



INTEGRATION OF COASTAL/INLAND SURFACE WATER AND GROUNDWATER

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Acknowledgements

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- Angelina Freeman
- David Lindquist

PM-TAC Team

- Courtney Harris (VIMS)
- John Callaway (USFCA)
- Mike Waldon
- Scott Hagen (LSU)
- Wim Kimmerer (SFSU)

Water Institute Lead

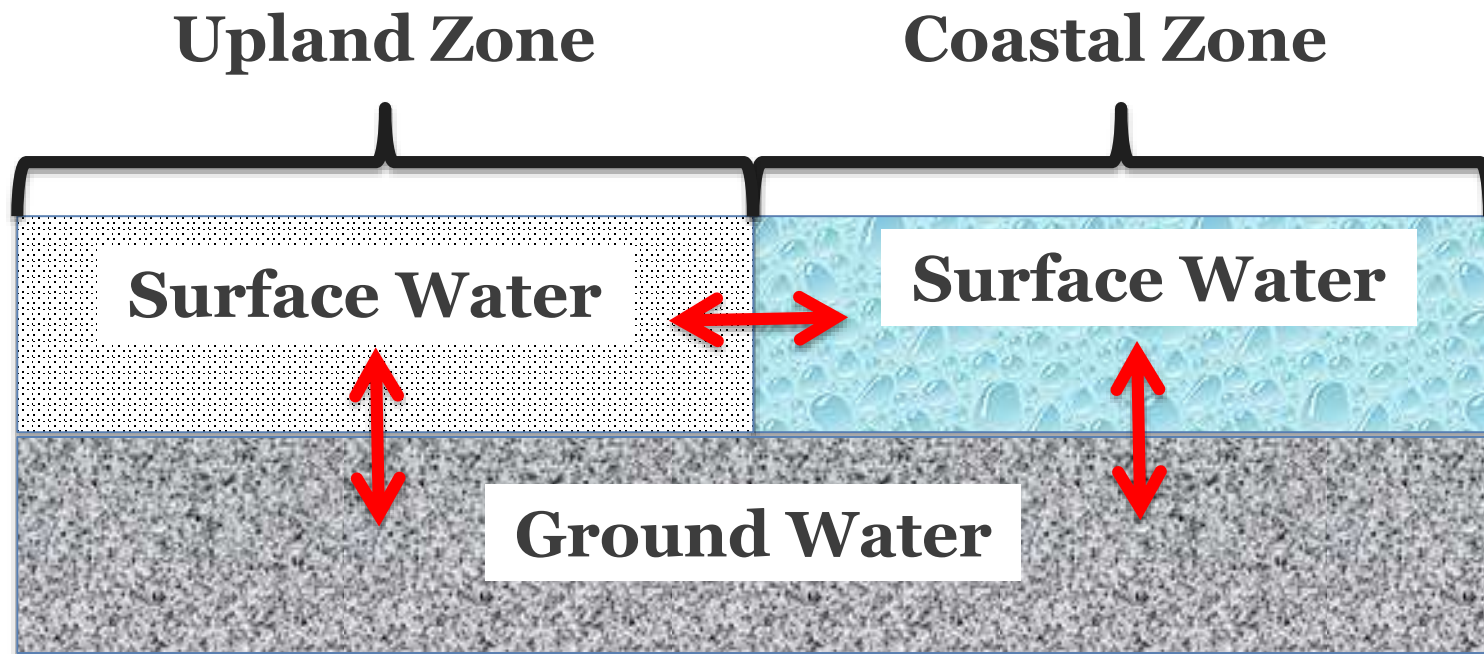
- Denise Reed
- Ehab Meselhe

Modeling Team

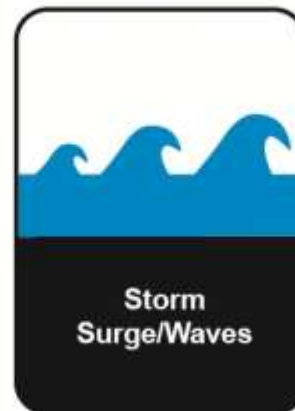
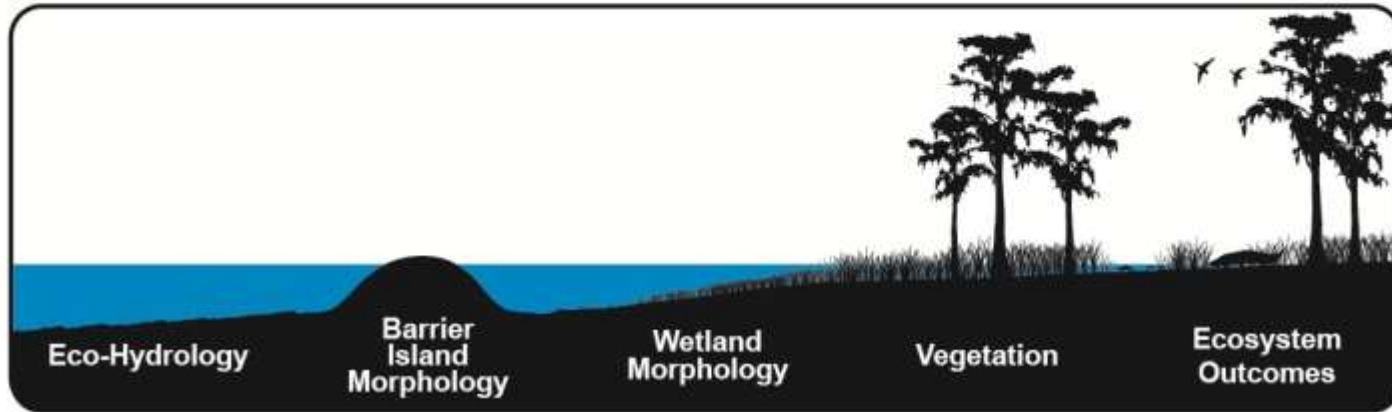
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- Vadim Alymov (CECI)
- Michael Poff (CECI)
- Brady Couvillion (USGS)
- Craig Conzelmann (USGS)
- Hardin Waddle (USGS)
- Kevin Suir (USGS)
- David Johnson (RAND)
- Kenneth Kuhn (RAND)

- Jordan Fischbach (RAND)
- Gordon Thomson (CB&I)
- Zhifei Dong (CB&I)
- Hugh Roberts (Arcadis)
- Zach Cobell (Arcadis)
- John Atkinson (Arcadis)
- Haihong Zhao (Arcadis)
- Kim de Mutsert (GMU)
- Kristy Lewis (GMU)

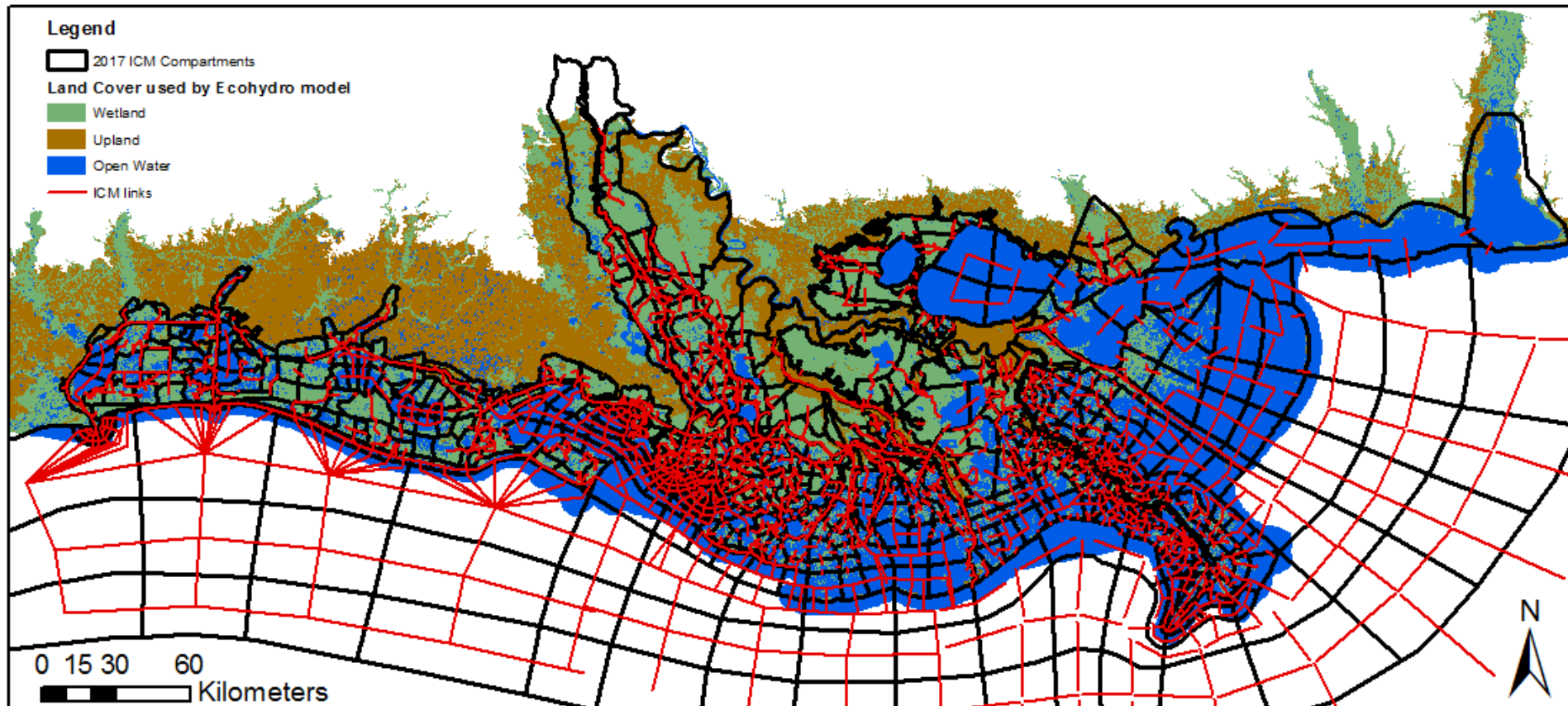
Conceptual Water Budget



Integrated Compartment Model (ICM)



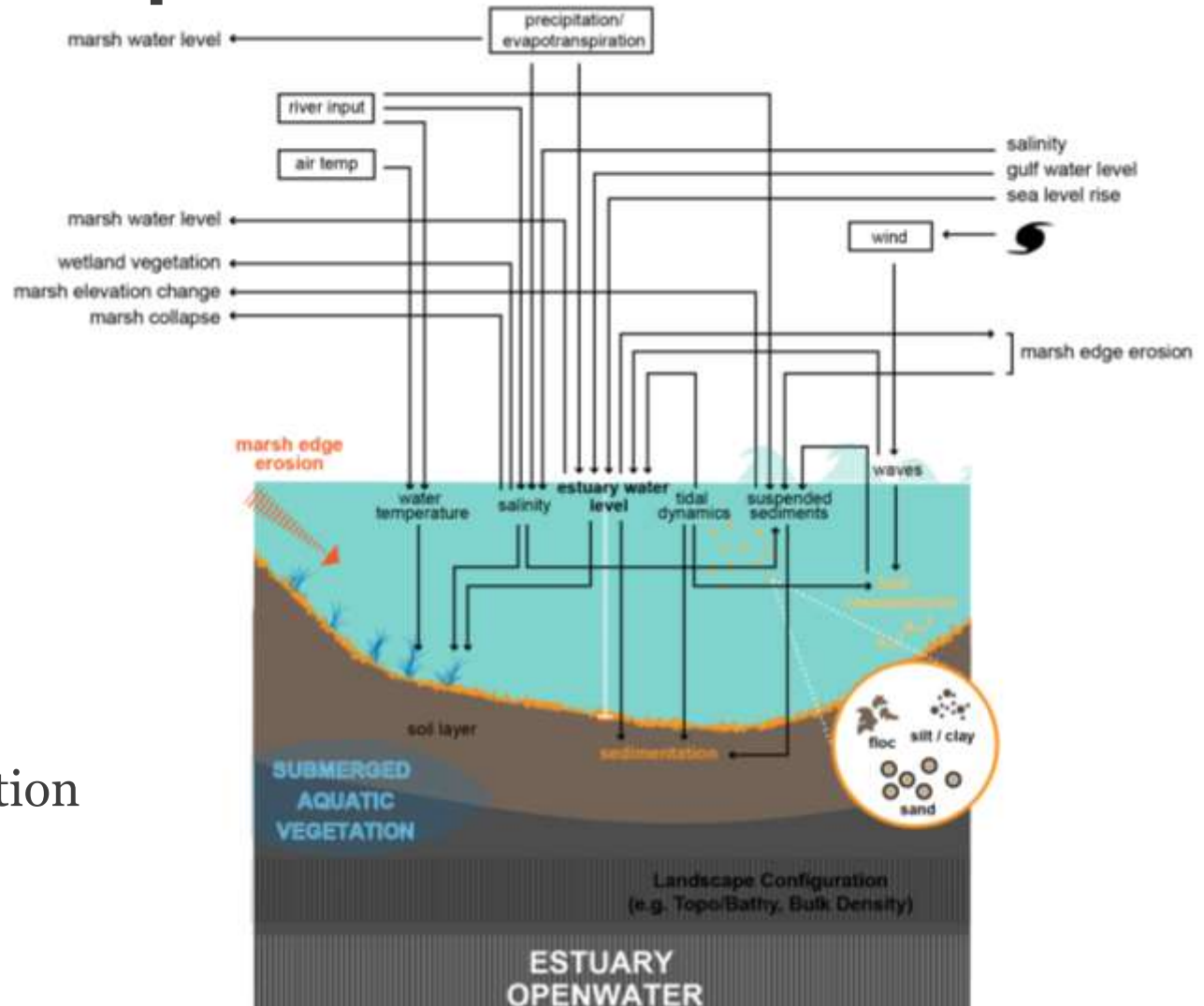
ICM Model Hydraulic Link Network



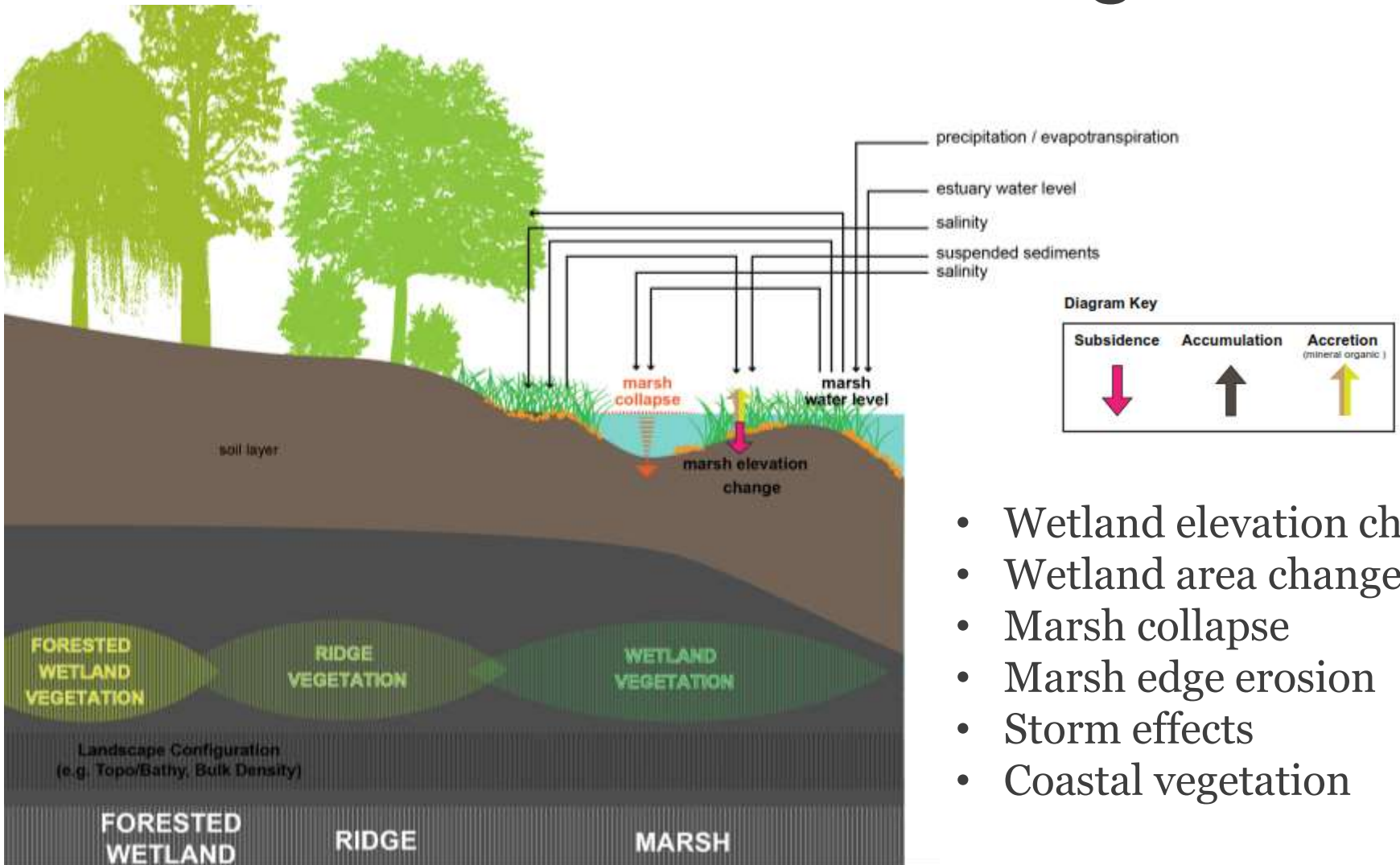
Contains 946 ICM compartments

Estuary and Open Water Processes

- Hydrodynamics
- Water quality
- Sedimentation
- Bed resuspension
- Sediment distribution



Wetland Processes and Vegetation



- Wetland elevation change
- Wetland area change
- Marsh collapse
- Marsh edge erosion
- Storm effects
- Coastal vegetation

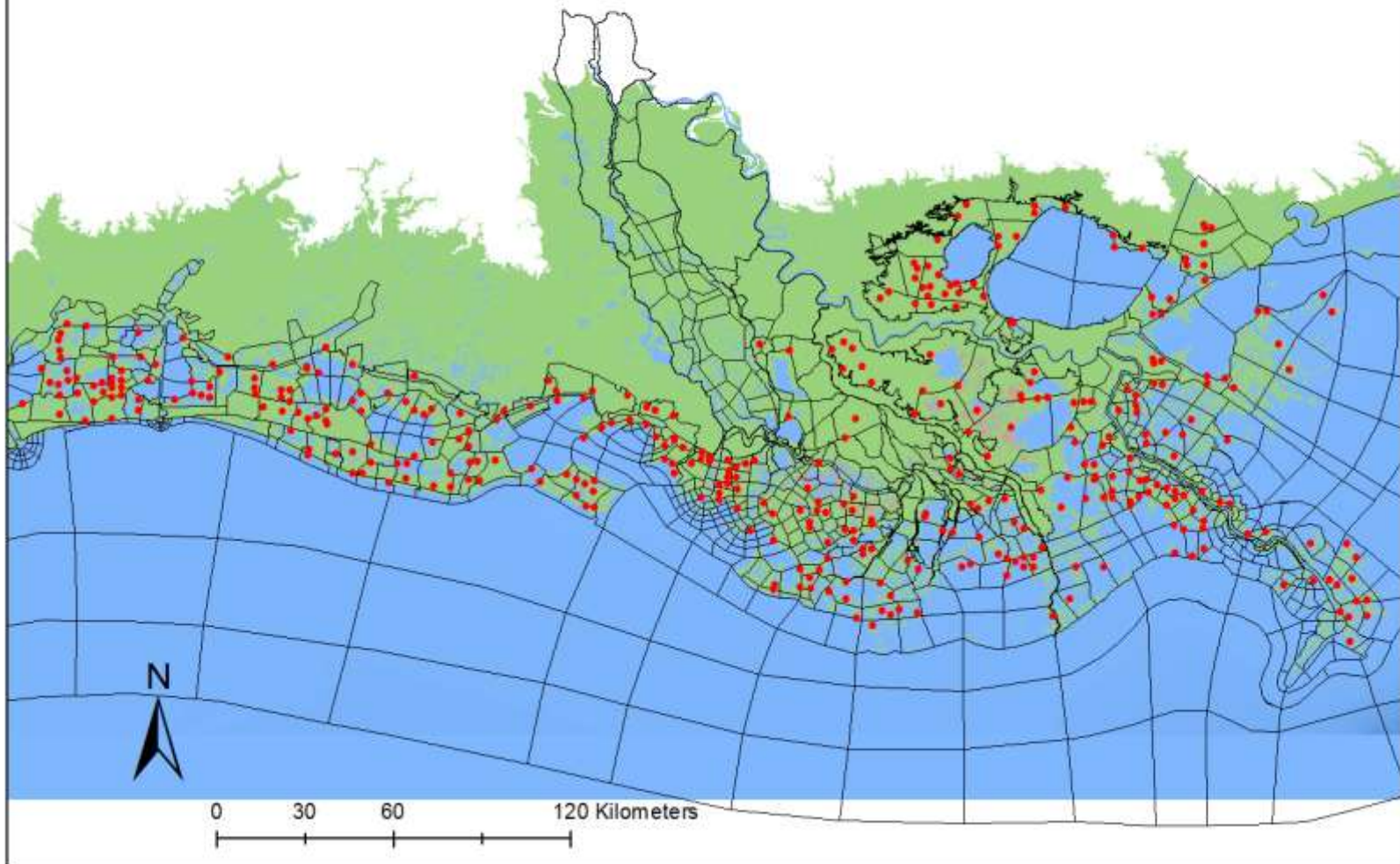
Fish and Shellfish

- 19 fish, shellfish, and wildlife Habitat Suitability Indexes (HSIs)
 - Statistical analysis
 - Revised equations from 2012
 - Added several new HSIs
 - Coded into the ICM
- EwE (Ecopath with Ecosim)
 - Community fish and shellfish model
 - Dynamically coupled to the ICM

Model Calibration and Validation

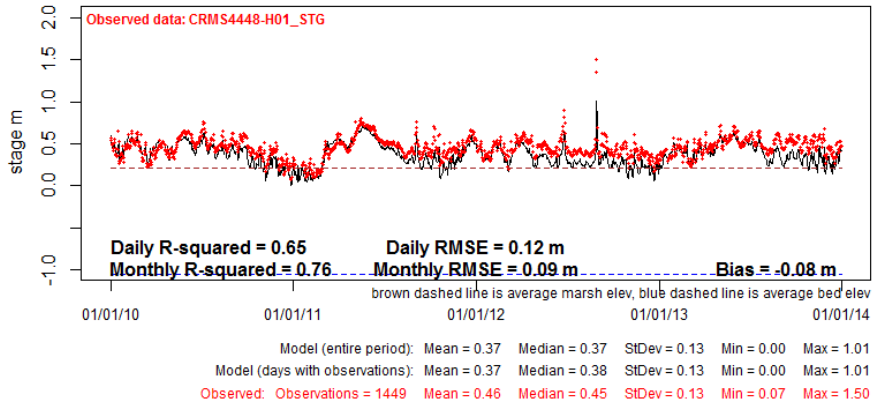
2017 Coastal Master Plan Integrated Compartment Model Coastwide Reference Monitoring System (CRMS)

Data used to calibrate water level, salinity, & vegetation.

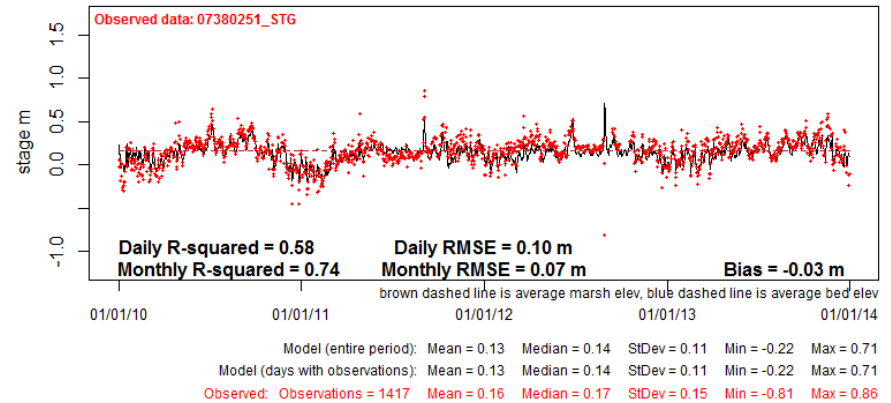


Stage Calibration – 201 sites

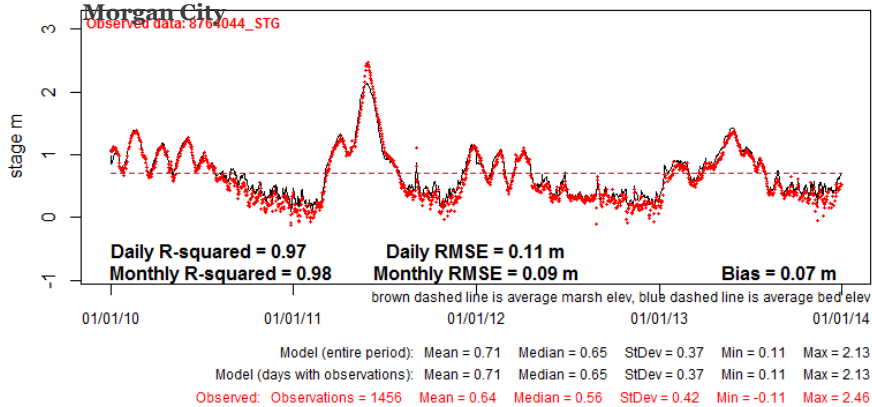
stage - 2010-2013 - ICM_ID: 92 - PB - Brant Island (Breton)



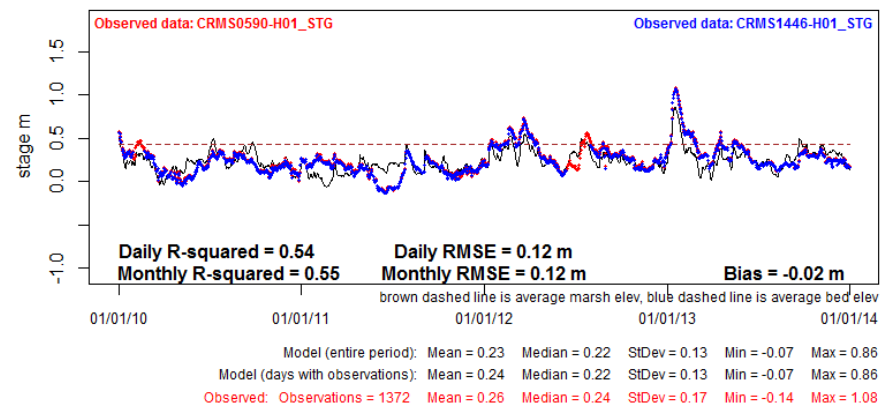
stage - 2010-2013 - ICM_ID: 280 - PB - N Barataria Bay



stage - 2010-2013 - ICM_ID: 545: AA - Atchafalaya River @

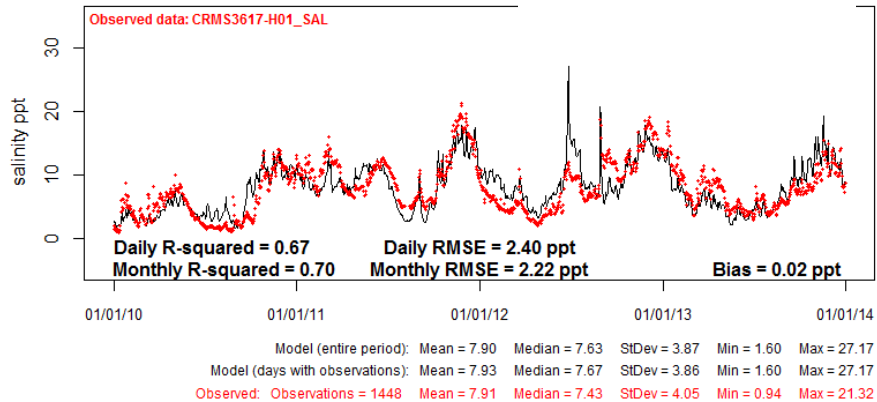


stage - 2010-2013 - ICM_ID: 796 - CP - Mud Lake (CP)

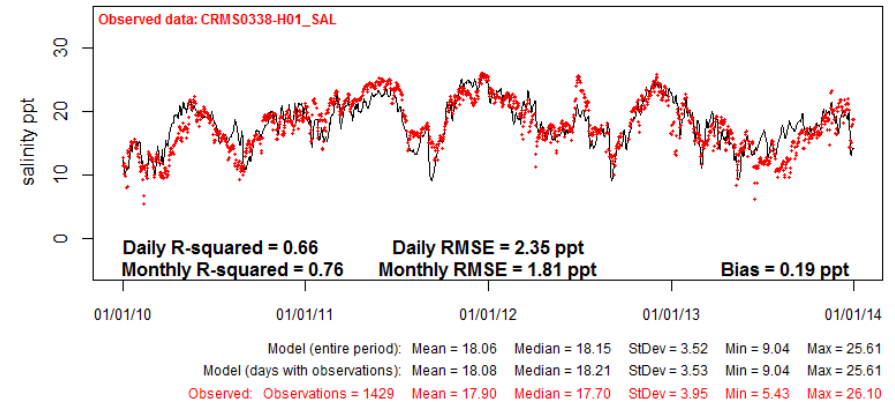


Salinity Calibration Example

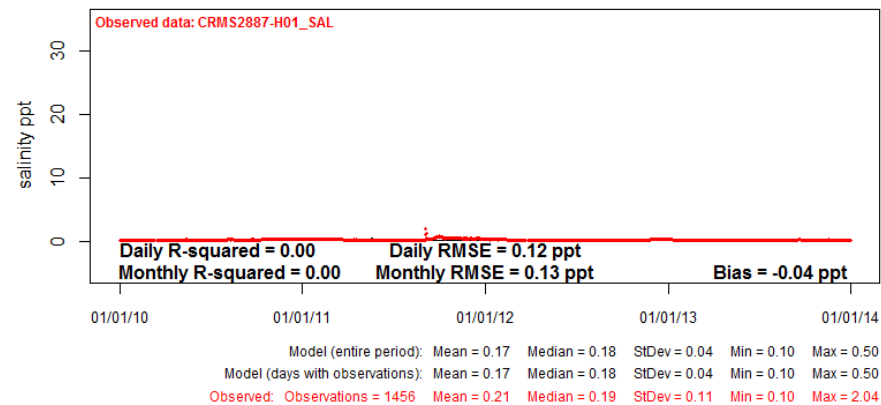
salinity - 2010-2013 - ICM_ID: 247 - PB - Wilkinson Bayou (E Barataria)



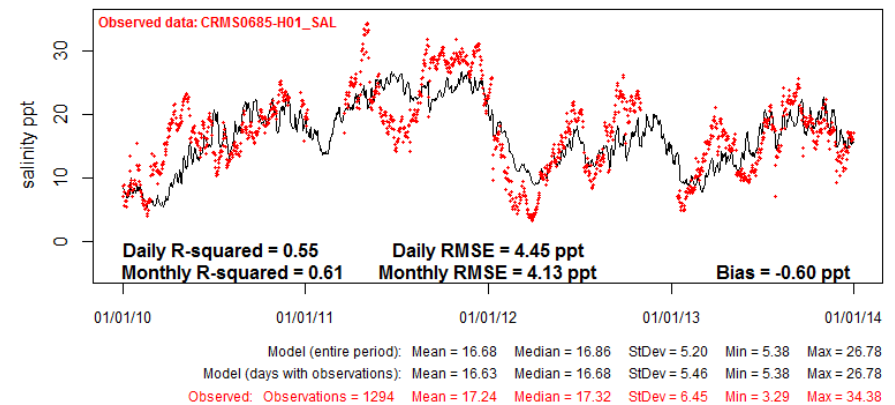
salinity - 2010-2013 - ICM_ID: 373 - AA -



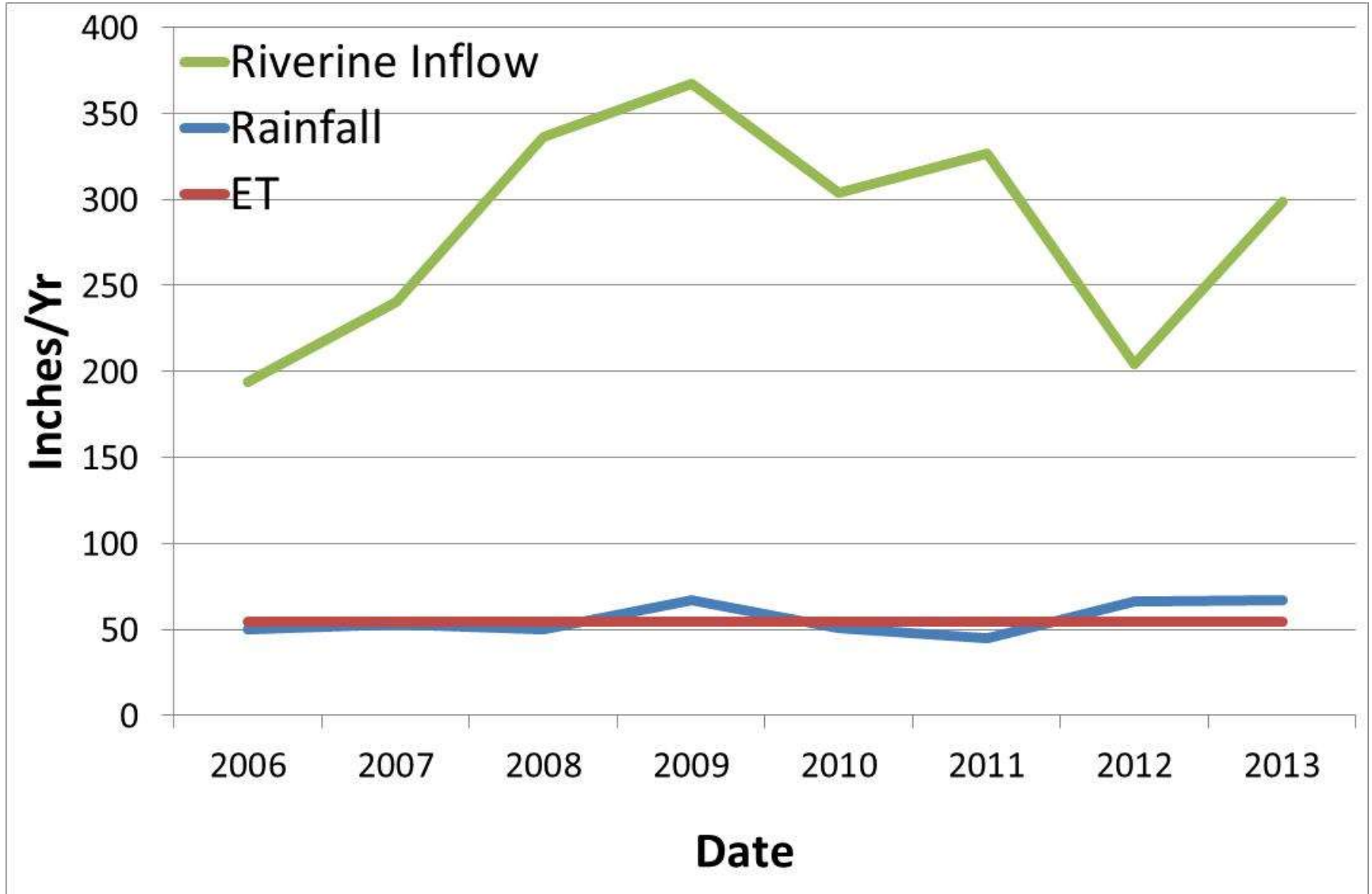
salinity - 2010-2013 - ICM_ID: 468 - AA -



salinity - 2010-2013 - ICM_ID: 863 - CP -

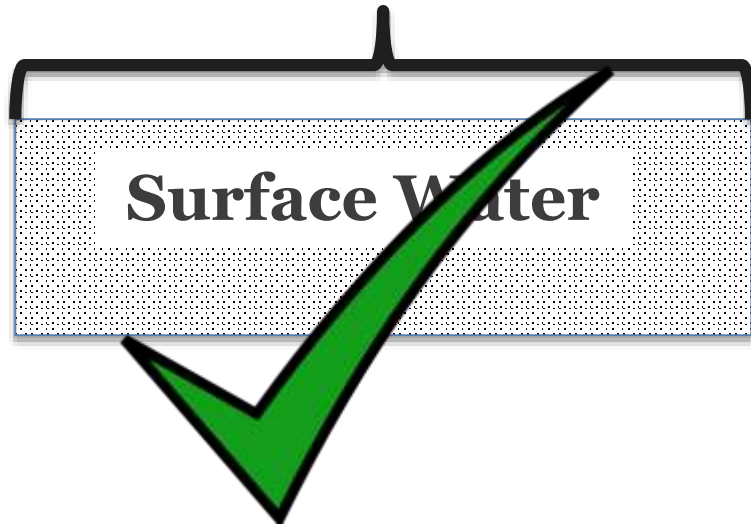


Water Budget



Integrated Water Management System

Upland Zone



Integrated Water Management System

Coastal Zone



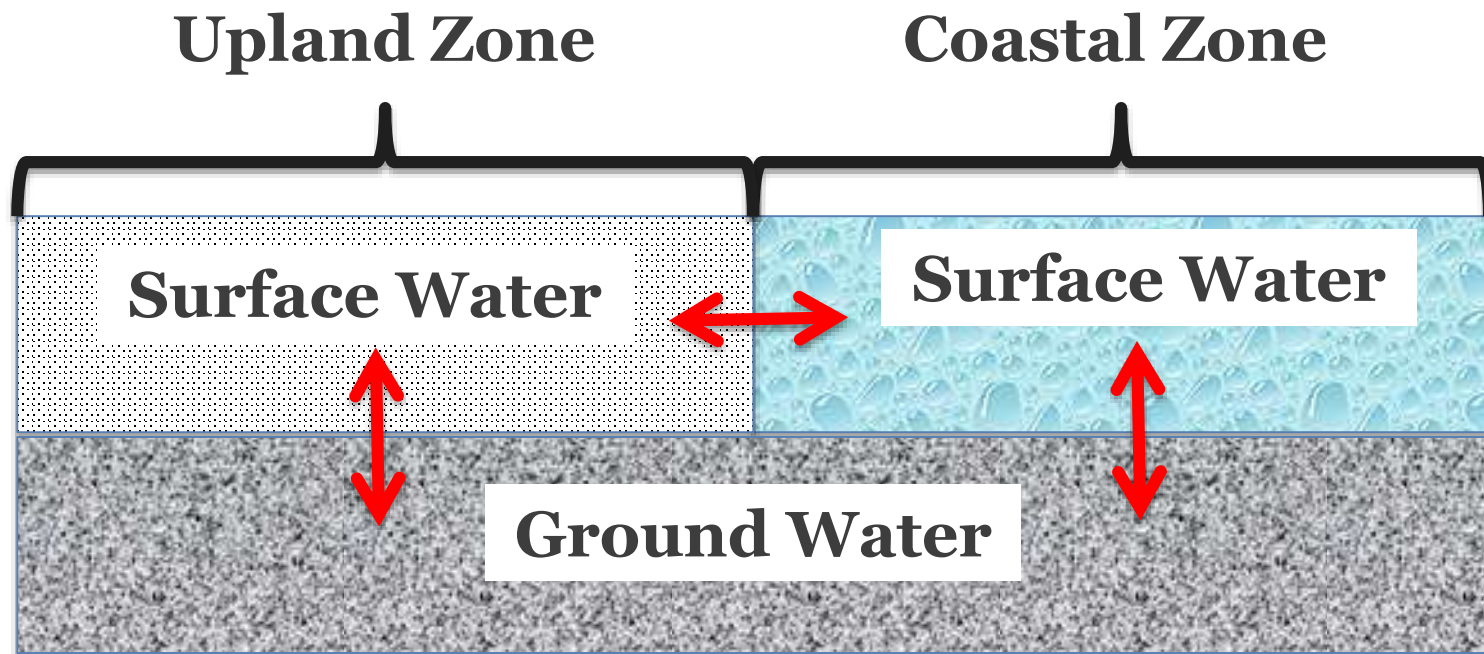
Integrated Water Management System

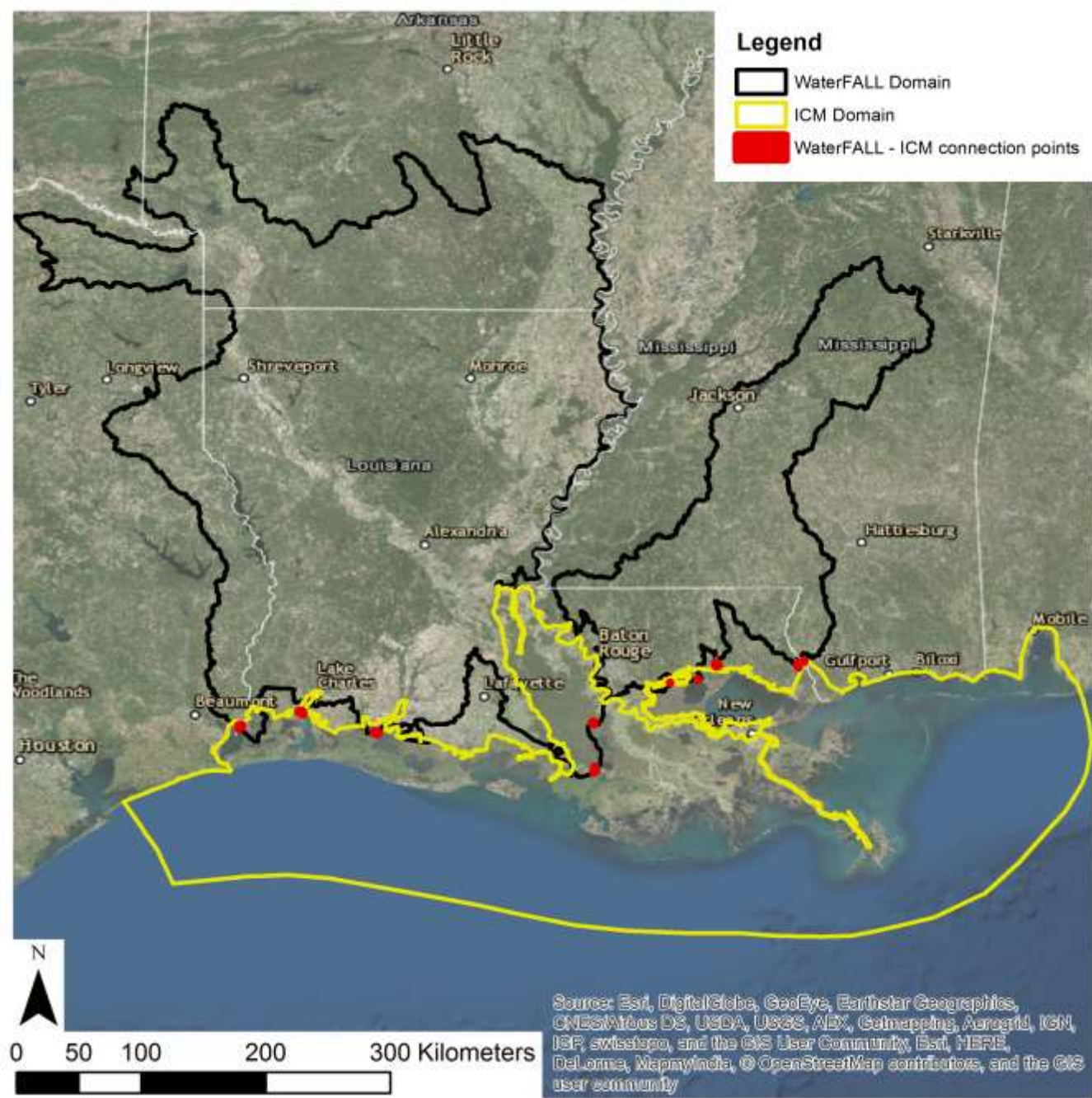
Some updates
and
improvements
needed



Ground Water

Integrated Water Management System





Integrated Water Management System

Summary

- Considerable funds and effort already devoted to develop these individual components
- Integrating the components provides a comprehensive water management tool
- Integrated tool can be used to:
 - Manage current and projected resources
 - Support decision making process
 - Support development of policies

Questions