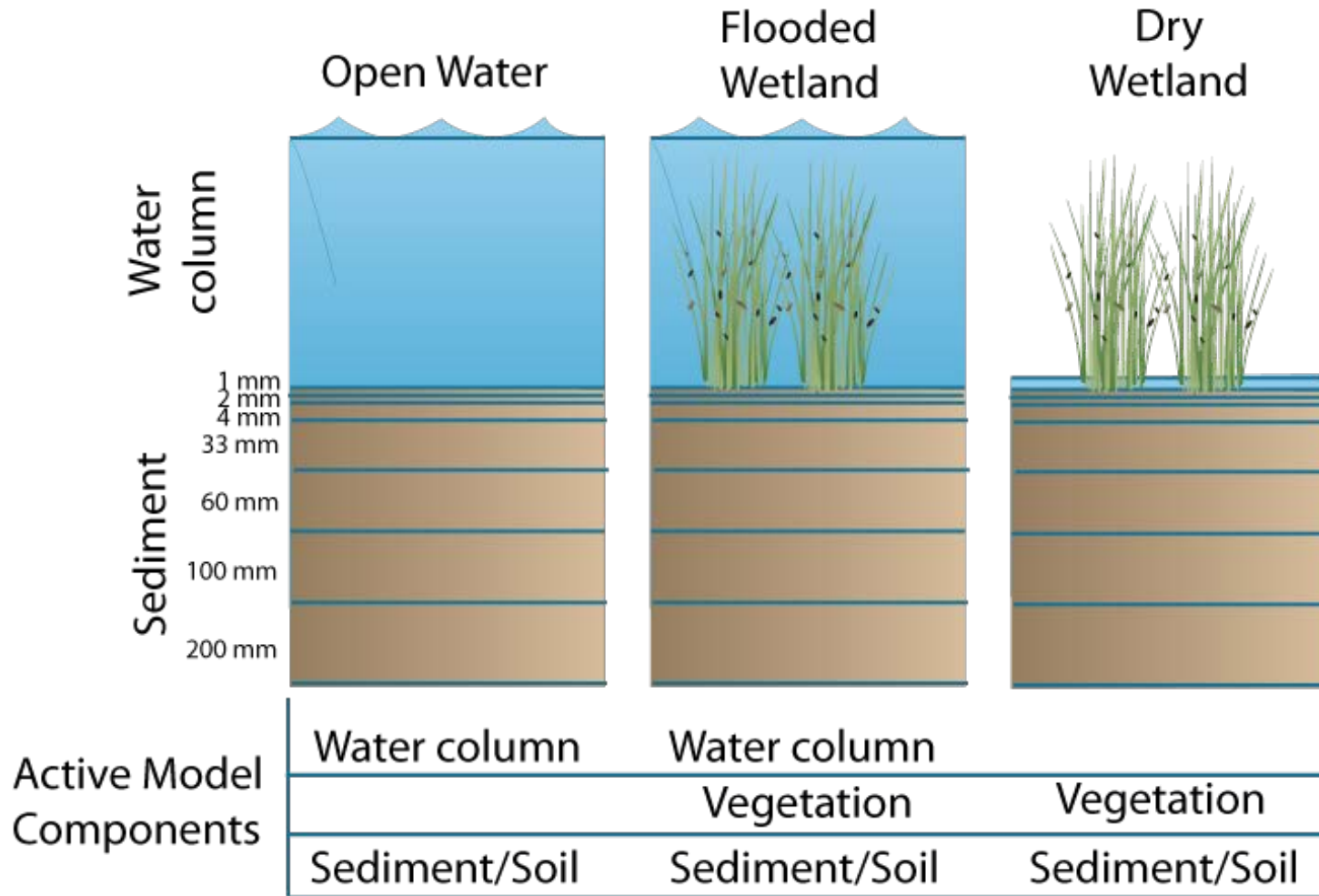
EXTRA SLIDES



NUTRIENT EFFECTS CONCEPTUAL DIAGRAM



D-WAQ: SEDIMENT/SOIL LAYERS



PHYTOPLANKTON MODULE

Delft3D

- Freshwater Diatoms (FDIATOMS)
- Marine Diatoms (MDIATOMS)



WI Data Collection

- Pennate + Centric Diatoms

- Freshwater Flagellates (FFLAGELA)
- Marine Flagellates (MFLAGELA)



- Flagellates

- Green Algae (GREENS)



- Chlorophytes

- *Microcystis* (MICROCYSTIS)
- *Anabaena* (ANABAENA)



- *Microcystis*



- *Anabaena*

- Cyanobacteria (including picos)

- Dinoflagellates (DINOFLAG)



- Dinoflagellates

