NORTH CAROLINA
Department of Transportation

NC 12: Maintaining Access and Building Resilience for the Outer Banks

Joint Legislative Transportation Oversight Committee Presentation

NCDOT – Division 1

March 5, 2026

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

Agenda

- NC 12 Hot Spots
- Regional Bridge Projects
- Maintenance Activities/Sand Removal
- Historic Storm Damage
- Response & Repair Methods
- Ongoing Challenges
- Outlook

Route Information

Division One

- 3 counties, approximately 109 miles of roadway
  - Currituck – 11.1 miles
    - AADT: 7,100 VPD
  - Dare – 84.2 miles
    - 48 miles located South of Marc Basnight Bridge
      - AADT: 5,600 VPD
  - Hyde – 13.8 miles
    - AADT: 1,800 VPD

Identified Hot Spots

Regional Bridge Projects

Marc Basnight Bridge

- Replacement for Bonner Bridge over Oregon Inlet connecting Bodie Island to Pea Island
- Start Date – 8/29/11
- Completion Date – 6/1/22
- 2.8 Miles Long
- Construction Cost - $296.5M

Captain Richard Etheridge Bridge

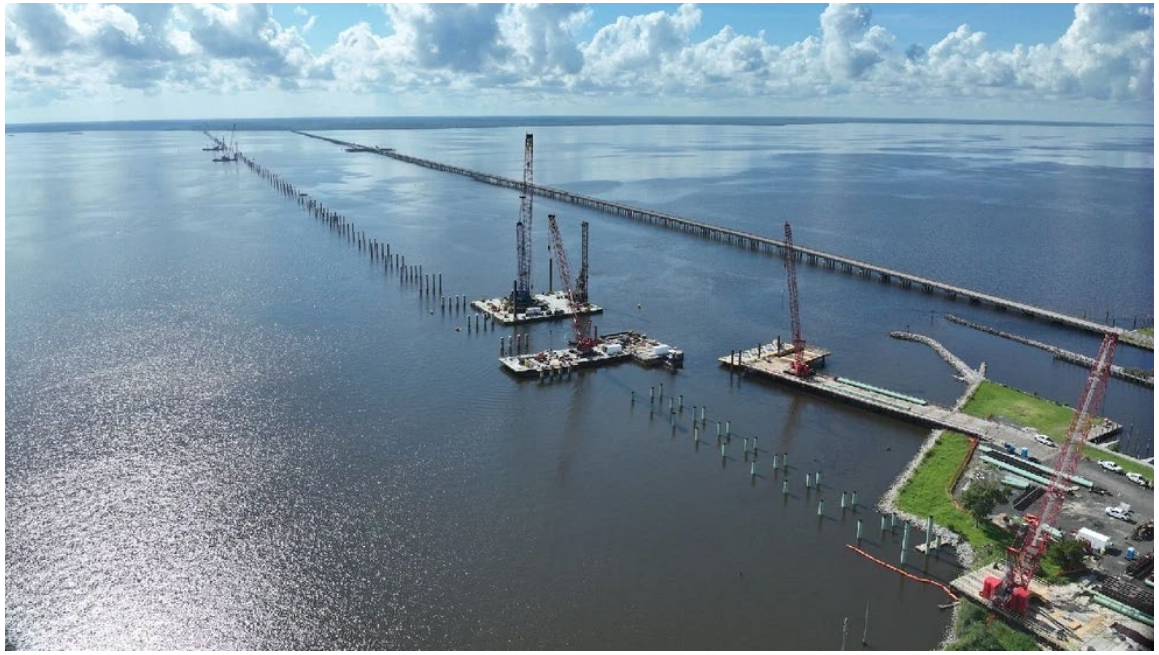
- Cored slab “Short-term bridge” over new inlet formed by Hurricane Irene in 2011; located on Pea Island just south of Oregon Inlet
- Replaced the Pea Island Intermittent Bridge—commonly called the ‘Lego Bridge’—which was originally constructed within six weeks of the inlet’s formation
- Start Date – 12/1/15
- Completion Date – 5/22/18
- 0.45 Miles Long
- 25 Year lifespan
- Construction Cost - $14.7M

Rodanthe Bridge

- The Rodanthe “Jug Handle” Bridge was constructed through the Pamlico Sound to bypass the Mirlo Beach “S-Curves” hot spot, eliminating one of NC 12’s most erosion-prone segments.
- Provides a long-term solution to chronic ocean overwash and storm-related closures in the Rodanthe area.
- Start Date – 1/25/17
- Completion Date – 1/20/23
- 2.46 Miles Long
- Construction Cost - $171.1M

Alligator River Bridge

- Replacement for Lindsay C. Warren swing-span bridge over the Alligator River connecting Tyrrell County to Dare County
- $110 million federal STERLING grant awarded via USDOT's Multimodal Project Discretionary (Mega) program, significantly offsetting the Alligator River Bridge replacement cost.
- Fixed-span bridge project (~3.2 mi) replacing the aging 1962 swing-span structure, improving evacuation routes, reducing traffic delays, and supporting economic growth for eastern NC.
- Integrated with highway improvements along US 64, the grant also funds broadband infrastructure deployment, enhancing connectivity from Rocky Mount to the Outer Banks
- Start Date – 1/22/25
- Anticipated Completion Date – 4/19/30
- 3.32 Miles Long
- Construction Cost - $449.8M



Maintenance Activities/Sand Removal

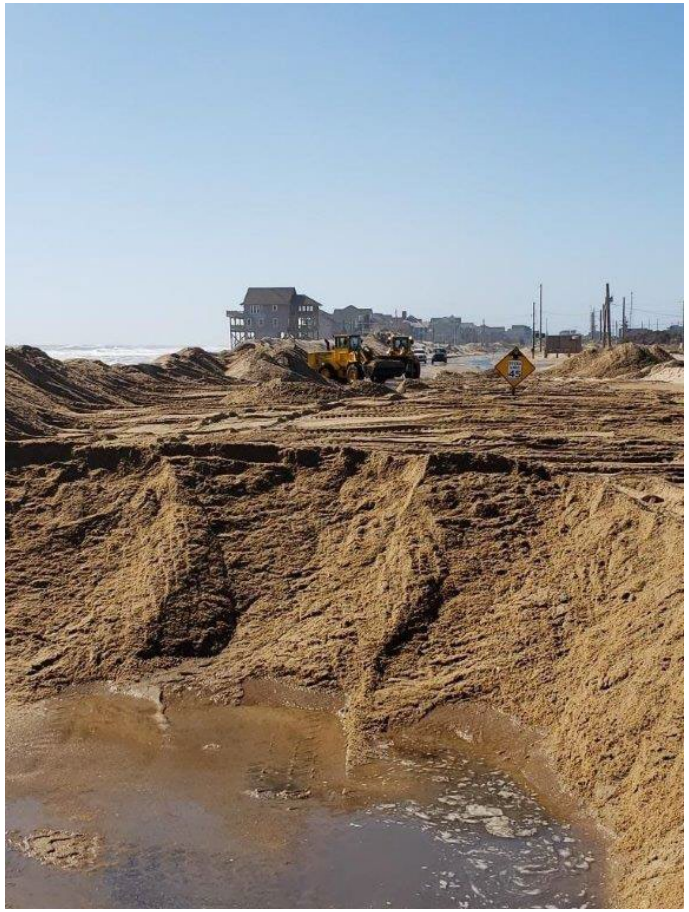
Sand Removal

Canal Zone

Sand Removal

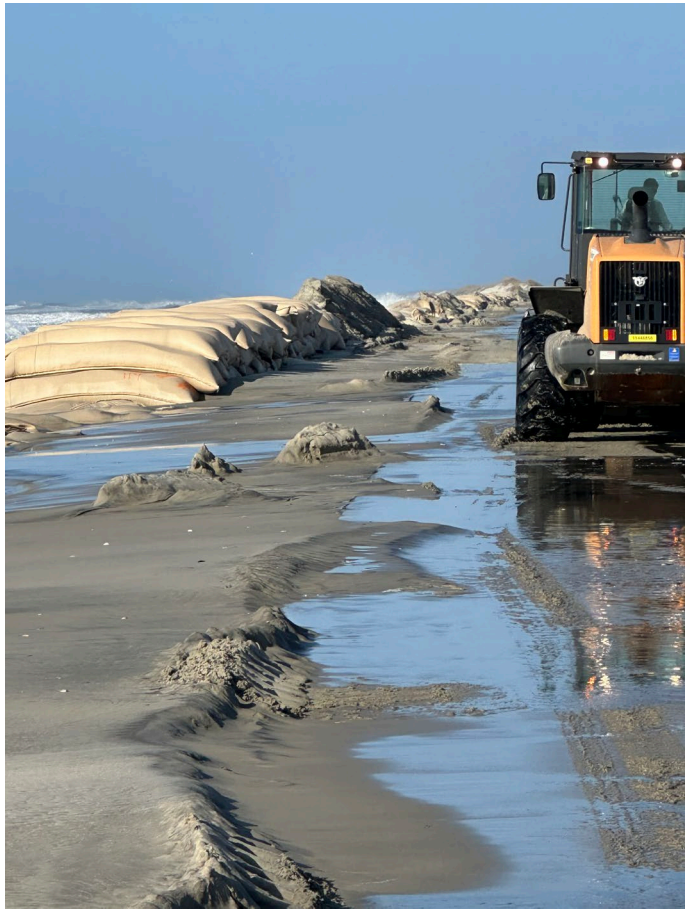
Canal Zone

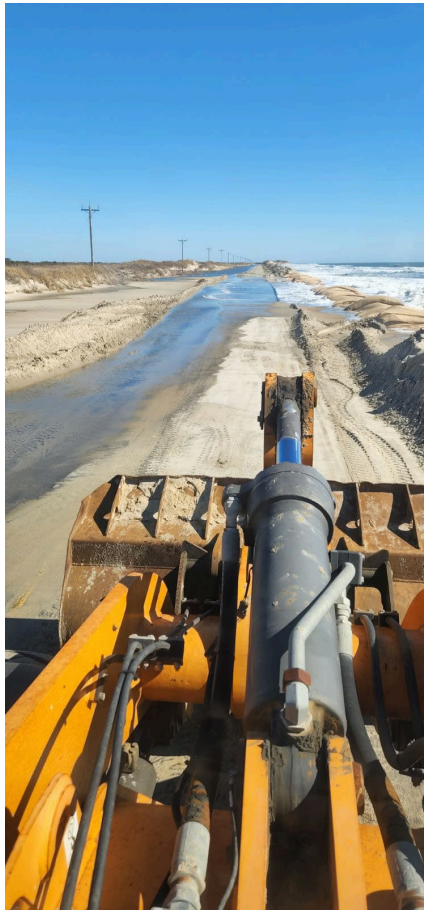
Sand Removal



Mirlo/Rodanthe

Sand Removal





Ocracoke

Historic Storm Damage

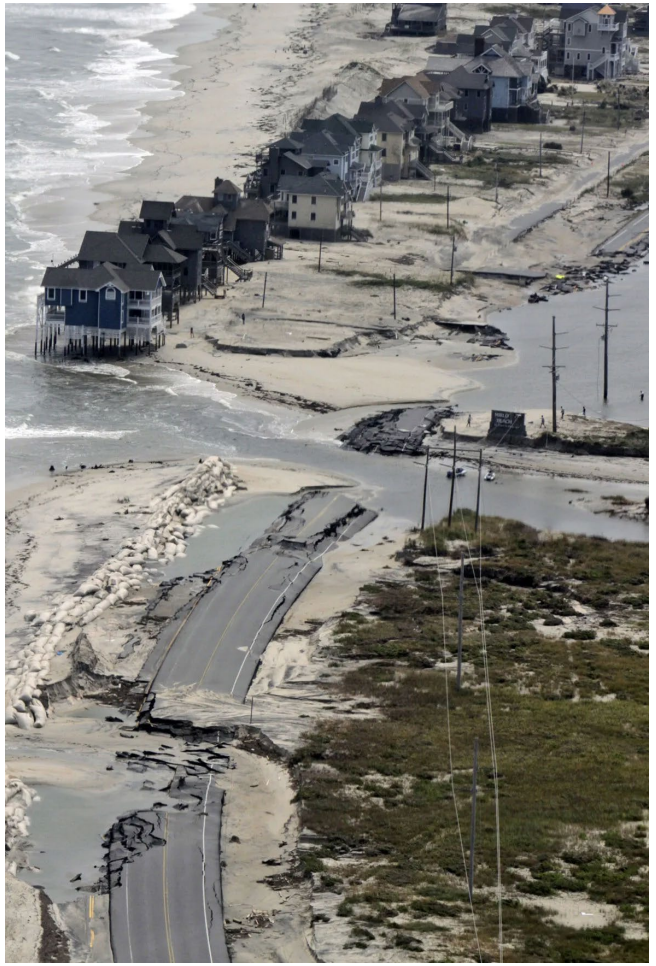
2011 – Hurricane Irene

Pea Island (New Inlet)

- Repair Cost: $16.8 M

2011 – Hurricane Irene

Rodanthe



2012 – Hurricane Sandy

- Repair Cost: $29.2 M

Rodanthe

2018 – Hurricane Florence

- Ocracoke (Hyde) Repair Cost: $1.4 M

Ocracoke

2019 – Hurricane Dorian

- Ocracoke (Hyde) Repair Cost: $2.8 M

Ocracoke

2020 – Tropical Storm Sally

- Ocracoke (Hyde) Repair Cost: $2.7 M

Ocracoke

2024 – January 9th Storm

Ocracoke

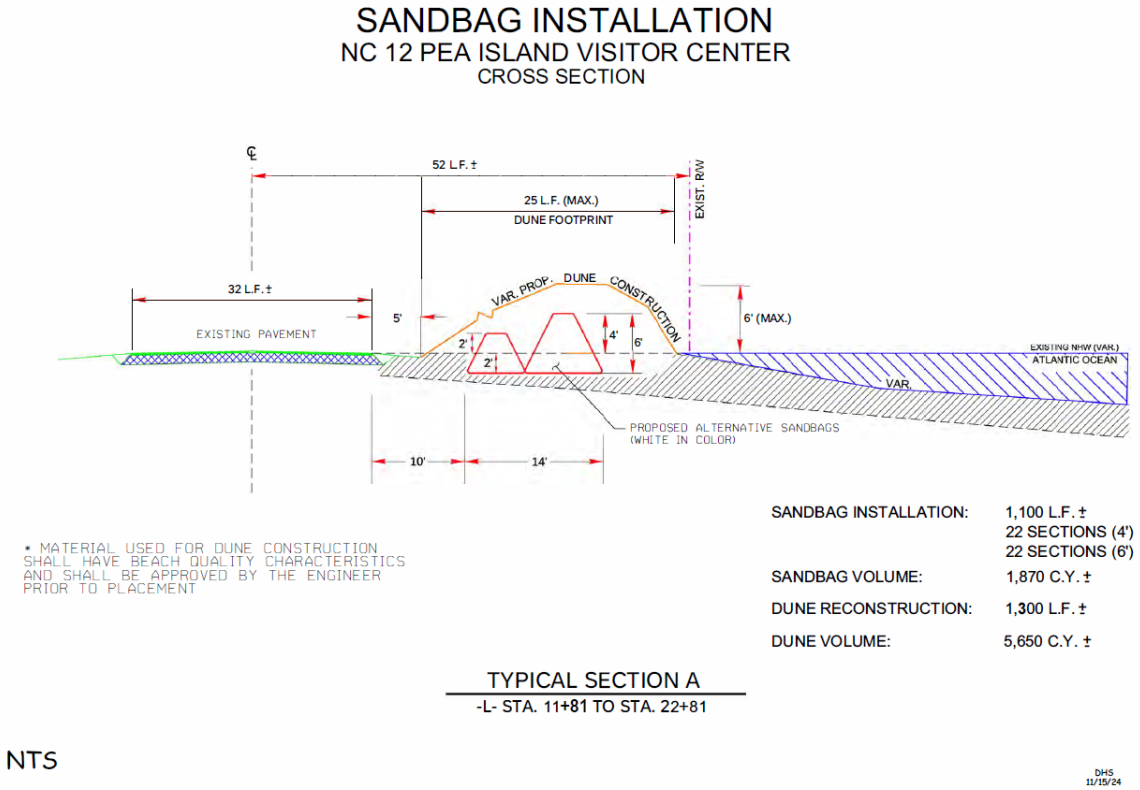
- Ocracoke (Hyde)

  Repair Cost: $2.4 M

Response & Repair Methods

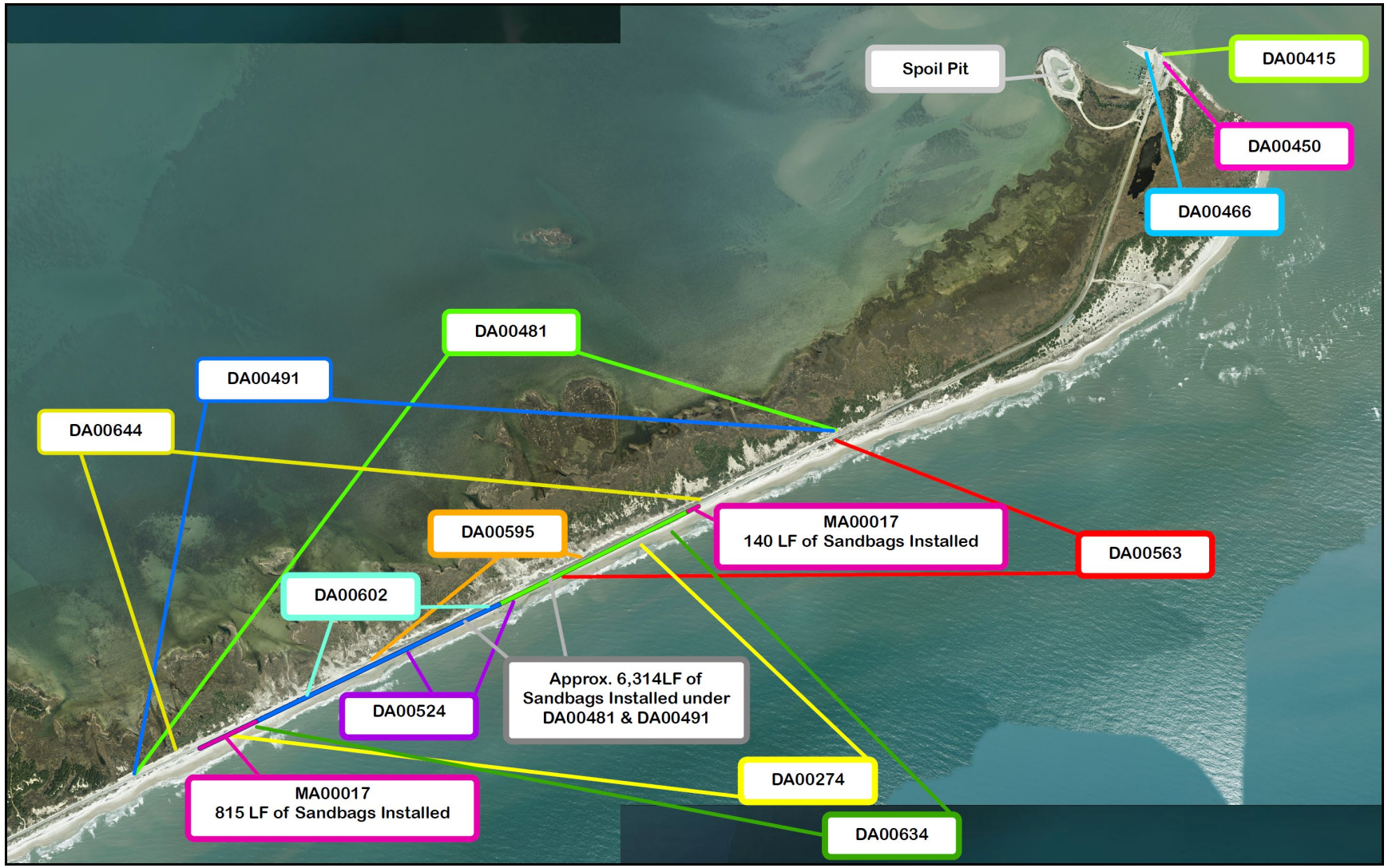
Pea Island Visitor Center

- November 15, 2024 Nor'easter
- "Alternative Style" Sandbag Installation
- 1,100 LF
- Completed January 2025
- Construction Cost - $514K



Ocracoke “Original Style” Sandbags

Ocracoke Repair History Since 2015 – 13 Contracts



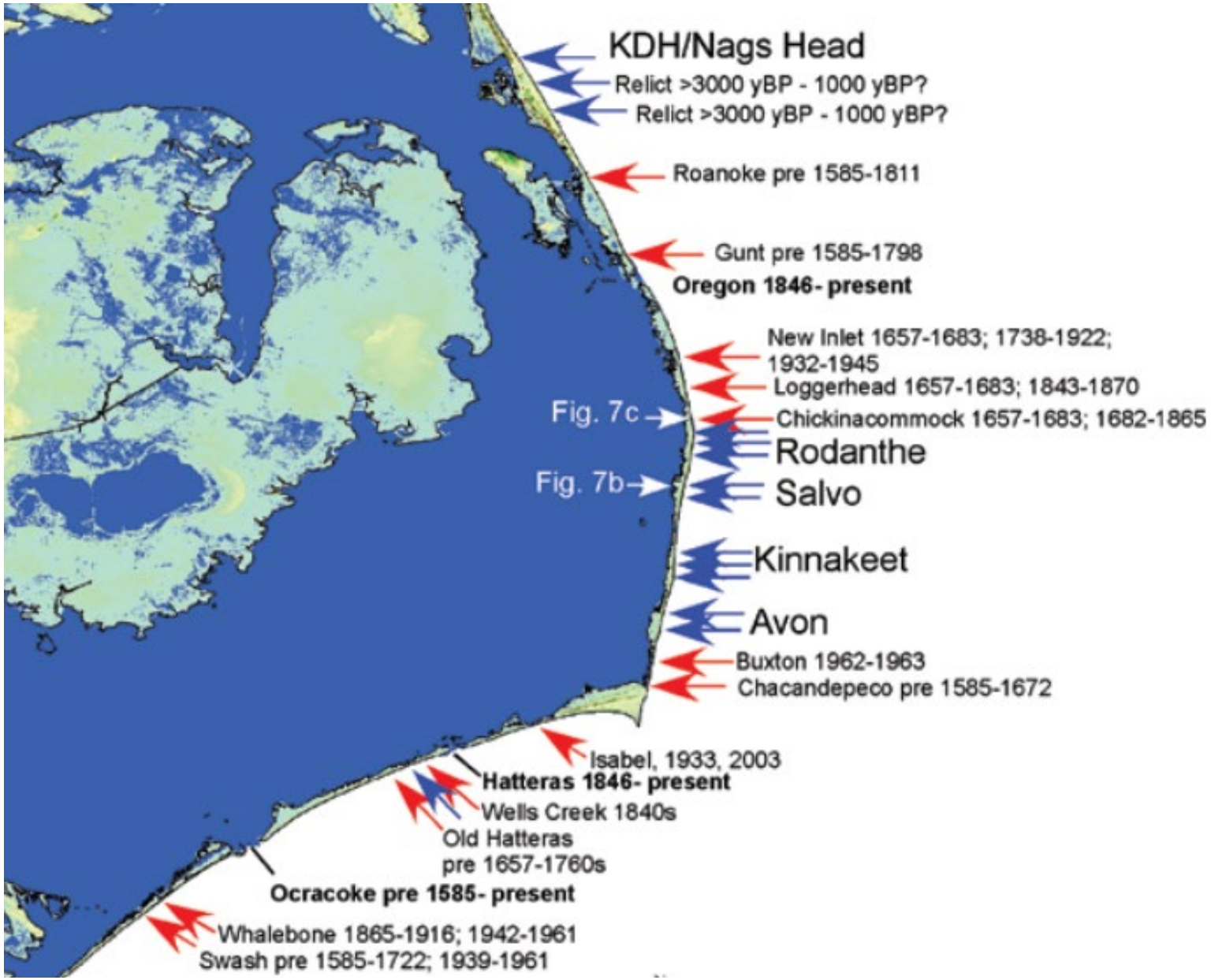
Ocracoke Repair History Since 2015

Ocracoke Island, NC 12 - Contract History 2015-2026										
Division	**Contract**	**Storm Event**	**Description**	**Contractor**	**Completion Date**	**Total Contract Amount**	**Borrow Excavation (CY)**	**Sandbags (EA)**	**Asphalt Concrete Pavement (Tons)**	**Sheet Pile (LF)**
DOH	DA00274	Hurrican Joaquin	Dune Reconstruction	Carolina Marine Structures Inc.	2/5/2016	$ 365,350.40	70,744.62			
DOH	DA00415		Stacking Lanes	Sawyer's Land Development	8/10/2018	$ 643,215.22	2,292.27	104	357.60	
DOH	DA00450	Hurrican Florence	Road & Dune Reconstruction	Barnhill Contracting Co.	5/1/2019	$ 1,109,462.14	51,859.90		1,997.46	
Ferry	DA00466		Southdock Sheet Pile Wall	Carolina Bridge Co.	8/19/2020	$ 2,537,708.05	24,587.54	32		996
DOH	DA00481	Hurricane Dorian	Sandbags, Road, and Dune Reconstruction	RPC Contracting Co.	5/12/2020	$ 2,600,150.66	102,008.00	223	2,847.66	
DOH	DA00491	September 17, 2020 Severe Weather	Sandbags, Road, and Dune Reconstruction	Barnhill Contracting Co.	4/30/2021	$ 2,131,722.57	33,579.20	2,811	2,065.15	
DOH	DA00524	November 7, 2021 Severe Weather	Dredging and Dune Reconstruction	McLean Contracting Co.	4/30/2022	$ 5,281,368.20	39,811.20			
DOH	DA00563	Hurrican Ian	Dune Reconstruction	Barnhill Contracting Co.	11/21/2022	$ 262,294.14	15,997.30			
DOH	DA00595		Sand Haul and Stockpile	Sawyer and Sons Construction, Inc.	12/12/2023	$ 66,025.80	9,292.40			
DOH	DA00602		Sandbag Repair and Replacement	Barnhill Contracting Co.	5/22/2024	$ 1,622,228.96		2,215	1,257.32	
DOH	DA00634	January 9th, 2024 Severe Weather	Dune Reconstruction	Fred Smith Co.	11/13/2024	$ 256,131.80	10,566.10			
DOH	DA00644	Hurricane Erin	Dune Reconstruction	Sawyer and Sons Construction, Inc.	9/8/2025	$ 351,951.43	31,027.20			
DOH	MA00017	September 16, 2024 Severe Weather	Sandbag Installation	Guardian Retention Systems, LLC	10/21/2025	$ 448,409.38		957 LF		
					Total	**$ 17,676,018.75**	**391,765.73**	**5,385**	**8,525.19**	**996**

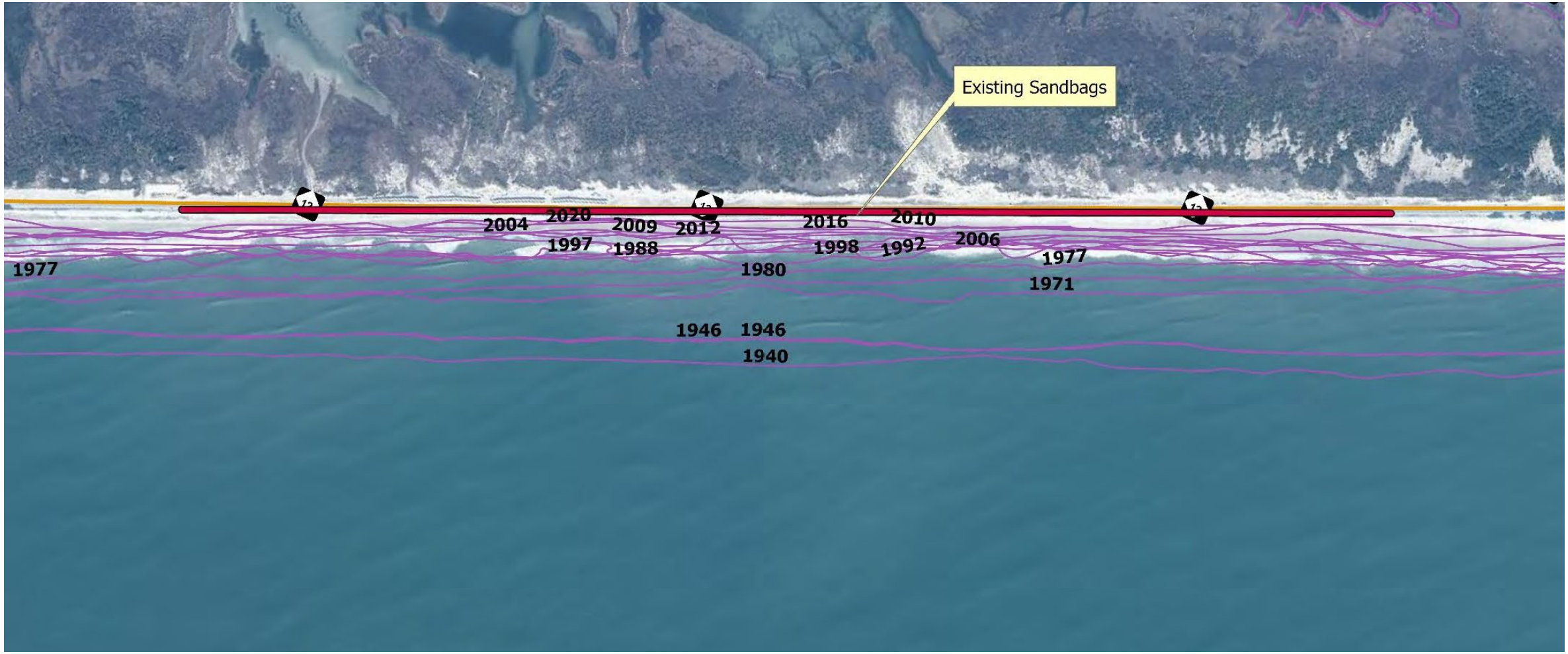
*Total Contract Amount reflects only payments made to contractors and does not include engineering, inspection, or force account costs.

Ongoing Challenges

Historic Inlets



Ocracoke Historic Shoreline Movement



Wildlife

Spring & Summer Nesting

Complexity

Key Challenges

- Multiple permits required from regulatory agencies (CAMA Permit, Section 10 Permit, 401 Water Quality Certification)
- Special Use Permits required from Federal property owners – USFWS (Refuge) and NPS (Seashore)
- Permit processing timelines can delay projects and emergency response
- Seasonal restrictions for protected species (sea turtles, shorebirds) can impact construction windows

Wildlife & Habitat Protection

- Section 7 Consultation required for impacts to Endangered Species
- Sea turtle and shorebird nesting seasons result in work moratoriums
- Daily nest surveys, buffer zones, and monitoring are required
- Sensitive dunes, wetlands, and wildlife habitats restrict equipment movement

Working on Federal Lands, Easements, and Dynamic Shorelines

Property & Easement Limitations

- Refuge and Seashore property impacts can trigger Section 4(f) reviews
- Existing Easements on Federal property limit access and staging
- Working outside the NCDOT Easement is extremely restricted and requires permits
- Refuge Compatibility Determination can limit the use of sandbags to few areas on the Refuge

Shoreline & Erosion Challenges

- Rapid shoreline erosion affects project boundaries frequently
- Emergency response work still requires coordination with regulatory and resource agencies
- Protective measures limited to temporary sandbags and dune rebuilding

Impact on NCDOT Operations

- Longer planning and permitting lead times
- Limited and shifting construction windows
- Need for early and frequent coordination with regulatory and resource agencies
- Higher project costs from specialized protective measures and permit restrictions

NC 12 Dare Hot Spot Expenditures January 1, 2010 - December 31, 2025				
Calendar Year	Sand Removal General Maintenance Expenditures	Natural Event Expenditures		Total
2010	$ 689,248	$ 128,528	Hurricane Earl	$ 901,291
2011	$ 375,588	$ 16,790,160	Hurricane Irene	$ 17,261,140
2012	$ 118,793	$ 29,238,221	Hurricane Sandy	$ 30,000,525
2013	$ 529,489	$ -	No Named Storm	$ 1,181,217
2014	$ 667,226	$ -	No Named Storm	$ 2,194,162
2015	$ 520,600	$ 2,345,646	Joaquin	$ 4,208,181
2016	$ 1,672,211	$ 1,101,720	TS Hermine/Hurricane Matthew	$ 2,808,788
2017	$ 944,059	$ -	No Named Storm	$ 1,018,578
2018	$ 875,155	$ 11,477	Hurricane Florence	$ 940,328
2019	$ 1,062,008	$ 248,395	Hurricane Dorian November Nor'easter	$ 1,430,791
2020	$ 999,994	$ 180,469	Sept 2020 Storm	$ 1,180,463
2021	$ 703,842	$ 290,384	November 7th 2021 Coastal Storm	$ 1,047,040
2022	$ 1,499,368	$ 129,878	November 7th 2021 Coastal Storm/Hurricane Ian	$ 1,684,880
2023	$ 1,262,873	$ -	No Named Storm	$ 1,615,936
2024	$ 2,439,095	$ -	No Named Storm	$ 2,791,718
2025	$ 2,762,539	$ 294,916	Hurricane Erin	$ 3,341,695
TOTALS	**$ 17,122,088**	**$ 50,759,794**		**$ 73,606,735**

NC 12 Ocracoke Expenditures January 1, 2018 - December 31, 2025				
Calendar Year	**Sand Removal General Maintenance Expenditures**	**Natural Event Expenditures**		**Total**
2018	$ 94,073	$ 787,225	Various Storm Events	$ 881,297
2019	$ 112,734	$ 1,431,550	Various Storm Events Hurricane Florence	$ 1,544,284
2020	$ 52,136	$ 4,745,504	Various Storm Events Hurricane Dorian Coastal Storm November 16, 2019	$ 4,797,641
2021	$ 111,216	$ 2,730,790	Various Storm Events September 17, 2020 Severe Weather Event	$ 2,842,006
2022	$ 143,417	$ 5,660,830	Various Storm Events November 7th 2021 Coastal Storm/Hurricane Ian	$ 5,804,247
2023	$ 338,543	$ -	Various Storm Events	$ 338,543
2024	$ 483,409	$ 2,386,866	Various Storm Events January 9, 2024 Severe Weather Event	$ 2,870,274
2025	$ 597,351	$ 948,912	Various Storm Events September 16, 2024 Severe Weather Event Hurricane Erin	$ 1,546,263
TOTALS	**$ 1,932,878**	**$ 18,691,677**		**$ 20,624,555**

Roadway Weather Event Impacts to NC 12 2015-2026						
Year	County	Route	Lane Closure Incidents	Road Closure Incidents	Hours Impacted	
2015	Dare	NC-12	0	2	1,586.20	
	Hyde	NC-12	0	2	156.24	
2016	Dare	NC-12	4	10	1,357.23	
	Hyde	NC-12	0	2	44.85	
2017	Dare	NC-12	1	2	78.58	
2018	Dare	NC-12	5	2	410.88	
	Hyde	NC-12	0	4	458.88	
2019	Dare	NC-12	7	6	650.03	
	Hyde	NC-12	0	1	2,357.84	
2020	Dare	NC-12	12	3	2,248.42	
	Hyde	NC-12	0	1	3.25	
2021	Dare	NC-12	5	1	952.26	
2022	Dare	NC-12	8	5	871.63	
	Hyde	NC-12	0	1	1.75	
2023	Dare	NC-12	5	1	241.27	
	Hyde	NC-12	0	2	143.87	
2024	Dare	NC-12	5	1	105.04	
	Hyde	NC-12	4	11	1,156.48	
2025	Dare	NC-12	9	6	763.88	
	Hyde	NC-12	1	5	373.27	
2026	Dare	NC-12	1	1	284.51	
		Dare Total	62	40	9,549.93	398 Days
		Hyde Total	5	29	4,696.43	196 Days
		Grand Total	67	69	14,246.36	594 Days

*The data included in this report/presentation is sourced from the NCDOT Traffic Incident Management System (TIMS)/DriveNC.gov. Due to the way incidents are reported and logged within the system, some entries may appear duplicated or may reflect overlapping events. As a result, certain values may not represent unique incidents and should be interpreted accordingly.

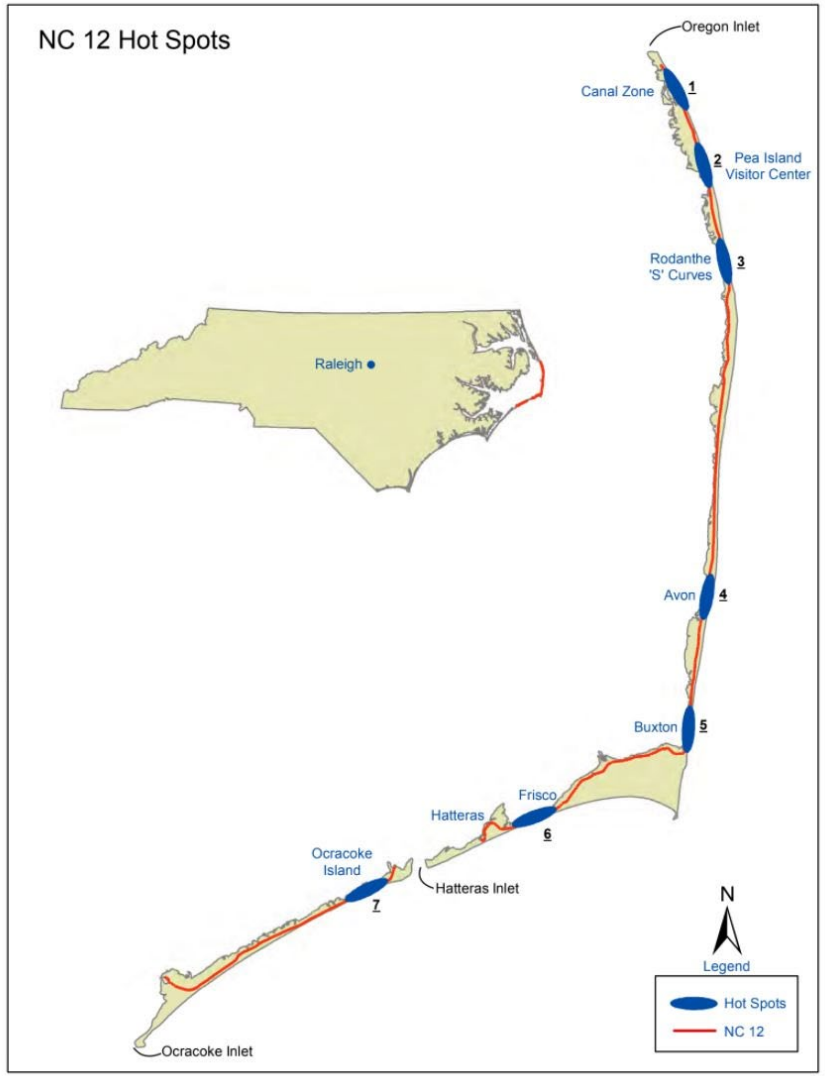
Outlook

Research Studies & Programs

- Highway 12 Task Force
- Solving Access for NC 12 in Dare County (SAND)
- B-2500 Coastal Monitoring Program
- Hatteras Island Adaptation Study/Modeling Project
- Dare County Resilience Strategy CAT (Community Action Team)
- Ocracoke Adaptation Study
- Comprehensive Ocracoke Island Access Study Workgroup

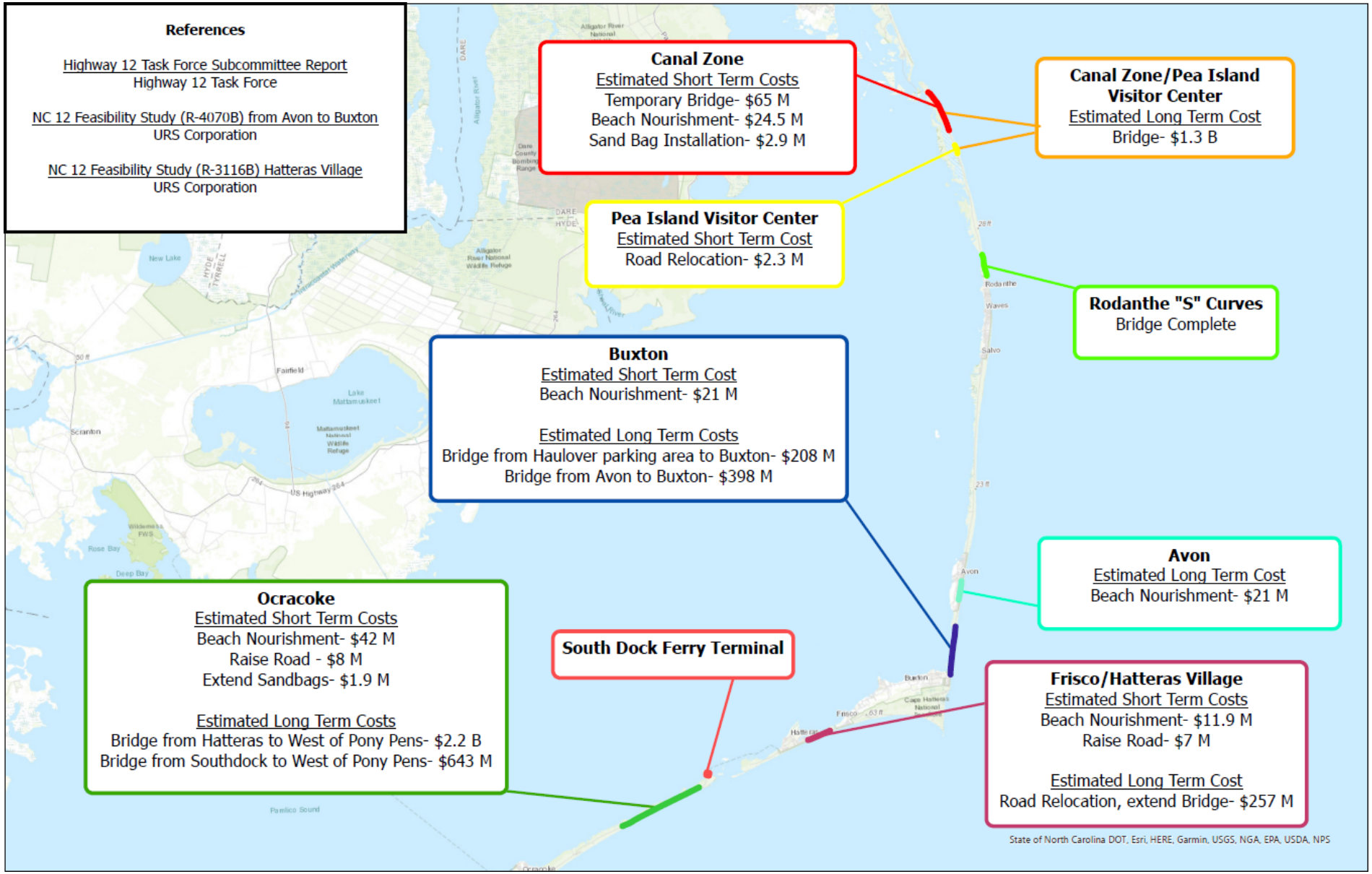
Highway 12 Task Force

- Collaborative effort to develop a long term, prioritized, and resilient transportation plan for NC 12 and associated transportation infrastructure in and around Dare and Hyde Counties
- Formally established in April of 2021. Final report was released February 7, 2023
- Pea Island/Canal Zone, Frisco/Hatteras Village (Isabel Inlet area), and Ocracoke deemed most critical
- Stakeholders:
  - Dare & Hyde Counties
  - National Park Service (Cape Hatteras National Seashore)
  - U.S. Fish & Wildlife Service (Pea Island NWR)
  - NCDOT (Division 1, Environmental, Ferry Division)
  - NC Wildlife Resources Commission
  - NC Division of Coastal Management
  - Cape Hatteras Electric Cooperative & Tideland EMC
  - Additional environmental and academic partners (SELC, CSI, UNC/ECU researchers)



[Highway 12 Task Force Subcommittee Report (Link)]

Proposed Alternatives

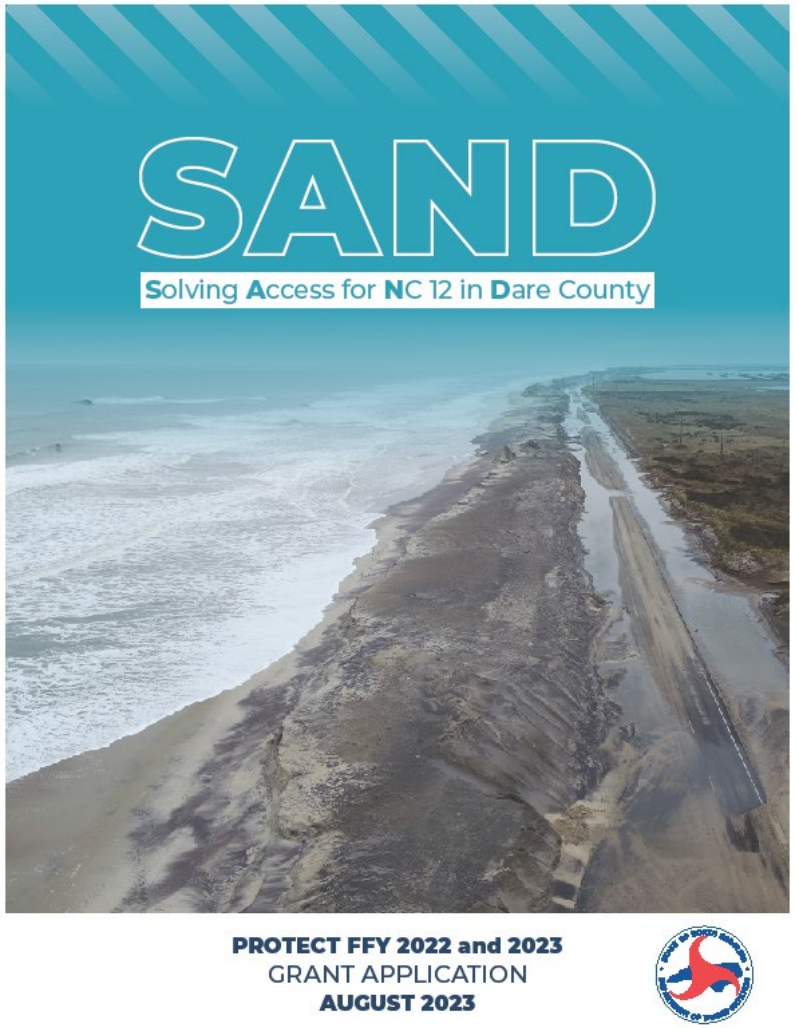


Solving Access for NC 12 in Dare County (SAND)

Funded through a Federal PROTECT Grant, NCDOT has launched the SAND Study (TIP HO-0020) to complete a Planning and Environmental Linkages (PEL) Study for an 11-mile section of NC 12 between the Marc Basnight Bridge and the Rodanthe Bridge within the Pea Island National Wildlife Refuge. The study focuses on long-term resiliency, development and evaluation of alternatives, and extensive public engagement to address chronic vulnerability along this corridor. This collaborative effort—supported by the Cape Hatteras National Seashore, Pea Island National Wildlife Refuge, Federal and State resource agencies, Dare and Hyde Counties, utilities, and regional partners—will streamline future environmental reviews, accelerate project delivery, and guide both short-term and long-term solutions to maintain reliable access on NC 12.

Stakeholders include:

NCDOT; National Park Service; U.S. Fish & Wildlife Service; U.S. Army Corps of Engineers; NOAA Fisheries; NC Wildlife Resources Commission; NC Division of Coastal Management; NC Division of Water Resources; NC Division of Marine Fisheries; Cape Hatteras Electric Cooperative; Tideland EMC; NCDOT Ferry Division; Dare County; Hyde County; Coastal Studies Institute; Southern Environmental Law Center; and the NC 12 Task Force.



B-2500 Coastal Monitoring Program

Implemented by NCDOT in 2011, the primary purpose of the Coastal Monitoring Program is to assess highway vulnerability between Oregon Inlet and Rodanthe and is a condition of the 2010 Record of Decision for the NC 12- Replacement of the Bonner Bridge (B-2500). The program is conducted in conjunction with the U.S. Fish and Wildlife Service (Pea Island National Wildlife Refuge) and NC State University. The coastal monitoring program produces detailed annual monitoring reports that include highway vulnerability, dune height/width/location, erosion rates, and shoreline predictions. These annual reports also include terminal groin monitoring, which is required as a condition of the 2012 Easement with the Refuge.

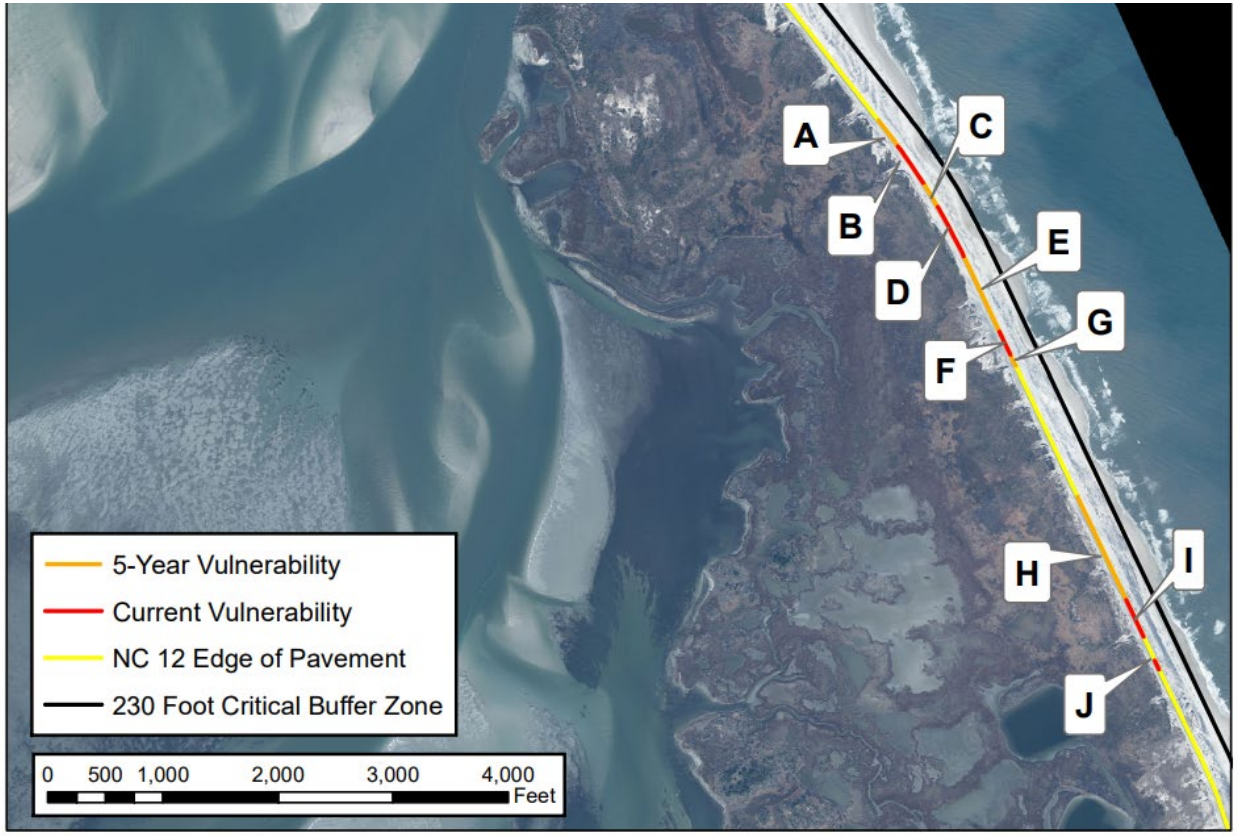


Figure 28
(View 1 of 6)

Current NC 12 Vulnerability
Prepared for the North Carolina Department of Transportation
Horizontal Datum: North Carolina State Plane Feet 1983 FIPS 3200
Orthophoto Date: December 12, 2024; Map Created: November 11, 2025.

Hatteras Island Adaptation Study/Modeling Project

This project is a collaborative effort to evaluate the likely future effects of different management strategies on island width, elevation, position and habitability under different future sea level rise scenarios. By working with project partners—including the National Park Service, Dare County, the North Carolina Department of Transportation and other stakeholders, scientists from the University of North Carolina at Chapel Hill, North Carolina State University, Duke University, and the Water Institute will generate model outcomes to support discussions of management choices, while also advancing our understanding of how human and natural processes interact to shape barrier island futures

Isabel Inlet - 2003

Dare County Resilience Strategy CAT (Community Action Team)

The RCCP (Resilient Coastal Communities Program) is a state-local partnership designed to help overcome barriers in coastal resilience and adaptation planning, boost local government capacity, and support a proactive, sustainable, and equitable approach to coastal resilience planning and project implementation. Dare County was awarded money for resilience planning through RCCP. This program is designed to help coastal communities prepare for and adapt to the challenges of climate change and natural hazards. The program is administered by the Division of Coastal Management and funded by the N.C. General Assembly and National Fish and Wildlife Foundation.

Ocracoke Adaptation Study

The overall goal of this project is to implement a co-production process that results in science-based assessments that can be used to inform decision-making as Cape Hatteras National Seashore, North Carolina Department of Transportation, Hyde County and the Village of Ocracoke work to address transportation and resource management related challenges along the east end of Ocracoke Island as well as access to and from Hatteras Island.

Comprehensive Ocracoke Island Access Study Workgroup

Funded by a Federal PROTECT Grant, NCDOT is conducting a feasibility study to evaluate four ferry terminal alternatives—including upgrades to the existing South Dock—on Ocracoke Island. On December 5, 2025, a large group of stakeholders traveled to Ocracoke Island to visit the sites included within the feasibility study and discuss the viability of each potential location as well as broader considerations for the long-term connectivity of Ocracoke. During the visit, it was determined that a holistic, comprehensive access study for long-term access to Ocracoke Island is needed. This comprehensive study must address the full range of transportation, environmental, community, and operational considerations that must be considered. This workgroup will prepare for a potential PROTECT grant application to assist in funding the completion of the comprehensive study.

Thank you!