
# Imagery Evidence of SLAMM-Estimated Increases In 2025 Tidal Wetland Area: Preliminary Analysis

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U.S. Department of the Interior
U.S. Geological Survey

# Overview:

- **Sea Level Affecting Marshes Model (SLAMM)* run from a 1996 base year (CCAP) to out-years: 2025, 2050, 2075, and 2100**

- **Output interpolated to represent a 0.22 m, 0.31 m, 0.42 m, and 0.53 m sea level rise for input to the CBP Water Quality Model**

- **SLAMM results for initial period, 1996-2020, indicate a net increase in "wetland" area of ~3,100 hectares in the watershed with roughly equal proportions transitioning from uplands and woody swamp.**

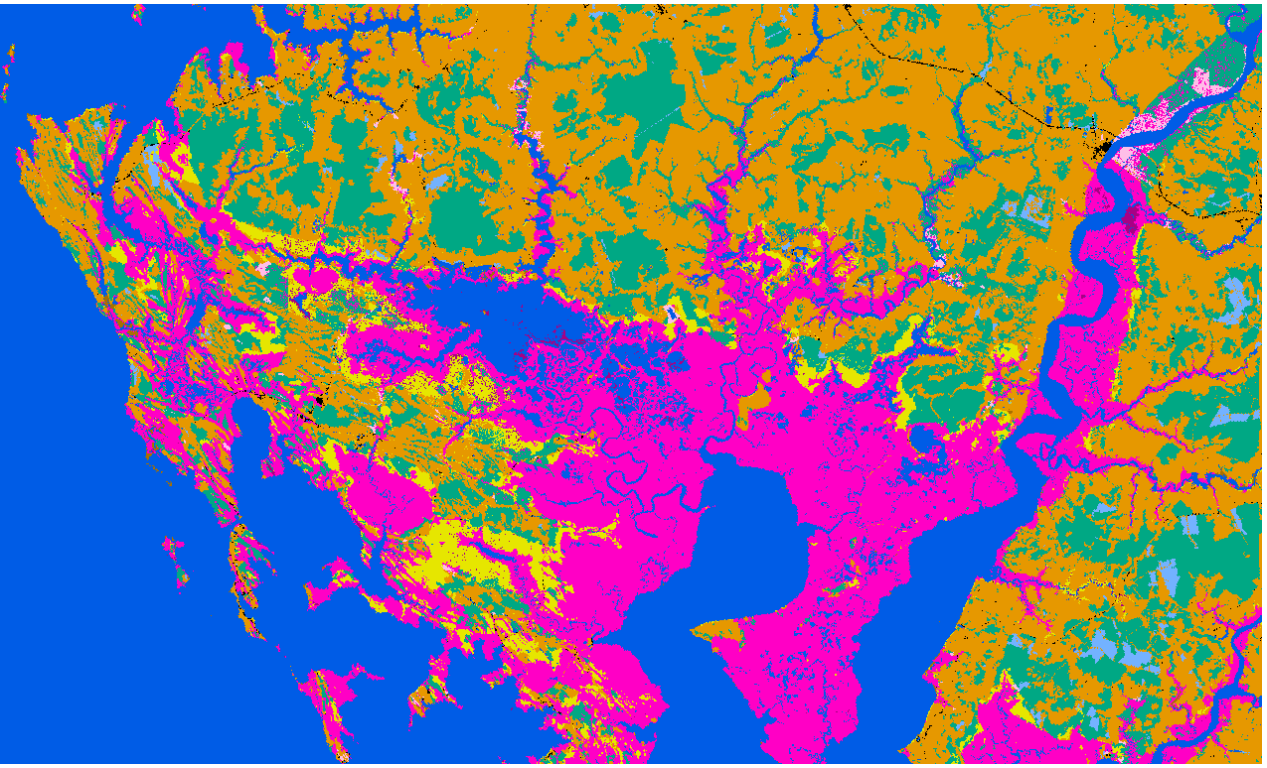
- **All other periods indicate a decrease in "wetland" area (to open water).**

Is there any evidence of wetland gain from 1996 to 2020 in readily available remotely sensed imagery?

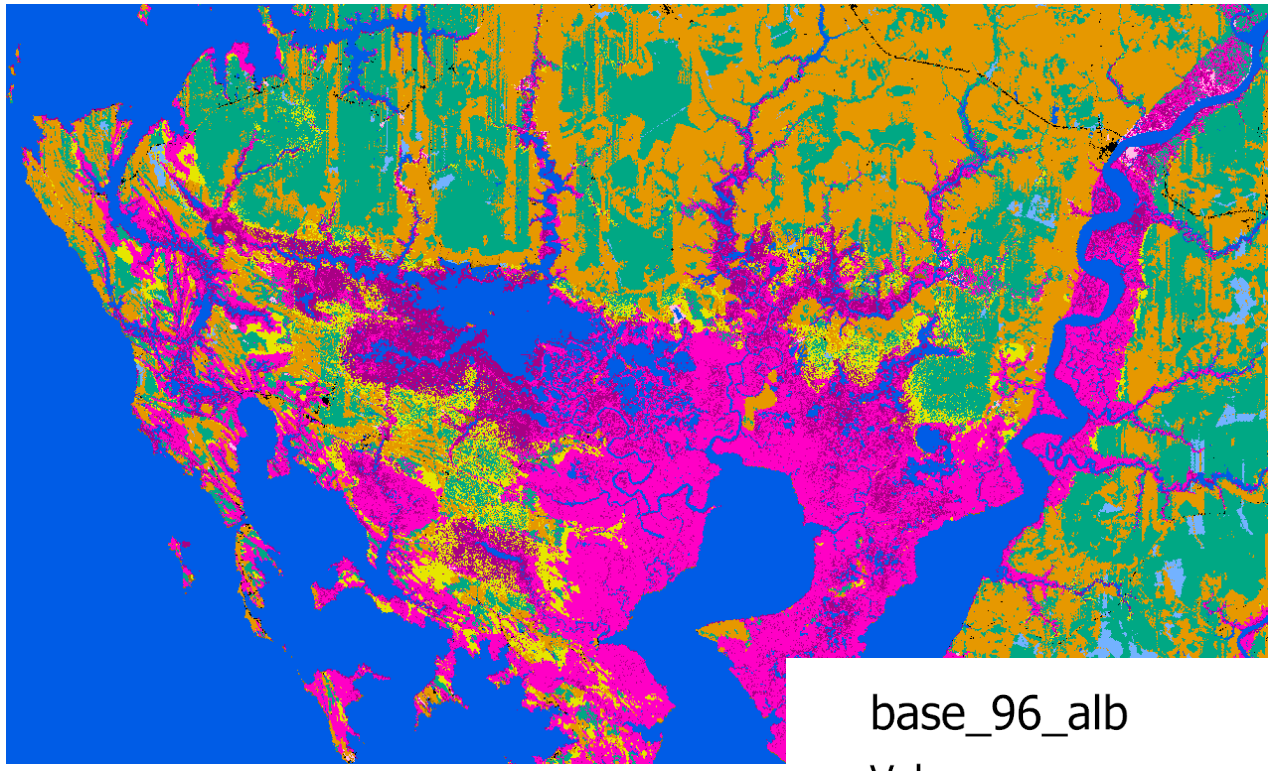
* Glick, 2008. Sea-Level Rise and Coastal Habitats in the Chesapeake Bay Region: Technical Report, National Wildlife Federation, Washington D.C., 128p.

USGS

1996 SLAMM BASELINE (CCAP)



2025 SLAMM (1-meter SLR by 2100)



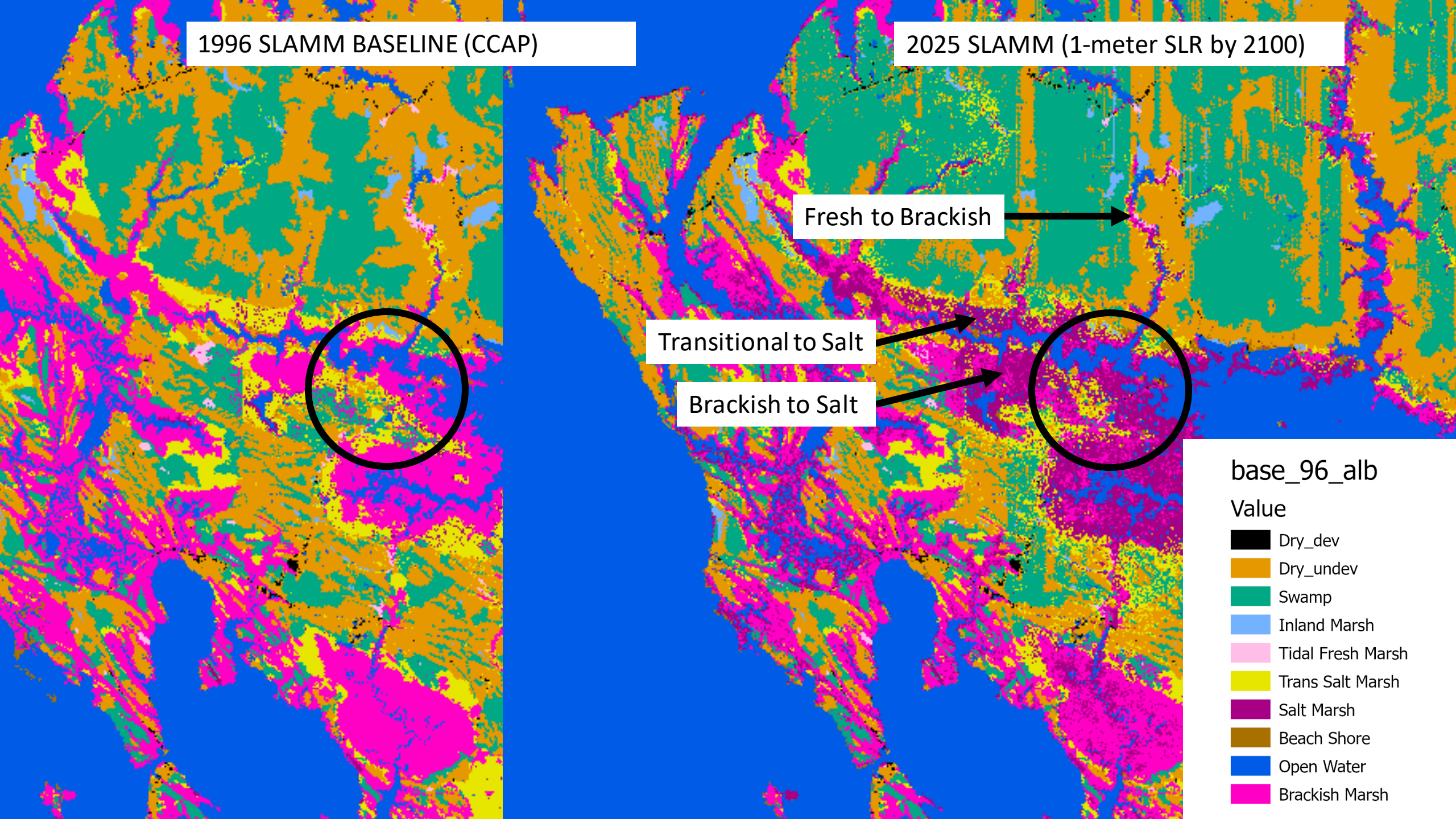

Tidal Wetlands = Marsh (Tidal Fresh, Brackish, and Salt, + Transitional)

<u>Change from 1996 to 2025 in CBW:</u>

Gains: 130M m2 (51% swamp to marsh; 49% upland to transitional)

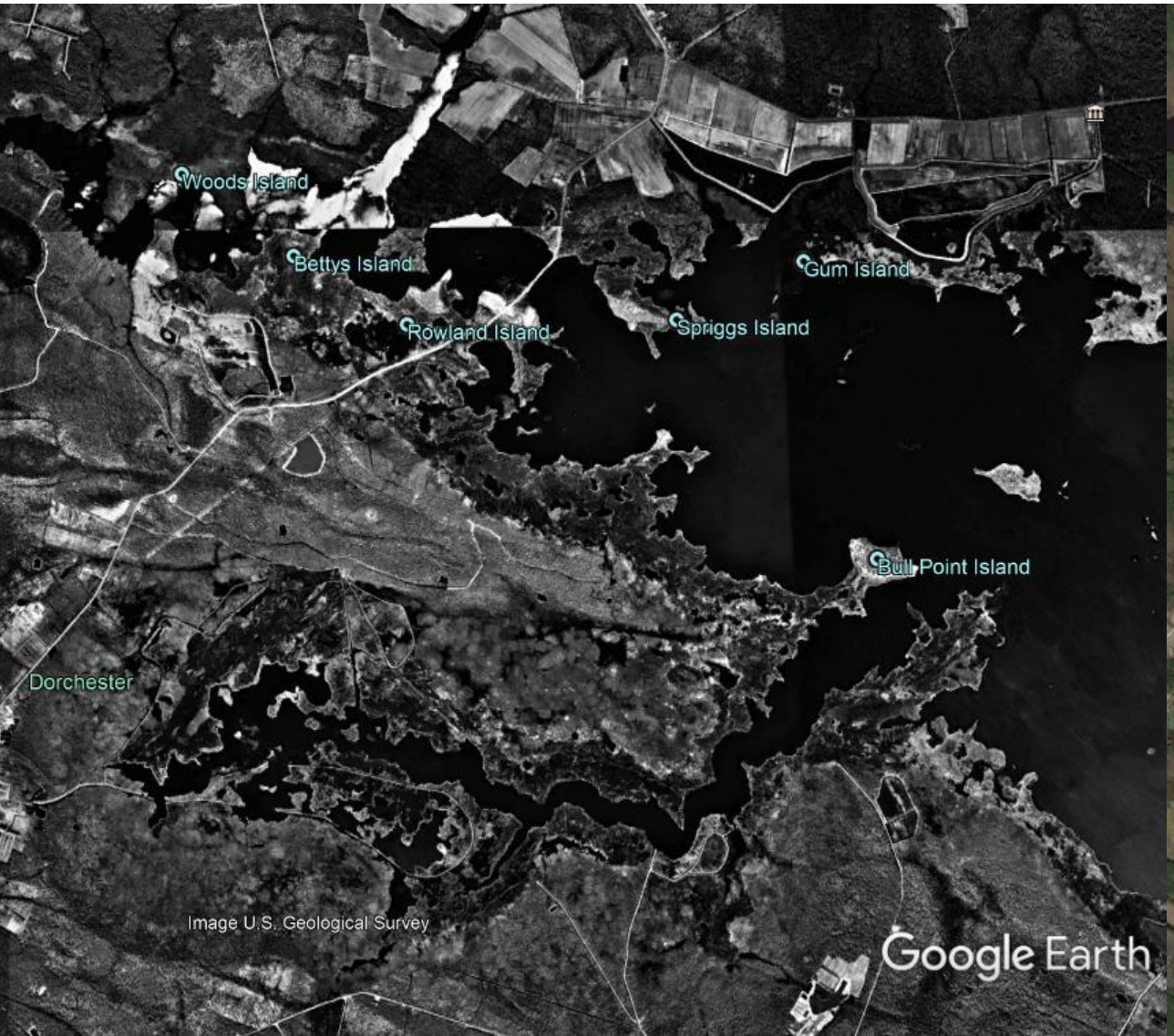
Losses: 67M m2 (80% marsh to water; 20% marsh to flat)

Net gain of 16M m2 estimated for Blackwater for 0.22m rise (FSBMH)


1996 SLAMM BASELINE (CCAP)
2025 SLAMM (1-meter SLR by 2100)
Fresh to Brackish
Transitional to Salt
Brackish to Salt
base_96_alb
Value
Dry_dev
Dry_undev
Swamp
Inland Marsh
Tidal Fresh Marsh
Trans Salt Marsh
Salt Marsh
Beach Shore
Open Water
Brackish Marsh

# Aerial Imagery Assessment: possible losses to open water, no visible net gains

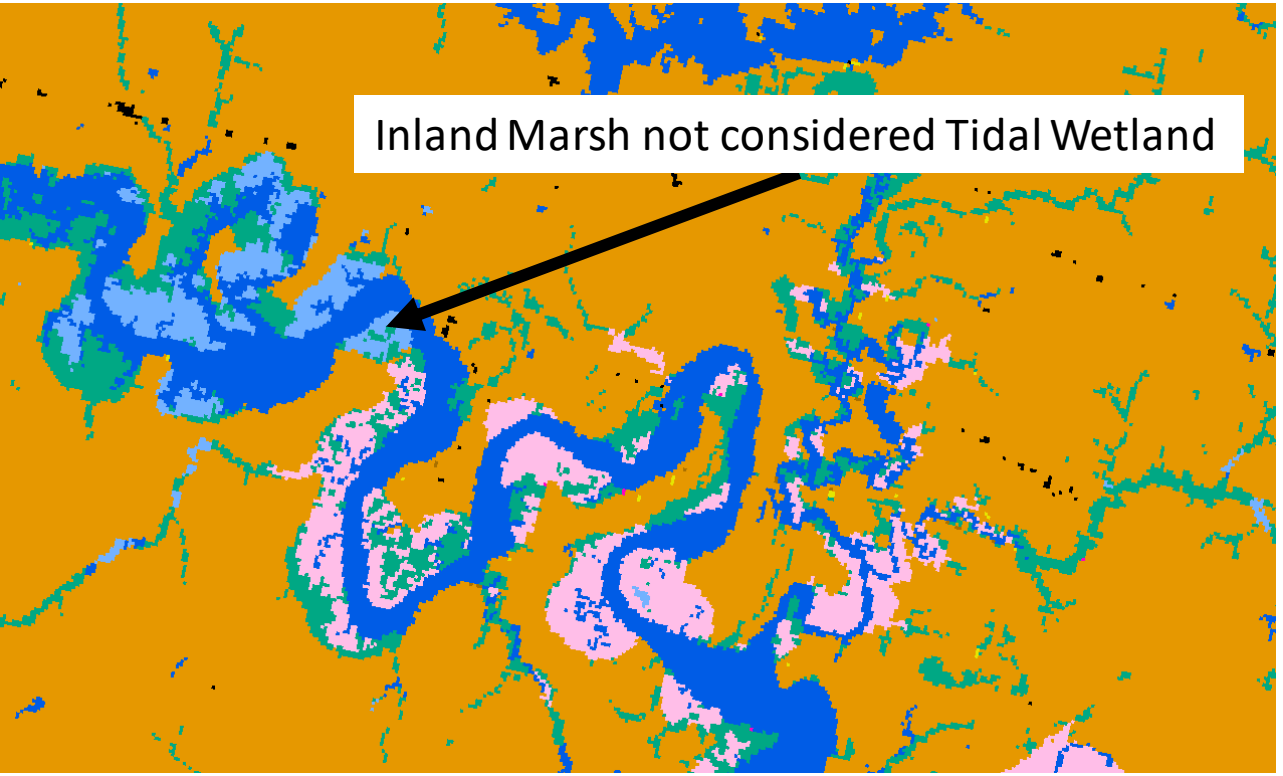
March 1995



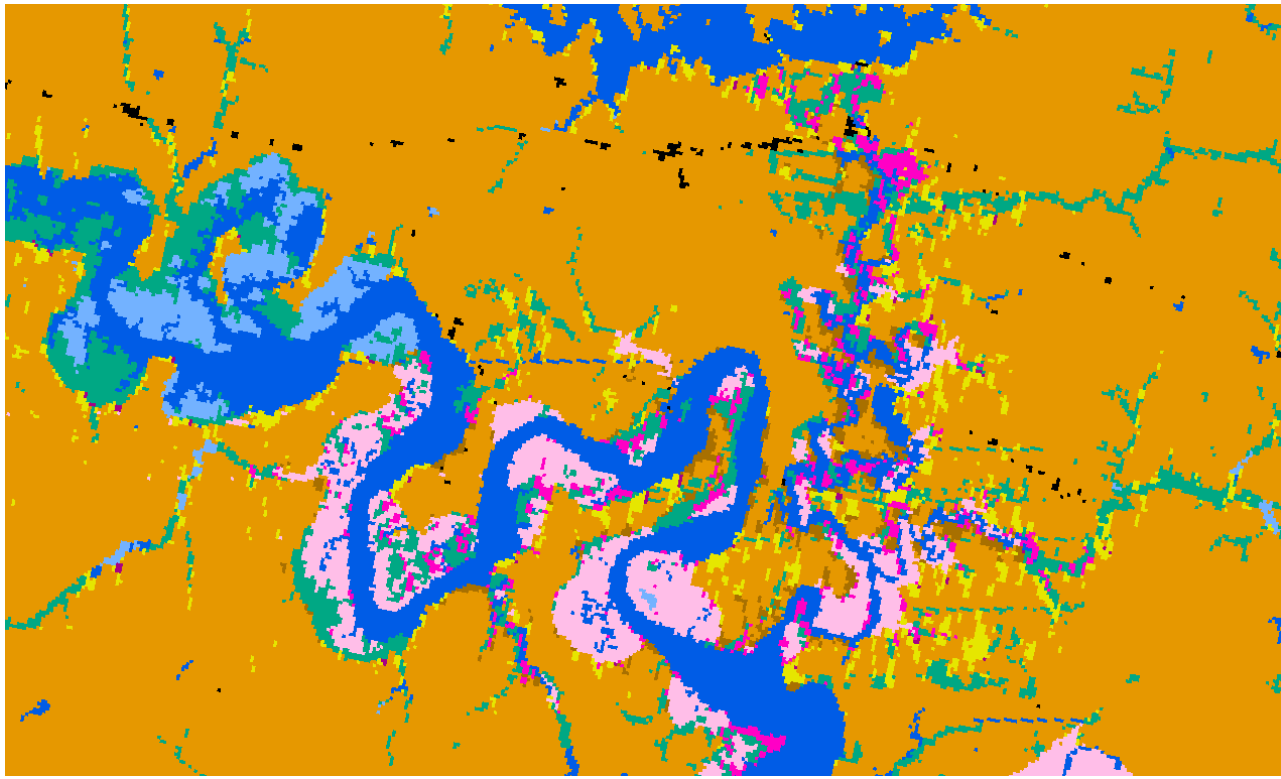

October 2013

# Chickahominy River, Virginia

## 1996 SLAMM BASELINE (CCAP)




## 2025 SLAMM (1-meter SLR by 2100)



Tidal Wetlands = Marsh (Tidal Fresh, Brackish, and Salt, + Transitional)

Net gain of 13M m2 estimated for Chickahominy for 0.22m rise (CHKOH)

- Dry_dev
- Dry_undev
- Swamp
- Inland Marsh
- Tidal Fresh Marsh
- Trans Salt Marsh
- Salt Marsh
- Beach Shore
- Open Water
- Brackish Marsh

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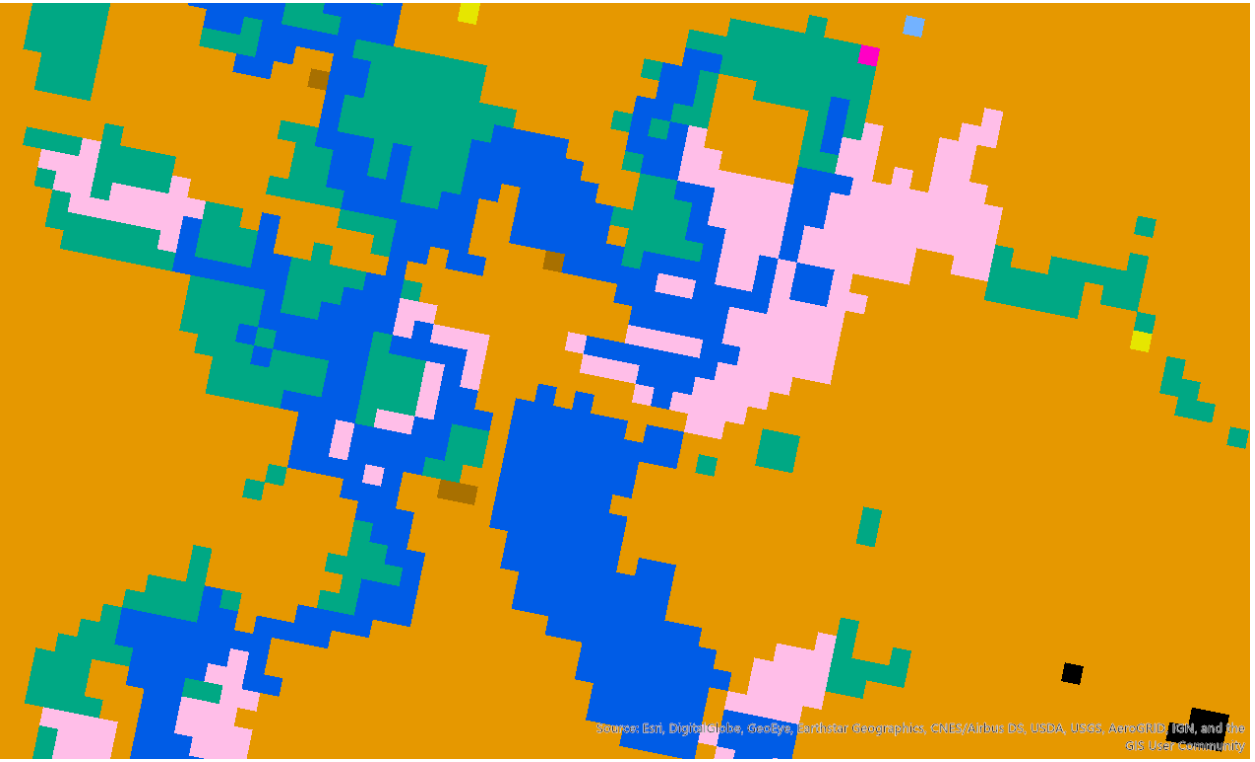

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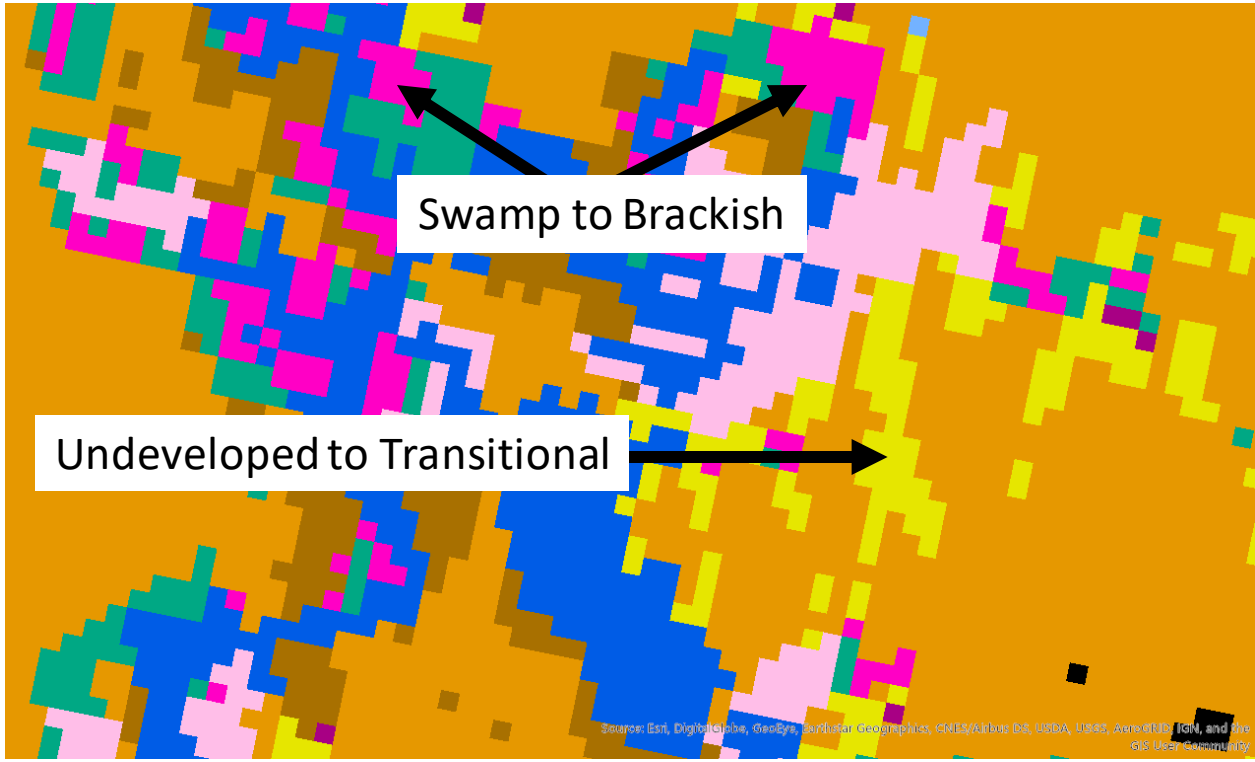


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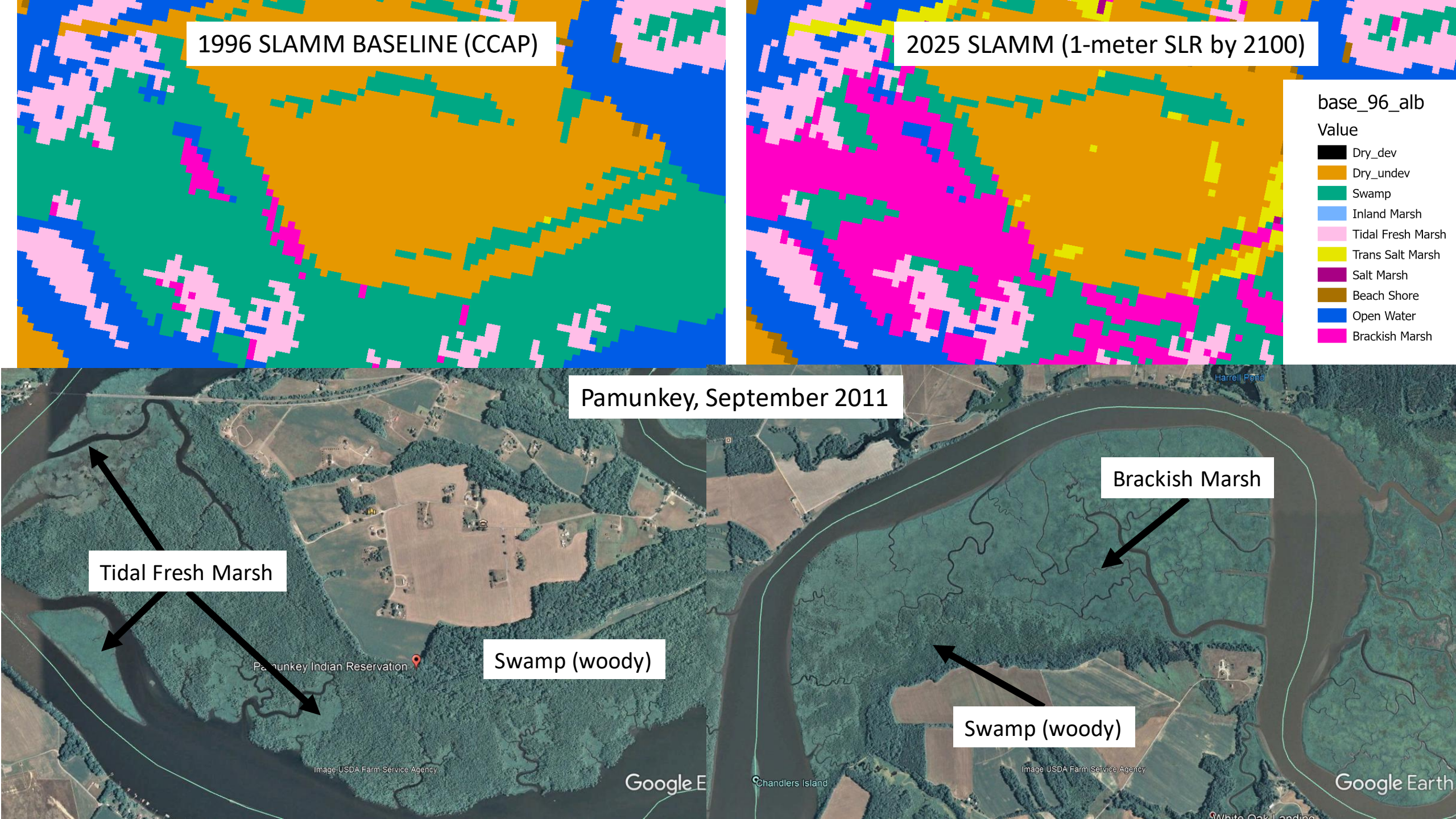
- Open Water
- Brackish Marsh

Aerial Imagery Assessment: apparent gains from open water but could be associated with tidal stage and image quality, no visible loss of uplands to transitional

March 1994


February 2019


1996 SLAMM BASELINE (CCAP)
2025 SLAMM (1-meter SLR by 2100)
base_96_alb
Value
Dry_dev
Dry_undev
Swamp
Inland Marsh
Tidal Fresh Marsh
Trans Salt Marsh
Salt Marsh
Beach Shore
Open Water
Brackish Marsh
Pamunkey, September 2011
Tidal Fresh Marsh
Swamp (woody)
Brackish Marsh
Swamp (woody)
Image USDA Farm Service Agency
Google Earth

# Preliminary Conclusions

- No photographic evidence for undeveloped upland converting to “transitional salt marsh”
- No photographic evidence for woody swamp transitioning to herbaceous brackish marsh but transitions may be not be visible for decades (woody vegetation has to decay and transition to herbaceous to be visible).
- Apparent photographic evidence for marsh loss to open water in Blackwater Wildlife Refuge
- Existing available photography is challenging to interpret for land to water transitions in shallow tidal areas due to the unknown tidal stage and limited spectral bands (black and white) in pre-2000 imagery.