

# **Can North Carolina Take Precautions Against Accelerated Sea-Level Rise Without Acknowledging Sea-Level Rise?**

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## **I. Introduction**

Despite its acceptance in the global community of climate experts, “sea-level rise” is a political term and issue in North Carolina, and currently state and local governments cannot use sea-level rise (SLR) data for regulations or policy-making. Some experts say SLR only exacerbates existing problems for coastal communities, and because there will usually be other reasons for a precautionary action other than SLR, policy-makers simply have to market the other reasons instead of SLR. Others say there will be situations in which long-term data for accelerated SLR needs to be factored in, such as when building public infrastructures, and politicians must be acknowledging the research. This paper will outline why SLR is a political issue, and the different arguments for why it can be combatted without being expressly addressed, and why it cannot.

## **II. Background on Sea-Level Rise**

A number of historical measurements, including core samples, global temperatures, mean trends in CO<sub>2</sub> concentration levels, and tide gauge records, indicate that the climate is warming and sea levels are rising.<sup>1</sup> However, there is no consensus on the projected future rate of SLR and what SLR means for smaller communities, making it a tough concept for the public to understand and for politicians to address through policy.

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<sup>1</sup> SPENCER ROGERS ET AL., SEA GRANT, “WIN-WIN” CLIMATE CHANGE ADAPTATION STRATEGIES: LESSONS LEARNED FROM SEA GRANT COASTAL PROCESSES AND HAZARDS PROGRAMMING (2012), [http://seagrants.noaa.gov/Portals/0/Documents/what\\_we\\_do/focus\\_areas/hazard\\_resilient\\_coastal\\_communities/resources/White%20Paper%20-%20Coastal%20Processes%20and%20Hazards.pdf](http://seagrants.noaa.gov/Portals/0/Documents/what_we_do/focus_areas/hazard_resilient_coastal_communities/resources/White%20Paper%20-%20Coastal%20Processes%20and%20Hazards.pdf).

Sea-level rise is largely a result of three factors: (1) thermal expansion, (2) glacier caps melting, and (3) ice loss from Greenland and West Antarctica. About half of the rise is attributable to thermal expansion.<sup>2</sup> Ocean waters expand as they warm, causing the ocean to creep up beaches along shorelines.<sup>3</sup> Glaciers and polar ice caps melt during the summer regularly, and typically are reformed during the winter. Recently, however, more of the ice forms are melting during the summer, and they are not being reformed during the winter due to the higher temperatures.<sup>4</sup> The ice sheets in Greenland and West Antarctica are melting, and if the sustained warming were to continue at a certain threshold above what it was pre-1900, this would lead to almost complete loss of Greenland ice sheet.<sup>5</sup>

While climate experts agree that sea-level is rising at an accelerated rate and it is attributable to emissions from human activities, they haven't reached a consensus in prediction of future sea-level rise. The Intergovernmental Panel on Climate Change (IPCC), comprised of a group of 1,300 independent scientific experts, concluded it is more than 90% likely that human activities of the past 250 years have warmed the planet.<sup>6</sup> It also determined that the rate of global mean of sea-level rise for the 21<sup>st</sup> century will exceed the rate between 1978-2010.<sup>7</sup> Calculating based on high emissions rates, it determined sea level would rise 52-98 cm by 2100, and

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<sup>2</sup> Telephone Interview with Dr. William Cleary, Marine and Coastal Geologist (Oct. 24, 2015).

<sup>3</sup> *Id.*

<sup>4</sup> *Sea Level Rise*, NAT'L GEOGRAPHIC, <http://ocean.nationalgeographic.com/ocean/critical-issues-sea-level-rise/> (last visited Jan. 2, 2016).

<sup>5</sup> JONATHAN GREGORY, PROJECTIONS OF SEA LEVEL RISE, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 13 (2013), [https://www.ipcc.ch/pdf/unfccc/cop19/3\\_gregory13sbsta.pdf](https://www.ipcc.ch/pdf/unfccc/cop19/3_gregory13sbsta.pdf).

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

conservatively with drastic emissions reductions, by 28-61 cm.<sup>8</sup> However, ninety scientists in another study published soon after the IPCC's predicted a much higher rate in acceleration.<sup>9</sup>

Not only is there not a global consensus, but also some areas will not be affected as much as other areas, and it is especially variable on the micro level. For example, in North Carolina, the southeastern coastal land around Wrightsville Beach and Carolina Beach is rising because of tectonic activities.<sup>10</sup> This will counter the sea-level rise, making the rise in tides less drastic.<sup>11</sup> But the Outer Banks off the coast in central North Carolina is sinking because of tectonic activity, and sea-level rise will be exacerbated there.<sup>12</sup>

### **III. House Bill 819 and Revised Climate Change Report**

Climate change and sea-level rise are especially hard to address in North Carolina right now because of politics. House Bill 819, passed in 2012, prohibits state and local agencies from passing any laws or regulations related to SLR unless authorized to do so under that bill.<sup>13</sup> Only the Division of Coastal Management will be able to determine rates of sea-level rise, and they must do so using historical data limited to the time period following 1900 and according to findings from the Coastal Resources Committee's Science Panel.<sup>14</sup> This law was created in response to the 2010 CRC's Science Panel report, which predicted sea-level will rise by thirty-nine inches in the next century in North Carolina.<sup>15</sup>

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<sup>8</sup> *Id.*

<sup>9</sup> Benjamin P. Horton et al., *Expert Assessment of Sea-Level Rise by AD 2100 and AD 2300*, 84 QUARTERNARY SCI. REVIEWS 1, 1 (2014).

<sup>10</sup> Telephone Interview with Dr. William Cleary, Marine and Coastal Geologist (Oct. 24, 2015).

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> House Bill 819 amended a preexisting statute. Act to Study and Modify Certain Coastal Management Policies, 2012 N.C. Laws S.L. 202 (codified as amended at N.C.G.S. § 113A-107.1).

<sup>14</sup> *Id.*

<sup>15</sup> Patrick Gannon, *Sea-Level Rise Bill Becomes Law*, STARNEWS ONLINE (Aug. 1, 2012, 4:49 PM), <http://www.starnewsonline.com/article/20120801/articles/120809970>.

The Science Panel issued a new report in 2015, calculating SLR for the next thirty years and using two ways to measure the rise (1) based on tide gauges in North Carolina and (2) projections from the IPCC 2013 report.<sup>16</sup> According to tidal gauge measurements, SLR would vary from 2.4 inches near Southport to 5.4 inches near Duck.<sup>17</sup> According to IPCC measurements with the highest estimates, SLR varies from 6.8 inches near Wilmington to 8.1 inches at Duck.<sup>18</sup> Estimates for a thirty-year time frame should be adequate for determining primary concerns for coastal communities, such as mortgages and oceanfront setback, said Spencer Rogers, a coastal engineer and member of the CRC Science Panel.<sup>19</sup> In addition, the conservative and higher estimates for SLR in the next thirty years are relatively small, and the difference between the numbers should not dramatically affect appropriate actions.<sup>20</sup>

The report is still up for peer review, and it has not been approved by the CRC or legislature.<sup>21</sup> The statutory language states “[i]f the Commission has not approved a sea-level rise rate, then the sea-level rise policy shall not use a rate of sea-level rise.”<sup>22</sup> Therefore, state and local agencies still cannot create policies based on SLR.

#### **IV. Marketing SLR Precautions Differently**

While policies and regulations cannot be based on SLR predictions, there are usually other good reasons for the policy that would combat SLR, and that can be marketed as the main

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<sup>16</sup> CRC SCI. PANEL, NORTH CAROLINA SEA LEVEL RISE ASSESSMENT REPORT: 2015 UPDATE TO THE 2010 REPORT AND 2012 ADDENDUM 4 (2015), [http://portal.ncdenr.org/c/document\\_library/get\\_file?uuid=dd00328d-67d4-4f39-9e8c-6585cae50577&groupId=38319](http://portal.ncdenr.org/c/document_library/get_file?uuid=dd00328d-67d4-4f39-9e8c-6585cae50577&groupId=38319).

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

<sup>19</sup> Telephone Interview with Spencer Rogers, CRC Science Panel Member (Oct. 22, 2015).

<sup>20</sup> *Id.*

<sup>21</sup> *Sea-Level Rise Study Update*, N.C. DEP’T OF ENVTL. QUALITY, <http://portal.ncdenr.org/web/cm/sea-level-rise-study-update> (last visited Jan. 2, 2016).

<sup>22</sup> Act to Study and Modify Certain Coastal Management Policies, 2012 N.C Laws S.L. 202 (codified as amended at N.C.G.S. § 113A-107.1).

reason for the policy.<sup>23</sup> Coastal communities already face and prepare accordingly for the hazards of storm surge and flooding, tsunamis, long-term flooding in low-lying areas, and coastal erosion.<sup>24</sup> Climate change and SLR will not create new problems for coastal communities, according to a Sea Grant report, but will exacerbate the hazards the communities already address.<sup>25</sup> Actions for long-term SLR protection are typically the same actions required for coastal floodplain hazard mitigation, which North Carolina has been implementing for decades.<sup>26</sup>

For example, the National Flood Insurance Program (NFIP) establishes minimum standards for construction within floodplains that would be subjected to flooding within the next 100 years.<sup>27</sup> Regulations and predictions are based on present conditions, not future SLR, but many coastal communities already adopt a higher standard.<sup>28</sup> The NFIP offers discounts to communities that implement “freeboards,” or higher floor elevations to avoid flood hazards, incentivizing this practice.<sup>29</sup> Adding freeboard to buildings protects against short-term hazards as well as the long-term risks of SLR or increases in storm severity due to climate change.<sup>30</sup>

In addition, the highest erosion rates in N.C. are due to local causes, not SLR, according to Rogers.<sup>31</sup> When other causes for coastal erosion are high, sea-level rise “becomes an insignificant factor in the accuracy of future shoreline predictions.”<sup>32</sup> Erosion rates, which are used to determine minimum ocean setbacks for new construction, factor in historical SLR,

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<sup>23</sup> ROGERS ET AL., *supra* note 1.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> Spencer Rogers, *Adaptation to Sea-Level Rise in North Carolina?* (2014) NORTH CAROLINA SEA GRANT.

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

although not accelerated SLR. The historical SLR typically goes back as far as seventy years.<sup>33</sup> More than half the N.C. coast has a historical erosion rate of less than one foot per year, and for these communities, the minimum setback is two feet per year.<sup>34</sup> By going beyond the prediction and requirement, these communities will protect themselves against damage due to accelerated SLR.<sup>35</sup>

## **V. Potential Drawbacks to Not Acknowledging Accelerated SLR**

Experts have listed several concerns related to the state legislature's restrictions on SLR regulations. For one, not accounting for long-term SLR is risky when planning expensive, permanent structures meant for public use, such as a hospital or nuclear power plant.<sup>36</sup> Even the thirty year predictions in the CRC Science Panel's 2015 report do not cover a large enough time period for these kinds of structures.<sup>37</sup> Also, this could prevent local governments from acting proactively and devising their own plans not consistent with the CRC's report on SLR rates, putting them at a disadvantage while competing for federal grants for public infrastructure.<sup>38</sup>

One of the biggest gray areas is how the state will handle sand allocation for beach nourishment projects, which is North Carolina's main defense against coastal erosion. Beach nourishment, or pumping sand onto beaches, slows erosion, but it's not a permanent fix; more sand will have to be added in the future or the beach will continue to erode.<sup>39</sup> As of 2011, approximately 112 miles of N.C.'s developed shoreline has either received public funding for

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<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

<sup>35</sup> *Id.*

<sup>36</sup> Rogers, *supra* note 19.

<sup>37</sup> *Id.*

<sup>38</sup> *Unintended Consequences of House Bill 819 -- Sea-Level Rise*, N.C. COASTAL FED'N, <http://www.nccoast.org/uploads/documents/Legislature/HB819%20fact%20sheet.pdf> (last visited Jan. 2, 2016).

<sup>39</sup> Rogers, *supra* note 19.

beach nourishment, or the local governments are investigating the option.<sup>40</sup> Sand within three miles off N.C.'s shoreline is the state government's property, and the state leases sand for beach nourishment projects to local governments on a first-come, first-serve basis.<sup>41</sup> The federal government owns the sand beyond that, though they have yet to lease sand as a resource.<sup>42</sup>

Dredging sand is an expensive process, and for it to be cost-effective, most coastal communities dredge sand close to the shores where the sand will be pumped.<sup>43</sup> Sand must be "similar in quality and grain size to sand in the area being nourished."<sup>44</sup> This is tricky for communities, like Topsail Island, with rock bottoms in its surrounding waters and limited sand supplies off its coast.<sup>45</sup> Experts anticipate a shortage of sand from within N.C. state-controlled waters in the near future, possibly within the next thirty to forty years, due to storm surges and long-term SLR.<sup>46</sup> The state will have to lower its standards for sand quality or consider hard structure defenses, such as terminal groins.<sup>47</sup>

## **VI. Rebuilding N.C. Highway 12**

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<sup>40</sup> N.C. DEPT. OF ENV'T AND NAT. RES., NORTH CAROLINA BEACH AND INLET MANAGEMENT PLAN FINAL REPORT 7 (2011), <http://portal.ncdenr.org/web/cm/bimp-final-report1>.

<sup>41</sup> SEA GRANT N.C., DEVELOPING A MANAGEMENT STRATEGY FOR NORTH CAROLINA'S COASTAL OCEAN 17-18 (2009), [http://ncseagrant.ncsu.edu/ncseagrant\\_docs/products/2000s/developing\\_mgmt\\_strategy.pdf](http://ncseagrant.ncsu.edu/ncseagrant_docs/products/2000s/developing_mgmt_strategy.pdf).

<sup>42</sup> Rogers, *supra* note 19.

<sup>43</sup> Cleary, *supra* note 10.

<sup>44</sup> *Beach Nourishment (Oceanfront)*, NCDEQ DIV. OF COASTAL MGMT., <http://portal.ncdenr.org/web/cm/beach-nourishment> (last visited Jan. 2, 2016).

<sup>45</sup> Cleary, *supra* note 10.

<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

Recently, the N.C. Department of Transportation reached a settlement regarding the reconstruction of N.C. Hwy 12, which connects Bodie Island to Hatteras Island.<sup>48</sup> It is the only road connecting all the barrier islands in the Outer Banks to the mainland. Thirteen miles of the highway pass through Pea Island National Wildlife Refuge, which is currently barely above sea level. The highway flooded fairly regularly during high tides and storms, and the state spent tens of millions of taxpayer dollars rebuilding the road each time parts of it washed away during a storm.<sup>49</sup> Efforts to maintain the road were “degrading the once-pristine Pea Island National Wildlife Refuge.”<sup>50</sup> Because of the frequent closures due to ocean overwash, the N.C. Department of Transportation planned to reconstruct the highway.<sup>51</sup> In its 2009 plan, it stated it would reconstruct Bonner Bridge, the only bridge out of Hatteras island that is deteriorating, and it would consider plans for other parts of the highway at a later time so that “the environmental impacts can be better quantified, minimized, and mitigated.”<sup>52</sup>

After the N.C. Department of Transportation proposed reconstructing the highway in phases, environmental law groups sued the Federal Highway Administration (FHWA) in 2011 for violating the National Environmental Policy Act by committing to the construction of only one segment of the transportation project and denying the public the full review of the entire project and its environmental impact.<sup>53</sup> They also claimed the FHWA violated and Section 4(f)

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<sup>48</sup> *New Settlement Agreement for Bonner Bridge and N. C. 12*, S. ENVTL. LAW PROJECT (June 15, 2015), <https://www.southernenvironment.org/news-and-press/press-releases/new-settlement-agreement-for-bonner-bridge-and-n-c-12>.

<sup>49</sup> *Id.*

<sup>50</sup> *Settlement Maintains Access to Hatteras and Protects Refuge*, S. ENVTL. LAW PROJECT (June 15, 2015), <https://www.southernenvironment.org/news-and-press/news-feed/settlement-reached-on-plans-for-deteriorating-bridge-to-hatteras>.

<sup>51</sup> *Defenders of Wildlife v. North Carolina Dept. of Transp.*, U.S. Ct. App. 4th Cir. (2014), available at [http://www.ncdot.gov/projects/bonnerbridgereplace/download/4th\\_Circuit\\_Decision\\_August\\_06\\_2014.pdf](http://www.ncdot.gov/projects/bonnerbridgereplace/download/4th_Circuit_Decision_August_06_2014.pdf)

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

of the Department of Transportation Act of 1966 by not considering alternatives that would not use protected wildlife refuge land. The district court granted a motion for summary judgment for the defendants.<sup>54</sup> In August 2014, the United States Court of Appeals for the Fourth Circuit reversed and remanded the decision regarding Section 4(f) for the lower court to determine if the FHWA conducted “all possible planning to minimize harm” before planning to build the new highway on the wildlife refuge.<sup>55</sup> The parties settled in June 2015 after the N.C. Department of Transportation agreed to study long-term options for the stretch on Pea Island, and prioritize building a bridge on the Pamlico Sound rather than a road through the wildlife refuge.<sup>56</sup>

This was celebrated as a forward-moving compromise and a victory for the environmental groups, but the reasons listed in the lawsuit are because the proposed road would pass through a wildlife refuge, not because it was unwise to build an expensive public use structure in an area vulnerable to flooding due to sea-level rise and climate change. It is not a guarantee that there will be another reason, such as protection of a wildlife refuge, to quash every plan to build a near-permanent structure in an area that will likely be flooded due to SLR. This could be a dangerous thing to not consider when funding structures upon which communities will rely.<sup>57</sup>

## **VII. Conclusion**

It is unclear whether not acknowledging SLR when implementing protections against coastal hazards can always be compensated by other, nonpolitical reasons for the protections. It is also unclear whether the revised SLR report from the CRC’s Science Panel will be approved,

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<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> *Bonner Bridge Replacement Project*, NCDOT, <http://www.ncdot.gov/projects/bonnerbridgereplace/> (last visited Jan. 2, 2016).

<sup>57</sup> Cleary, *supra* note 10.

or if the measurements will always be appropriate when planning for public infrastructure. Time will tell.