Highway 12 Task Force Report

February 7, 2023

Highway 12 Task Force Subcommittee Report

November 10, 2022

Over the years, N.C. Highway 12 (N.C. 12) in Dare and Hyde Counties has been closed at various times due to ocean overwash of water and sand, beach erosion, and flooding from precipitation and sound-side inundation. The vulnerable nature of N.C. 12 and frequent closures have resulted in: disruptions to the lives of residents and visitors to Hatteras and Ocracoke Islands; negative impacts to the Cape Hatteras National Seashore and the Pea Island Wildlife Refuge; large costs to maintain the roadway; and negative impacts to the Dare and Hyde County economies. Natural barrier island dynamics, coupled with projections of 10-14" of sea level rise by 2050 and a 10-fold increase in the frequency of moderately damaging flooding events, will make N.C. 12 increasingly vulnerable (Sweet et al. 2022). Recognizing these concerns and the need to find solutions, officials from Dare County, Hyde County, the Cape Hatteras National Seashore, the Pea Island Wildlife Refuge and the North Carolina Department of Transportation (NCDOT) began meeting in the late winter and early spring of 2021 to discuss and develop a plan to maintain access along the N.C. 12 corridor in both Dare and Hyde Counties. Following these meetings, in April 2021, Dare County created the N.C. 12 Task Force (Task Force) with the following members:

Robert L. Woodward, Sr. (Chairman, Dare County Commissioners), Chairman
Bobby Outten (Dare County Manager)
David Hallac (Superintendent, National Parks of Eastern NC)
Randal Mathews (Hyde County Commissioners)
Kris Cahoon Noble (Hyde County Manager)
Rebekah Martin (Project Leader, Coastal NC National Wildlife Refuge Complex)
Allen Moran (Division 1 Rep, NCDOT)
Sterling Baker (Division 1 Engineer, NCDOT)
Gretchen Byrum (Division 1 Project Development Engineer, NCDOT)
Paul Williams (Division Environmental Officer, NCDOT)
Win Bridgers (Deputy Division Engineer, NCDOT)

The goal of the N.C. 12 Task Force was to engage in a collaborative effort to develop a long term, prioritized and resilient transportation plan for N.C. 12 and associated transportation infrastructure in and around Dare and Hyde Counties, North Carolina, (resilient meaning: compatible with dynamic, storm-prone coastal environment, reliable, safe, less prone to damage and closures, and easier and less costly to maintain) and to identify more vulnerable areas (hot spots), challenges, priorities, solutions, funding strategies and a timeline for implementation. The Task Force agreed the plan should:

1. Recognize the need for safe, reliable routine and emergency transportation for the thousands of residents in the communities in Dare and Hyde Counties and the millions of visitors that travel to the area from around the world.
2. Incorporate information on climate change and sea level rise that may exacerbate existing and present new transportation challenges in the future.
3. Recognize the missions of the Seashore, Refuge and other public lands within the project area and balance ecological values and the restoration of the barrier island processes while maintaining public access.
4. Be collaborative and include substantial opportunities for input from stakeholders, agencies, organizations, and the public.
5. Utilize existing NCDOT transportation feasibility studies and other information as important foundational information that contributes to our region.
6. Evaluate the economic impacts associated with the status quo and on future transportation options.
7. Develop a strategic financial plan that leverages existing funding and identifies new funding sources.
8. Be designed to help overcome barriers to coastal resilience and adaptation planning and support a proactive and sustainable approach to resilient transportation planning and project implementation.

The Task Force identified the project area as: The approximately 67-mile long portion of N.C. 12, largely imbedded within the Cape Hatteras National Seashore, including the Pea Island National Wildlife Refuge, beginning at the northern boundary of the Cape Hatteras National Seashore adjacent to the Town of Nags Head in Dare County and terminating in the Village of Ocracoke in Hyde County, with the Hatteras - Ocracoke Ferry connecting the southern portion of N.C. 12 on Hatteras Island to the northern portion of N.C. 12 on Ocracoke Island . The highway is located within or adjacent the Town of Nags Head and the Villages of Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras and Ocracoke.

To facilitate work on this transportation plan and to solicit stakeholder input, the Task Force appointed the following members to the N.C. 12 Task Force Subcommittee of Stakeholders (Subcommittee):

All members of the N.C. 12 Task Force (de facto members of the Subcommittee)
Bobby Outten, (Dare County Manager), Chairman
David Hallac (Superintendent, National Parks of Eastern, NC), Vice Chairman
Bob Chestnut (Ocracoke Representative)
Randal Mathews (Hyde County Commissioner)
Kris Cahoon Noble (Hyde County Manager)
Robert L. Woodard, Sr. (Chairman, Dare County Board of Commissioners)
Danny Couch (Dare County Commissioner, Hatteras Island Representative)
Susan Flythe or designee (Cape Hatteras Electric Cooperative)
Paul Spruill or designee (Tideland Electric Membership Corporation)

Kym Hunter or designee (Southern Environmental Law Center)
Braxton Davis or designee (NC Division of Coastal Management)
Cameron Ingram or designee (NC Wildlife Resources Commission)
Pete Benjamin or designee (US Fish and Wildlife Service)
Dr. D. Reide Corbett (Coastal Studies Institute)
Col. Benjamin A. Bennett or designee (US Army Corps of Engineers)
S. Daniel Smith or designee (NC Division of Water Resources)
Kathy Rawls or designee (NC Division of Marine Fisheries)
Pace Wilber or designee (National Marine Fisheries)
Harold Thomas or designee (NCDOT Ferry Division)

The subcommittee met in a series of meetings over the six-month period from June to December of 2021. A representative from National Marine Fisheries was not able to participate as part of the subcommittee. In those meetings, the subcommittee reviewed data associated with "hot spots" along N.C. 12 from the northern boundary of the Cape Hatteras National Seashore adjacent to the Town of Nags Head in Dare County to the Village of Ocracoke (Figure 1), reviewed and considered information related to coastal erosion, sea-level rise and potential for breaches at each hotspot, reviewed existing NCDOT studies (NCDOT 2015a, NCDOT 2015b, NCDOT 2016, NCDOT 2017, NCDOT 2020, NCDOT 2021), and visited each of the hot spots with the exception of Ocracoke (though most of the subcommittee had visited Ocracoke individually and were aware of the conditions on Ocracoke). Using this information, the subcommittee discussed each of the hot spots thoroughly to reach consensus on 1) the short-term solutions to maintain accessibility; 2) the long-term solutions to maintain accessibility; and 3) the overall priority across all hot spots for implementing solutions.

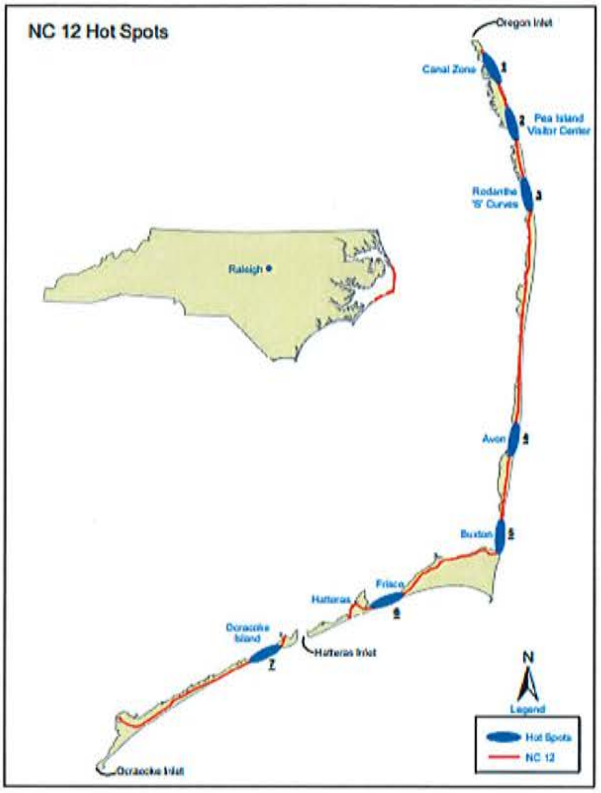

Figure 1. N.C. 12 Hot Spots (from: NCDOT 2021)

The hot spots, from north to south, and the consensus of the subcommittee follows.

1 and 2) Northern Pea Island/Old Sandbag Area, aka Canal Zone and Pea Island Visitor Center

Background: The northern portion of Hatteras Island includes a hotspot area referred to as the Canal Zone and, further to the south, a hotpot next to the Pea Island Visitor Center. NCDOT makes significant road and dune maintenance investments all year, every year, to maintain transportation. Despite their tremendous efforts, the area overwashes several times a year causing unsafe road conditions, transportation delays, and road closures.

Short-term: The short-term alternatives (the period between now and the date a long-term solution is completed) discussed were to continue the current efforts to remove sand from N.C. 12 to re-construct dunes after storm events, use "temporary" bridges to span potential breaches and, if necessary, to use beach nourishment to widen the beach and improve the dunes to reduce the threat to N.C. 12. The consensus of the subcommittee was to continue the current approach and build temporary bridges when necessary and to consider beach nourishment as an emergency, stop-gap measure.

Long-term: For the long term the subcommittee looked at the following alternatives: status quo maintenance; bridge in place, a long bridge around all areas connecting Basnight Bridge to the Jug Handle Bridge, and a series of smaller bridges around the various hot spots in the area. NCDOT advised the status quo was not sustainable and the consensus was this was not a viable alternative. It was also the consensus of the subcommittee that a bridge in place was not viable because of the excessive cost and potential permitting issues. A long bridge, which could span more than 10 miles around the entire area, while being a good solution, was not preferred by the subcommittee because of cost concerns and the complexity and difficulty in obtaining the necessary permits, which would postpone construction for many years, if ever. The consensus of the subcommittee was that series of smaller bridges around the Canal Zone and Visitor Center areas could work, but that "Alternative G" from a prior NCDOT report, (an approximately 7-mile-long bridge starting around the southern terminus of the Basnight Bridge and continuing around the Visitor Center) may be the most feasible solution considering highway vulnerability and cost.

2) Rodanthe S-Curves

Background: N.C. 12 on Hatteras Island north of Rodanthe, referred to as the "S-curves", has experienced substantial erosion throughout the years. In preparation for a project to build a bridge around the area, sandbags were installed to help protect the asphalt.

Long-term: A long-term solution has been implemented with the construction of the bridge known as the "Rodanthe" or "Jug Handle" Bridge. The bridge opened to traffic in early 2022, effectively bypassing the "S Curves" hotspot. No additional work was recommended by the Highway 12 Task Force.

3) Avon

Background: The hot spot location begins around the Avon Pier and continues south to the end of Ocean View Drive. The location of the Avon Pier is in roughly the center of Avon and recent rapid erosion and loss of dunes and frequent ocean overwash, sometimes combined with sound side flooding and rainfall, can result in deep flooding of N.C. 12. It was noted that while substantial flooding has significant negative impacts on transportation, unlike other hot spots, flooding was not threatening the integrity of N.C. 12.

Short-term: For the short term, beach nourishment was seen as the only practical short-term solution. During Summer 2022, Dare County implemented a beach nourishment project in this area and the project is performing as designed.

Long-term: For the longer term, raising the road in place was considered as an option; however, this alternative could create other problems with drainage and flooding of adjacent areas. Raising the road in place, a bridge around Avon, and a combination of raising the road and beach nourishment were all considered. The consensus of the subcommittee was to consider implementation of beach nourishment until other ideas were developed. Some stakeholders

expressed concerns about implementing beach nourishment as a long-term solution and the subcommittee agreed that a new feasibility study would be needed to explore long-term solutions.

4) Buxton

Background: The Buxton hot spot starts on the south end of the Village of Avon and continues to the northern portion of Buxton Village. The most vulnerable area is an approximately 1-mile-long section in northern Buxton between the village boundary and jetties near the original site of the Cape Hatteras Lighthouse. It frequently overwashes in an area around several motels and adjacent side streets located on the northern end of the village.

Short term: The short-term solution that has been implemented and will likely continue to be implemented is beach nourishment. A project was completed in 2018 and again in 2022. Both projects met the goal of protecting the integrity of N.C. 12 and minimizing impacts to transportation.

Long-term: For the southern end of Avon to the Village of Buxton, several long-term alternatives were considered from NCDOT's report entitled "NC 12 Improvements from Buxton to Avon," dated October 2015. Alternatives 1 and 4 of that report, moving the road westward and moving the road westward coupled with beach nourishment were eliminated because there is very little land to move the road, and neither were thought to be cost effective. The subcommittee discussed favorably Alternative 2, a bridge from the Haulover Beach Parking Area, west of the current road, to the northern entrance of Buxton, north of the curve. The subcommittee also discussed Alternative 3, a bridge from the southern boundary of Avon, west of the current road, and curving to the west north of Buxton and terminating in the areas of Rocky Rollinson Road. The consensus of the subcommittee for the long term was to consider a combination of Alternatives 2 and 3; ultimately, a bridge that starts from southern Avon and comes into the center of Buxton Village.

5) Frisco/Hatteras Village

Background: The highway between the western edge of Frisco to the eastern side of Hatteras Village is quite vulnerable. One section, about 1-mile long, represents a very narrow section of Hatteras Island that is particularly vulnerable to coastal hazards. The area was breached by Hurricane Isabel in 2003.

Short-term: The consensus of the group for the short term in this area was that there were very few alternatives. The consensus was to utilize the short-term solution of beach nourishment to preserve the road. Where seepage continued to flood the road along northern Hatteras Village, the group considered raising the road elevation.

Long-term: The subcommittee considered four alternatives. Alternative 1 was a road relocation to the north. Alternative 2 was a combination of road relocation and a 200 feet bridge.

Alternative 3 was beach nourishment. Alternative 4 was road relocation and a beach nourishment project. Alternative 1 was eliminated because there was insufficient land area. Alternative 3 was eliminated because it cost more than other alternatives and was less sustainable. The consensus of the subcommittee was a longer bridge hybrid of NCDOT alternatives 2 and 4, which would extend the bridge from near the Frisco bathhouse into Hatteras Village to try to avoid the hot spot area in its entirety.

6) Ocracoke

Background: There are three transportation challenges for motor vehicles traveling from Hatteras Island to Ocracoke Village. First, the navigational channel used by vessels across or around Hatteras Inlet has been challenging to maintain, which has caused transportation delays, longer one-way trips between islands, and fewer daily ferry trips for visitors and residents. Second, the South Dock Terminal, including the ferry basin and vehicle staging areas, have been difficult to maintain as the island is rapidly eroding. Finally, the area adjacent to N.C. 12, about 2 miles long, south of South Dock Terminal, is rapidly eroding and frequently overwashes. Occasionally, the highway has been badly damaged by rough surf and storm surge from Pamlico Sound. In combination, vehicle transportation from Hatteras to Ocracoke along the N.C. 12 Corridor is very vulnerable.

Short-term: The consensus of the group was that there were very few short-term solutions in this area other than beach nourishment. It was the consensus that the short-term solution was to continue using the current method to hold the dock and roadway in place until a more permanent solution could be implemented.

Long-term: It was the consensus of the subcommittee that neither South Dock nor the roadway could be protected for many more years absent major engineering of the island. The subcommittee discussed high speed ferries to Silver Lake and conventional ferries to Silver Lake. However, the Silver Lake option would result in longer travel times and fewer trips. The group spent time discussing the logistical issues to meet demand with Silver Lake as the only landing site, significant costs to purchase new ferries, and negative impacts to residents' way of life, tourism, and Hyde County's economy.

The consensus of the subcommittee was to move the South Dock to an undetermined location nearer to Ocracoke Village to avoid the cost of having to build a long causeway type entrance to the dock in locations previously identified, to avoid having the dock located in an area that would likely be cut off from Ocracoke Village in storms and from continued erosion and to mitigate as much as possible the negative impact to tourism. Passenger ferries were also seen as a possible way to mitigate impacts to tourism caused by longer run times and the inability to meet demand. Additional study of a landing site in the location of Ocracoke Village near Silver Lake and other areas was recommended to facilitate decision making.

Priorities

The subcommittee looked at erosion rate data, sea level rise data and heard from NCDOT on where the maintenance efforts were currently focused. All beach areas adjacent to N.C. 12 hot spots are experiencing erosion based on analysis of long-term data. Additionally, sea level rise is expected to result in high tide or continuous inundation of highway areas along several hot spots. Based upon that information, the subcommittee agreed that three areas stood out as the most critical areas of concern:

Pea Island/Canal Zone, Frisco/Hatteras Village (Isabel Inlet area) and Ocracoke. The areas in Avon and Buxton were seen as critical but did not have the immediate needs of the three others due to existing beach nourishment programs.

The consensus of the subcommittee was that of the three most critical areas, the Pea Island/Canal Zone was the most critical and a top priority. This area is the gateway to Hatteras and Ocracoke Islands. If this area is inaccessible, then all other areas become inaccessible. This is also an area where significant NCDOT resources are used annually to protect, repair and maintain access. The Frisco/Hatteras Village and Ocracoke hot spots followed Pea Island/Canal Zone in priority. The consensus was that the Canal Zone and Ocracoke were of equal priority due to the frequency and regularity of ongoing impacts. Loss of access in either of these areas result in loss of access to all points further south. Additionally, in the case of Ocracoke, the consensus of the group was that current efforts to maintain access with the continued erosion at South Dock and the oceanfront adjacent to N.C. 12 cannot be sustained indefinitely. The Frisco/Hatteras Village hot spot was seen as the third priority in the area, mainly due to the smaller size of the vulnerable area and ability to utilize emergency breach filling or small-scale beach nourishment projects until a bridge around the area could be built.

Avon/Buxton followed all other locations. While loss of access in this area would make areas further south inaccessible as well, there are currently beach nourishment projects in place for Avon and Buxton to mitigate the impacts of erosion and sea level rise.

Conclusions

Implementation of sustainable solutions for the N.C. 12 hot spots is important for long-term, safe, and reliable transportation to Dare and Hyde County communities and the Cape Hatteras National Seashore and Pea Island National Wildlife Refuge. Coastal hazards including chronic erosion and flooding from storms and ocean overwash are normal disturbances that have shaped the Hatteras and Ocracoke barrier islands since they were formed. Sea level rise, and projections for a higher frequency of damaging flooding events, will exacerbate coastal hazards in the future. The N.C. 12 Subcommittee generally recommends the construction of bridges

around all N.C. 12 hot spots as the most sustainable long-term solution in all areas. Additional planning and design work is needed to determine the exact length and entry and exit locations for each bridge. Detailed planning and design should consider the most current sea level rise projections available.

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