

ISLE OF PALMS – BREACH INLET EROSION STUDY & RECOMMENDATIONS

Coastal Protection Engineering (CPE)

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Location: Southern Isle of Palms, SC

PURPOSE & OBJECTIVES

- Assess causes of accelerated erosion near Breach Inlet
- Evaluate historical shoreline change
- Recommend management strategies
- Provide technical basis for decision-making



PROJECT AREA & CONTEXT

- Study focus: Breach Inlet to ~6th Avenue
- Historically unmanaged shoreline segment
- Comparison: NE end of island has had repeated nourishment/stabilization
- Dynamic inlet-adjacent setting (b/t 1919 and 2025, 200 m accretion)



RECENT EROSION TRENDS

- 40 – 70 meter shoreline retreat (2019–2024)
- Loss of frontal dune system
- Direct exposure of homes and infrastructure
- Accelerated erosion over past 5 years



CAUSES OF EROSION

Dynamic inlet processes – channel migration, shoal welding, sediment bypassing

Predominant longshore sediment transport to the south

Wave/wind climate: NE & E storms increase southerly transport

Sea level rise projections: +2 ft by 2060, +4 ft by 2100



CURRENT CONDITIONS

- Narrow high-tide beach with minimal dry sand area
- Almost no dunes seaward of homes
- Fine sand prone to wind-blown loss
- Widespread sandbag use
- USACE placed 500,000 cy offshore (2024–2025)



HISTORICAL SHORELINE VARIABILITY

- Cycles of erosion and accretion over past century
- Ebb-spillover lobes influence shoreline stability
- Accretion phases in 1920s and 1990s
- Chronic erosion trend since ~2009



MANAGEMENT ALTERNATIVES

No Action – understand risks

Soft engineering – nourishment, dune restoration

Hybrid – limited structures + sand/vegetation

Hard structures – permeable terminal groin

Evaluate for cost, effectiveness, environmental impact

TERMINAL GROIN CONCEPT



- Capture portion of longshore transport to build stable beach
- Allow sand bypass to Sullivan's Island
- Requires modeling (Delft3D) and sediment budget analysis
- Examples: Ocean Isle Beach & Bald Head Island, NC

PATH FORWARD & NEXT STEPS

