

Barn Island Sea Level Fens

Collaborators:

- William Miller – 1947
- Frank Egler – 1947 to 1983
- William Niering – 1953 to 1996
- Alfred Gross – 1965/1966
- Scott Warren – 1970 to present
- Wendy Blake-Coleman – 1975/1976
- George Hebard – 1977/1978
- Ron Rozsa – 1977 to present



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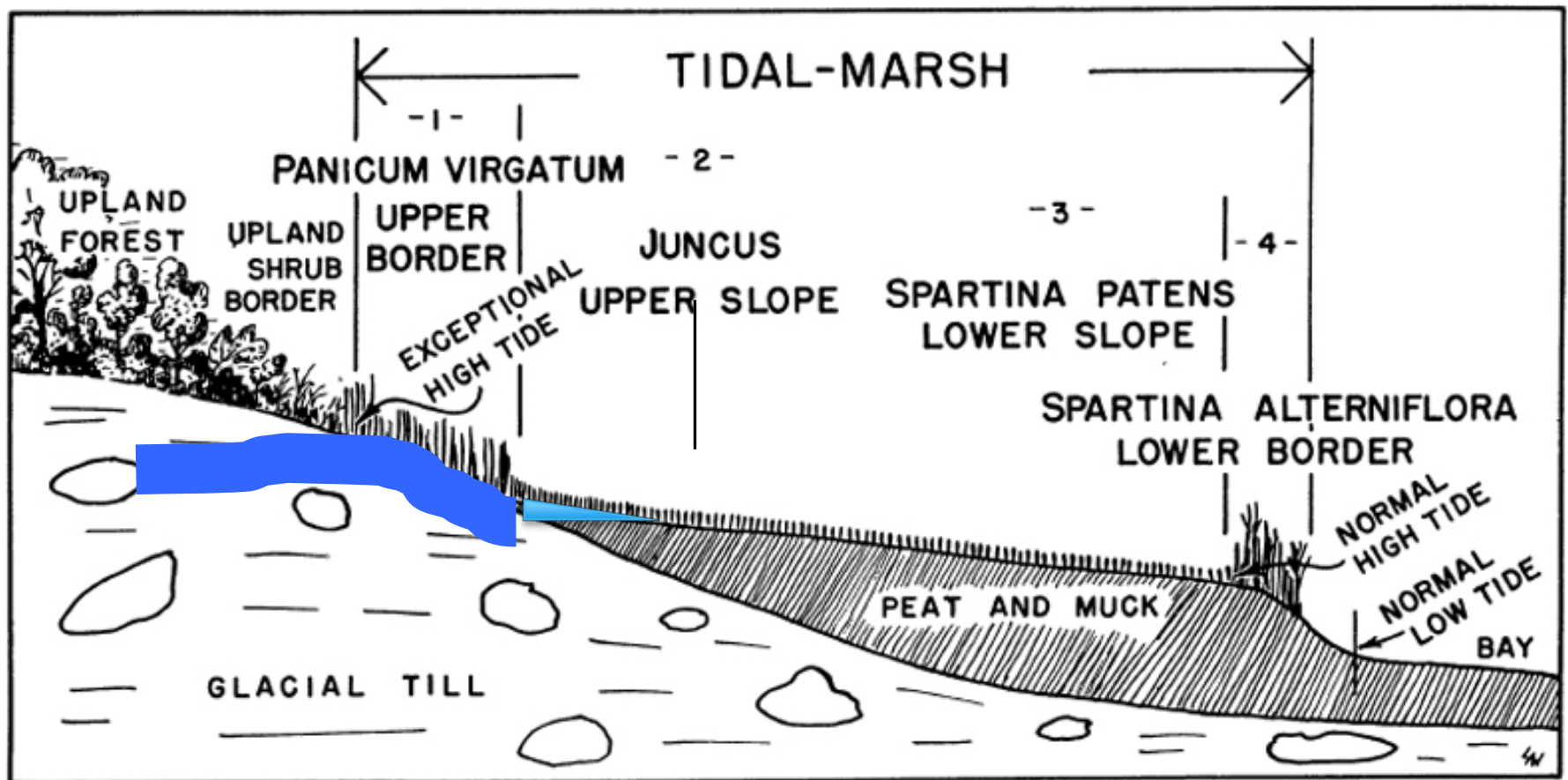
Sea Level Fens

“The feature that distinguishes fens from bogs is the fact that fens receive water from the surrounding watershed in inflowing streams and groundwater, while bogs receive water primarily from precipitation.” (Source USDA Forested Wetlands; NA-PR-01-95)

In Maryland one type of Ground-water fed **seepage wetlands** on the coast plain is, the sea-level fen a “community type is best developed just **above the highest tide levels** at the interface between brackish marshes and gently sloping uplands of **sand and gravel substrates**. Within this transition zone, **acidic, nutrient-poor groundwater discharges** from the bases of the upland slopes creating saturated areas.”

Miller & Egler 1950 – upland to bay sequence

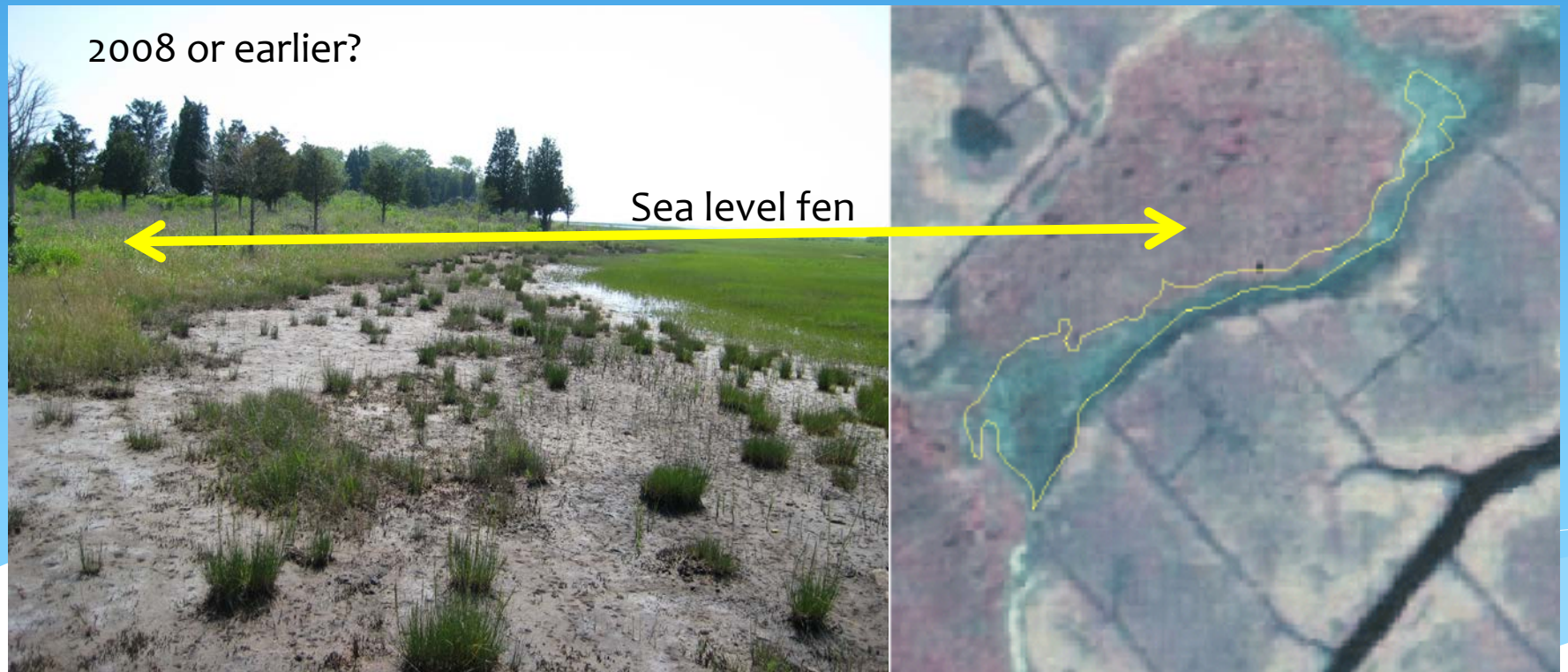
Sea level fen – Upland/non-tidal!



Eroded Edge returns 2008 – brackish border known as the *Juncus* belt

Not a dieback – groundwater erodes the aerobic peat; no peat – no *Juncus*.

Substrate is glacial sand and the peat thickness was ~ 6 to 8 centimeters.



2008 edge overlain on 1981 photo

HQ Marsh 1983 v. 1987

Sea level fen (absent in 2014)



1975-76 – no *Juncus* belt – belt rebuilds by 1983 but then the erosion begins.

Juncus belt is dependent upon groundwater discharge to reduce the soil salinity - oligohaline to mesohaline.

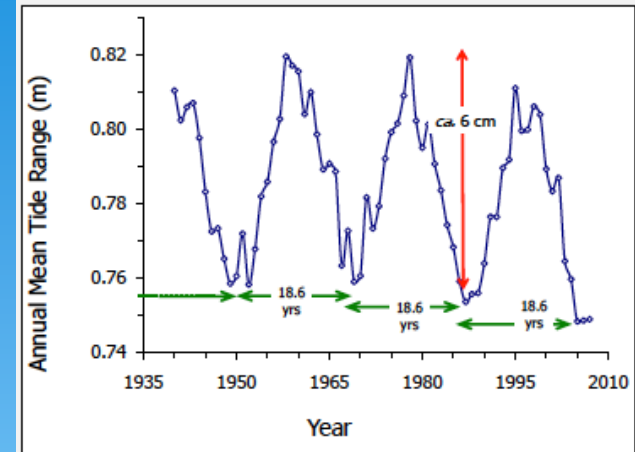


Eroded Edge

Erosion Event	Time Interval
1947	
1964	17 years
1983	19 years
2008?	25 years



Photostation 14 - 1947



Brucker Marsh section – 6/1964

Panicum rhizomes

2008 – note sandy substrate



1987 – in path that formed
adjacent to glacial till

2014 – 6 years later

Red Cedar dead and *Panicum* coverage is decreasing



JG belt/brackish
marsh invades
Panicum Fen

Salt marsh (SAS)
colonizes the former
brackish marsh

Panicum belt (fen) 1953 HQ Marsh



Panicum Fen – late summer



Iris prismatica



Cirsium horridulum



Fen – mixed *Cladium* & *Panicum*



Impoundment 3 Fen



Nyssa Forested (seepage) Wetland

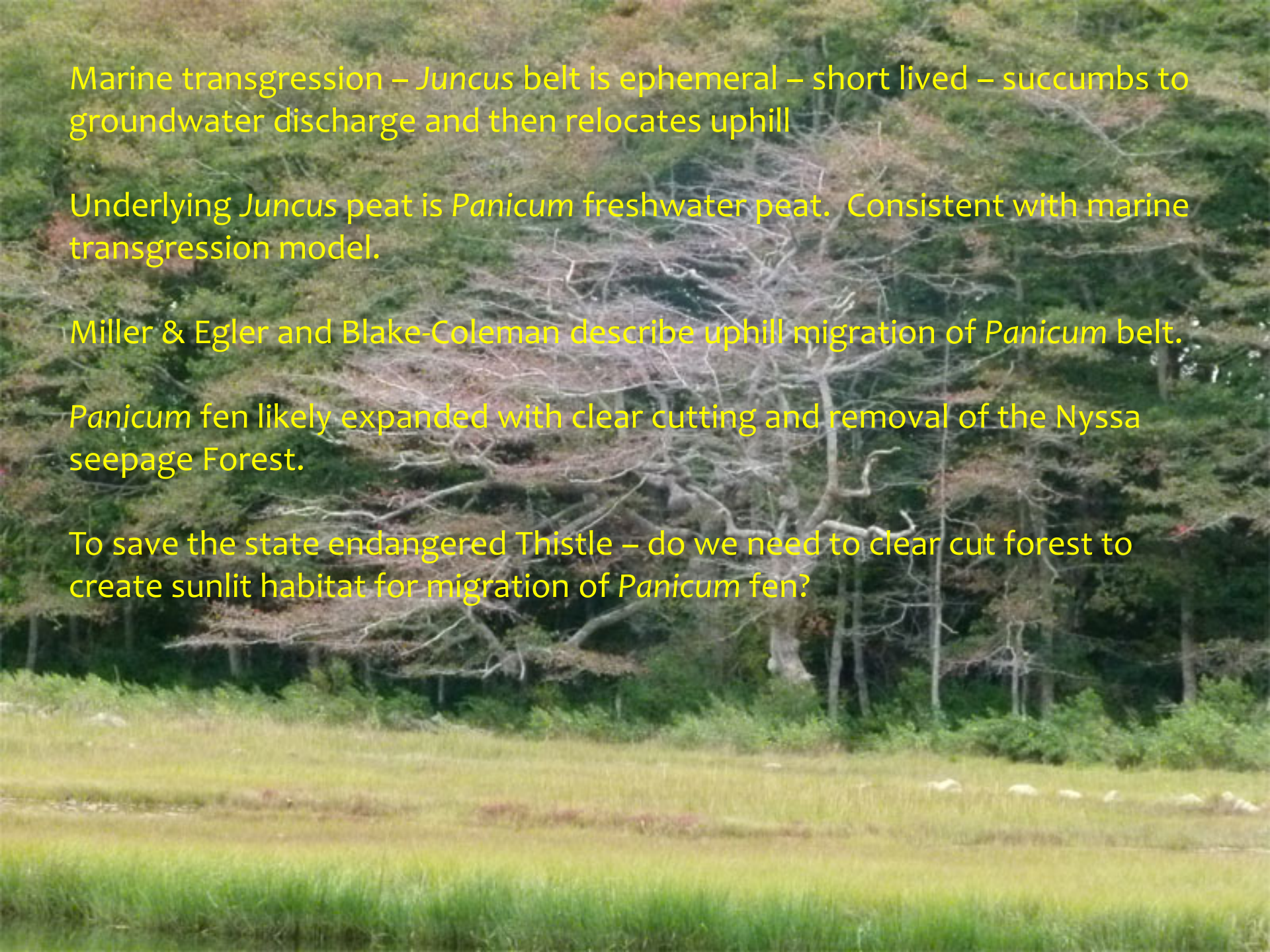


Nyssa - Baccharis



Nyssa w/*Juncus* understory





Marine transgression – *Juncus* belt is ephemeral – short lived – succumbs to groundwater discharge and then relocates uphill

Underlying *Juncus* peat is *Panicum* freshwater peat. Consistent with marine transgression model.

Miller & Egler and Blake-Coleman describe uphill migration of *Panicum* belt.

Panicum fen likely expanded with clear cutting and removal of the *Nyssa* seepage Forest.

To save the state endangered Thistle – do we need to clear cut forest to create sunlit habitat for migration of *Panicum* fen?

Marine transgression



Looking across several scales

Canopy



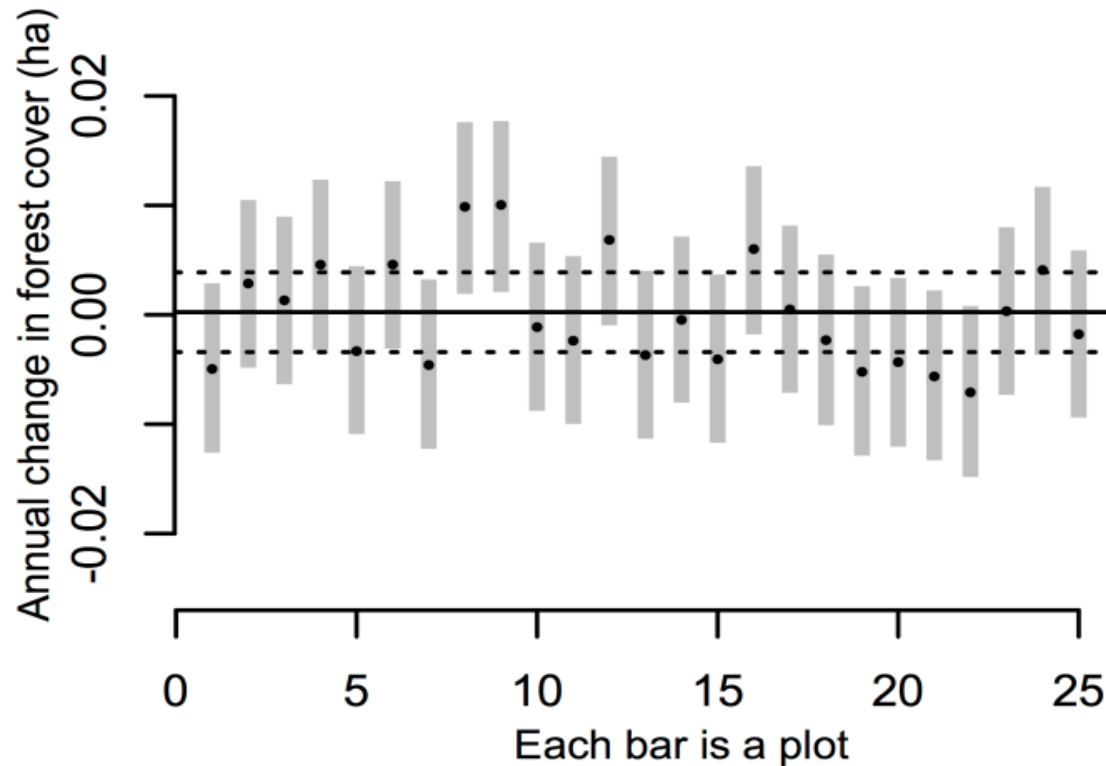
Rates of recent tree mortality



Annual growth rates of individual trees



No widespread evidence that forest edge is moving



Field & Elphick, unpubl.



Transects

25-100m, most ~75m

114 in CT

68 in NY

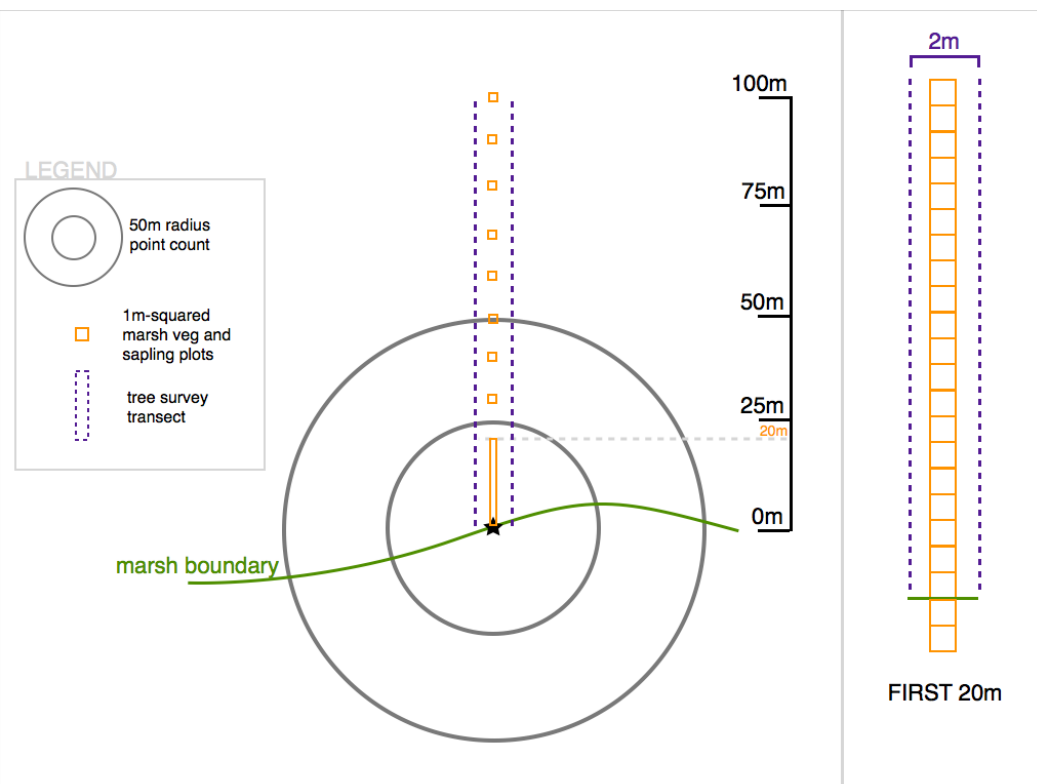
Birds: point counts,
shorebird transects

Trees: species, distance from
edge, dbh, dieback, alive or
dead, ID tag

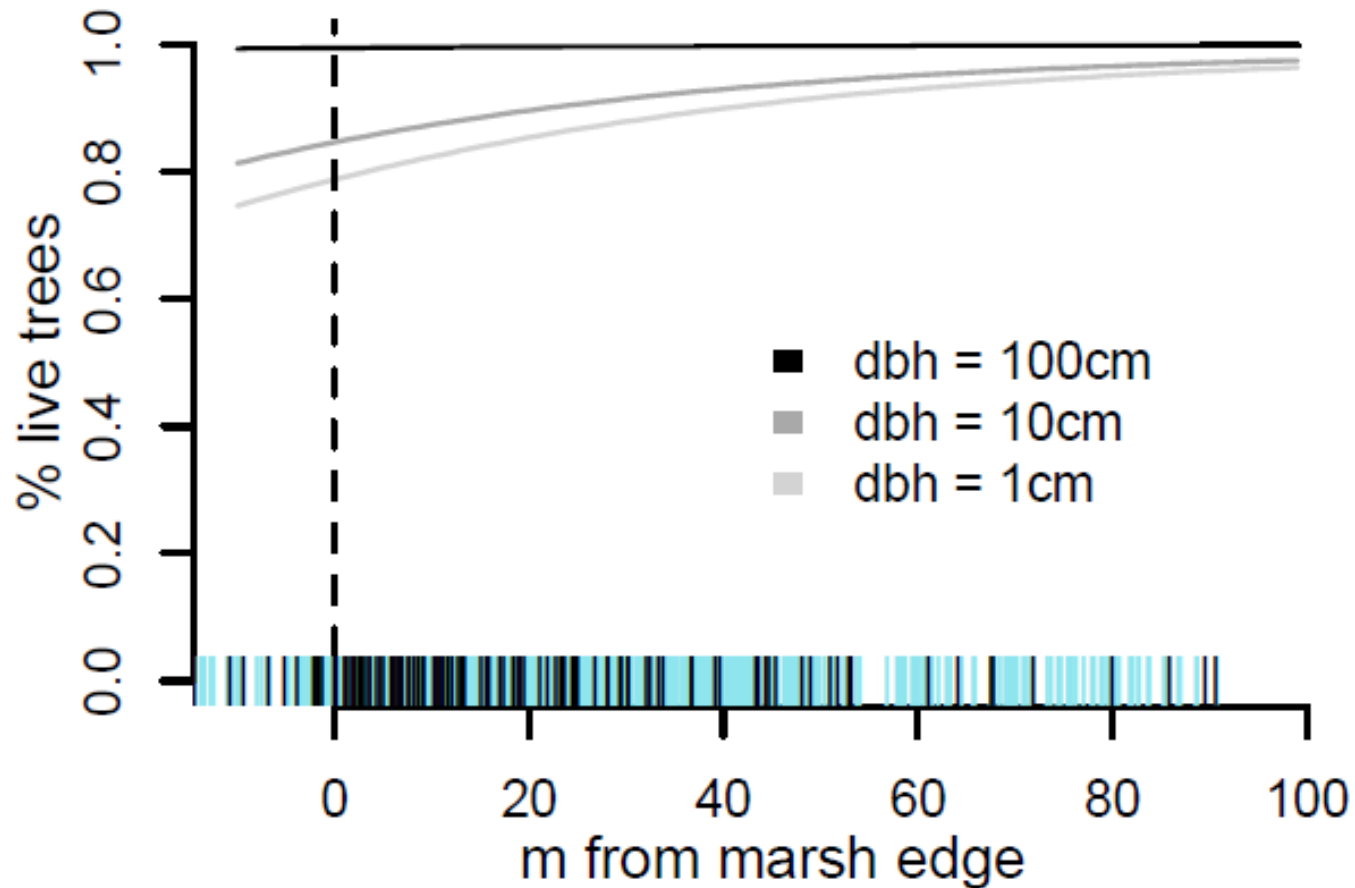
Seedlings: presence/absence

Marsh and border plants:
presence/absence, *Iva* height

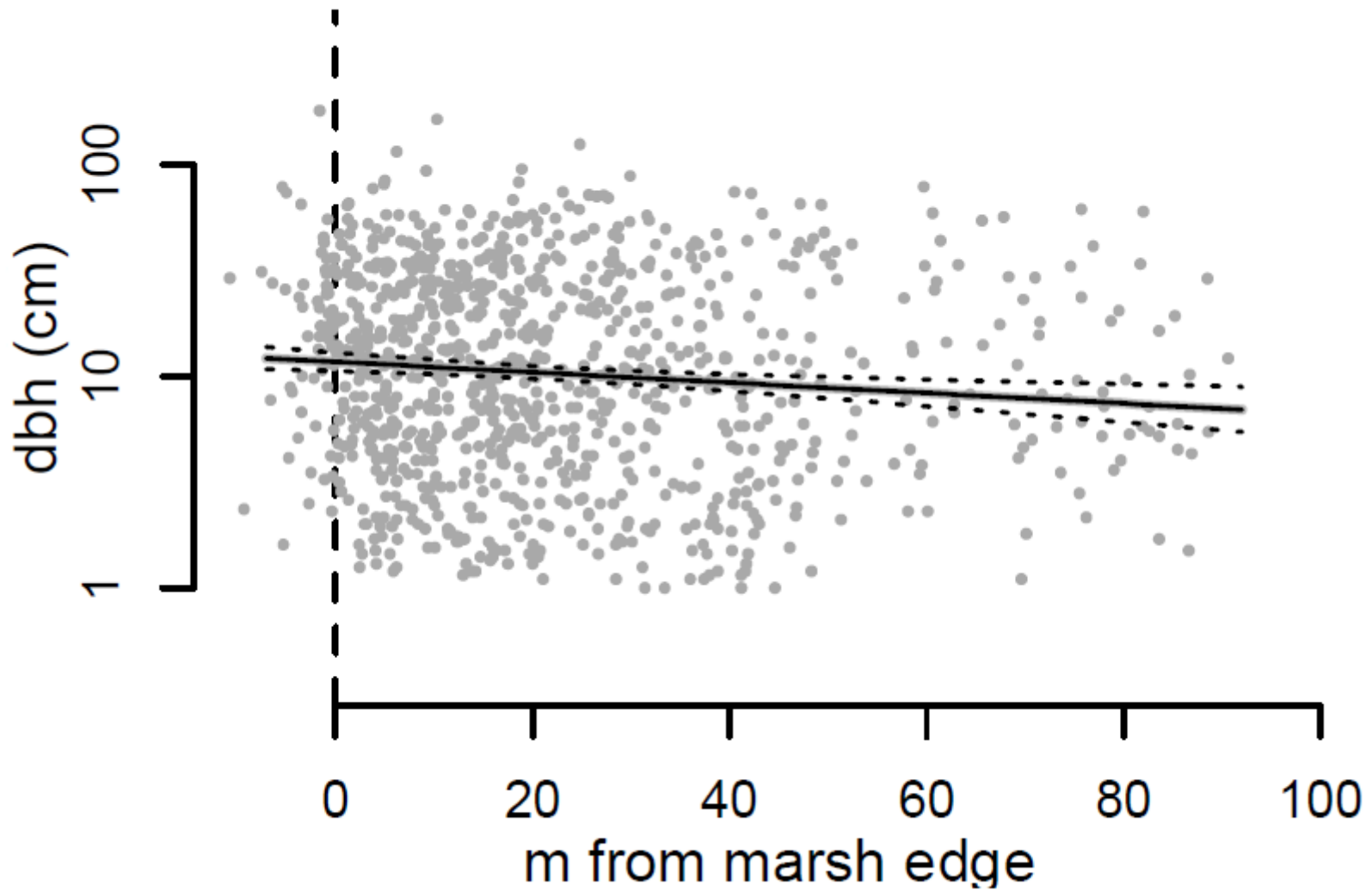
Location of edge: 3 GPS
readings, drawings on aerial
photos, tagged trees



Tree mortality for 3 size classes



Tree size declines as move away from





picture from NOAA