

LEGAL ISSUES WHEN
MANAGING PUBLIC ROADS
AFFECTED BY SEA LEVEL RISE:

NORTH CAROLINA



Heather Payne, Associate Professor, Seton Hall School of Law

Ian Brown, Law Student, University of North Carolina School of Law & North Carolina Sea Grant

SPRING 2019

ABOUT THE AUTHORS

HEATHER PAYNE is an associate professor at Seton Hall School of Law. In addition to teaching responsibilities, she conducts original research (empirical and qualitative) on energy and environmental law topics, writes law review articles and white papers, and engages with stakeholders, students and alumni. Prior to joining Seton Hall, Ms. Payne clerked for the Honorable Marth Geer at the North Carolina Court of Appeals and was Assistant Director and Fellow with the Center for Climate, Energy, Environment and Economics (CE3) at the University of North Carolina School of Law. Before attending law school, she worked in positions of increasing responsibility at Sears Holdings, Inc. and Honeywell International. Ms. Payne earned a bachelor's degree in chemical engineering from the Georgia Institute of Technology and a J.D. from the University of North Carolina School of Law. She has also served on the Board of Directors of the Orange Water and Sewer Authority.

IAN BROWN is a recent graduate of the University of North Carolina School of Law, where he served as a research assistant for the Center for Climate, Energy, Environment and Economics.

Shana Jones, J.D., director of the Georgia Sea Grant Law Program and Scott Pippin, J.D., of the Carl Vinson Institute of Government at the University of Georgia, also provided research support as well as overall direction for the legal research questions. The authors are especially grateful to Yee Huang, J.D., who provided exceptional research support and editing assistance.

PROJECT BACKGROUND

This white paper is one outcome of a four-state regional project funded by the National Oceanic and Atmospheric Administration Office of Coastal Management, Florida Sea Grant, Georgia Sea Grant, South Carolina Sea Grant, and North Carolina Sea Grant (Project No.: FY2014–2018: NA14OAR4170084). Coastal communities are increasingly becoming aware of the risks to their ecosystems, homes, and economies because of increased flooding, more extreme storm surges, and sea level rise. Reducing risk on the coast will be achieved by means of a variety of approaches, including policy and regulatory changes, natural resource protection, structural and non-structural intervention and investment, and retreat. A project team involving researchers, legal and policy experts, and law students have assisted coastal communities in four states – Florida, Georgia, South Carolina, and North Carolina – to prepare for present vulnerabilities and projected future conditions based on likely sea-level rise scenarios. This paper is part of the project’s objective to analyze legal and policy factors affecting adaptation responses, focusing on the state and local levels. Additional white papers associated with this project may be found at <http://gacoast.uga.edu/>.



UNIVERSITY OF
GEORGIA

Marine Extension and Georgia Sea Grant
Carl Vinson Institute of Government



Sea Grant

Sea Grant
S.C. Sea Grant Consortium

Sea Grant North Carolina Sea Grant Florida



INTRODUCTION

Sea level rise is a current and growing threat to roads in coastal areas. Although scientific projections have inherent uncertainty, North Carolina is likely to face up to four feet of sea level rise before the end of the century.¹ With the rising waters and extended storm surges comes the inundation and destruction of roads, water treatment facilities, drainage infrastructure, and other critical governmental services. In the near term, low-lying coastal communities will have to make difficult choices about when, where, and how to selectively relocate from the advancing sea.

As roads are subjected to repeated storm and erosive action, the costs of maintaining or rebuilding these stretches of road can become untenable. State and local government budgets are finite. Formally abandoning a road may provide an escape from financially impracticable maintenance costs, but road closure comes with its own potential liabilities. The issue presents a difficult balancing act between the financial limits of local governments and the property rights of individuals who may rely on the road to access their property.

| KEY POINTS OF THIS PAPER INCLUDE:

- In North Carolina, the state Department of Transportation (NCDOT) and municipalities—but *not* counties—have a duty to maintain and repair roads. Doing so is likely to become more expensive and frequent with sea level rise. In North Carolina, NCDOT has jurisdiction over 75% of the roads in the state.
- A governmental entity may be sued for negligence for failing to maintain and repair roads under its control. The likelihood of success in such a lawsuit depends on the facts of the case. A governmental entity may assert immunity—and is not liable—for governmental functions, such as deciding to keep open or abandon a road. However, immunity does not apply to proprietary functions, such as repairing and maintaining roads.
- A governmental entity may also assert the doctrine of public duty to defeat a negligence claim. The doctrine states that a governmental entity has a duty to the general public, and not specific individuals, therefore nullifying the first element of a negligence lawsuit. However, if the negligence amounts to prolonged disregard for public health and safety, the doctrine will not provide a legal shield for the entity.
- A governmental entity has other options to limit liability in a negligence lawsuit. For example, North Carolina exempts from liability injuries caused by an unforeseeable act of God, but courts have narrowly defined “unforeseeable,” suggesting that climate change impacts may not be considered unforeseeable. A governmental entity may also purchase liability insurance

1. Daniel Grossman. 2016, March 22. “North Carolina Sea Level: No More Head-in-the-Sand?” Yale Climate Connections. Retrieved from www.yaleclimateconnections.org/2016/03/north-carolina-rising-sea-level-no-more-head-in-the-sand/.

for injuries arising from specific acts, but it is unclear whether insurance is available for injuries specifically arising from sea level rise or other climate change impacts.

- If continuing to repair and maintain roads becomes prohibitively expensive, the state, counties, and municipalities may close or abandon roads by following specific statutory procedures. Title to abandoned roads vests in the adjacent property owners, and the governmental entity is no longer required to maintain the road.
- One consideration for governmental entities is that abandoning a road may lead to a takings claim, particularly if the road abandonment eliminates direct access. A governmental entity should provide reasonable alternative access to mitigate a potential takings claim.

This white paper explains the legal duties of municipalities and counties with respect to maintenance of roads in North Carolina. It examines the authority of local governments to abandon roads in light of the unique challenges posed by a changing climate. The paper further considers the potential liabilities that abandoning a road may incur, as well as some defenses available to a municipality or county. This paper is not intended to provide legal advice. Rather, it is a policy paper designed to highlight potential legal questions that are likely to arise in the context of community adaptation to sea level rise. Communities facing such questions should consult with their legal counsel when considering adaptation actions.

DUTIES FOR ROAD MAINTENANCE AND REPAIR

Determining “who owns the road” is critical because it defines who has the authority to act with respect to road closure, maintenance, and repair. In North Carolina, by a large margin, the state owns the largest percentage of road miles. Of the total 106,334 miles of roads and highways in North Carolina, the state owns 59,229 miles of rural roads and 20,330 miles of urban roads, or approximately 75% roadways.² Municipalities own 2,375 miles of rural roads and 2,310 miles of urban roads, or 21% of the roadways. Counties do not manage or own roadways in North Carolina.

Table 1: Miles of North Carolina Roads by Jurisdiction

NORTH CAROLINA ROAD MILES											
RURAL						URBAN					
State	County	Town/ Muni	Other	Fed	Rural Total	State	County	Town/ Muni	Other	Fed	Urban Total
59,229	—	2,375	1,017	2,881	65,502	20,330	—	20,310	22	170	40,832
TOTAL 106,334 miles											

2. US Department of Transportation, Office of Highway Policy Information. 2013, October. “Highway Statistics Series 2012.”

Of course, while understanding road ownership is essential to determining which jurisdiction has authority to act (or has a duty to act), road miles “owned” does not necessarily translate into vehicle miles traveled—large numbers of people often travel on a concentrated number of roads. Although North Carolina has more rural road miles than urban, for example, urban roads carry a larger percentage of vehicle traffic. In North Carolina, approximately 54 million miles are traveled annually. Of that amount, 15.2 million are vehicle miles traveled on rural roads, and 38.9 million are traveled on urban roads.³ Inventorying high traffic areas and essential transportation infrastructure will be critical for addressing climate impacts on road infrastructure.⁴

NCDOT is authorized to establish, construct, and maintain a statewide system of roads and to repair and maintain them in good condition.⁵ An individual citizen may petition the local county board of commissioners concerning road improvements. The county board must then forward the petition to NCDOT with recommendations.⁶ A local board may also file an independent complaint with NCDOT for failing to maintain state highways or any county road system in good condition.⁷

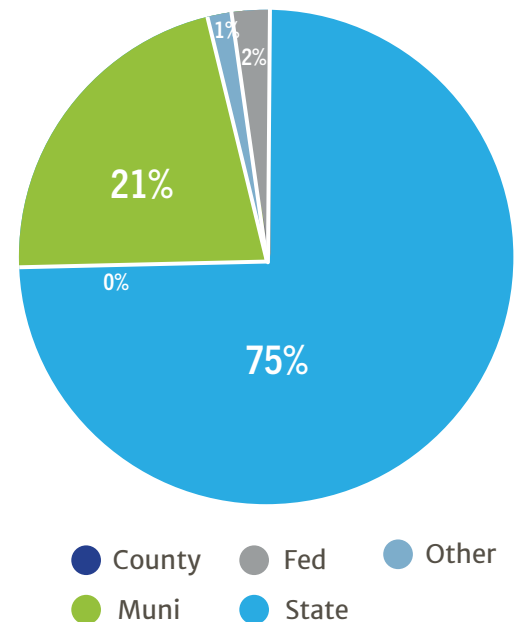
In North Carolina, a municipality has “general authority and control over all public streets, sidewalks, alleys, and bridges” within its limits, except those already under the control of the state Board of Transportation.⁸ A municipality has the affirmative duty to keep these public thoroughfares “in proper repair” and “open for travel and free from unnecessary obstructions.”⁹

Counties in North Carolina do not have a duty to maintain roads or alleys. As noted above, state law vests exclusive control, management, and responsibility for all public

NCDOT has a duty to repair, construct, and maintain a dependable system of statewide highways.

FIGURE 1.

NORTH CAROLINA: PERCENTAGE OF ROAD MILES BY OWNERSHIP



3. US Department of Transportation (DOT), Office of Highway Policy Information. 2017, September. “National Highway System Travel – 2016.”

4. National Research Council of the National Academies. 2008. *Potential Impacts of Climate Change on U.S. Transportation* (Transportation Research Board Special Report No. 290). Retrieved from onlinepubs.trb.org/onlinepubs/sr/sr290.pdf.

5. N.C. Gen. Stat. Ann. §§ 136–45 & 136–64.

6. N.C. Gen. Stat. Ann. § 136–62.

7. N.C. Gen. Stat. Ann. § 136–64.

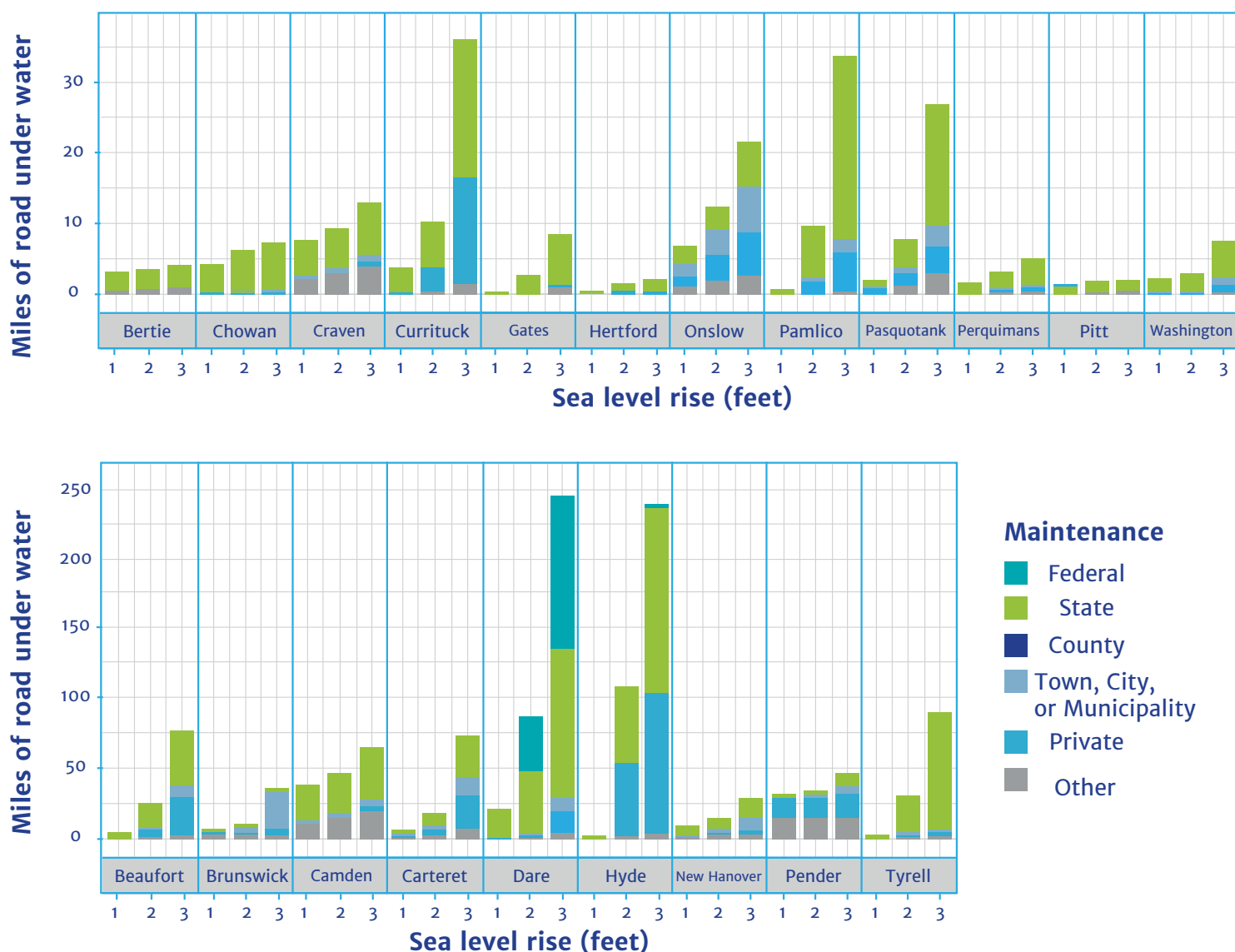
8. N.C. GEN. STAT. § 160A–296(a) (2016). The Board of Transportation is a sub-entity within the state Department of Transportation that is comprised of nineteen men and women appointed by the governor.

9. N.C. GEN. STAT. § 160A–296(a)(1)–(2) (2016).

roads in counties in NCDOT.¹⁰ A county may enter into an agreement with NCDOT to maintain, repair, or improve a road. If a road is in poor condition, the municipality where the road is located generally has the responsibility to repair it. If the road is located in an unincorporated area of the county, then NCDOT is responsible for maintaining it.

Finally, while increased extreme rainfall and riverine flooding has the potential to affect roadways across the state, this analysis focuses on the impact that sea level rise is likely to have on existing road infrastructure in the coastal zone. To begin to understand the potential scope of the problem, the research team analyzed roadways in coastal cities and counties in North Carolina vulnerable to sea level rise under one-, two-, and three-foot of rise scenarios, using sea level rise data from NOAA's Office for Coastal Management Sea Level Rise Viewer Data Download and NCDOT's GIS Mapping website.¹¹

TABLE 2 | Roads at Risk to Sea Level Rise by County



10. N.C. GEN. STAT. § 136-51 (2016). See also *Road Maintenance, Henderson County North Carolina*, www.hendersoncountync.org/links/roads.html.

11. coast.noaa.gov/digitalcoast/tools/slr.html. See Appendix A for a detailed description of the methodology used.

The state is responsible for maintaining approximately 75% of the roads in North Carolina, and, as Table 2 shows, under the three scenarios of sea level rise, the majority of affected roads are under state maintenance. Privately maintained roads are at greatest risk when three feet of sea level rise is reached, as are federally maintained roads. Note, however, that two counties—Hyde and Dare—contain the bulk of privately and federally maintained at-risk roads; thus, this risk to private and federal roads appears to be concentrated in these two counties.

TABLE 3 | Total miles of road maintained by state, local (city/county), or private entities that will be impacted by one, two, or three feet of sea level rise in North Carolina¹²

	1 FT SLR	2 FT SLR	3 FT SLR
State maintained	72.6	217.5	529.9
County maintained	0	0.1	0.5
Federally maintained	0.45	37.15	116.8
Town, city, municipality maintained	3.8	20.8	74.6
Privately maintained	22.4	110.8	250.2
Other	29.2	46	71.5

The analysis shown in Tables 2 and 3 reveals a few points for consideration. First, the state bears the majority of the burden for roads affected by sea level rise in most counties in North Carolina, but it will likely be required to coordinate with local governments about how to proceed as sea level rise and extreme weather events affect roadways used by local communities. The second is that privately and federally maintained roads in Dare and Hyde counties constitute the vast majority of those categories of affected roads. These counties have a high ratio of coastline to area. For privately maintained roads, the question of cost become significant in deciding how and whether or not to maintain repeatedly damaged roads. For federally maintained roads, these counties will require an additional level of coordination and planning.

Local impacts vary widely in terms of number of miles affected. Again, Dare and Hyde counties face the greatest exposure to potential road flooding by a wide margin due to their location, miles of exposed coastline, and natural topography. The general pattern for counties in coastal North Carolina is that as sea level rise increases, the state bears greater responsibility for flooded roads. Nevertheless, the different mix of entities responsible for roads supports, in our view, the idea that adaptation planning must be highly localized. Long-term and comprehensive planning involving multiple jurisdictions is more likely to create outcomes that result in community-wide resilience. Given that projections are uncertain, jurisdictions should work together to jointly plan for several scenarios, understanding that their burdens may change depending upon the scenario that occurs.

LEGAL ACTION FOR FAILURE TO MAINTAIN ROADS

NCDOT or a municipality may face a tort lawsuit as a result of a failure to maintain that road. The tort claim would most likely be a negligence claim. The theory behind a negligence claim is that if a defendant has a duty to a plaintiff and breaches that duty in a way that causes harm to the plaintiff, then the plaintiff can recover damages for the harm.

For a negligence claim to be successful, four elements must be present:

1. A legal duty,
2. A breach of that duty,
3. A causal link between the defendant's breach of duty and harm to the plaintiff, and
4. Damages suffered as a result of the breach of duty.

For example, a negligence claim against a municipality could potentially arise if a plaintiff was injured in a car accident on a poorly maintained road located within the municipality. As discussed above, the municipal government owes a legal duty to the public to keep the roads “in proper repair” and “open for travel free from unnecessary obstructions.”¹³ If the road does not meet these standards, an injured plaintiff would have a colorable claim that the municipality had breached its duty to maintain the road. The plaintiff could be awarded damages for medical bills, pain and suffering, car repairs, and other harms.

A governmental entity may also be subject to a nuisance lawsuit. The North Carolina Supreme Court has stated that the line between negligence and nuisance “is often indistinct and difficult to define.” The primary difference is that a nuisance is a *condition* – rather than an act or omission as in negligence – that causes injury by reason of the manner of its maintenance or management.¹⁴ A governmental entity is liable for maintaining a nuisance and for damages caused by that nuisance.¹⁵ Courts have found municipalities liable for nuisances from sewage disposal systems and other public facilities, impounded water caused by a highway bypass, and other road structures that cause flooding or water overflow onto private property.¹⁶

In the context of sea level rise, a nuisance claim could arise from failing to repair a damaged road for an extended time that causes damages. No cases appear to have been brought in North Carolina for this type of climate change-related nuisance.

The following discussion of doctrines and defenses to shield state entities from liability or mitigate liability applies primarily to NCDOT and municipalities. Counties

A governmental entity may assert a factual defense.

do not have a duty to maintain and repair road. Factual defenses apply to lawsuits against all levels of government: state, county, and municipal. Duty, breach, causation, and damages must *all* be present for the negligence claim to succeed. For example, a municipality could present evidence

13. N.C. GEN STAT. § 160A-296 (2016).

14. *Midgett v. N. Carolina State Highway Commission*, 265 N.C. 373, 379 (1965).

15. *Glance v. Town of Pilot Mountain*, 265 N.C. 181 (1965).

16. *See Glance and Midgett*.

to show that a duty did not exist, such as showing that the road was outside its jurisdiction or controlled by NCDOT. A municipality could also argue that, despite minor defects, the road is still maintained and free from unnecessary obstructions.

The doctrine of sovereign or governmental immunity shields the state and its agencies from liability, unless they have waived immunity. For example, municipal corporations are “immune from suit for the negligence of its

employees in the exercise of governmental functions absent waiver of immunity.”¹⁷ Governmental acts fall into two categories: governmental functions and proprietary functions. Governmental functions are shielded from legal liability by governmental immunity; proprietary functions are not. Therefore, the question of whether an action is covered by governmental immunity is essentially dictated by the inquiry into whether the action was proprietary or governmental.¹⁸

A governmental entity may assert sovereign immunity or governmental immunity for governmental functions but not for proprietary functions.

Governmental immunity applies to governmental functions, defined as an activity that is “discretionary, political, legislative, or public in nature and performed for the public good in behalf of the State rather than for itself.”¹⁹ In addition, a governmental function occurs “[w]hen a municipality is acting in behalf of the state in promoting or protecting the health, safety, security, or general welfare of its citizens.”²⁰

Immunity does not apply to proprietary functions. A proprietary function performed by a municipality is “commercial or chiefly for the private advantage of the compact community.”²¹ Road maintenance is a proprietary function, but choosing whether to close a road is a governmental function.²² It has long “been recognized and uniformly applied” that municipal road maintenance is classified as a proprietary function,²³ for which government immunity is unavailable.²⁴ Thus, a municipal government is liable when it fails to discharge these duties.

In North Carolina, the doctrine of public duty is a common law negligence doctrine that is separate from sovereign immunity and may limit tort liability even if the state has waived sovereign immunity. The doctrine was codified in 2008 as part of the State Tort Claims Act. The doctrine says that a governmental entity acts to protect the public in general and not specific individuals; thus, the first element of a negligence lawsuit — a legal duty — cannot be established.²⁵ For the purposes of road duties, the doctrine of public duty is an affirmative defense only if an injury is caused by the negligent failure of a state agent to perform a health or safety inspection required by statute.²⁶

17. *Moffitt v. City of Asheville*, 9 S.E.2d 695, 697 (N.C. 1889).

18. *Estate of Williams v. Pasquotank County Parks and Recreation Department*, 366 N.C. 195, 199 (2012).

19. *Millar v. Town of Wilson*, 222 N.C. 340, 341 (1942).

20. *Britt v. City of Wilmington*, 236 N.C. 446, 450–51 (1952).

21. *Millar*, 222 N.C. at 341.

22. *Kirkpatrick v. Town of Nags Head*, 713 S.E.2d, 151, 158 (N.C. Ct. App. 2011).

23. *Kirkpatrick*, 713 S.E.2d at 157 (quoting *Millar*, 222 N.C. at 342).

24. *Millar v. Town of Wilson*, 222 N.C. 340, 342 (1942).

25. *Ray v. North Carolina Department of Transportation*, 366 N.C. 1 (2012).

26. N.C.G.S.A. § 143–299.1A; *Ray*, 366 N.C. at 6 (2012).

However, the doctrine does not apply when the failure to act amounts to gross negligence that displays a conscious disregard for the safety of others. In *Ray v. NCDOT*, the court found that the doctrine of public

duty did not apply where the defective road conditions that killed the plaintiff had existed for a substantial period of time, giving rise to the inference that NCDOT deliberately avoided knowledge of the conditions and did not inspect or repair them. This inference, plus the general knowledge that an uninspected road can be dangerous for travelers, amounted to gross negligence.²⁷ In a coastal road maintenance case, a plaintiff would have to argue that the governmental entity failed to act after knowing about dangerous conditions caused by flooding or erosion in order to nullify the doctrine of public duty.

A governmental entity may argue that injuries were caused by an unforeseeable act of God.

In North Carolina, injuries or damages caused by an “act of God” may relieve a party of liability, depending on whether the act was reasonably foreseeable.²⁸ An act of God is an act that “results from natural causes and is in no sense attributable to human agency.”²⁹ In *Lea Company v. North Carolina Board of Transportation*, the court held that the 100-year flood that damaged the plaintiff’s property was statistically reasonably foreseeable and did not relieve the board of liability. The court explained that a 100-year flood can be anticipated, even though the interval of occurrence is uncertain.

This narrow application of what is and is not foreseeable suggests that a court may find impacts from a changing climate, including sea level rise and greater storm surges, foreseeable because of the numerous scientific projections of coastal impacts. Thus, a governmental entity may not be able to successfully argue this defense.

Municipalities and counties may also purchase insurance to protect themselves from tort liability resulting from substandard road maintenance.³⁰ However, if a municipality or county purchases insurance that fully indemnifies it from tort liability, then the municipality or county waives its right to invoke governmental immunity. The waiver is limited to what is covered by the insurance policy. In a way, purchasing insurance can set a cap on awards for damages. When a municipality or county loses a tort lawsuit, the maximum amount of damages that can be awarded is equivalent to the payout limits on the insurance policy.

27. *Ray*, 366 N.C. 1 (2012).

28. *Safeguard Insurance Company v. Wilmington Cold Storage Company*, 267 N.C. 679, 687 (1966); *Lea Co. v. N. Carolina Bd. of Transp.*, 308 N.C. 603, 616 (1983).

29. *Lea Company v. North Carolina Board of Transportation*, 308 N.C. 603, 615–16 (1983).

30. N.C. GEN. STAT. § 160A-485 (a) (2016) (municipalities); N.C. GEN. STAT. § 153A-435 (counties). A county can insure its officers, agents, and employees against liability.

ABANDONING A ROAD:

A Consideration When Unable To Maintain Roads

In some cases, a governmental entity may wish to permanently close or abandon a road to avoid costly road maintenance expenses. Abandoning a road may also protect the entity from potential liability for damages resulting from the disrepair of a road. If the governmental entity successfully abandons a road, then it will not face any tort suits for injuries related to that road: It has renounced ownership over that road and is no longer responsible for maintaining it.

A municipality must follow a specific statutory protocol to permanently close any public street or alley within its territory and control.³¹ First, a town council must adopt a resolution of intent to close the road segment and announce a public hearing on the subject. To advertise the hearing, a copy of the resolution must be (1) published weekly over four consecutive weeks prior to the hearing, (2) sent by registered or certified mail to every owner of property adjoining the segment per county tax records, (3) posted visibly in at least two places along the road segment, and finally, (4) if the street or alley is under the control of NCDOT, a copy must be mailed to NCDOT.

At the hearing, the council must allow any person to speak on “whether or not the closing would be detrimental to the public interest, or the property rights of any individual.” After public comment, the council may adopt an order to close the road “if it appears to the satisfaction of the council” that closing the street would be “not contrary to the public interest” and no adjacent landowner would be “deprived of reasonable means of ingress and egress” to his or her property. Once the order is adopted, it must be filed in the office of the register of deeds of the county in which the street or street segment is located.

Courts appear to give municipalities significant discretion to close roads as long as they adhere to the statutory requirements. In *Kirkpatrick v. Town of Nags Head*, the court upheld the town’s decision to stop repairing and rebuilding a road that was repeatedly washed away by storms.³²

The town eventually installed permanent barricades to block vehicle access, and the road was completely washed away a few years later. The court emphasized that decisions about which streets to keep open for public use are governmental functions, for which governmental immunity applies. However, if a municipality decides to keep a road open, governmental immunity is not available for injuries caused by a road defects that the municipality failed to repair.

After closing a street or alley, the former right-of-way automatically vests in the abutting landowners. Each landowner receives a parcel the width of the land abutting the road up to the center line of the right-of-way.³³ The collective owners of the former right-of-way maintain a common-law right of access as abutting landowners. If an improved roadway exists at the time of formal abandonment, the new owners are entitled to collectively maintain the right-of-way as a private road.

³¹ N.C. GEN. STAT. § 160A-299(a) (2016).

³² *Kirkpatrick v. Town of Nags Head*, 213 N.C. App. 132 (2011).

³³ N.C. GEN. STAT. § 160A-299(c) (2016).

However, though the fee vests in the abutting property owners, the town may also reserve easements for utilities, drainage, pedestrians, landscaping, conservation, or any other easements “considered by the city to be in the public interest.”³⁴ An easement reserved under this provision must be “stated in the order of the closing.”³⁵ Finally, in the event that the city owns abutting lots on one or both sides of the street, title will revert in the city by the same process as it would for private landowners. The city is at liberty to use this land for any reasonable public purpose, such as creating a park in its strip of former roadway.

A county may abandon a road by following specific statutory procedures, after which title vests in the abutting private property owners.

A county may also permanently close “any public road or any easement within the county and not within a city, except public roads or easements for public roads under the control and supervision of NCDOT.”³⁶ Although a county does not have a legal duty to maintain and repair roads, a county may create roads through the subdivision process and may close roads when they are realigned or no longer needed.

To close a road, the board of commissioners must first “adopt a resolution declaring its intent to close the public road or easement and calling a public hearing on the question.” Second, the board must publish a notice of the public hearing that is “reasonably calculated to give full and fair disclosure of the proposed closing.” This “reasonably calculated” notice must be published once a week for three successive weeks before the hearing. Third, a copy of the resolution must be sent by registered or certified mail to each owner as shown on the county tax records of property adjoining the public road or easement who did not join in the request to have the road or easement closed. Fourth, a notice of the closing and public hearing must be prominently displayed in at least two places along the road.

At the hearing, the board hears all persons who appear regarding “whether the closing would be detrimental to the public interest or to any individual property rights.”³⁷ For example, the Currituck County Board of Commissioners approved a resolution to close residential subdivision roads to the public, a decision that a jury later found was contrary to the public interest. One witness testified that she was concerned about safely getting to and from the beach if the roads were closed to the general public; another testified that the road was always meant to be and remain public.³⁸

If the board of commissioners is satisfied that closing the road is not against the public interest and that no owners of adjacent properties would be deprived of reasonable means of ingress and egress to their property, the board may adopt an order closing the road. A certified copy of the order must then be filed in the office of the register of deeds of the county.³⁹

34. N.C. GEN. STAT. § 160A-299(f) (2016).

35. N.C. GEN. STAT. § 160A-299(f) (2016).

36. N.C. GEN. STAT. § 153A-241 (2016).

37. N.C. GEN. STAT. § 153A-241 (2016).

38. *Ocean Hill Joint Venture v. Currituck County Board of Commissioners*, 178 N.C. App. 182 (2006).

39. N.C. GEN. STAT. § 153A-241 (2016).

When a public road has been properly closed in accordance with the statutory protocol, all “right, title, and interest in the right-of-way is vested in those persons owning lots or parcels of land adjacent to the road or easement, and the title of each adjoining landowner, for the width of his abutting land, extends to the center line of the public road or easement.”⁴⁰

An aggrieved person may challenge the decision by a municipality or county to abandon a road.

Any “person aggrieved” may appeal a municipal council’s or board of commissioners’ order to the General Court of Justice within 30 days of the decision or adoption of the order.⁴¹ The appeal will not be heard at all if it is not filed within 30 days. The courts have defined such an “aggrieved person” as someone who “can either show an interest in the property affected, or if the party is a nearby property owner, some special damage, distinct from the rest of the community, amounting to a reduction in the value of his property.”⁴² In *Cox v. Town of Oriental*, the court found that the plaintiff could not challenge a road closure because his property was not adjacent to the road, he could not show a special connection distinct from the general public, and his status as a taxpayer was wholly irrelevant.⁴³

All facts and issues related to the appeal will be heard by a judge. The court “shall hear the matter de novo and has jurisdiction to try the issues arising and to order the road closed upon proper findings of fact.”⁴⁴

On appeal, the judge shall determine whether all procedural requirements were met for the abandonment process. In addition, the judge shall evaluate whether the decision to close the road was not contrary to the public interest and that the closure did not deprive any property owners of “reasonable means of ingress and egress” to their property.

A court may find that the public interest requires a judicious allocation of a municipality’s limited budget for road maintenance. For roads impacted by sea level rise and coastal flooding, constant repair could deplete the resources to keep the remainder of its road network in proper, safe, and navigable condition. Abandoning a repetitive-loss road might seem to benefit the public by not depleting public coffers, and thus better capture the “public” dimension of the requirements.

The North Carolina Board of Transportation is authorized to change, alter, or abandon any portion of the state highway system if it determines that the public good requires such an action.⁴⁵ Prior to any action, the board must give 60 days’ notice to all property owners adjacent to the affected portion of the road of the date, place, and time of the meeting to take action. A municipality may assume responsibility for abandoned roads that are within one mile of the corporate limits.⁴⁶

40. N.C. GEN. STAT. § 153A-241 (2016).

41. N.C. GEN. STAT. § 160A-299(b) (2016) (municipalities); N.C. GEN. STAT. § 153A-241 (2016) (counties).

42. *Matter of Granting of Variance by Town of Franklin*, 131 N.C. App. 846, 848–49 (1998) (importing the meaning of “person aggrieved” from decisions about the same phrase in the context of zoning ordinances).

43. *Cox v. Town of Oriental*, 759 S.E.2d 388 (N.C. App. 2014).

44. N.C. GEN. STAT. § 160A-299(a) (2016).

45. N.C. Gen. Stat. Ann. § 136-54.

46. N.C. Gen. Stat. Ann. § 136-55.1.

ROAD ABANDONMENT AND TAKINGS CHALLENGES

If a governmental entity abandons a road because repeated flooding or other road damage becomes prohibitively expensive to repair, it may inadvertently cause a takings and may be required to pay affected property owners just compensation. When a municipality or county abandons a road, there is always the risk that it may negatively impact the owners of surrounding properties and decrease the overall property value. For example, the abandoned road may affect ingress and egress to a property that relies on the road for access and thus affect a property owner's quiet enjoyment of his or her land. The overall property value may also be affected, raising the issue of takings.

Distinguishing between the exercise of eminent domain and police power is important to determining whether the government must pay compensation to a property owner. The state or a municipality may regulate activities that are detrimental to the health, safety, or welfare of its citizens as part of its police power. Certain reasonable restrictions on access to roads are proper exercises of police power, and the resulting damages are generally noncompensable. The nature of property usage does not matter to the takings versus police power inquiry. In other words, the use of the property — whether for religious, residential, commercial, or other purposes — does not affect the inquiry into whether an action constitutes a compensable taking or is a valid use of the police power.⁴⁷

To date, eliminating direct access is what can trigger a takings claim. In *Dr. T.C. Smith Company, Inc. v. North Carolina State Highway Commission*, the North Carolina Supreme Court found a compensable taking when NCDOT eliminated the plaintiff's direct access to a state highway and the remaining access route was an indirect, 1.5-mile detour through residential streets.⁴⁸ *Smith* provides a useful example of the court's interpretation of "direct access." However, elimination of direct access does not automatically mean there is a compensable takings claim.⁴⁹

Even if direct access to a highway is eliminated by governmental action, a local government can protect itself from a takings claim by providing reasonable alternative access from the property to the highway.⁵⁰ If a governmental entity commandeers land in a way that affects access to the highway but leaves reasonable alternative access to the highway from the property, then there is generally not a compensable takings claim.

Department of Transportation v. Harkey provides an example of a compensable taking based on a lack of reasonable alternative access.⁵¹ In this case, the North Carolina Supreme Court found that NCDOT eliminated all direct access to the highway and the alternative route was inadequate because it involved driving along a number of local streets that were part of the city street system. The court also noted the lack of a service or frontage road and indicated that if a service

47. See *Department of Transportation v. Harkey*, 308 N.C. 148, 153 (1983).

48. *Dr. T.C. Smith Company, Inc. v. North Carolina State Highway Commission*, 279 N.C. 328, 334-35 (1962).

49. *Department of Transportation v. Harkey*, 308 N.C. 148, 158 (1983).

50. *Smith*, 279 N.C. at 334-35.

51. *Harkey*, 308 N.C. at 149.

or frontage road is provided to give a property access to the highway, then the government is likely not required to pay compensation. If direct access is completely taken without providing an alternative, as in *Harkey*, then no inquiry into the reasonableness of alternative access is necessary and the property owner is entitled to compensation.

A municipality or county should plan for reasonable alternative access to a highway before abandoning a road that may eliminate direct access from a highway to a property abutting the road. If a local government does not provide reasonable alternative access to a highway in such a case, then it may have to pay compensation to the property owners whose direct access is eliminated.

The question of alternative access hinges on the reasonableness of that access. In *North Carolina State Highway Commission v. Rankin*, the court held that when the property owner's direct access was eliminated and replaced with a paved service road that connected the property to the highway seven-tenths of a mile from the property, that service road constituted reasonable access. As a result, the property owners were not entitled to any compensation for the loss of direct access to the highway because they retained reasonable alternative access.⁵²

CONCLUSION

One of the main ways in which sea level rise can damage critical infrastructure in coastal areas is by washing out roads. Repairing these roads over and over again can critically deplete a local government's already thinly stretched budget. If the local government does not have a legal obligation to maintain the road, it may be best to abandon maintenance of the road in order to conserve finite budget resources.

On the other hand, municipal governments owe a legal duty to maintain roads within their boundaries that are not controlled by NCDOT. Therefore, a municipal government could face a negligence lawsuit for failing to continue maintenance of a road. In such a case, a municipal government can defend itself through a factual defense, immunity, or an affirmative defense. To eliminate the legal duty to maintain roads and avoid a negligence lawsuit, a municipal government can abandon a road through a statutorily defined process. Generally, when a road is abandoned, there is not a taking. However, there may be a compensable takings claim in some cases, such as when abandoning a road denies a property owner of direct access to his or her property.

Understanding these complex issues is integral for local governments to effectively deal with the damaging effects of sea level rise and coastal flooding on roads in their communities.

52. *North Carolina State Highway Commission v. Rankin*, 163 S.E.2d 302, 304 (N.C. Ct. App. 1968).

APPENDIX A: METHODOLOGY

The methodology for NOAA’s Sea Level Rise Inundation Mapping is considered a modified bathtub model that “attempts to account for local and regional tidal variability and hydrological connectivity” not including wind tides.⁵³ It maps sea level rise on top of mean higher high water but does not “incorporate future changes in coastal geomorphology” and does not include a detailed hydrological network analysis. It is meant for high-level management decisions, and further research and surveys are necessary for “navigation, permitting, or other legal purposes.”⁵⁴ These data came in one-foot intervals in geodatabases that were separated geographically by state and then by coastal region in the state. As seen in Table A1, Pitt, Hyde, and Beaufort counties in North Carolina are in multiple geodatabases, likely due to their geographic extent across regions.

The county shapefiles were selected from the Census Boundary Shapefiles at a 1:500,000 scale.⁵⁵ The North Carolina road data can be found at the NCDOT GIS Data Layers website.⁵⁶ They include state-maintained and non-state-maintained roads, including delineation between county-, city-, and township-maintained roads.

TABLE A1 | *Sea Level Rise Viewer Data Download*
Geodatabases in North Carolina

Geodatabases	South Carolina Counties
Region 1	Bladen, Brunswick, Columbus, New Hanover, Pender
Region 2	Camden, Chowan, Currituck, Gates, Pasquotank, Perquimans
Region 3	Beaufort, Bertie, Hertford, Hyde, Martin, Pitt, Tyrrell, Washington
Region 4	Dare, Hyde
Region 5	Beaufort, Carteret, Craven, Jones, Onslow, Pamlico, Pitt

To select and calculate roads affected by sea level rise, two primary steps were required: data preprocessing and processing. ArcMap and Python were used to conduct the majority of the methodology. To begin the preprocessing, 12 identified counties were exported as a separate shapefile. If necessary, the multiple regional geodatabases were merged to encompass the entire coastline as well as potentially impacted inland counties. This process resulted in three sea level rise shapefiles per state at one, two, and three feet of sea level rise. Each state’s road shapefiles were clipped by the county shapefiles, resulting in individual county-level road networks.

53. coast.noaa.gov/data/digitalcoast/pdf/slr-inundation-methods.pdf

54. coast.noaa.gov/slr/

55. www.census.gov/geo/maps-data/data/cbf/cbf_counties.html

56. connect.ncdot.gov/resources/gis/pages/gis-data-layers.aspx

After the data preprocessing took place, the extraction of impacted road data commenced. Each county's road layers were clipped by the sea level rise layers. The length of each road segment included within the final clipped road shapefiles was calculated using ArcMap. They were then aggregated by depending on the state's road shapefile metadata into three categories: state maintained, locally maintained, and privately maintained. For North Carolina, a federally maintained category was added and the locally maintained category was broken into two further categories: county maintained and town, city, or municipally maintained. In North Carolina, they were aggregated by RouteClass for state roads and then OwnerType for county, local, and private roads (Table A2). Some counties that were identified by the NOAA Sea Level Rise Viewer as at risk for sea level rise did not have roads impacted at the one-, two-, or three-foot levels; however, they are still included to present a complete picture of the impacts.

TABLE A2 | North Carolina Road Maintenance Designations⁵⁷

Aggregated Category	Route Class	Owner Type
Federally maintained		60, 63
State maintained	2, 3, 4, 6, 7	21
County maintained		2
Town, city, municipally maintained		3, 4
Privately maintained		98, 99
Other (unknown owner type, planned road projects)	5	0

It is crucial to note that this is just the “tip of the iceberg” in terms of using these data to identify future road vulnerabilities to sea level rise. The databases break down road types further into paved and unpaved as well as including other information. Additionally, this analysis was done assuming that the roads are at the same elevation as the surrounding land; however, with the addition of LiDAR, a more comprehensive outlook of future impacts could be conducted.

57. [xfer.services.ncdot.gov/gisdot/DistDOTData/NCDOTRouteArcsFieldDescriptions.pdf](https://www.ncdot.gov/gisdot/DistDOTData/NCDOTRouteArcsFieldDescriptions.pdf)

NORTH CAROLINA: MILES OF ROAD MAINTAINED BY STATE, LOCAL (CITY/COUNTY), OR PRIVATE ENTITIES THAT WILL BE IMPACTED BY ONE, TWO, OR THREE FEET OF SEA LEVEL RISE			
	1 foot of SLR	2 feet of SLR	3 feet of SLR
Beaufort			
Federal	0.0	0.0	0.0
State	5.1	13.3	35.5
County	0.0	0.0	0.0
Town/City/Muni	0.1	2.7	11.3
Private	0.2	7.2	26.1
Other	0.1	1.4	3.6
Bertie			
Federal	0.0	0.0	0.0
State	3.0	3.3	3.5
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.0
Other	0.2	0.3	0.4
Bladen			
Federal	0.0	0.0	0.0
State	0.1	0.1	0.1
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.0
Other	0.0	0.0	0.0
Brunswick			
Federal	0.0	0.0	0.0
State	2.4	3.0	4.4
County	0.0	0.0	0.0
Town/City/Muni	0.3	3.6	17.2
Private	1.1	2.2	5.4
Other	3.1	3.5	5.1
Camden			
Federal	0.0	0.0	0.0
State	1.2	8.3	18.5
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	1.5	7.3	11.4
Other	1.7	7.2	10.0

NORTH CAROLINA:			
MILES OF ROAD MAINTAINED BY STATE, LOCAL (CITY/COUNTY), OR PRIVATE ENTITIES THAT WILL BE IMPACTED BY ONE, TWO, OR THREE FEET OF SEA LEVEL RISE			
	1 foot of SLR	2 feet of SLR	3 feet of SLR
Carteret			
Federal	0.05	0.05	0.1
State	4.3	8.0	29.6
County	0.0	0.0	0.0
Town/City/Muni	0.6	2.4	12.6
Private	0.7	6.0	23.0
Other	1.4	2.9	8.0
Chowan			
Federal	0.0	0.0	0.0
State	3.9	5.6	6.3
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.1	0.3
Private	0.1	0.2	0.5
Other	0.0	0.1	0.1
Columbus⁵⁸			
Federal	0.0	0.0	0.0
State	0.0	0.0	0.0
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.0
Other	0.0	0.0	0.0
Craven			
Federal	0.0	0.0	0.0
State	5.0	5.7	6.3
County	0.0	0.0	0.0
Town/City/Muni	0.5	0.6	1.2
Private	0.0	0.0	0.7
Other	1.9	2.8	3.9
Currituck			
Federal	0.0	0.0	0.0
State	3.2	6.5	19.5
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.3	3.2	15.0
Other	0.0	0.5	1.8

58. Columbus is included in the NOAA SLR Viewer; however, no roads are touched at one, two, or three feet of rise

NORTH CAROLINA: MILES OF ROAD MAINTAINED BY STATE, LOCAL (CITY/COUNTY), OR PRIVATE ENTITIES THAT WILL BE IMPACTED BY ONE, TWO, OR THREE FEET OF SEA LEVEL RISE			
	1 foot of SLR	2 feet of SLR	3 feet of SLR
Dare			
Federal	0.4	36.4	113.8
State	21.5	44.6	105.2
County	0.0	0.1	0.5
Town/City/Muni	0.0	0.5	5.6
Private	0.3	3.0	18.9
Other	0.2	1.0	3.2
Gates			
Federal	0.0	0.0	0.0
State	0.2	2.7	6.6
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.2
Other	0.0	0.0	0.6
Hertford			
Federal	0.0	0.0	0.0
State	0.3	0.9	1.5
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.3	0.4
Other	0.0	0.1	0.1
Hyde			
Federal	0.0	0.7	2.9
State	3.4	53.2	128.9
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.1	54.8	103.9
Other	0.0	1.4	3.4
Jones			
Federal	0.0	0.0	0.0
State	0.1	0.1	0.1
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.0
Other	0.1	0.1	0.2

NORTH CAROLINA: MILES OF ROAD MAINTAINED BY STATE, LOCAL (CITY/COUNTY), OR PRIVATE ENTITIES THAT WILL BE IMPACTED BY ONE, TWO, OR THREE FEET OF SEA LEVEL RISE			
	1 foot of SLR	2 feet of SLR	3 feet of SLR
Martin			
Federal	0.0	0.0	0.0
State	0.1	0.1	0.1
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.0
Other	0.0	0.0	0.0
New Hanover			
Federal	0.0	0.0	0.0
State	6.8	9.0	12.8
County	0.0	0.0	0.0
Town/City/Muni	0.3	3.1	7.3
Private	0.4	1.7	4.8
Other	2.5	3.3	4.3
Onslow			
Federal	0.0	0.0	0.0
State	2.5	3.4	6.8
County	0.0	0.0	0.0
Town/City/Muni	1.6	3.6	6.7
Private	1.6	3.7	5.8
Other	1.3	2.1	2.9
Pamlico			
Federal	0.0	0.0	0.0
State	0.7	7.6	26.2
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.5	1.8
Private	0.0	1.9	5.8
Other	0.0	0.0	0.4
Pasquotank			
Federal	0.0	0.0	0.0
State	0.6	3.8	17.7
County	0.0	0.0	0.0
Town/City/Muni	0.1	0.7	2.8
Private	0.7	1.7	3.4
Other	0.1	1.2	3.2

NORTH CAROLINA:			
MILES OF ROAD MAINTAINED BY STATE, LOCAL (CITY/COUNTY), OR PRIVATE ENTITIES THAT WILL BE IMPACTED BY ONE, TWO, OR THREE FEET OF SEA LEVEL RISE			
	1 foot of SLR	2 feet of SLR	3 feet of SLR
Pender			
Federal	0.0	0.0	0.0
State	1.0	3.6	6.6
County	0.0	0.0	0.0
Town/City/Muni	0.2	1.4	3.6
Private	15.3	16.1	17.9
Other	16.5	16.7	17.5
Perquimans			
Federal	0.0	0.0	0.0
State	1.4	2.3	4.1
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.1	0.1
Private	0.0	0.2	0.5
Other	0.0	0.2	0.3
Pitt			
Federal	0.0	0.0	0.0
State	0.8	1.0	1.1
County	0.0	0.0	0.0
Town/City/Muni	0.0	0.0	0.0
Private	0.0	0.0	0.1
Other	0.0	0.1	0.1
Tyrrell			
Federal	0.0	0.0	0.0
State	3.0	28.8	82.5
County	0.0	0.0	0.0
Town/City/Muni	0.0	1.4	3.3
Private	0.0	1.0	5.2
Other	0.1	1.1	2.2
Washington			
Federal	0.0	0.0	0.0
State	2.0	2.6	6.0
County	0.0	0.0	0.0
Town/City/Muni	0.1	0.1	0.8
Private	0.1	0.3	1.2
Other	0.0	0.0	0.2