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**THE EASTERN SHORE'S  
TRIPLE THREAT:  
CHANGES IN LAND AND  
MOSQUITO HABITAT**

# MARYLAND'S EASTERN SHORE



**WHERE IS IT?**

**AND**

**WHERE IS IT  
GOING?**

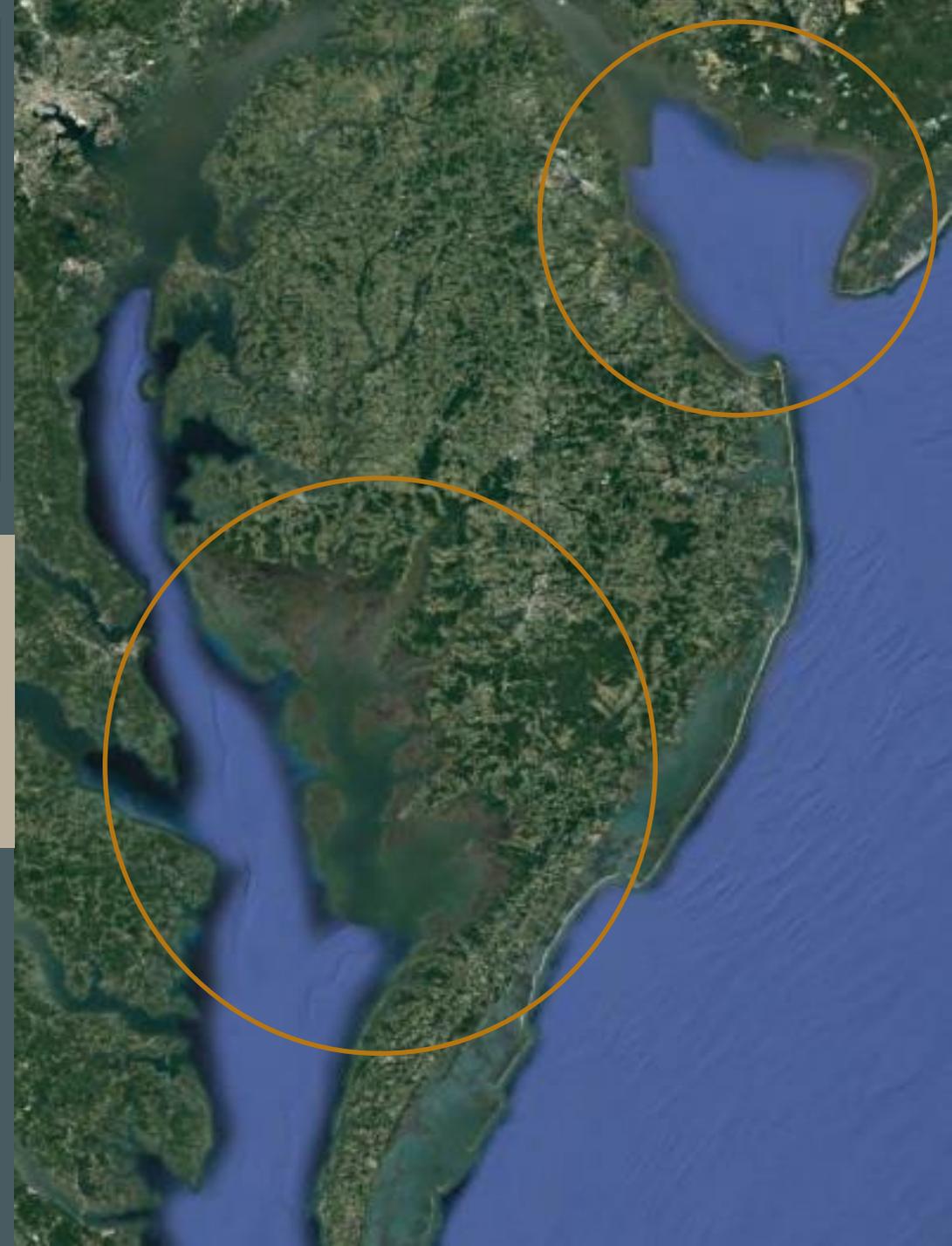


THOUSANDS OF ACRES OF LAND  
FROM DELAWARE, MARYLAND AND  
VIRGINIA ARE DISAPPEARING  
INTO THE CHESAPEAKE BAY

“500 Acres of Maryland  
shoreline are lost each year”

DeFillippo, Frank A. (2019)

**That's 15,000 acres in a 30-year career!!**



# THE TRIPLE THREAT

## Threat #1

### Post Glacial Subsidence

- **The Polar Ice Caps are melting causing Glacial Isostatic Adjustment:**
- **Post glacial rebound in the Arctic**
- **Post glacial subsidence on the East Coast**
- **Since we share a tectonic plate, our lithosphere is sinking:**  
**>1 inch per decade = 1 foot per century**



# THE TRIPLE THREAT

## Threat #2 Land Erosion

- Tidal movements from waves and, more significantly, from storms create substantial land loss.

- “Approximately 260 acres of MD shoreline is lost to erosion each year”

MD DNR, (2000)



Gravestones from 1920



# THE TRIPLE THREAT

## Threat #3

### Rising Water Levels

**“Since Captain John Smith charted the Chesapeake Bay in the 1600s, the bay has risen three feet”**

**National Geographic(2019)**



**BASEBALL FIELD**

(High Tide in Dorchester, MPT)

# TANGIER ISLAND EROSION HISTORY

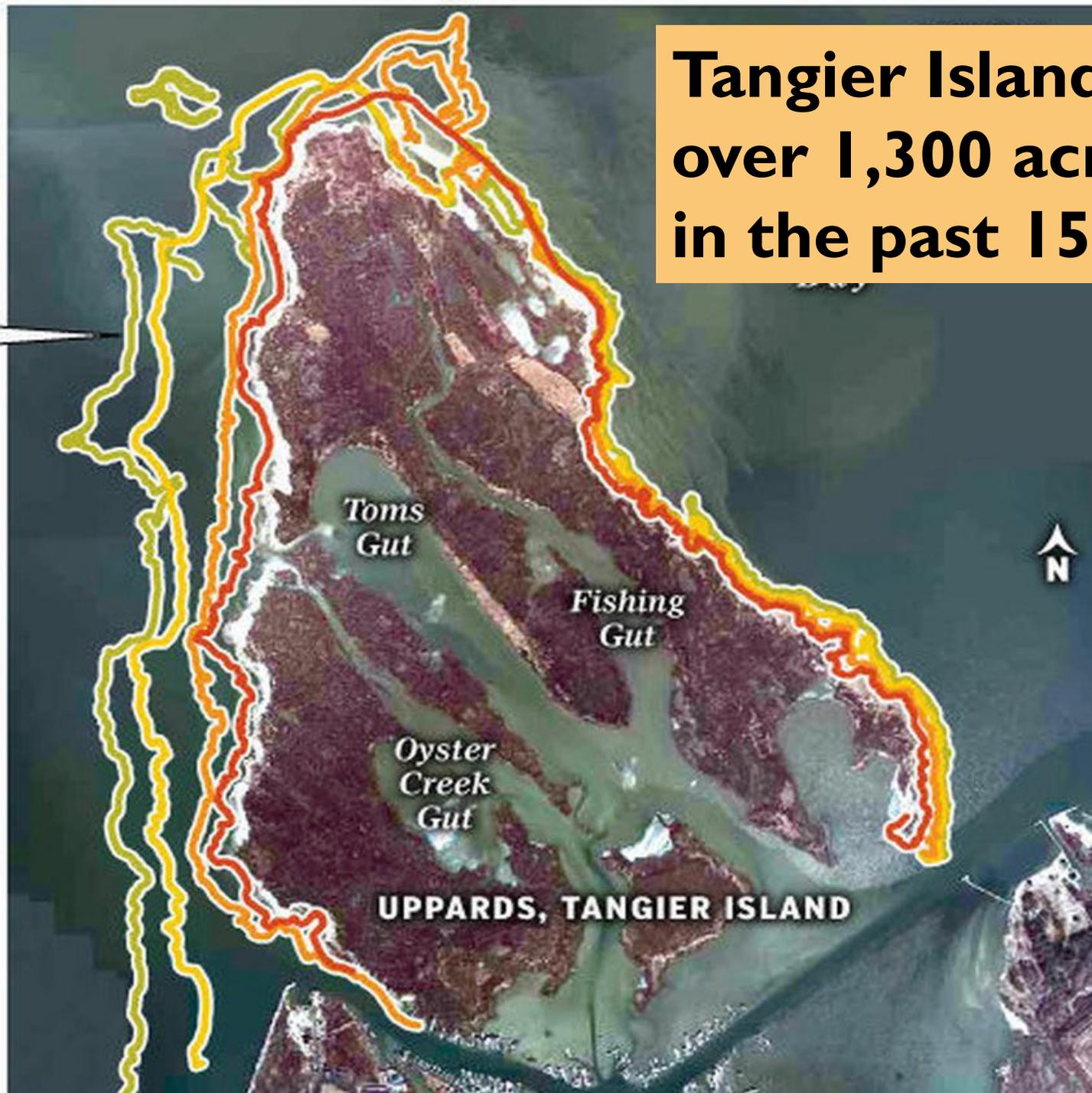
Tangier Island is slowly being swallowed by the Chesapeake Bay's rising seas and heavy erosion over the years.



SOURCES:  
U.S. Army Corps of Engineers,  
Norfolk District; ESRI, Tele Atlas

Graphic by ROBERT D. VOROS  
THE VIRGINIAN-PILOT

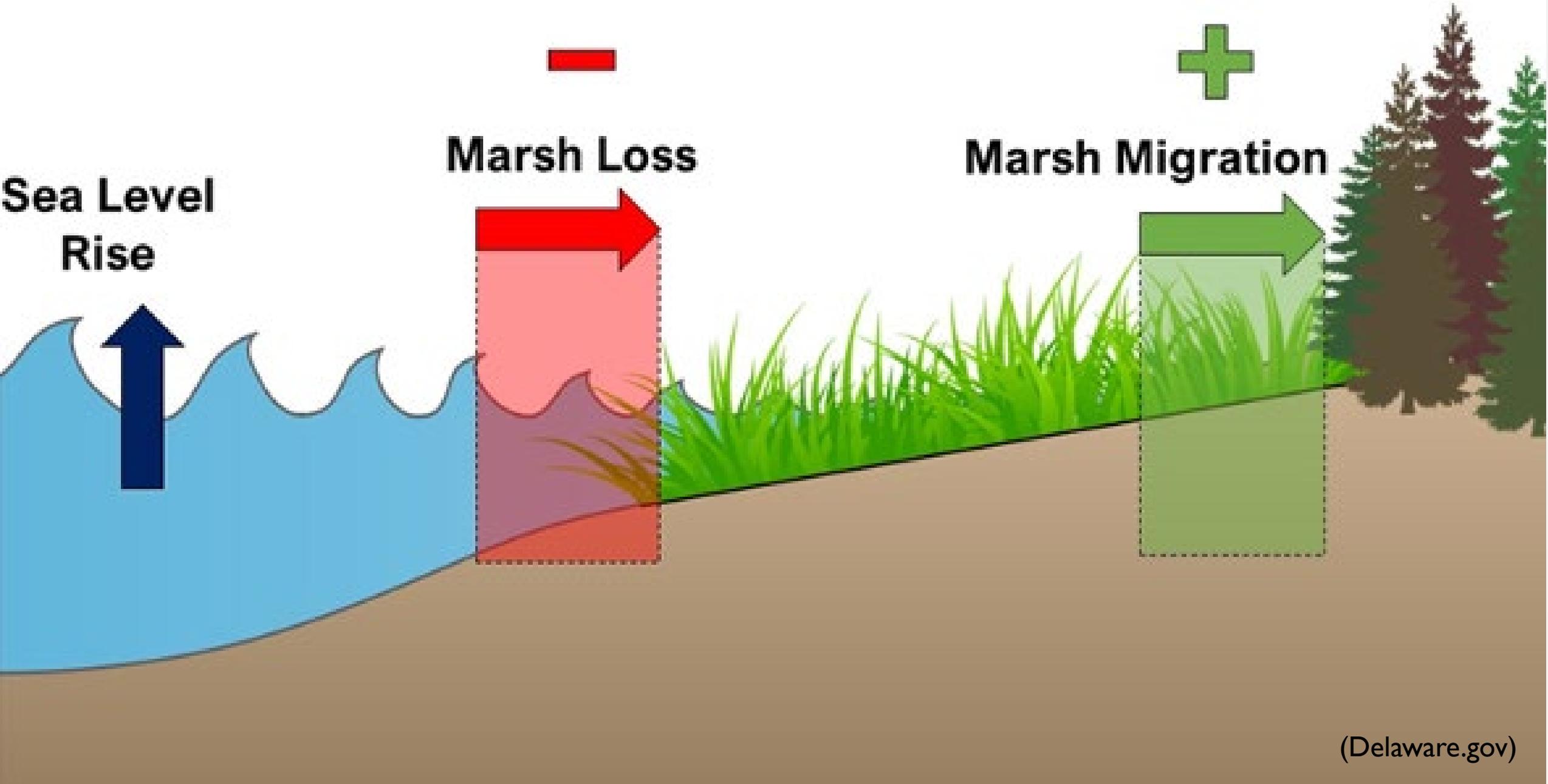
**Tangier Island, VA has lost over 1,300 acres of land in the past 150 years.**

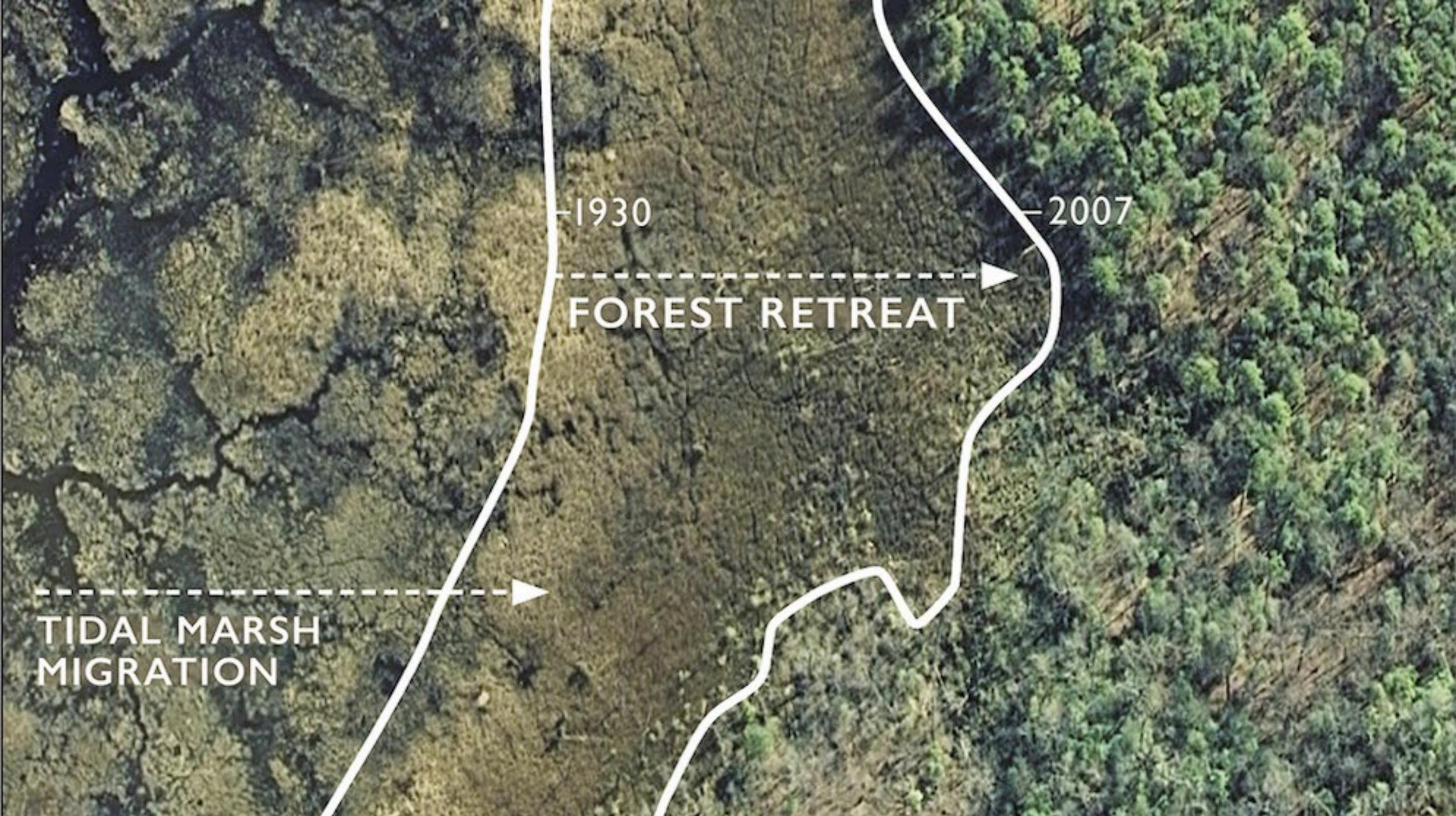


# A SINKING, ERODING ISLAND: MARSHES RETREAT, ULTIMATELY TAKING OVER HUMAN HABITAT



# The Land is Changing





1930

2007

FOREST RETREAT

TIDAL MARSH  
MIGRATION



**PEOPLE IN MD AND VA BUILT BERMS AROUND  
PROPERTIES TO SAVE THEIR LAND**

**THE SUCCESS OF THEIR LABORS WAS SHORT LIVED**

# **SO WHAT'S ALL THIS GOTTA TO DO WITH DEM MUSKEETAS ???**

**Marshland that did produce abundant mosquito populations now stay flooded and no longer provide habitat**



**Areas that were once farm or forest are being converted into marshland and becoming new mosquito habitat**

MANY MARSHES ARE TRANSITIONING  
SLOWER, STILL PROVIDING HABITAT



# FLOODED MARSH : OLD HABITAT

*CONSISTENTLY FLOODED: FISH FLOW FREELY  
IN SHORT TIME, IT WILL BE COMPLETELY UNDERWATER*

TODDVILLE, MD  
DORCHESTER COUNTY



**“GO INSPECT RUMBLY POINT; LARVAE BALLS EVERYWHERE  
CAN'T MISS 'EM”**

**GRASS STICKING UP OUT OF 6+” DEEP WATER**

**I HAVE MONITORED THIS MARSH SINCE 2013 AND I'VE  
NEVER SEEN 1 LARVA HERE**



Various Marshes in Somerset County, MD



**LAND ONCE USED TO CULTIVATE CROPS  
NOW CULTIVATES MOSQUITOS**



# PERIOD OF TRANSITION

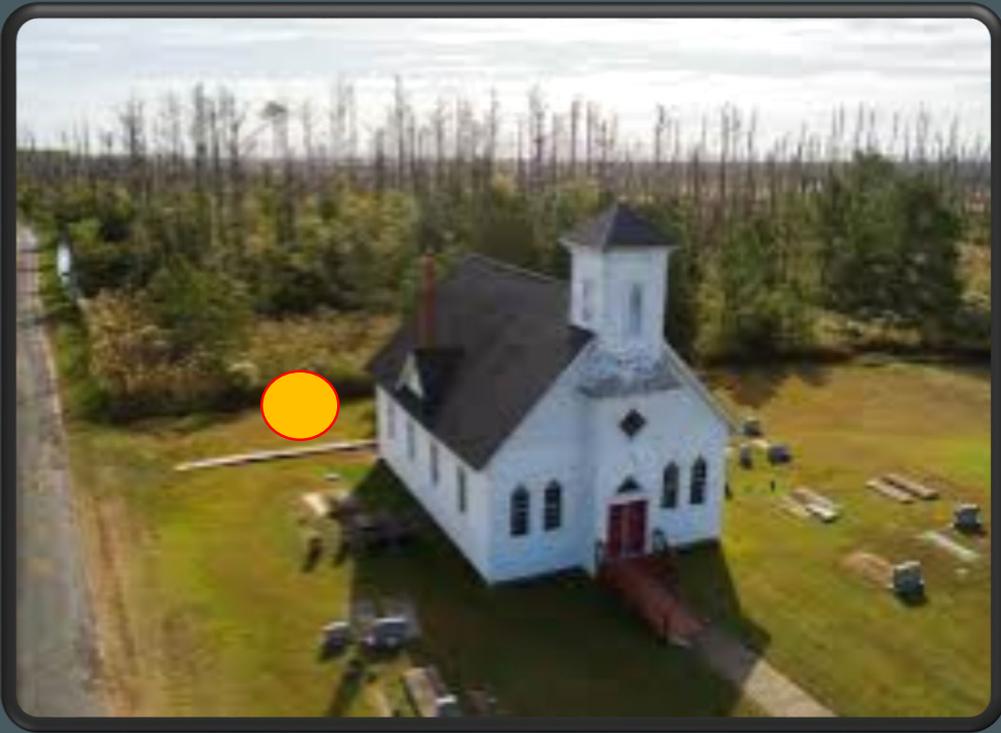
- **Woodland is being converted into marsh**
- **AKA:: “Ghost Woods”**
- **Pockets of water, 2-6 inches deep, become trapped from higher tides. These pools become perfect mosquito breeding habitat**



“GHOST WOODS  
OF THE  
CHESAPEAKE”

**Once a thriving  
woodland → now a  
perfect habitat for  
saltwater species such  
as the *Ae. sollicitans***





CHURCH IN DORCHESTER  
COUNTY, MD

## LRC of 1 minute

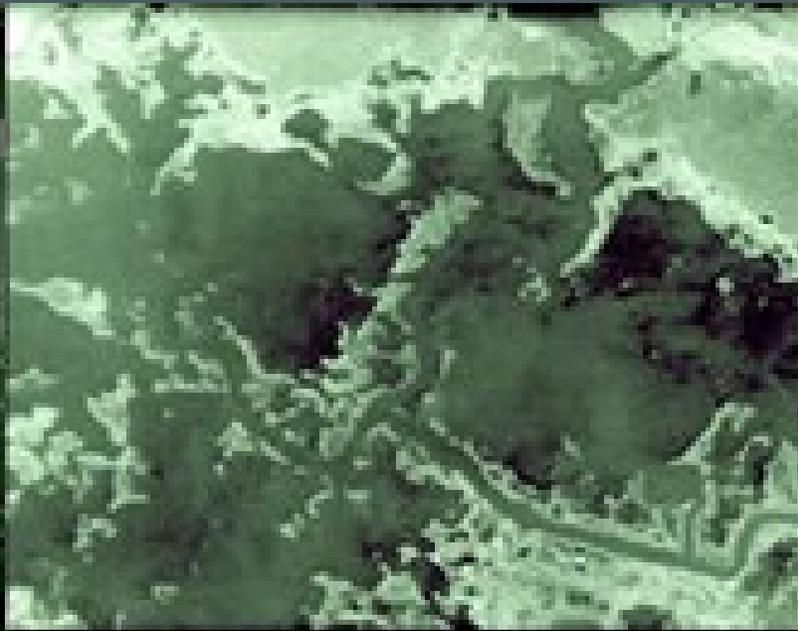
Date	# of <i>Ae. sollicitans</i>
8/29/17	2
8/29/18	0
8/28/19	11
8/31/20	TMTC : 200+ in < 30 seconds
8/31/21	TMTC : 200+ in < 30 seconds

Non-baited Light Traps yield well over 2,000 *Ae. sollicitans*

BLACKWATER NATIONAL WILDLIFE REFUGE,  
DORCHESTER COUNTY, MD



1938



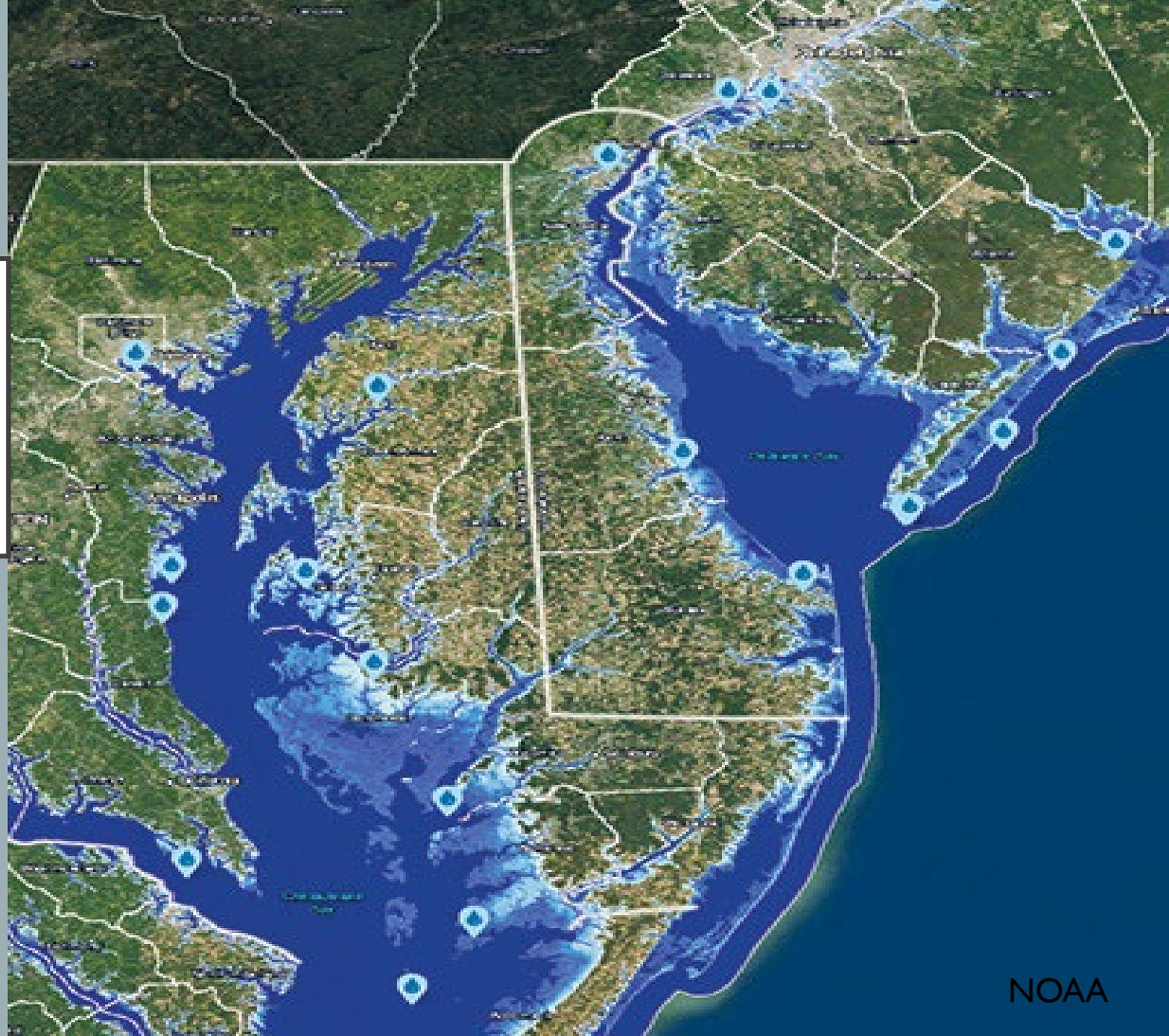
1974



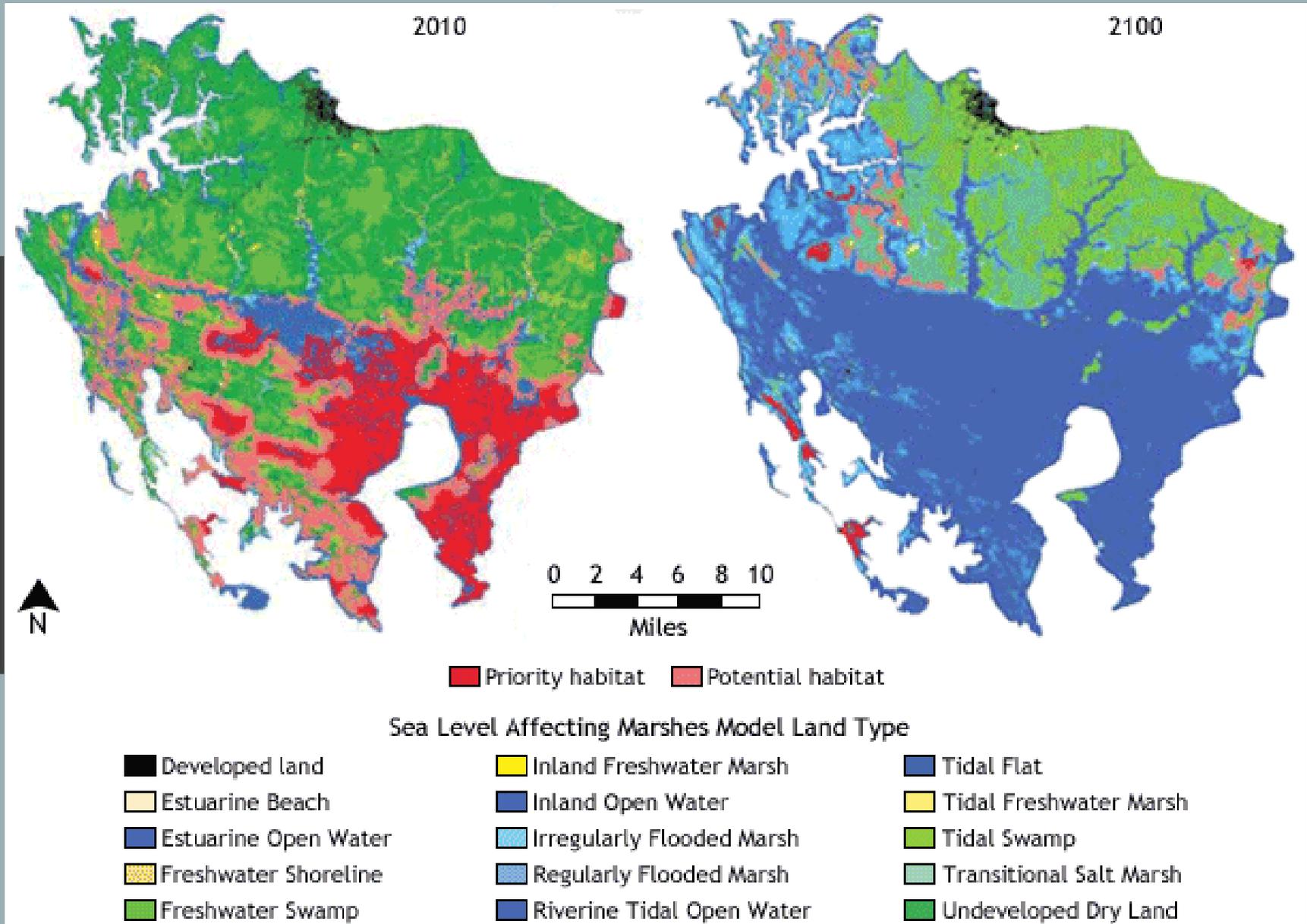
1989

(U.S. Fish and Wildlife Services)

PREDICTION:  
YEAR 2100  
SHOWING A 5-FOOT  
INCREASE



DORCHESTER  
 COUNTY, MD  
 YEAR 2100  
 PREDICTION



(Research Gate)

**This is not rainwater  
This is tidal salt water**

**No tidal issues when  
these homes were built.**

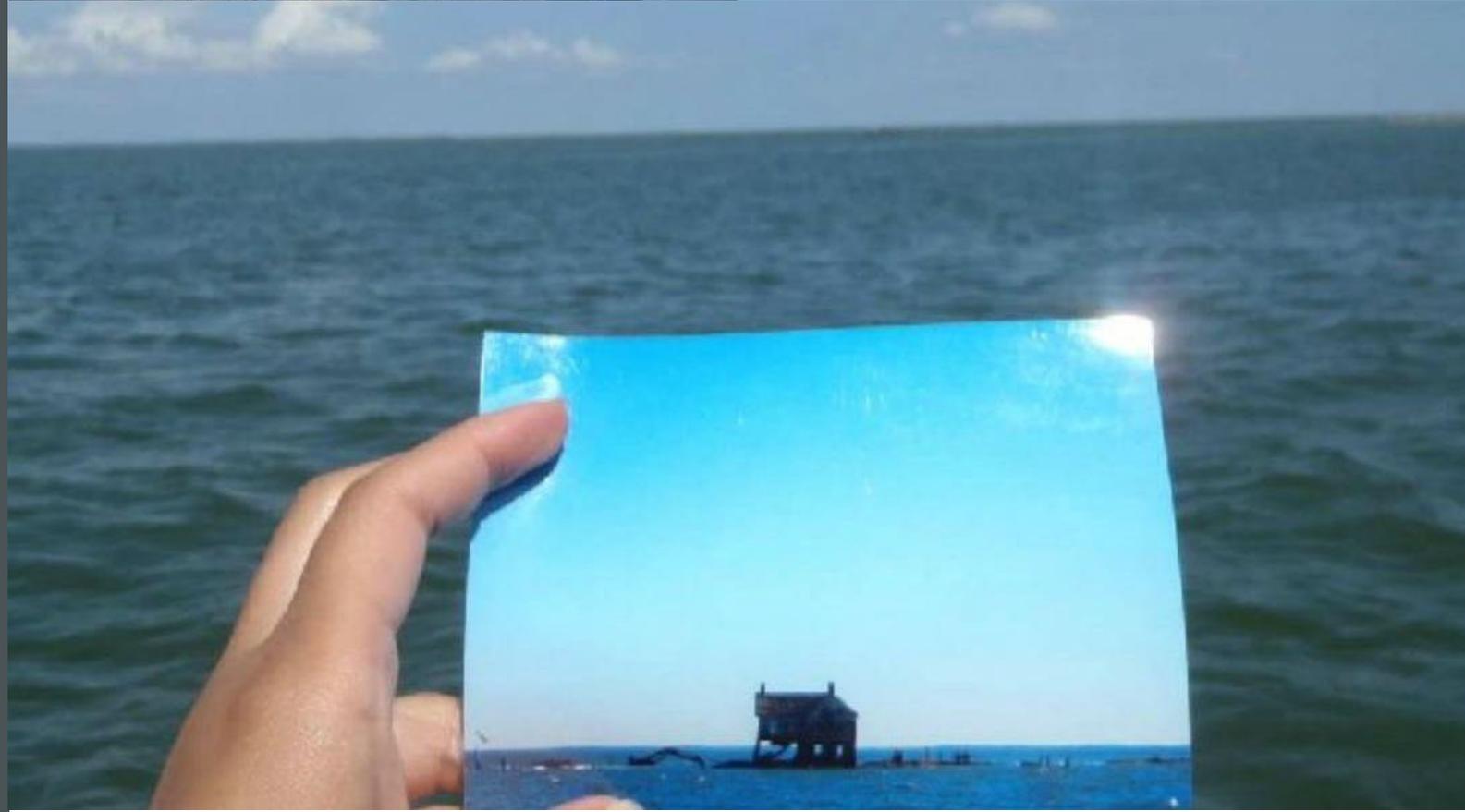




MORE THAN  
MOSQUITOS:  
HOMES ARE LOST  
FOREVER

IN 1910, HOLLAND  
ISLAND HAD 360  
RESIDENTS

EXACTLY 100 YEARS  
LATER, IN 2010, THE  
LAST HOUSE FELL  
INTO THE  
CHESAPEAKE BAY





**BOTTOM  
LINE**

**Many (not all) tidal areas that were once prime mosquito breeding habitat no longer are.**

**Young staff observe many different environments than the old staff did.**

**Staff must remain diligent because the habitats are constantly evolving.**

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