

Depressional (“isolated”) wetlands of the Southeast – clearly not protected after Sackett



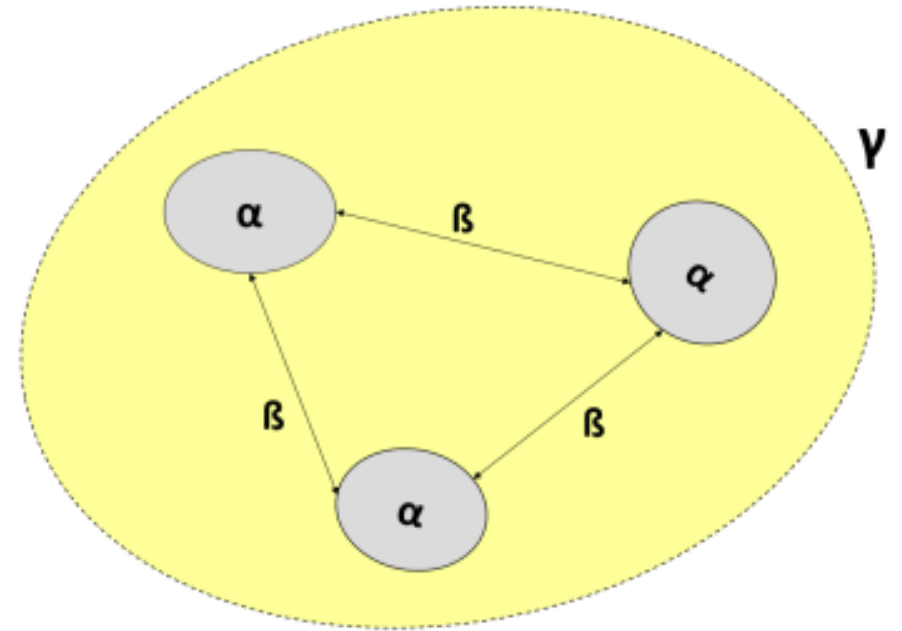
- Carolina bays, DelMarVa bays, cypress domes, gum ponds, seasonal marshes, flatwoods marshes, limesinks, Citronelle ponds, Grady ponds
- Hydrology based mostly on inputs of precipitation and outputs of ET; thus very susceptible to changes in climate or draining/filling
- Most lack permanent outlet streams, hence the loss of Federal jurisdiction from recent Supreme Court decisions

Values of non-protected wetlands

- Contributions to biodiversity
- Influence on landscape water quantity and quality
- Roles in carbon/nutrient/pollutant cycling and sequestration
- Recreational and cultural values
- Some are among the most “pristine” natural habitats remaining in the Southeast
- Others are among the most threatened



Contributions of wetlands to biodiversity



- Alpha diversity: not particularly high, as wetlands are harsh places to live
- Beta diversity: usually high because slight differences among individual wetlands has big consequences, and so each wetland tends to be unique
- Gamma diversity: contribution to landscape diversity is high because many of the plants, animals and microbes in wetlands occur nowhere else

Conserving/managing biodiversity in depression wetlands

- Organism responses are very unpredictable and an optimal condition for all biota does not exist
- Better to conserve a range of natural conditions (different sizes, different hydroperiods, different plant communities.....)
- Best to focus on the landscape level, and conserve a range of depression wetland habitats



Values of plant diversity

- Wetlands support many unique plants, found no where else
- Basis for all life in depressional wetlands
- Basis for most wetland ecosystem services (plants influence water quantity and quality, carbon budgets, cultural and recreational values)
- 200 species of special concern, and 69 labeled as threatened, are associated with depressional wetlands of the Southeast (Edwards and Weakly 2001)



Values of invertebrate diversity



- Most specious group in depressional wetlands (e.g. 59 species of midges (Chironomidae) have been identified from a single Carolina bay (Leeper and Taylor 1998))
- Major link between plants and higher trophic levels
- Many unique taxa (e.g. fairy shrimps)
- Lack of large fish in depressional wetlands benefits invertebrates



Values of amphibian/reptilian diversity



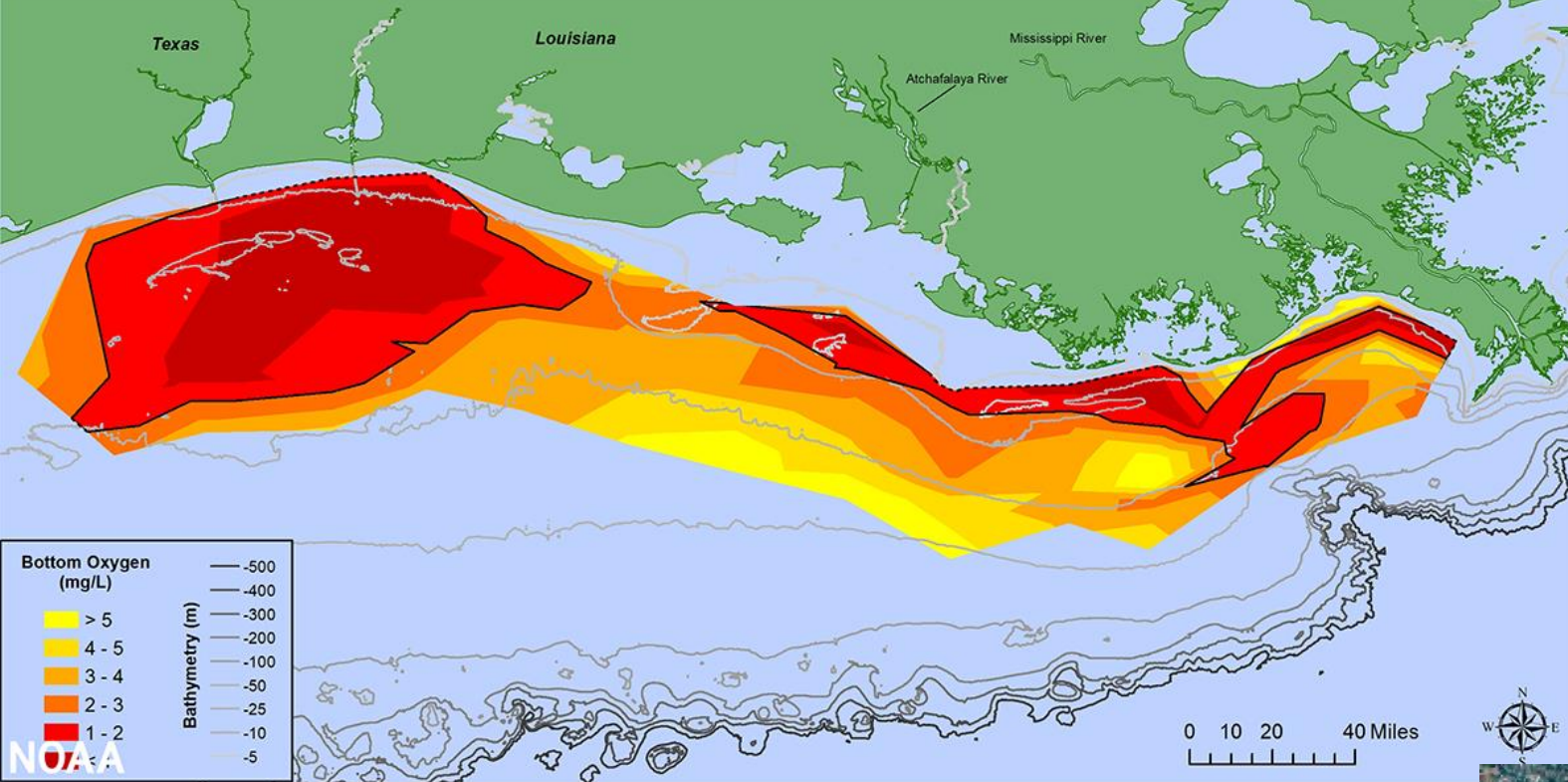
- Depressional wetlands are major habitats for amphibians in the Southeast, an area already rich in amphibians
- Lack of large fish in depressional wetlands also offers opportunities for many vulnerable amphibians
- Several endangered amphibians inhabit SE depressional wetlands
- Depressional wetlands can be important alligator nursery habitats



Values of bird diversity

- Many birds are specialized to live in wetland habitats
- Wading birds, waterfowl and passerines (songbirds) use depressional wetlands extensively for foraging and breeding
- Flooding inhibits some nest predators
- Bird watching and bird hunting are major recreational activities and financial supports for wetland conservation





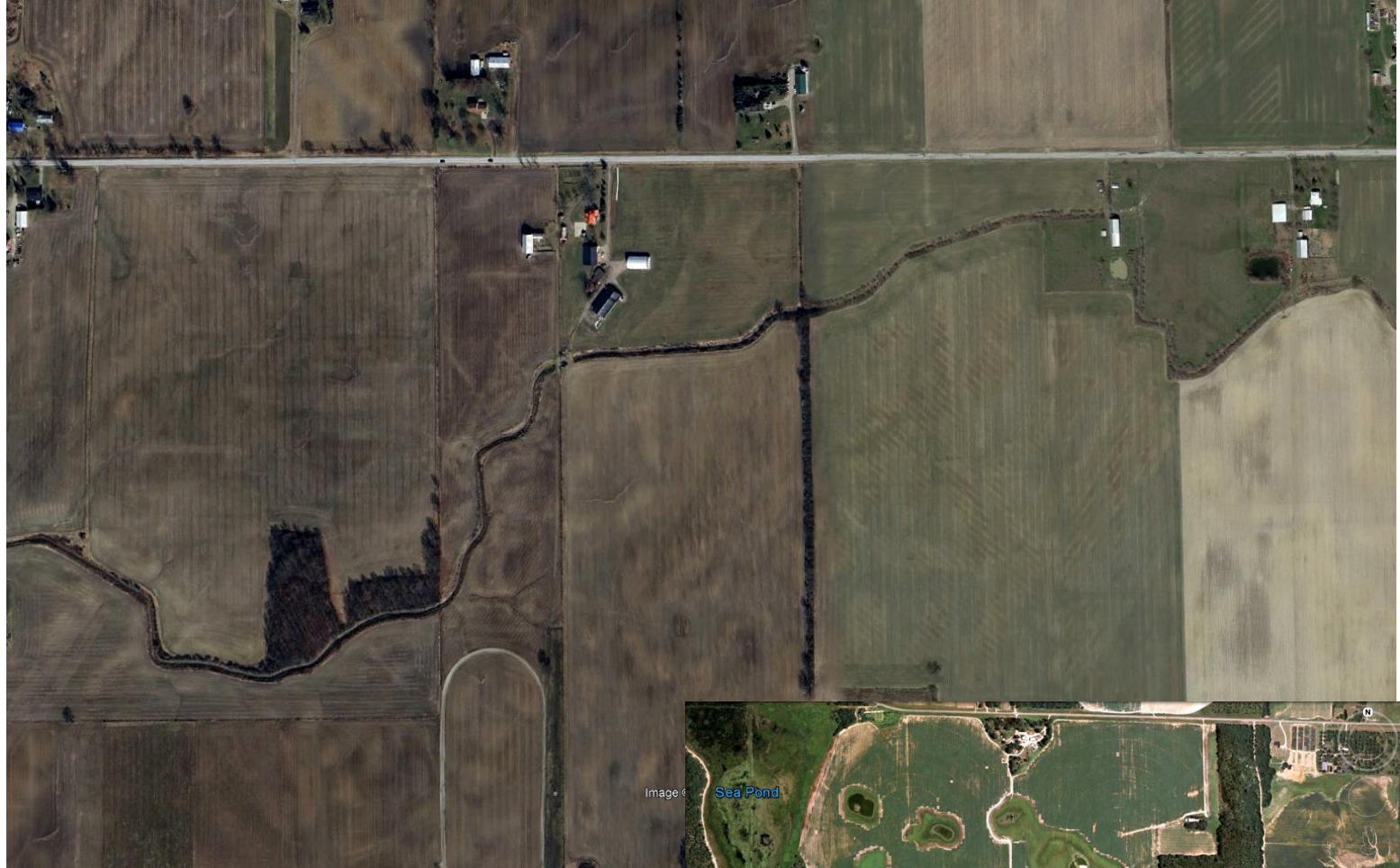
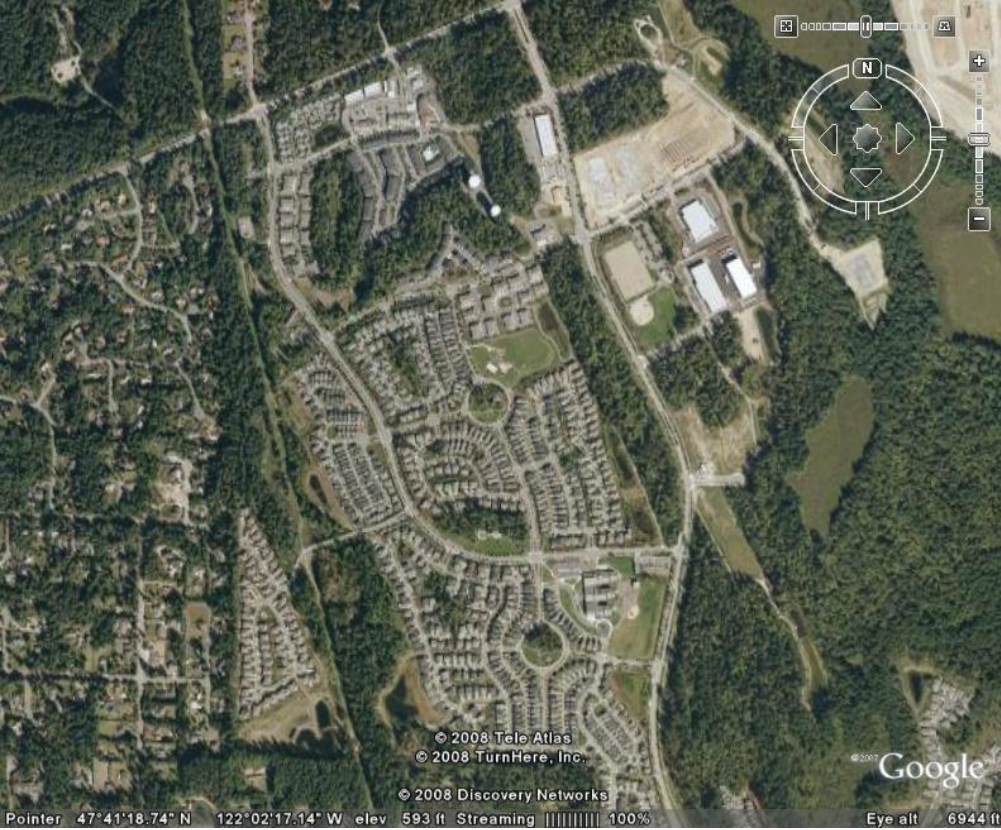
Gulf of Mexico dead zone.



Lake Alatoona, those are dead fish.

Lake Erie.

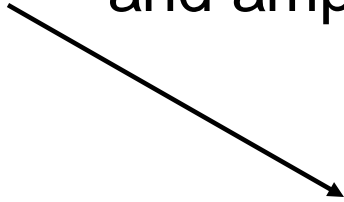




We have already intentionally destroyed/removed over 50% of the wetlands that were present in the CONUS in 1492.

We need the rest to help keep our water clean.

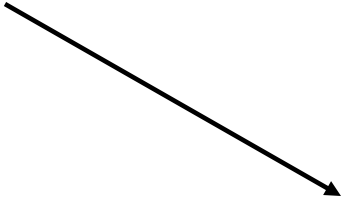
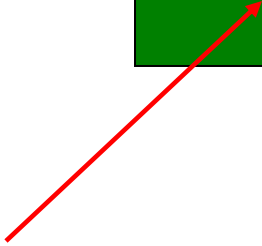
Water that is bad for fish,
and amphibians



The Wetland
water quality
puzzle

???

Magic



Water that is OK for fish
and amphibians

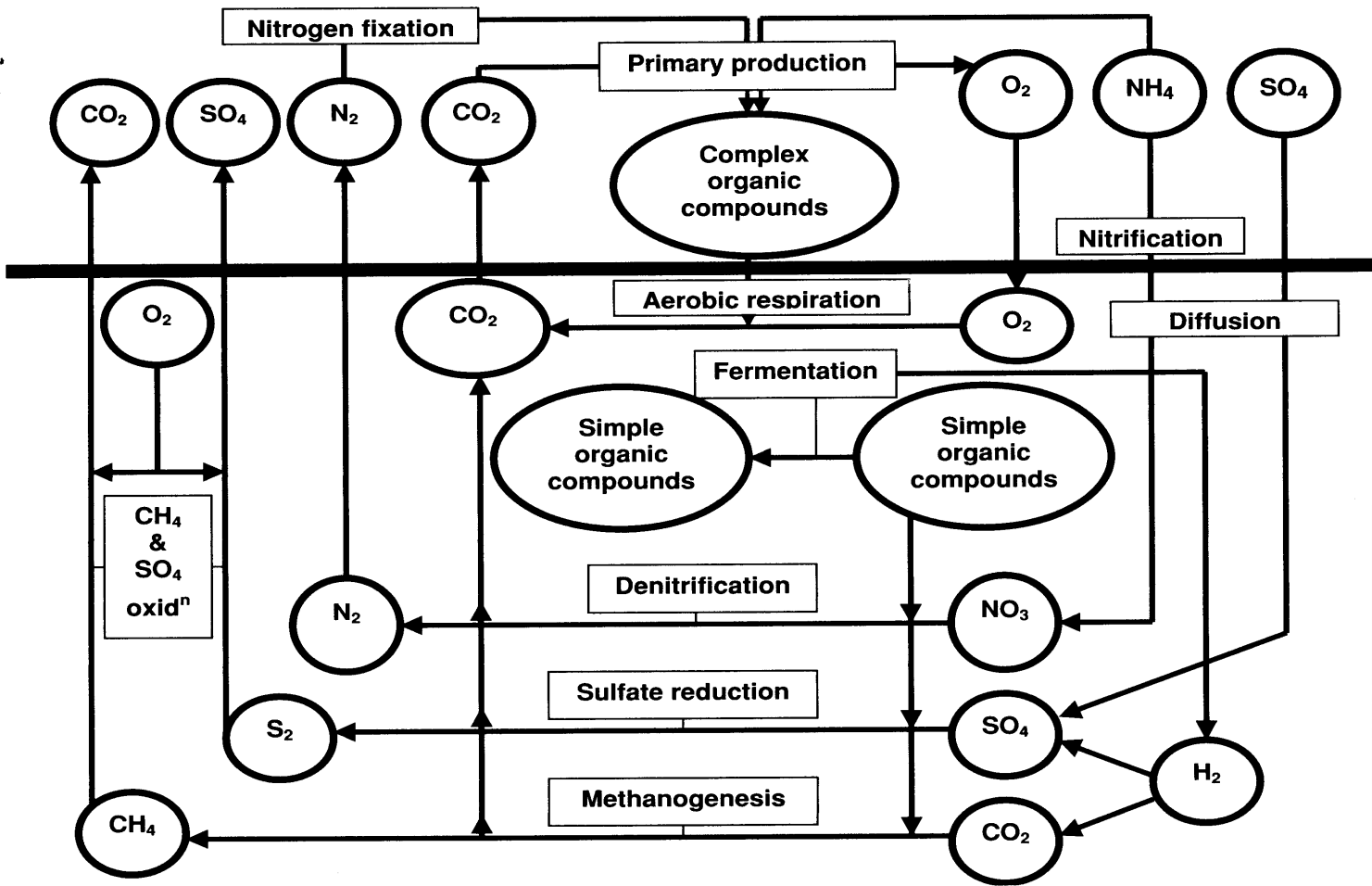
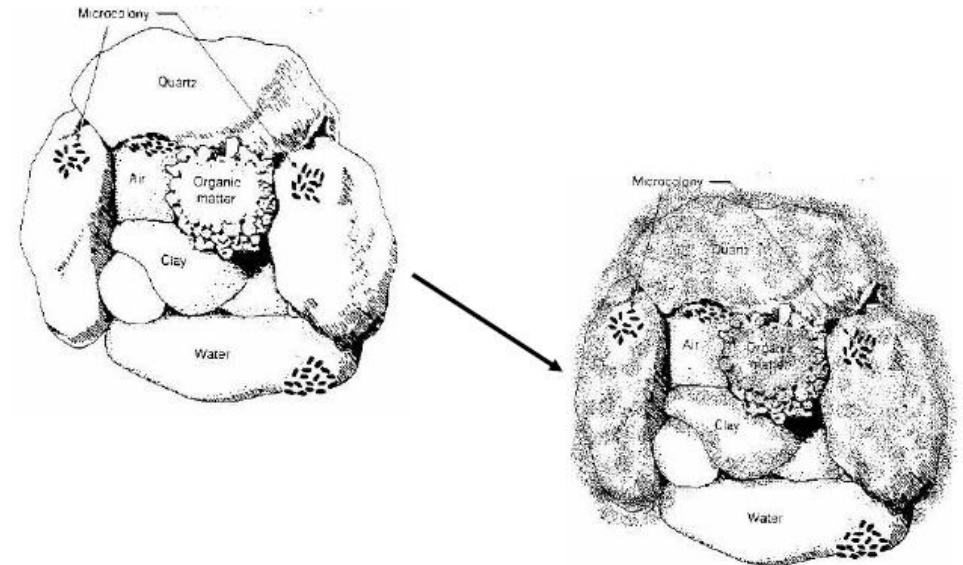
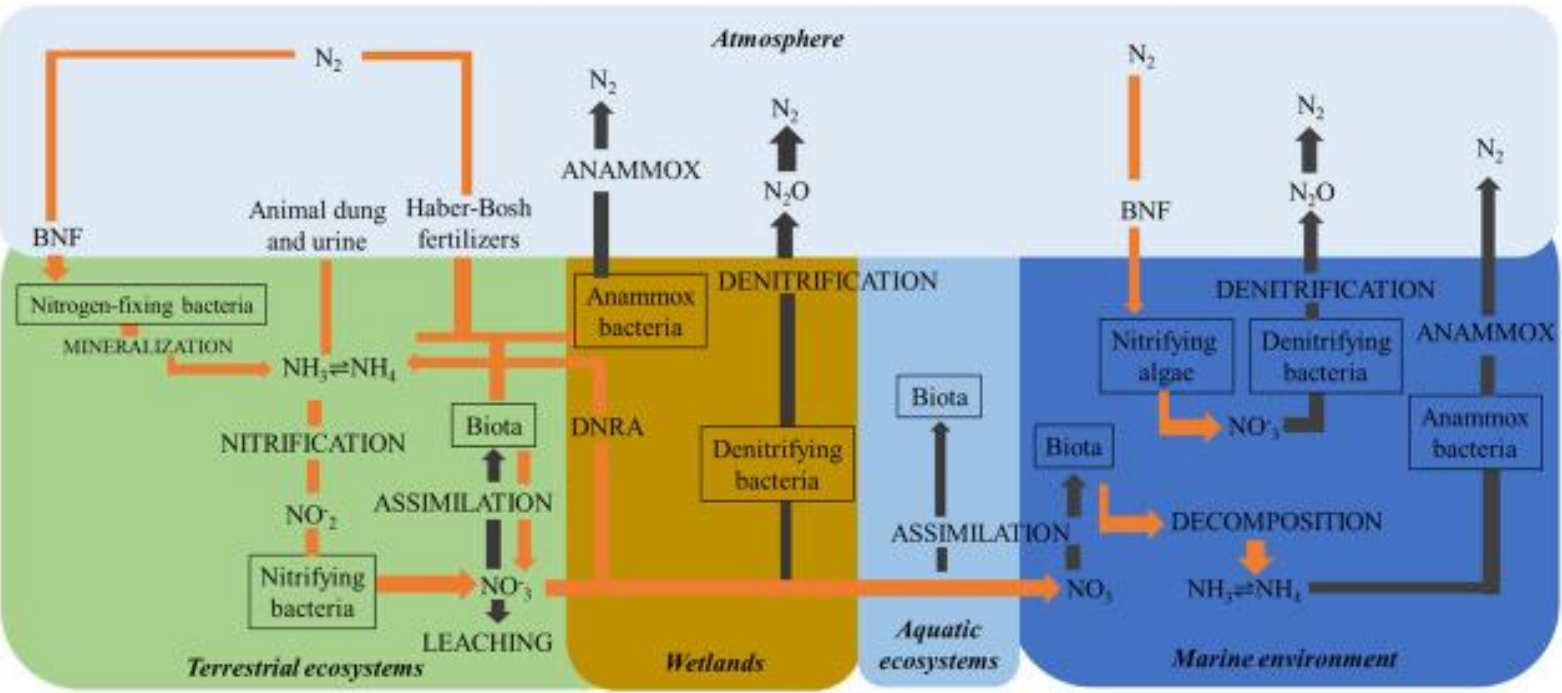


FIGURE 5.5
Biogeochemical pathways in wetland sediments associated with the decomposition of organic matter. The thick horizontal line indicates the sediment-water interface.



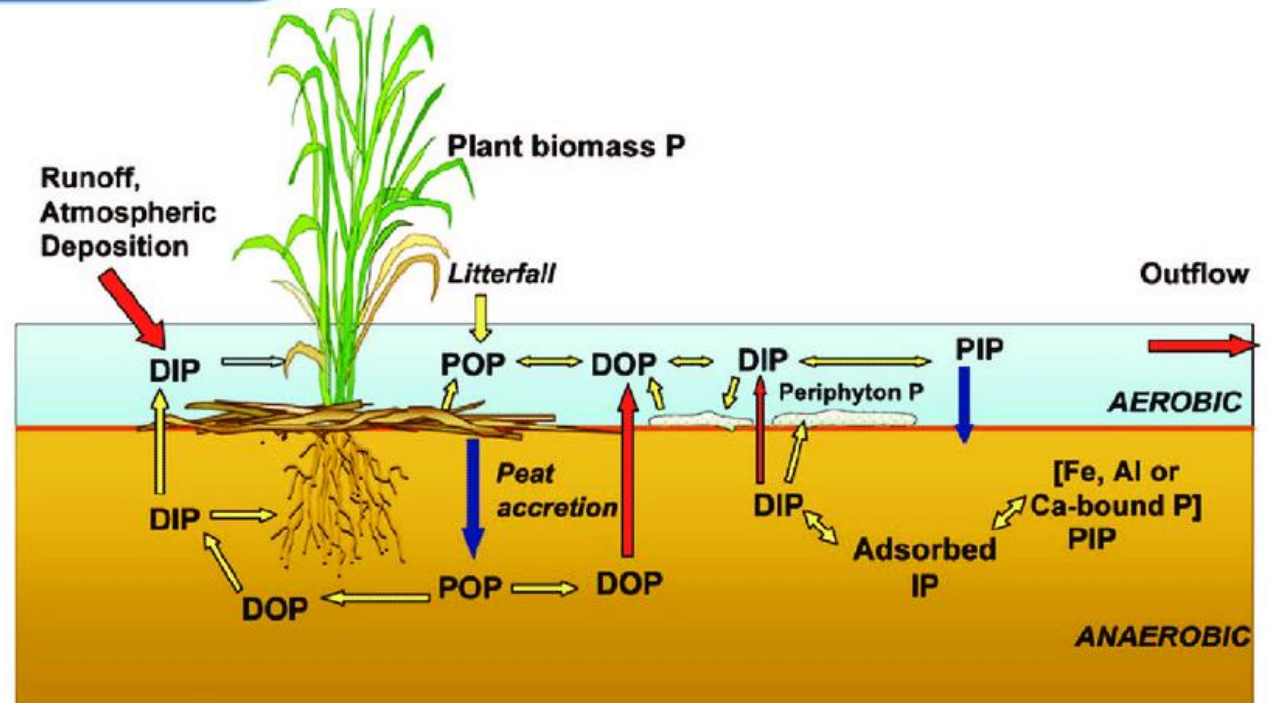
Development of Microbial Biofilm on a Solid Substrate - nitrification and denitrification occur within the biofilm



Wetlands remove bioavailable nitrogen from aquatic systems, and they sequester phosphorus and carbon. Consequently, they reduce eutrophication downstream.

The diverse microbial assemblages of wetlands break down a diverse array of toxins, rendering them harmless.

Martinez-Espinoza et al. 2021. Sci. Total Environment.



Reddy and DeLaune. 2008.

Wetlands store water during storms – we all agree on that

How much it affects stormflows is highly situational, depending on the location and size of the wetlands and the watershed characteristics.

In general, removing wetlands from the landscape increases peak flows.

Ecological Applications, 28(4), 2018, pp. 953–966
© 2018 by the Ecological Society of America

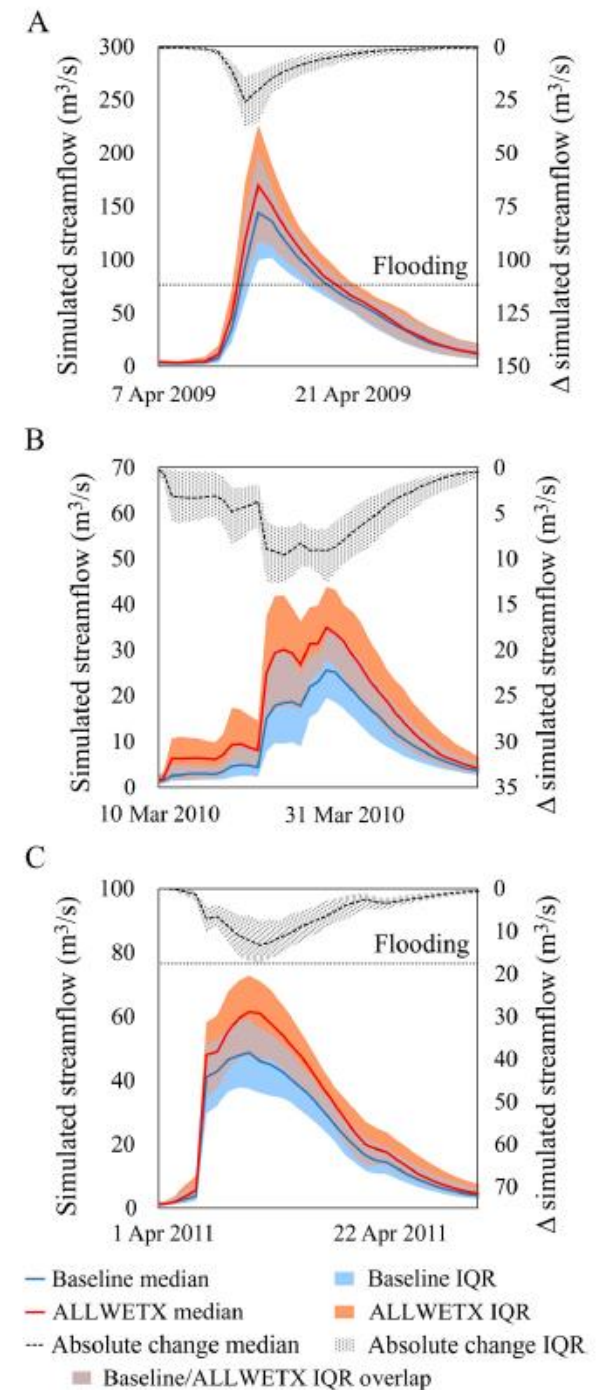
Depressional wetlands affect watershed hydrological, biogeochemical, and ecological functions

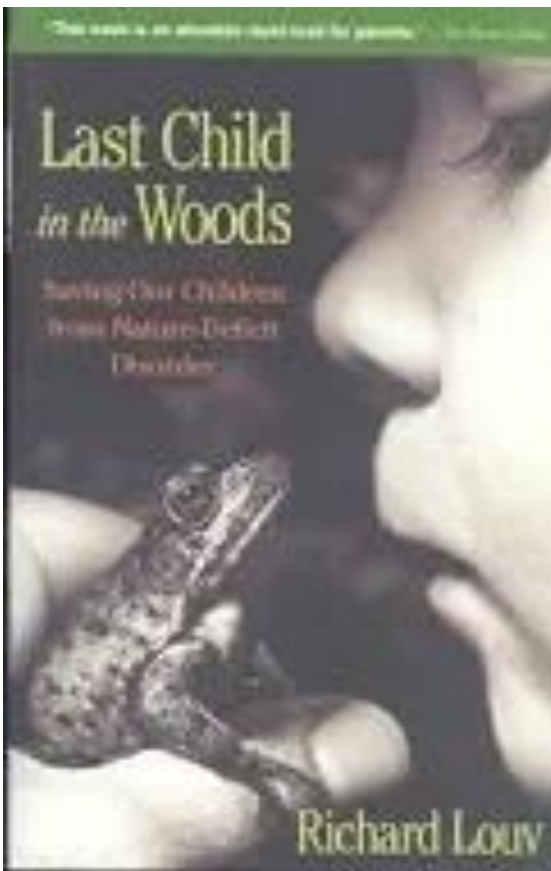
GREY R. EVENSON,^{1,4} HEATHER E. GOLDEN,² CHARLES R. LANE,² DANIEL L. McLAUGHLIN,¹ AND ELLEN D'AMICO³

¹ Department of Forest Resources and Environmental Conservation, Virginia Polytechnic Institute and State University, Cheatham Hall, Blacksburg, Virginia 24061 USA

² US Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory, Cincinnati, Ohio 45220 USA

³ CSS Corporation, Cincinnati 45220 Ohio USA

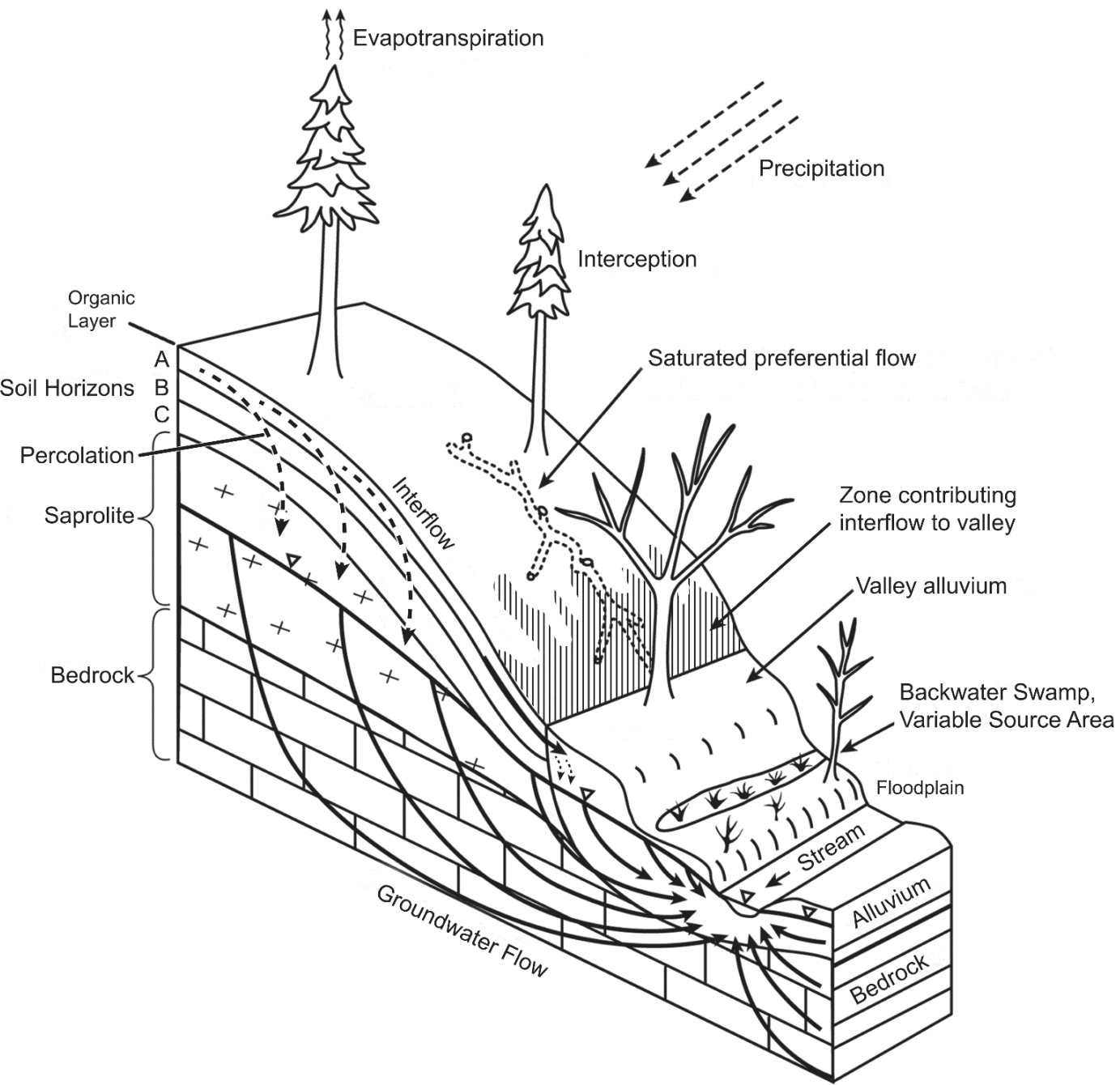




Wetlands provide recreational and social benefits.

Enjoyed by birdwatchers, nature-lovers, hunters, families, and children.



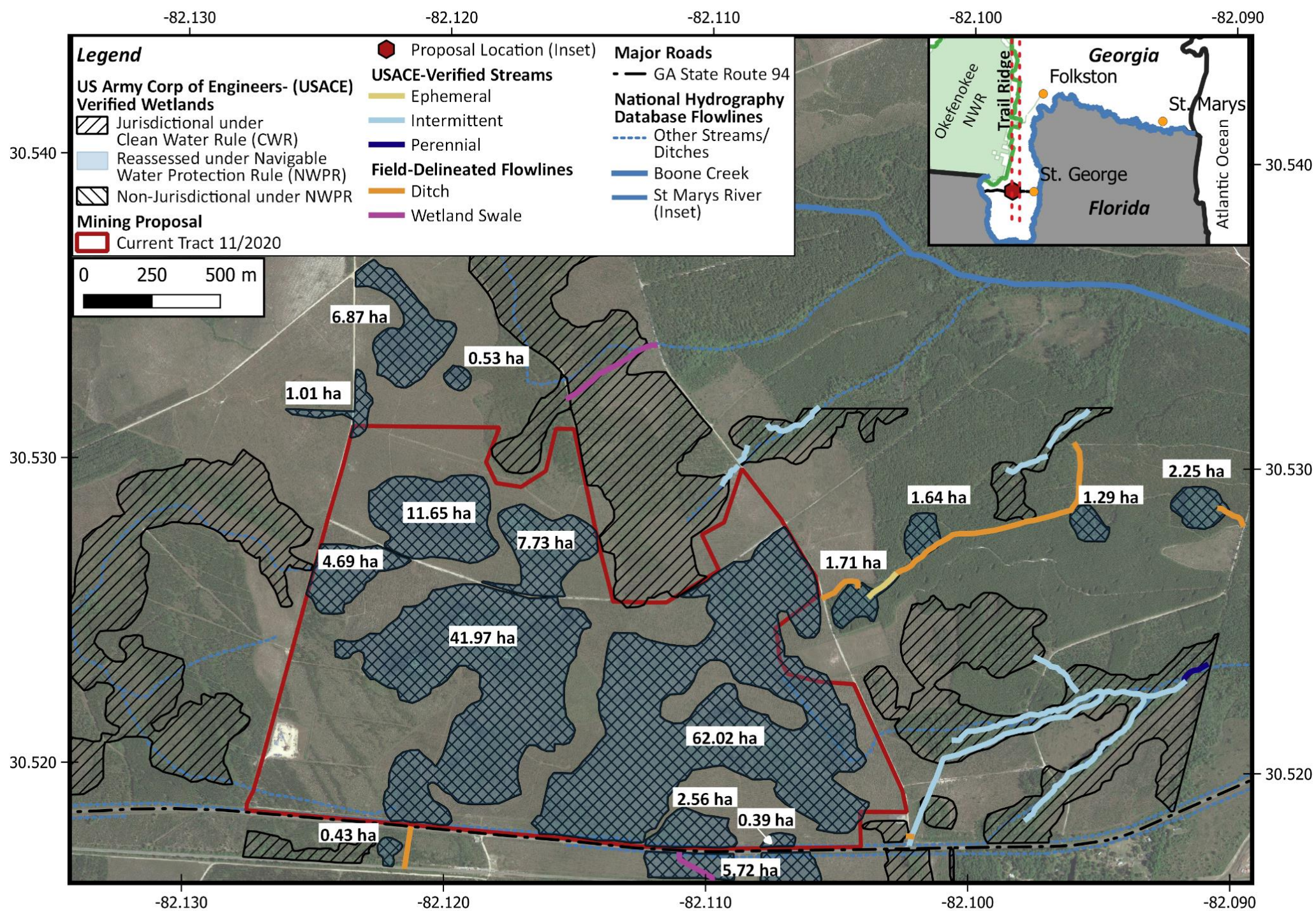


The legal interpretations and the implementation of the Clean Water Act are not consistent with hydrologic science.

Hydrologically, the entire landscape is connected to navigable waters and affects the flow, chemistry, and ecology of navigable waters (“the physical, chemical, and biological integrity of the Nation’s waters”).

Groundwater-surface water distinctions are arbitrary and meaningless.

Perennial-intermittent flow distinctions are arbitrary and meaningless.



Under the Clean Water Rule, all these wetlands were ruled jurisdictional.

Under the Navigable Waters Protection Rule, NONE were ruled jurisdictional.

This change will affect a lot of wetlands!