Local governments in the coastal zone play a key role in adapting to the changing climate. This Article presents an analysis of coastal communities in four states, Florida, Georgia, South Carolina, and North Carolina, and provides three proposals for local governments that take action to address climate impacts: (1) redefining the scope of the duties that define reasonable conduct for governments making decisions about public infrastructure in an era of rising sea levels; (2) defining the scope of sovereign immunity protections in a way that encourages innovative and creative decisionmaking in an era of climate uncertainty; and (3) calling for consistent adaptation duties and authorities at the state level as a crucial first step in mending the legal-standards patchwork that currently exists at the state, county, and city levels in our four-state study area.

I. Background on Sea-Level Rise, Coastal Science, and Transportation Infrastructure

A. Four Southeastern States Facing Sea-Level Rise

Coastal communities and ecosystems are vulnerable to sea-level rise. Addressing sea-level rise and its impact on infrastructure presents itself as a paramount concern due to the physical impacts and costs of sea-level rise. Coastal roads subject to sea-level rise have shorter functional lifespans and require more frequent and costly repairs and maintenance.


B. State and Local Government Adaptation—Roads Are Ground Zero

Climate change will affect the entirety of our transportation infrastructure. The U.S. Department of Transportation (USDOT) identified three vulnerabilities that require “resiliencies” to climate change:

1. **Existing Infrastructure Resilience**: Existing transportation infrastructure varies in age, service life, and sophistication. Decisions about replacement or abandonment should take into account changing future risks.

2. **New Infrastructure Resilience**: New infrastructure should be designed in recognition of the best understanding of environmental risks. Public and private entities need to incorporate an understanding of projected climate changes into their infrastructure planning.

3. **System Resilience**: Selectively adding redundant infrastructure may be necessary to increase system resilience.

| State County Municipality Other Federal Total Rural/ Urban Mileage Total Mileage |
|---------------------------------|------------------|---------------|---------------|----------|-----------------|-----------------|--------------------|
| FL Rural 5,643 26,454 2,578 81 1,733 36,489 122,659 |
| Urban 6,473 43,981 35,251 5 459 86,170 |
| GA Rural 12,588 58,257 4,078 90 2,775 77,788 128,134 |
| Urban 5,361 29,156 15,757 31 41 50,346 |
| NC Rural 59,229 - 2,375 4,078 1,017 3,817 65,502 106,334 |
| Urban 20,330 - 20,310 - - 50,346 |
| SC Rural 29,792 25,583 523 194 1,589 57,681 76,250 |
| Urban 11,567 4,345 2,654 1 3 18,569 |

Table 1. Public Road Miles by Ownership (2015)

<table>
<thead>
<tr>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida 20,289</td>
<td>88,856</td>
<td>109,145</td>
</tr>
<tr>
<td>Georgia 14,816</td>
<td>45,608</td>
<td>60,424</td>
</tr>
<tr>
<td>North Carolina 15,258</td>
<td>38,935</td>
<td>54,193</td>
</tr>
<tr>
<td>South Carolina 12,782</td>
<td>16,733</td>
<td>29,515</td>
</tr>
</tbody>
</table>

Table 2. Annual Vehicle Miles by Functional System (in Millions)

Adaptation planning is often described in three categories: protect/defend, accommodate/adapt, or relocate. Even if a governmental entity wanted to make an adaptive choice, current laws make such choices difficult.
A. Roads and Duties in Four States:
   A Doctrinal Stew

States, counties, and municipalities have primary responsibility for most roads in the United States. When they fail to maintain or design these roads adequately, they may face tort liability, such as negligence. Each state may define this duty differently, and the scope may differ depending on the entity. Even when negligence by a government entity is demonstrated, sovereign immunity may bar claims.

Duties of care appear to be the most consistent at the state level, with arguably only Georgia presenting an affirmative duty to “improve” roads alongside the more standard duties for repair and maintenance. Duties vary more at the county and municipal levels. For example, in Florida, counties must provide reasonable maintenance that results in meaningful access, but it is unclear from case law interpreting duties if this standard might include upgrades needed to address sea-level rise or other environmental challenges. Counties in Georgia must maintain county roads so that “ordinary loads, with ordinary ease and facility, can be continuously hauled over” them. South Carolina counties have a duty to repair roads in unincorporated areas, but the duty is not defined, while North Carolina counties have no road maintenance duties unless they choose to do maintenance through agreement with the state. The variations continue at the municipal level in each state, adding further confusion. Despite the lack of incentive, some local governments are undertaking responses to sea-level rise due to political pressure or to protect their communities.5 Careful consideration of the many distinctions between maintenance duties leads to the question of when the need to “maintain” and keep roads reasonably safe could lead to conflict with the general legal rule in all four states that governments are not usually required to “upgrade” existing infrastructure. In other words, sea-level rise and increased erosion might make it impossible to meet standards such as “reasonably safe” or “available for normal use” without significant upgrades that usually fall outside the scope of mandatory government duties.


<table>
<thead>
<tr>
<th>State</th>
<th>County</th>
<th>Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>The Florida Department of Transportation (&quot;FDOT&quot;) has a duty to maintain roads under its control.</td>
<td>A county has a duty to keep roads in good order and provide a reasonable level of maintenance that affords meaningful access.</td>
</tr>
<tr>
<td>Georgia</td>
<td>The Georgia Department of Transportation (&quot;GDOT&quot;) has a duty to improve, manage, and maintain the state highway system.</td>
<td>A county has a duty to maintain county roads in a condition such that they can be continuously used for ordinary loads with ordinary ease and faculty.</td>
</tr>
<tr>
<td>North Carolina</td>
<td>The North Carolina Department of Transportation (&quot;NCDOT&quot;) has a duty to establish, construct, and maintain a statewide system of hard-surfaced and other dependable highways running to all county seats and to all principal towns.</td>
<td>Counties do not have maintenance duties. A county may enter into an agreement with NCDOT to repair, maintain, or improve a road.</td>
</tr>
<tr>
<td>South Carolina</td>
<td>The South Carolina Department of Transportation (&quot;SCDOT&quot;) has a duty to maintain the state highway system in a safe and serviceable condition.</td>
<td>A county has a duty to repair roads in unincorporated areas of the county.</td>
</tr>
</tbody>
</table>
1. Comparing Immunities

Distinctions in sovereign immunity protections raise challenges for adaptation at the local level. In Florida and North Carolina, immunity does not apply to road maintenance. Georgia counties are protected by sovereign immunity for failing to maintain roads, but municipalities are not. In South Carolina, immunity applies to road maintenance. 

Sea-level rise will push governments to take actions that are arguably upgrades and not repairs. This could mean that maintenance failures that were once actionable may become barred by sovereign immunity. Sovereign immunity can also discourage adaptation planning. For example, Georgia distinguishes between discretionary actions, where immunity applies, and ministerial duties, where no immunity applies. If a decisionmaking body develops a policy on how it utilizes its discretion, courts have interpreted the policy as now creating duties for which sovereign immunity is waived, meaning a lawsuit may go forward. This creates a perverse incentive to decline to adopt policies so that waiver of sovereign immunity is avoided.

2. Governmental Inaction When Failing to Maintain a Road: Economic Damages

An unsafe road raises liability concerns, but closing such a road could adversely affect landowners. At the same time, at least once court in North Carolina has been sympathetic to the dilemma in which local governments can find themselves: a road that the local government cannot afford to repair to keep safe or close and abandon without potential liability for damages to abutting landowners. Climate change and sea-level rise will force courts to consider whether the state has a duty under such circumstances to provide a road at all.

B. Nuisance and Mandamus Actions: Compelling Governments to Repair and Maintain Roads

In Florida, Georgia, and North Carolina, if a government fails to maintain a road, a plaintiff could allege that the entity is maintaining a nuisance and seek an injunction. Governments in South Carolina are not liable for nuisances. In all four states, a citizen may petition for a writ of mandamus to compel a government to fulfill its duty to repair a road. However, mandamus actions are reserved for extraordinary circumstances.

C. Road Abandonment and Takings Claims

1. Comparing Abandonment Authority

Abandonment comes at a price as “takings” claims often successfully maintain that property owners abutting abandoned roads are owed compensation. When deciding whether abandonment is proper, courts consider a variety of factors, including the burden of maintaining the road, the public’s dependence on the road, and what caused a decrease in the public’s use of the road. Having the authority to abandon roads even when they abut private property is likely to be a critical tool for adaptation. In Florida, rights-of-way are held in trust for the public, but this does not preclude abandoning streets “when done in the interest of the general welfare.” In North Carolina, closing the street may not be “contrary to the public interest” and no adjacent landowner should be “deprived of reasonable means of ingress and egress” to her property. In South Carolina, a court will determine whether abandoning the street is in the best interest of all parties.

2. Eliminating a Property Owner’s Access to a Road: Issues and Distinctions

If an entity abandons a public road that abuts a landowner’s property, and such abandonment substantially interferes with the landowner’s ability to enter and exit his property, a compensable taking of private property may have occurred. In Florida, interfering with the right to access constitutes a taking if the property owner’s right of access was substantially diminished. In Georgia and South Carolina, if the easement of access is substantially interfered with, the property owner is entitled to compensation, even if an alternative route exists. In North Carolina, eliminating direct access to property can trigger a takings claim, but such claims may be mitigated by providing reasonable alternative access.

6. Commercial Carrier Corp. v. Indian River Cty., 371 So. 2d 1010 (Fla. 1979); Trianon Park Condominium Assc. v. City of Hialeah, 468 So. 2d 912 (Fla. 1985).
10. Florida courts define a nuisance as, in part, omitting to perform a duty that injures or endangers the safety of a person or that interferes with or otherwise renders unsafe another’s use of his property. Prior v. White, 180 So. 347, 355 (Fla. 1938). Georgia law defines nuisance as “anything that causes hurt, inconvenience, or damage to another . . . .” Ga. Code Ann. §41-1-1 (2018).
13. In Scarrow et al. v. Hunter et al., 746 S.E.2d 119, 125 (Ga. 2013), the court held that evidence that the county would need to rebuild the road at a cost of $600,000 to $800,000, and that plaintiff’s less expensive proposal would not make the road stable, supported the board’s decision.


3. Governmental Inaction When Failing to Maintain a Road: Takings

Two states in our study area—Florida and South Carolina—have considered issues involving whether insufficient maintenance results in abandonment. A Florida court found that failing to maintain a road to certain standards despite extreme erosion might be sufficient to support a compensable taking, even when the local government continued to expend funds for maintenance; the court found that the local government’s failure to take action that resulted in meaningful access for property owners abutting the road could support a “takings” claim based on local government inaction. This Florida case is an outlier, representing a more fringe view by allowing inaction to support a takings claim. For example, South Carolina has made clear that only an “affirmative . . . act” can serve as the basis for an inverse condemnation claim. Similarly, federal case law has made it clear that an authorized government action represents a prerequisite to a valid taking claim. Thus, other than possibly in Florida, it appears that a government could not be held liable under a takings claim for failure to maintain a road, even if, as noted above, a tort case might still be possible.

III. Roads Less Traveled: Toward Adaptive Duties and Abandonment Authorities for State and Local Governments Facing Sea-Level Rise

A. Toward an Adaptive Duty to Maintain Road Systems: Adopting a Resilience Standard

We propose modifying the scope of the duty to maintain roadways to incorporate an “adaptive” component that views the road network as an interconnected system rather than as individual segments. As increased flooding is readily foreseeable in coastal communities, and uncertainty about the timing and severity of local impacts is not the same as low probability, we see a need for the duty to maintain to include sovereign immunity that protects governments that will have to make risky decisions, unless they act with gross negligence. It is time to emphasize the public trust nature of government road ownership so that the public’s collective interests inform the scope of government’s duty to maintain a roadway, mitigating viewing

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20. Foreseeability of the harm also often plays a role, although the extent of risk usually depends on the specific facts of the case. Restatement (Third) of Torts: Physical and Emotional Harm §7 (Am. Law Inst. 2010).
access as a property right connected to individual parcels. An adaptive duty to maintain would allow for an alteration of the concept of “reasonable means of access.” Such an approach is in line with some cases. Florida courts have emphasized how streets are held in trust for the benefit of the public, and abandoning such streets is allowable “when done in the interest of the general welfare.”

1. Minimum Maintenance Standard

Deteriorating road conditions coupled with prohibitive maintenance costs have long been an issue for many rural areas. Several states allow special designation of roads as “low volume” or “minimum maintenance,”

23. decreasing maintenance costs and reducing liability. Just as rural states have statutes to allow communities to balance costs and resources, coastal communities need the same ability.

2. Vulnerability Assessments

An adaptive duty to maintain should reflect short- and long-term vulnerability assessments, characterizing the potential impacts from climate change. An adaptive duty to maintain should be fulfilled by formal process with community-defined time lines and risk thresholds to ensure that decisionmaking occurs objectively and equitably.


We propose “resilience” as a legal standard to judge local government actions. Resilience generally describes “the capacity of a system to withstand or adapt to disturbance while maintaining the same basic structures and functions.”

24. How a local community defines resilience should be determined at the local level through the adaptation planning process.

A resilience standard would evaluate government action in light of whether it is likely to promote community resilience and whether the community’s adaptation goals are reasonable. Those actions that promote resilience should promote the public interest, even where private interests are adversely affected. Thus, such actions should be protected under sovereign immunity. Management practices that best illustrate resilience goals include incorporating best available science into decisionmaking; assessing vulnerabilities; and evaluating the effectiveness of actions taken. A system’s resilience can degrade or even collapse. When this occurs, a reasonable resilience standard would allow actions such as road abandonment.

4. Sovereign Immunity

Expanding a duty while simultaneously weakening sovereign immunity protections would paralyze most local governments. If we want to encourage local leaders to invest significant time, money, and staff resources to assess their communities’ vulnerabilities, these communities need to have the protection of sovereign immunity for making adaptation planning decisions with inherently uncertain data. As is currently true generally in tort law, immunity for an adaptive duty to maintain can and should include exceptions for gross negligence, such as allowing the development of roadways in repeatedly flooded areas or ignoring the best available science.

5. Adaptive Duty to Maintain

Sovereign immunity should not turn on whether a government’s action is a “repair” or an “upgrade.” An adaptive duty to maintain would include both repairs and upgrades as long as the reasonable resilience standard is met and would allow for more appropriate maintenance actions. An adaptive duty to maintain would also encourage jurisdictions to set priorities and put property owners on notice about the likely future conditions of roads.

In Georgia, an adaptive duty to maintain with associated sovereign immunity would address the current conundrum regarding discretionary and ministerial duties: that the presence of a policy that directs a government to repair or maintain results in a waiver of sovereign immunity.

27. Governments should develop adaptation plans that trigger direct action when certain thresholds are met, but flexibility may be necessary. In South Carolina, an adaptive duty of care might incorporate the already-existing tiers of duties that recognize the fiscal limits of some communities. An adaptive duty to maintain could spur governments to take more proactive approaches to maintaining South Carolina’s overall roadway system. In North Carolina, an adaptive duty to maintain falls within the definition of governmental functions and would result in sovereign immunity; however, road maintenance remains a proprietary function for which sovereign immunity is not available. With rising sea levels, road maintenance will no longer be routine making it within the traditional conception of a governmental function.

If we want governments to make their communities more resilient, it is time to clarify the scope of their duty to do so. Adaptation decisions will cost a lot of money and cre-


ate controversy. While the science is very good, adaptation decisions will be made with some degree of uncertainty. This duty is designed to avoid bad development in dangerous places, potentially putting them into the category of gross negligence. Anticipating future risks is different from managing risks based on the past. An adaptive duty of care draws a framework to manage this reality.

B. Toward an Adaptive Authority to Abandon: Property Rights and Roads

We also recognize that there will be situations where road abandonment is the most prudent course of action. An adaptive authority to abandon should reflect values of holding roadways in the public trust, decisionmaking with overall system functionality as a priority, and principles of adaptive management. Adaptive abandonment decisions should be made in the context of short- and long-term thresholds as well as the overall public interest.

We advocate for an abandonment standard that allows abandonment when a road no longer serves “a substantial public purpose”28 and explicitly incorporates resilience into the determination of the public interest. Additional factors could include whether vulnerability assessments and adaptation planning has occurred; whether a step-by-step policy for managing road maintenance and abandonment has been established; and whether public notice has been provided to residents.

While takings claims are likely to remain a concern, developing an adaptive authority to abandon presents an opportunity to mitigate such claims, shaping future expectations. An adaptive authority to abandon under Georgia’s current jurisprudence would be affirmed, even in situations where a road abuts private property. In Florida, where counties and municipalities have wide authority to abandon roads but must not harm the public welfare,29 consideration of the public interest would allow the entire road system to be taken into account.30 North Carolina, on the other hand, would be directed away from individual and toward community concerns. South Carolina’s approach of allowing abandonment at the county level when roads are “useless” would pivot toward considering the necessity of a road as well as the overall “improvement” of the city.

C. Mending the Patchwork: States Must Lead

Our preference would be for an adaptive duty to maintain to be adopted by statute and applied consistently across state, county, and municipal jurisdictions. It would send a consistent policy signal that adaptation planning is expected—and that governments will be protected from liability. Sea-level rise will not follow jurisdictional boundaries. Therefore, an adaptive duty to maintain that applies across all jurisdictions, affirms a holistic approach to road maintenance, and emphasizes the public trust nature of government ownership and maintenance of the road system. A statewide adaptive authority to abandon would improve coordination in adaptation planning. While takings claims will remain a concern, an adaptive authority to abandon would mitigate takings liability by putting property owners on notice.

IV. Conclusion

Decisions regarding infrastructure development will continue to be critical to successful climate adaptation. Local governments are on the frontline of adaptation action, yet have limited resources. Determining duties and obligations based on a static environment is increasingly untenable. Conflicting standards already exist between jurisdictions. Sea-level rise will exacerbate these tensions and will likely reward government inaction and short-term compromises.

Our proposals address these tensions and inform local planning for climate change impacts. An adaptive duty to maintain furthers necessary action while acknowledging risks. Statewide standards would facilitate state and local coordination. If community resilience is our goal, then we must develop new duties and authorities to facilitate forward-looking, creative, and difficult decisionmaking. While the Talking Head’s song “The Road to Nowhere” is an absolute classic, it cannot be our anthem for local adaptation. We are not on a road to paradise, and time is not on our side.