

Waging War on the Rising Seas: Fashioning a Comprehensive Approach to Combating the Effects of Sea Level Rise on Hampton Roads, Virginia Military Installations Under Existing Frameworks

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WAGING WAR ON THE RISING SEAS: FASHIONING A COMPREHENSIVE APPROACH TO COMBATING THE EFFECTS OF SEA LEVEL RISE ON HAMPTON ROADS, VIRGINIA MILITARY INSTALLATIONS UNDER EXISTING FRAMEWORKS

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INTRODUCTION

Putting it mildly, climate change is a contentious issue in policy and political circles. While most of the scientific community is in agreement about the causes and effects of global warming,¹ this is far from the case within the American political realm, especially in the United States Congress.² However, events may begin to overwhelm the conversation in an area that *should* generate consensus—national security.

In 2003, Hurricane Isabel struck the eastern coast of Virginia.³ In her crosshairs were the multiple, strategically important military installations that call the Hampton Roads area home.⁴ Langley Air Force Base

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¹ See generally INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: SYNTHESIS REPORT (2014), http://ar5-syr.ipcc.ch/ipcc/resources/pdf/IPCC_Synthesis_Report.pdf [<https://perma.cc/73RN-MV5K>] [hereinafter IPCC REPORT] (synthesizing the most up-to-date worldwide climate science).

² See Jeff Goodell, *The Pentagon & Climate Change: How Deniers Put National Security at Risk*, ROLLING STONE (Feb. 12, 2015), <http://www.rollingstone.com/politics/news/the-pentagon-climate-change-how-climate-deniers-put-national-security-at-risk-20150212> [<https://perma.cc/49G2-35A5>].

³ Ali Rockett, *Hampton Roads Military Bases Brace for Climate Change, Sea Level Rise*, THE DAILY PRESS (Oct. 23, 2014), <http://www.dailypress.com/news/military/dp-nws-climate-change-military-20141023-story.html> [<https://perma.cc/R7LP-NL6U>].

⁴ This Note will utilize the localities included by the Hampton Roads Planning District Commission when referring to “Hampton Roads.” This includes: the cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; the counties of Gloucester, Isle of Wight, James City, Southampton, Surry, and York; and the town of Smithfield. See *Data and Info*, HAMPTON ROADS

("Langley"), located in Hampton, Virginia, was particularly affected.⁵ The hurricane rose the tidal level by a whopping 7.9 feet with the result of massive flooding throughout the base, causing damage to around two hundred facilities.⁶ The bill for repairs and recovery totaled \$166 million.⁷

In a scathing exposé in *Rolling Stone* magazine, Jeff Goodell sounded the alarm bell on the adverse effects that climate change—and particularly the secondary effects of sea level rise—are having on Hampton Roads' military installations.⁸ Virginia Senator Tim Kaine is quoted as saying that "[m]ilitary readiness is already being impacted by sea-level rise."⁹ The article further asserts that within 25–50 years operations could go from being "severely compromised" to facilities themselves rendered unusable.¹⁰ Even though these warnings are backed by thorough research, little is being done about it from a Congressional level.¹¹

Nonetheless, the Executive branch, through both Presidential and Department of Defense ("DoD") actions, has begun to take the issues of climate change and sea level rise seriously. In the 2010 Quadrennial Defense Review, climate change was spoken of as a national security issue.¹² The year before, the Navy had begun to address the issue through the establishment of Task Force Climate Change, presided over by the Navy's head oceanographer.¹³ Through establishment of these types of groups,

PLANNING DISTRICT COMMISSION, <http://www.hrpdcva.gov/page/data-and-info> [<https://perma.cc/9342-CC5B>] (last visited Oct. 24, 2016). Of note, the term "Tidewater" is also used for the region but actually encompasses a larger area than the one described here. See VA. CODE ANN. § 28.2-100. The issues implicated in this Note affect the entire region, but are mainly focused in the southern portion of Hampton Roads—including the cities of Norfolk, Portsmouth, Virginia Beach, and Hampton.

⁵ Rockett, *supra* note 3.

⁶ *Id.*

⁷ *Id.*

⁸ See Goodell, *supra* note 2.

⁹ *Id.*

¹⁰ *Id.*

¹¹ See *id.* Goodell argues that members of Congress, whom he refers to as "climate change deniers," have not only ignored the national security implications of climate change, but have been outright hostile to labeling the issue a national security concern, or even further studying the issue. Examples include an amendment attached by a House committee forbidding the Pentagon from implementing recommendations from the United Nations Intergovernmental Panel on Climate Change ("IPCC") and ignoring testimony concerning climate change impacts.

¹² See DEP'T OF DEF., QUADRENNIAL DEFENSE REVIEW REPORT FEB. 2010 84–85 (2010), http://www.defense.gov/Portals/1/features/defenseReviews/QDR/QDR_as_of_29JAN10_1600.pdf [<https://perma.cc/7JJE-C492>] [hereinafter 2010 QDR].

¹³ See U.S. NAVY TASK FORCE CLIMATE CHANGE, <http://greenfleet.dodlive.mil/climate-change/> [<https://perma.cc/2T3X-9V7A>] (last visited Oct. 24, 2016).

the Navy and broader DoD conducted multiple studies and disseminated their results. This has culminated in documents such as both the Navy's Climate Change Roadmap¹⁴ and the 2014 DoD Climate Change Roadmap.¹⁵ All of these documents touch on the need to adapt to the effects of sea level rise on coastal installations.¹⁶ However, some adaptation efforts have already taken place through the funding of small engineering projects on bases with some success.¹⁷

One such example is Langley. As already stated, Langley sustained severe damage in 2003. Afterwards, Air Force civil engineers began implementing adaptation efforts the best they could.¹⁸ During later hurricanes, such as Irene in 2011 and Sandy in 2012, damage was minimal despite the amounts of tidal rise being roughly the same as 2003.¹⁹ These small successes are certainly part of the solution going forward, but mere "Band-Aids" are not enough since they do not address many of the overarching problems faced by the military in bracing against the rising sea levels. Problems like partnering with local communities that the military relies on for critical base services and implementing a long-term plan for base relocations will necessitate creative policy and legal solutions in the absence of comprehensive congressional action.

In Part I, this Note will first explore the general impact of sea level rise on national security infrastructure, specifically looking at Naval Station Norfolk and the surrounding installations in the Hampton Roads area. Part II of this Note will discuss current DoD and local policies as well some of the legal challenges these entities face in the absence of an overarching Congressional mandate. Finally, in Part III, this Note will outline ways that the Department can more robustly utilize existing frameworks to meet goals of sea level rise adaptation as well as

¹⁴ See TASK FORCE CLIMATE CHANGE/OCEANOGRAPHER OF THE NAVY, U.S. NAVY CLIMATE CHANGE ROADMAP (2010) [hereinafter NAVY CLIMATE CHANGE ROADMAP], <http://greenfleet.dodlive.mil/files/2010/08/US-Navy-Climate-Change-Roadmap-21-05-10.pdf> [https://perma.cc/WU2T-68KU].

¹⁵ See Press Release, Dep't of Def., DoD Releases 2014 Climate Change Adaptation Roadmap (Oct. 13, 2014) <http://www.defense.gov/News/News-Releases/News-Release-View/Article/605221> [https://perma.cc/EF39-2LPQ].

¹⁶ See, e.g., DEP'T OF DEF., 2014 CLIMATE CHANGE ADAPTATION ROADMAP 6–7 (2014), [hereinafter 2014 DoD ROADMAP] http://www.acq.osd.mil/eie/Downloads/CCARprint_wForward_e.pdf [https://perma.cc/T83E-WZ2K].

¹⁷ See Rockett, *supra* note 3.

¹⁸ *Id.* (highlighting examples of efforts included raising "[g]enerators, electrical systems, air-conditioning units . . . above sea level" and installing other devices to help prevent water intrusion into facilities. These measures cost roughly one million dollars over ten years).

¹⁹ *Id.* (reporting tidal rise for Irene and Sandy was 7.6 feet and 6.8 feet respectively).

long-term realignment/closure of military bases. Such a comprehensive approach will include: (1) expanded, innovative use of the Joint Land Use Study ("JLUS") Program to enhance communication and coordination between DoD installations and local communities; (2) continued maximization of the use of discretionary military construction funds as well as updating the Unified Facilities Criteria ("UFC"); and (3) ensuring sea level rise is an important factor used by a future Base Realignment and Closure Commission.

I. THE PROBLEM OF SEA LEVEL RISE FOR HAMPTON ROADS DOD INSTALLATIONS: CAUSES AND IMPACTS

Sea level rise is but a mere symptom of the broader issue of climate change.²⁰ The vast majority of scientists now agree that the planet is warming at an accelerated pace and this warming is caused by human activity.²¹ In their most recent findings, the United Nations Intergovernmental Panel on Climate Change ("IPCC") reported that from 1880–2012 the planet warmed by an average of 0.85°C.²² The IPCC also projects that by the end of the twenty-first century the planet will warm by approximately 1.5°C.²³ These findings are generally consistent with U.S. government reports that have also been studying climate change and its effects.²⁴ This warming of the planet will likely carry multiple severe consequences, with sea level rise being one of the major challenges the world will have to face. This part will delve into the general causes of sea level rise, the measured rate of local sea level rise in the Hampton Roads area, and finally the current and predicted effects of the phenomenon on Hampton Roads military facilities and the neighboring localities.

A. *General Causes and Effects of Sea Level Rise*

Before looking at the specific impacts of sea level rise on the Hampton Roads region and its military infrastructure, it is important to understand the overall causes of sea level rise and global average estimates.

²⁰ See IPCC REPORT, *supra* note 1, at 2–17.

²¹ See *id.* at 2–4.

²² *Id.* at 2.

²³ *Id.* at 10.

²⁴ See U.S. GLOBAL CHANGE RESEARCH PROGRAM, 2014 NATIONAL CLIMATE ASSESSMENT 28–29 (2014) [hereinafter 2014 NCA], <http://nca2014.globalchange.gov/report> [<https://perma.cc/MUP3-2TU5>].

This information will provide a foundation with which to better understand regional impacts. Both the IPCC as well as the U.S. government have conducted large-scale studies and compiled reports on their findings.²⁵ These reports include both the U.S. National Climate Assessment (“NCA”) and the IPCC’s most recent Synthesis Report (2014).²⁶

The two drivers of increasing sea level rise are ocean expansion and ice melt, both of which are due to increased surface temperatures.²⁷ When the ocean warms, thermal expansion occurs as the water itself expands.²⁸ Concurrently, melting ice in both the Arctic and Antarctic regions is adding immense amounts of water to the oceans, which in turn is also contributing to higher sea levels throughout the world.²⁹ While there is slight disagreement over which factor is the larger contributor,³⁰ it is simply important to see the observed causal connection between these two phenomenon and rising global mean sea levels.

From a global perspective, sea level rise has generally been measured from a baseline of 1992 mean sea levels and projected out to 2100.³¹ Historically, sea levels rose by 0.2 meters (m) since 1900.³² The National Oceanic and Atmospheric Administration’s (“NOAA”) 2012 sea level rise conclusions, using various reports and scientific literature, noted that there is “high confidence” that mean sea levels will rise between 0.2 m (8 in.) and 2.0 m (6.6 ft.) by 2100.³³ This takes into account four separate lowest-to-highest scenarios.³⁴

These various reports also conclude that sea level rise will be an aggravator of other negative consequences of climate change.³⁵ NOAA concludes that “[sea level rise] amplif[ies] factors . . . [like] high tides, storm surge[s], high waves, and high [amounts of] runoff from rivers.”³⁶

²⁵ See, e.g., *id.*; IPCC REPORT, *supra* note 1.

²⁶ *Id.*

²⁷ See IPCC REPORT, *supra* note 1, at 42; NAT’L OCEANIC & ATMOSPHERIC ADMIN., GLOBAL SEA LEVEL RISE SCENARIOS FOR THE UNITED STATES NATIONAL CLIMATE ASSESSMENT 5 (2012) [hereinafter NOAA REPORT] http://cpo.noaa.gov/sites/cpo/Reports/2012/NOAA_SLR_r3.pdf [<https://perma.cc/WS75-LNSF>].

²⁸ NOAA REPORT, *supra* note 27, at 5.

²⁹ See *id.*

³⁰ *Id.* at 3.

³¹ See, e.g., *id.* at 2.

³² *Id.*

³³ NOAA REPORT, *supra* note 27, at 1.

³⁴ *Id.* at 2 (reporting the following scenarios: “lowest” 0.2 m; “intermediate-low” 0.5 m; “intermediate-high” 1.2 m; and “highest” 2.0 m.)

³⁵ See 2014 NCA, *supra* note 24, at 582.

³⁶ NOAA REPORT, *supra* note 27, at 18.

The NCA's section on coastal impacts of climate change projects that there will be increases in hurricane rainfall and intensity as well as an uptick in the number of winter storms such as nor'easters along the Atlantic Coast.³⁷ With a higher number of storms,³⁸ sea level rise will "increase the frequency, magnitude, and duration of flooding associated with a given storm."³⁹ These observations and predictions do not bode well for a low-lying coastal area like Hampton Roads, Virginia.

B. Hampton Roads: Local Sea Level Rise and Impacts

Local or regional sea level rise is measured in regards to the relative sea level, which is defined as "[t]he height of the sea with respect to a specific point of land."⁴⁰ Local sea level rise measurement relies on historical data from established tidal gauges such as the Sewells Point tidal gauge in Norfolk.⁴¹ Relative sea level further takes into account land subsidence.⁴² Land subsidence is the measured sinking of the ground due to various geological factors.⁴³ This obviously worsens the problem of sea level rise due to the sinking of the land in relation to the ocean.

Historic data from the Sewells Point tidal gauge located at Naval Station Norfolk shows an average increase in sea level by 1.5 ft. per one hundred years.⁴⁴ The Virginia Climate Change Commission reported that, region-wide, the Chesapeake Bay area would see an increase in sea level by 0.7–1.6 m (2.3–5.2 ft.) by 2100.⁴⁵ The rate of rise in the Hampton Roads area is twice that of the global measurement.⁴⁶ This is due to a higher rate of land subsidence, ocean circulation factors, and overall sea level rise acceleration.⁴⁷ Specifically, at the Sewells Point tide gauge, projections noting these factors place the level as high as 2.5 ft. of increase by

³⁷ See 2014 NCA, *supra* note 24, at 582.

³⁸ IPCC REPORT, *supra* note 1, at 7–8.

³⁹ NOAA REPORT, *supra* note 27, at 3.

⁴⁰ *Id.* at 6, n. 2.

⁴¹ See Larry P. Atkinson et al., *Sea Level Rise and Flooding Risk in Virginia* 5 SEA GRANT L. & POL'Y J. 3, 4–5 (2013).

⁴² *Id.* at 6.

⁴³ *Id.*

⁴⁴ *Id.* at 5.

⁴⁵ VA. GOVERNOR'S COMM'N ON CLIMATE CHANGE, FINAL REPORT: A CLIMATE CHANGE ACTION PLAN 5 (2008), [hereinafter 2008 VIRGINIA COMMISSION] http://www.sealevelrisevirginia.net/docs/homepage/CCC_Final_Report-Final_12152008.pdf [<https://perma.cc/M883-E6RR>].

⁴⁶ Atkinson et al., *supra* note 41, at 7.

⁴⁷ *Id.* at 7–10.

2100.⁴⁸ “This local rise rate is nearly the highest rise rate seen anywhere in the U.S.”⁴⁹

Further, as was noted previously, this rise in sea levels will intensify flooding problems. First, there will be more frequent and severe recurrent flooding due to regular tides and “high intensity rain events.”⁵⁰ Second, studies predict that the occurrences of extreme, storm-induced flooding are also likely to increase.⁵¹ Storms themselves are likely to become more frequent, thereby bringing the problem of storm surge.⁵² For example, an extreme event such as a so-called 100-year flood, which at the Sewells Point tide gauge is 5.5 ft. above the high tide line, has a one percent per year likelihood of occurrence.⁵³ That percentage increases to ten percent within just the medium-range projections for sea level rise.⁵⁴ What are considered record floods now could become an almost annual happening by 2060.⁵⁵

Many of these effects are already being seen in some of Hampton Roads’ more lowland areas.⁵⁶ Areas throughout the City of Norfolk, such as the Hague neighborhood, already see almost regular street flooding.⁵⁷ With the predictions of increasing sea levels and storms, this is only likely to increase.

C. *Impacts on Hampton Roads’ Military Installations*

Hampton Roads is home to several military installations that house or perform strategically critical missions. Naval Station Norfolk

⁴⁸ *Id.* at 9–10.

⁴⁹ *Id.* at 10.

⁵⁰ See VA. INST. OF MARINE SCIENCE, RECURRENT FLOODING STUDY FOR TIDEWATER VIRGINIA 10–13 (2013), http://ccrm.vims.edu/recurrent_flooding/Recurrent_Flooding_Study_web.pdf [<https://perma.cc/CZ7F-ZS34>].

⁵¹ *Id.*

⁵² See *id.* at 11 (noting the increase in tropical storms and winter storms in the past century and the continued upward projections into the future). See also *id.* at 8 (stating, for example, that a passing storm may cause the ocean in Hampton Roads to be three feet above what would normally be expected from the tide. Thus, the storm surge is three feet. Local sea level rise means that years from, now the same storm would result in a three-foot and two-inch rise, approximately).

⁵³ BEN STRAUSS ET AL., CLIMATE CENTRAL, VIRGINIA AND THE SURGING SEA: A VULNERABILITY ASSESSMENT WITH PROJECTIONS FOR SEA LEVEL RISE AND COASTAL FLOOD RISK 12 (2014), <http://sealevel.climatecentral.org/uploads/ssrf/VA-Report.pdf> [<https://perma.cc/2MY9-8RNH>].

⁵⁴ *Id.* at 13.

⁵⁵ *Id.* at 10.

⁵⁶ Atkinson et al., *supra* note 41, at 11.

⁵⁷ *Id.* (noting also the “exponential” increase in these large flooding events as compared to past measurements).

is the largest naval base in the United States and is home to the bulk of the Navy's Atlantic Fleet, which also includes several major shore commands, and an airfield.⁵⁸ Norfolk Naval Shipyard, located in Portsmouth, is an important ship repair facility with the capabilities of maintaining and refueling nuclear powered ships.⁵⁹ Joint Base Langley-Eustis (formerly known as Langley Air Force Base and Fort Eustis separately), in Hampton, houses Air Force fighter squadrons and the Air Force's Air Combat Command.⁶⁰ Other military facilities in the area include Naval Air Station Oceana, Dam Neck Annex, and Joint Base Little Creek–Fort Story.⁶¹ These facilities house everything from several Navy aircraft squadrons to Navy amphibious forces and training facilities.⁶² Installation resilience is key to ensuring the military is fully ready to meet its mission.⁶³ Installations function as “power projection platforms.”⁶⁴ The compromising of base functions harms a direct link in the nation's defense policy.⁶⁵

It is worth noting here that sea level rise is but one problem within the realm of climate change's effects on military installations writ large.⁶⁶ In addition to sea level rise, for example, studies are being conducted to measure the possible effects of increased heat waves and water shortages.⁶⁷ Further, much has been written about the various national security problems that climate change will thrust upon the military. Policy

⁵⁸ KELLY A. BURKS-COPES ET AL., RISK QUANTIFICATION FOR SUSTAINING COASTAL MILITARY INSTALLATION ASSET AND MISSION CAPABILITIES (RC-1701): FINAL REPORT, U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER 8 (2014), https://www.serdp-estcp.org/content/download/30139/291303/file/RC_1701_Final%20Report.pdf [<https://perma.cc/SXZ3-L74N>].

⁵⁹ See NORFOLK NAVAL SHIPYARD, <http://www.navsea.navy.mil/Home/Shipyards/Norfolk.aspx> [<https://perma.cc/655A-UJTC>] (last visited Oct. 24, 2016).

⁶⁰ JOINT BASE LANGLEY-EUSTIS: UNITS, <http://www.jble.af.mil/units/airforceunits/> [<https://perma.cc/Q4CZ-B32D>] (last visited Oct. 24, 2016).

⁶¹ See NAVAL AIR STATION OCEANA, http://www.cnrc.navy.mil/regions/cnrma/installations/nas_oceana.html [<https://perma.cc/9LCT-T6YX>] (last visited Oct. 24, 2016); JOINT BASE LITTLE CREEK-FORT STORY, http://www.cnrc.navy.mil/regions/cnrma/installations/jeb_little_creek_fort_story.html [<https://perma.cc/3G9Z-4PQH>] (last visited Oct. 24, 2016).

⁶² *Id.*

⁶³ 2014 DoD ROADMAP, *supra* note 16, at 10.

⁶⁴ *Id.* (internal quotes omitted).

⁶⁵ *Id.*

⁶⁶ *Id.* at 6–7.

⁶⁷ See STRATEGIC ENVTL. RES. & DEV. PROGRAM, ASSESSING IMPACTS OF CLIMATE CHANGE ON COASTAL MILITARY INSTALLATIONS: POLICY IMPLICATIONS 4–5 (2013) [hereinafter SERDP POLICY IMPLICATIONS], https://www.serdp-estcp.org/content/download/17219/192680/version/1/file/SERDP+Coastal+Assessment+White+Paper_January+2013.pdf [<https://perma.cc/TKT7-9MSM>].

makers, scholars, and government agencies have begun to look at the national security implications of climate change scenarios that may affect mass migration of people, economic problems, and increased activity in the Arctic, to name a few.⁶⁸

1. Effect of Sea Level Rise on National Security Infrastructure in Hampton Roads

An American Security Project study quoting the 2010 Quadrennial Defense Review shows that there are thirty U.S. military installations at risk because of sea level rise.⁶⁹ Naval Station Norfolk is listed as one of the top five most at-risk bases.⁷⁰ The interagency Strategic Environmental Research and Development Program (“SERDP”), along with the U.S. Army Corps of Engineers and other researchers, has already begun studies on the impacts of sea level rise and sea level rise consequences.

Compounding the regional problem of sea level rise and increased flooding that has already been discussed is the flat, low-lying nature of these installations and Naval Station Norfolk in particular.⁷¹ The subsidence rate measured at the Sewells Point tide gauge was 2.72 mm per year from 1976–2007.⁷² Naval Station Norfolk lies on average at under 5.6 m above mean sea level.⁷³ Additionally, forty percent of Joint Base Langley-Eustis and thirty percent of Norfolk Naval Shipyard lie below the five-feet-over-high-tide line.⁷⁴

With this starting point, flooding increases “exponentially” when modeling higher sea level scenarios.⁷⁵ SERDP reports, for example, that “surge generated by all five [modeled] storms inundated approximately 50–80% of Naval Station Norfolk under the 2.0 m [sea level rise] scenario.”⁷⁶ This same study also conducted risk assessments for the Naval

⁶⁸ See, e.g., John Podesta and Peter Ogden, *Security Implications of Climate Change*, 31 THE WASH. Q. 115 (2008); JOSHUA W. BUSBY, CLIMATE CHANGE & NAT’L SECURITY, COUNCIL ON FOREIGN RELATIONS: COUNCIL SPECIAL REPORT NO. 32 (2007); NAT’L INTELLIGENCE COUNCIL, GLOBAL TRENDS 2030: ALTERNATIVE WORLDS (2012), <http://www.dni.gov/nic/globaltrends> [<https://perma.cc/PH6V-Y8PE>].

⁶⁹ CATHERINE FOLEY, AMERICAN SECURITY PROJECT: CLIMATE SECURITY, MILITARY BASING AND CLIMATE CHANGE, 1 (2012).

⁷⁰ *Id.* at 4.

⁷¹ See BURKS-COPES ET AL., *supra* note 58, at 9.

⁷² *Id.* at 143.

⁷³ *Id.* at 9.

⁷⁴ STRAUSS ET AL., *supra* note 53, at 15.

⁷⁵ BURKS-COPES ET AL., *supra* note 58, at 175.

⁷⁶ *Id.*

Station's piers, which both berth and provide critical services for the Atlantic Fleet's ships.⁷⁷ The results were not encouraging. At one pier, sea level rise of at least 1.0 m saw major ship services such as oily waste, wastewater, steam, electricity, and potable water all interrupted.⁷⁸

These predictions show that military readiness at these bases is likely to be severely threatened. Catastrophic disturbances of use caused by storms as well as the regular interruption of basic services would severely inhibit routine operations, training, and ship maintenance. The impacts on the bases themselves are only part of the story—the bases themselves depend on the local communities.

2. Implications on the Local Community: Effects on Bases

The impact of sea level rise on the Hampton Roads region has already been discussed *supra*. Specifically, though, it is important to see how these impacts will be felt concerning key services the military relies upon to complete their mission. These services include transportation, utilities, and housing. Addressing the Hampton Roads Transportation Planning Organization (“TPO”) board, retired Rear Admiral Byron Tobin stated “we are dependent, in large measure, upon the resources and support of this region for the efficient and successful conduct of our mission.”⁷⁹

Rear Admiral Tobin further stated that “[o]ne of the key components of that success is mobility, [which is currently impeded] because our transportation infrastructure is in decline and struggling to meet our needs.”⁸⁰ The transportation issues related to Hampton Roads military bases cover everything from logistical support, to military forces, to daily commuting for service members and government civilians.⁸¹ Several of the major interstates in the region, which are interconnected through a system of tunnels and bridges, serve Naval Station Norfolk and other military installations in some capacity.⁸² For example, some sixty percent

⁷⁷ *See generally id.* (studying references methodology and risk assessments for evaluating Naval Station Norfolk piers).

⁷⁸ SERDP POLICY IMPLICATIONS, *supra* note 67, at 5.

⁷⁹ HAMPTON ROADS TRANSP. PLANNING ORG., HAMPTON ROADS TRANSPORTATION MILITARY NEEDS STUDY: ROADWAYS SERVING THE MILITARY AND SEA LEVEL RISE/STORM SURGE 7 (2013) [hereinafter HRTPO TRANSP. REPORT], <http://www.hrtpo.org/uploads/docs/Roadways%20Serving%20the%20Military%20&%20Sea%20Level%20Rise-Storm%20Surge%20Report.pdf> [<https://perma.cc/WZJ9-YRK4>].

⁸⁰ *Id.*

⁸¹ *See id.* at 7–9.

⁸² *Id.* at 10–13.

of land within Norfolk identified as “developed” has potential to flood with 119 miles of roadway also susceptible to flooding.⁸³ The various identified impacts include: “flooding of evacuation routes” during storm surge events, “increased hydraulic pressure on tunnels” that are routinely used for commuting and logistical operations, “alteration in drainage capacity” for roadways, and other effects such as erosion which may degrade transportation infrastructure over time.⁸⁴

Critical, locally provided utilities such as water/sewer and electricity are further likely to be affected. Higher levels of storm surge and tidal flooding may lead to salt water intrusion into local aquifers.⁸⁵ Additionally, up to five power plants in the Hampton Roads area could be affected by the rising seas.⁸⁶

Finally, the local sea level rise will most certainly affect housing and residential quality of life. Thousands of residents sit below the five- and nine-foot-above-high-tide levels exposing their properties to many of the potential dangers of increased flooding.⁸⁷ With this, home values, and several additional related issues are implicated.⁸⁸ This, along with commuting issues discussed *supra*, can likely affect service members’ and civilian workers’ quality of life, which could potentially also have far reaching effects into military personnel systems and readiness.

II. CURRENT POLICY RESPONSES TO SEA LEVEL RISE

Combating climate change and its effects such as sea level rise can be categorized in two ways: mitigation and adaptation.⁸⁹ Mitigation generally encompasses efforts to slow or reverse the warming of the planet by reducing emissions of greenhouse gases.⁹⁰ Adaptation entails policies and actions that are meant to counter present as well as predicted climate change effects.⁹¹ Adaptation can “broad[ly include] retreat, accommodation,

⁸³ *Id.* at 19.

⁸⁴ *Id.* at 20.

⁸⁵ SERDP POLICY IMPLICATIONS, *supra* note 67, at 6.

⁸⁶ STRAUSS ET AL., *supra* note 53, at 16.

⁸⁷ *Id.*

⁸⁸ *See id.*

⁸⁹ Trip Pollard, *Damage Control: Adapting Transportation to a Changing Climate*, 39 WM. & MARY ENVTL. L. & POL’Y REV. 365, 377 (2015).

⁹⁰ *Id.*

⁹¹ *Id.* at 378.

and protection.”⁹² All three of these types of adaptation can be used exclusively or concurrently depending on the unique situation.

Both the DoD and executive levels had not begun to address the problems until around 2009–10.⁹³ This should come as no surprise since these problems are so closely linked to the politically charged issue of climate change, and 2008 saw the election of President Barack Obama who had vowed to make climate change issues a priority.⁹⁴ Since this time, much of the response has centered on studying the overall causes and effects of the problem with some resources put to both adaptation and mitigation efforts. This Note will focus exclusively on DoD and Hampton Roads area adaptation responses, rather than climate change mitigation policies.

A. *The General DoD Sea Level Rise Response*

1. Presidential Executive Orders

The genesis for the DoD response to the rising seas can be seen mainly in the direct policies of the Obama White House. Without any kind of overarching legislation from Congress, the Administration has resorted to the use of non-statutory means to accomplish climate change adaptation goals for federal agencies.⁹⁵ Most relevant to DoD efforts to prepare for and combat the effects of sea level rise specifically are Executive Orders 13653, 13690, and 13693.

Executive Order (“EO”) 13653 speaks directly to the need to implement climate change resiliency measures.⁹⁶ The EO established a council on climate change preparedness and resilience that includes senior members from all federal departments and certain agencies.⁹⁷

⁹² Joshua G. Behr et al., *Building Resiliency in Response to Sea Level Rise and Recurrent Flooding: Comprehensive Planning in Hampton Roads*, 92 THE VA. NEWS LETTER 1, 2 (2016); Pollard, *supra* note 89, at 378 (referring to these three adaptation categories as “(1) fortify . . . (2) adjust . . . and (3) retreat.”).

⁹³ See *infra* Part II (discussing Presidential Executive Orders and DoD-level policy).

⁹⁴ See John M. Broder, *Obama Affirms Climate Change Goals*, N.Y. TIMES (Nov. 18, 2008), <http://www.nytimes.com/2008/11/19/us/politics/19climate.html> [<https://perma.cc/8MPK-Z3TA>].

⁹⁵ See *Obama’s Green Gamble*, THE ECONOMIST: DEMOCRACY IN AM. (Jun. 3, 2014, 12:36 AM), <http://www.economist.com/blogs/democracyinamerica/2014/06/climate-policy> [<https://perma.cc/4F2V-NYWF>].

⁹⁶ Exec. Order No. 13,653, 3 C.F.R. § 330 (2014).

⁹⁷ *Id.* at 334–35.

Most importantly, though, the EO charges federal agencies with continuing to include climate change considerations in agency planning with a particular focus on climate adaptation and resilience.⁹⁸

EO 13690, entitled “Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input,” amended an older executive order and provided for guidelines when developing areas that are in flood plain.⁹⁹ EO 13693 updated an earlier, consequential, Obama Administration order—EO 13514.¹⁰⁰

Executive Order 13514, issued in 2009 during Obama’s first term in office, did not focus as much on federal facility adaptation to the effects of climate change, but instead addressed federal government standards regarding sustainability and energy efficiency to include targeted greenhouse gas emissions.¹⁰¹ It sought to make the federal government a model and “lead by example” in energy use.¹⁰² Additionally, EO 13514 required the submission of Strategic Sustainability Performance Plans (“SSPP”) to ensure integration of this EO into agency budgeting and decision-making.¹⁰³ This EO essentially had the effect of prioritizing climate change planning in federal processes.¹⁰⁴ EO 13693, signed in March 2015, built on the earlier order by further specifying roles within the government to manage sustainability.¹⁰⁵ Of note, EO 13693 singled out DoD (among others) to “convene regional interagency workgroups to identify and address . . . climate change preparedness and resilience planning in coordination with State, local, and tribal communities”¹⁰⁶

In 2013, the President also issued the Climate Action Plan.¹⁰⁷ This document summarized the President’s climate change priorities focusing on both mitigation and adaptation.¹⁰⁸ It again called on federal agencies

⁹⁸ *Id.* at 333.

⁹⁹ *See* Exec. Order No. 13,690, 80 Fed. Reg. 6,425 (Feb. 4, 2015).

¹⁰⁰ Exec. Order No. 13,693, 80 Fed. Reg. 15,871, 15,880 (Mar. 25, 2015).

¹⁰¹ Exec. Order No. 13,514, 3 C.F.R. § 248 (2010).

¹⁰² *Id.*

¹⁰³ *Id.* at 255.

¹⁰⁴ *Id.* (stating “each agency Plan shall[] . . . evaluate agency climate-change risks and vulnerabilities to manage the effects of climate change on the agency’s operations and mission in both the short and long term . . .”).

¹⁰⁵ Exec. Order No. 13,693, 80 Fed. Reg. at 15,871.

¹⁰⁶ *Id.* at 15,879.

¹⁰⁷ *See* EXEC. OFFICE OF THE PRESIDENT, THE PRESIDENT’S CLIMATE ACTION PLAN (2013), <https://www.whitehouse.gov/sites/default/files/image/president27climateactionplan.pdf> [<https://perma.cc/ST49-9YEK>].

¹⁰⁸ *See id.* at 4–5.

to prioritize resilience planning and adaptation efforts, as well as comprehensively coordinate with local, state, and tribal governments.¹⁰⁹

2. DoD Adaptation Policy

Like other applicable departments and agencies, the Department of Defense began the task of implementing these Executive Orders and began promulgating guidance. However, there had been some movement to begin to address the broader problem of climate change and the specific problem of sea level rise from a national security perspective. As far back as 2003, researchers within the Department conducted a study called “An Abrupt Climate Change Scenario and Its Implications for United States National Security.”¹¹⁰ Apart from this, however, it was not until 2009 that large initiatives started to take place. In 2009, the Navy formed its Task Force Climate Change.¹¹¹ The Chief of Naval Operations formed this Task Force with the mission of studying climate change impacts first on Navy Arctic policy, and later on climate change effects on the Force itself.¹¹² The Task Force developed and released the Navy’s Climate Change Roadmap in May 2010.¹¹³ This was a broad document that addressed many of the strategic and operational impacts that climate change would have on Navy missions.¹¹⁴ Included in the document, though, were recommendations to study sea level rise effects and make investments in adaptation.¹¹⁵

That same year, the release of the 2010 Quadrennial Defense Review (“QDR”) showed a true shift in how seriously the entire department would begin addressing the overall climate change problem. The 2010 QDR has really served as the “foundation” of DoD’s current outlook on climate change.¹¹⁶ The 2010 QDR listed impacts on defense installations as one of the “two broad ways” that climate change would affect

¹⁰⁹ *Id.* at 12–13.

¹¹⁰ See PETER SCHWARTZ & DOUG RANDALL, AN ABRUPT CLIMATE CHANGE SCENARIO AND ITS IMPLICATIONS FOR UNITED STATES NATIONAL SECURITY (2003), <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA469325> [<https://perma.cc/YB8D-UQPG>].

¹¹¹ U.S. NAVY TASK FORCE CLIMATE CHANGE, *supra* note 13.

¹¹² ADM J.W. GREENERT, VICE CHIEF OF NAVAL OPERATIONS, TASK FORCE CLIMATE CHANGE CHARTER 2 (2009), <http://greenfleet.dodlive.mil/files/2010/09/Task-Force-Climate-Change-Charter.pdf> [<https://perma.cc/7H4Z-BESP>].

¹¹³ U.S. NAVY TASK FORCE CLIMATE CHANGE, *supra* note 13.

¹¹⁴ See generally NAVY CLIMATE CHANGE ROADMAP, *supra* note 14.

¹¹⁵ See *id.* at 13–17.

¹¹⁶ 2014 DoD ROADMAP, *supra* note 16, at 2.

DoD operations.¹¹⁷ It specifically called on the use of the Strategic Environmental Research and Development Program (SERDP), an organization of multiple federal departments and agencies of which DoD is a part, to study the problem more fully and “develop climate change assessment tools.”¹¹⁸ The SERDP studies began in the years that followed, culminating in a 360-plus page report on coastal installations that was released in 2014.¹¹⁹ These have provided the quantitative basis for understanding the exact impacts that sea level rise will have on DoD infrastructure.

In 2012, the department promulgated its first Climate Change Roadmap, which laid out plans to implement EO 13514.¹²⁰ Georgetown Climate Center, on their website, summarizes the roadmap’s four goals as follows: “(1) Define a coordinating body to address climate change; (2) utilize a robust decision-making approach based on the best available science; (3) integrate climate change considerations into existing processes; and (4) collaborate with Federal agencies and other key partners on challenges of climate change.”¹²¹ The Roadmap further pointed out that the Department was pushing forward with climate change adaptation and resilience projects and was studying the effects of climate change on coastal military bases.¹²²

In 2014, the Department released a new Climate Change Roadmap that continued the push to further adopt climate change and sea level rise planning into DoD operations.¹²³ Specifically, the 2014 Roadmap had the stated purpose of “increas[ing] the Department’s resilience to the impacts of climate change.”¹²⁴ Secretary of Defense Chuck Hagel even specifically singled out Hampton Roads in his foreword to the document.¹²⁵ Among other things, the Roadmap delegated authority over climate change resilience to the Undersecretary of Defense for Installations and Environment, reported on implementation of Executive Orders 13514 and 13653, and updated Department-wide goals.¹²⁶

¹¹⁷ 2010 QDR, *supra* note 12, at 84–85.

¹¹⁸ *Id.* at 86.

¹¹⁹ See BURKS-COPES ET AL., *supra* note 58.

¹²⁰ See U.S. Department of Defense 2012 Climate Change Adaptation Roadmap, GEORGETOWN CLIMATE CENTER, <http://www.georgetownclimate.org/resources/us-department-of-defense-2012-climate-change-adaptation-roadmap> [<https://perma.cc/6ENL-4NHV>] (last visited Oct. 24, 2016).

¹²¹ *Id.*

¹²² *Id.*

¹²³ See 2014 DOD ROADMAP, *supra* note 16.

¹²⁴ *Id.* at 1.

¹²⁵ Chuck Hagel, Foreword, 2014 DOD ROADMAP, *supra* note 16.

¹²⁶ 2014 DOD ROADMAP, *supra* note 16, at 1–3.

Finally, and most recently as of this writing, the DoD released a comprehensive directive focused solely on climate change adaptation—DoD Directive 4715.21: Climate Change Adaptation and Resilience.¹²⁷ This directive's purpose specifically states that it is in response to EO 13653 and that it will apply the 2014 DoD Climate Change Roadmap guidance by assigning direct responsibilities and promulgating guidance to those officials.¹²⁸ Of most relevance here, the directive: (1) assigns the role of “primary climate change adaptation official” to the Assistant Secretary for Energy, Installations, and Environment (“ASD(EI&E)”) with responsibility to “develop[] DoD climate change adaptation and resilience policy”; (2) tasks the ASD(EI&E) to “[o]verse[e] . . . research, development, testing, and evaluation programs” related to adaptation/resilience efforts; (3) directs him or her to factor climate change resilience and adaptation planning into “installation planning and basing processes,” as well as advising on updates to the Unified Facilities Criteria; and (4) using the Joint Land Use Study Program (JLUS) to help “[e]ngage[] with State and local governments”¹²⁹ The points regarding JLUS and the Unified Facilities Criteria Program potentially represent an interesting way forward in utilizing tools already available to the Department when combating sea level rise.¹³⁰

In Hampton Roads, possibly one of the most visible DoD efforts at sea level rise adaptation has been the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Planning Pilot Project. While this is a voluntary intergovernmental working group that is looking at several sea level rise issues outside of military installation effects, it has been endorsed by the DoD as part of implementation of EO 13653.¹³¹

This pilot project involves stakeholders from across the spectrum, including federal, state, regional, and local governmental bodies, as well

¹²⁷ See DEP'T OF DEF., DIR. 4715.21: CLIMATE CHANGE ADAPTATION AND RESILIENCE (2016) [hereinafter DOD ADAPTATION DIRECTIVE], <http://www.dtic.mil/whs/directives/corres/pdf/471521p.pdf> [<https://perma.cc/8A75-6A2Q>].

¹²⁸ *Id.* at 1.

¹²⁹ *Id.* at 4–5.

¹³⁰ See *infra* Parts III.A and III.B (discussing both of these programs and their potential uses).

¹³¹ See *About the Intergovernmental Planning Project*, THE CENTER FOR SEA LEVEL RISE, <http://www.centerforsealevelrise.org/about-the-center-for-sea-level-rise/> [<https://perma.cc/2LFW-TXEL>] (last visited Oct. 24, 2016); Office of Undersec'y of Defense (Acquisition, Tech. & Logistics), Memorandum for Assistant Sec'y of the Army (Installations, Energy and Env't), Assistant Sec'y of the Navy (Energy, Installations and Env't), Assistant Sec'y of the Air Force (Installations, Energy and Env't): DoD Climate Preparedness and Resiliency Planning Projects (2014) (on file with author).

as academic and other non-governmental entities.¹³² The project has already completed “Phase I” of the project.¹³³ Phase I served as a foundational effort to bring all stakeholders together to amass all the various reports, studies, and best-practices into certain deliverables that will inform future efforts of the project.¹³⁴ It also firmly established the organizational structure.¹³⁵ Phase II is currently underway and will culminate in a Memorandum of Understanding that will end the pilot project and establish a permanent intergovernmental working group.¹³⁶ This has been an extremely valuable effort in helping to bridge any divides in the adaptation goals from both the DoD and local perspectives.

B. Local and State Sea Level Rise Adaptation Policy in Hampton Roads

Again, since DoD facilities are dependent on nearby localities, it is important also to take note of non-federal adaptation efforts. In Hampton Roads, as the effects of worsening sea level rise have become evident,¹³⁷ there has been some movement at the state, regional, and local levels to study the problem and implement adaptation efforts. However, like at the federal level, the sea level rise issue has been affected by the broader politics of climate change.¹³⁸ This has subjected state-level adaptation policy to the “pendulum swings” of state-wide elections.¹³⁹ Notwithstanding this fact, localities in Hampton Roads have been implementing some planning and adaptation efforts.¹⁴⁰ Below is a summary of recent sea level rise policy initiatives at both the state and regional/local levels.

¹³² HAMPTON ROADS SEA LEVEL RISE PREPAREDNESS AND RESILIENCE INTERGOVERNMENTAL PLANNING PILOT PROJECT, CHARTER 2–3 (2014) [hereinafter PILOT PROJECT CHARTER], <http://www.centerforsealevelrise.org/research-resources/pilot-project-resources/> [https://perma.cc/Q5UA-PSST].

¹³³ HAMPTON ROADS SEA LEVEL RISE PREPAREDNESS AND RESILIENCE INTERGOVERNMENTAL PILOT PROJECT, CHARTER 2–3 (2014) [hereinafter PHASE 1 REPORT] <http://www.centerforsealevelrise.org/research-resources/pilot-project-resources/> [https://perma.cc/Q5UA-PSST].

¹³⁴ See PILOT PROJECT CHARTER, *supra* note 132, at 1–2.

¹³⁵ PHASE 1 REPORT, *supra* note 133, at 12–13.

¹³⁶ THE CENTER FOR SEA LEVEL RISE, *supra* note 131.

¹³⁷ See *supra* Part I.B.

¹³⁸ Pollard, *supra* note 89, at 386–87; see also Atkinson et al., *supra* note 41, at 13 (noting that “[u]nfortunately, the issue has been highly politicized which has made a regional or state approach difficult.”).

¹³⁹ Pollard, *supra* note 89, at 387.

¹⁴⁰ *Id.* at 388.

1. State-Level Sea Level Rise Policy in Virginia

State-level policy in Virginia has been inconsistent in the recent past, showing conflicting periods of strong focus on the topic with serious lulls in state-led efforts at studying and combating sea level rise effects.¹⁴¹ Governor Tim Kaine established a Climate Change Commission in 2008 to tackle a number of issues, including both mitigation and adaptation efforts.¹⁴² The Commission affirmed sea level rise projections and produced a number of proposals to be implemented at all levels of government within Virginia.¹⁴³ Only a handful of these recommendations have been implemented with some in progress, and all of these implementations were at the local and not state level.¹⁴⁴

There has, within the last three years, been some slow movement within both the legislative and executive branches.¹⁴⁵ The General Assembly requested a Virginia Institute of Marine Science study on recurring flooding and later created subcommittees and panels that would develop recommendations on the issue of recurrent flooding.¹⁴⁶ Recently, the General Assembly ordered localities within the Hampton Roads Planning District to incorporate sea level rise adaptation in their long range land use plans.¹⁴⁷ Also, while the 2008 Commission's recommendations had been "effectively shelved" from 2010–2014,¹⁴⁸ recently elected Governor Terry McAuliffe established a new commission by executive order.¹⁴⁹ This new commission released their report in December 2015, which contained several positive recommendations, including some that have already been implemented.¹⁵⁰

¹⁴¹ See William Stiles et al., *The Policy Climate for Climate Change in Virginia: Overview of Adaptation Policy, Planning and Implementation Landscape*, 5 SEA GRANT L. & POL'Y J. 15, 20–22 (2013).

¹⁴² *Id.* at 20.

¹⁴³ See 2008 VIRGINIA COMMISSION, *supra* note 45, at 4–6, 32–39.

¹⁴⁴ See Stiles et al., *supra* note 141, at 21.

¹⁴⁵ See Pollard, *supra* note 89, at 387–88.

¹⁴⁶ *Id.*

¹⁴⁷ VA. CODE ANN. § 15.2-2223.3 (2016) ("Beginning July 1, 2015, any locality included in the Hampton Roads Planning District Commission shall incorporate into the next scheduled and all subsequent reviews of its comprehensive plan strategies to combat projected relative sea-level rise and recurrent flooding.").

¹⁴⁸ Pollard, *supra* note 89, at 387.

¹⁴⁹ Va. Exec. Order 19 (July 1, 2014), <https://governor.virginia.gov/media/3348/eo-19-convening-the-governors-climate-change-and-resiliency-update-commissionada.pdf> [<https://perma.cc/FVD5-97CU>].

¹⁵⁰ *Virginia Climate and Energy Profile*, GEORGETOWN CLIMATE CENTER, <http://www.georgetownclimate.org/adaptation/state-information/virginia/overview.html> [<https://perma.cc/FVD5-97CU>].

As one can see, there has been some progress at the state level in studying and producing recommendations to combat the problem. However, what is also clearly apparent is what has been called an “implementation gap” in Virginia state adaptation policy.¹⁵¹ This is significant because Virginia, as a Dillon’s Rule state, restricts the powers of its municipalities to that which is expressly or impliedly granted by the legislature.¹⁵² Therefore, localities are ultimately limited in the extent to which they can respond to the problem.¹⁵³

2. The Regional and Local Response

Despite inconsistent policies at the state level, there have been real successes on the ground in Hampton Roads localities.¹⁵⁴ While each locality in the region is ultimately responsible for their own individual long-range planning and infrastructure maintenance, state statute authorizes region-wide bodies to lend assistance on these issues.¹⁵⁵ One example is the Hampton Roads Planning District Commission (“PDC”).¹⁵⁶ PDCs in Virginia are provided for by statute and have the purpose of “encourag[ing] and facilitat[ing] local government cooperation and state-local cooperation in addressing on a regional basis problems of greater than local significance.”¹⁵⁷ The Hampton Roads PDC, along with another regional body—the Hampton Roads Transportation Planning Organization (“HR-TPO”)¹⁵⁸—has to

.cc/Q29L-NVD6] (last visited Oct. 24, 2016) (implementing recommendations include the appointment of a state “Chief Resiliency Officer” as well as “developing a state-wide protocol for sea-level rise projections.” Additional, not-yet-implemented recommendations include looking for ways to provide “technical” assistance to policy makers and exploring funding sources for resiliency efforts); *see also* GOVERNOR TERENCE R. MCAULIFFE’S CLIMATE CHANGE AND RESILIENCY UPDATE COMMISSION, REPORT AND FINAL RECOMMENDATIONS TO THE GOVERNOR (2015), <https://naturalresources.virginia.gov/media/5101/climate-commission-and-resiliency-update-commission-report.pdf> [<https://perma.cc/PXK4-8GHQ>].

¹⁵¹ Stiles et al., *supra* note 141, at 27.

¹⁵² *Id.* at 17 (stating that “municipal governments have only those powers which are expressly granted by the state legislature, those powers fairly or necessarily implied from expressly granted powers, and those powers which are essential and indispensable.” quoting *Commonwealth v. Cty. Bd. of Arlington Cty.*, 232 S.E.2d 30, 40 (Va. 1977)).

¹⁵³ *See id.* at 28.

¹⁵⁴ Pollard, *supra* note 89, at 388 (noting “[m]ost of the adaptation activity in Virginia has been at the local and regional level.”).

¹⁵⁵ *See* VA. CODE ANN. § 15.2-4207 (2016).

¹⁵⁶ *See About*, HAMPTON ROADS PLANNING DISTRICT COMM’N, <http://www.hrpdca.gov/page/about> [<https://perma.cc/L7ZH-WXFU>] (last visited Oct. 24, 2016).

¹⁵⁷ VA. CODE ANN. § 15.2-4207(A) (2016).

¹⁵⁸ *About Us*, HAMPTON ROADS TRANSPORTATION PLANNING ORG. <http://www.hrtpo.org/page/about-us> [<https://perma.cc/3GV6-Z6ZL>] (last visited Oct. 24, 2016) (stating that HR-TPO

date released several helpful studies and provided mechanisms that can support local government long-range planning efforts.¹⁵⁹

As stated, these regional bodies can only provide support and assistance. The localities themselves are required to conduct long range planning and to include sea level rise projections within those plans.¹⁶⁰ Even as of a few years ago, most Hampton Roads localities were already making headway in their local planning processes.¹⁶¹ Unfortunately, actual adaptation efforts have at times been uneven and “ad hoc.”¹⁶²

However, some localities have been leaders in their adaptation efforts. For example, the City of Norfolk, as of a few years ago, had already developed a “comprehensive ‘Flooding Strategy’.”¹⁶³ Further, one author labeled the city a “national leader in planning for sea level rise”¹⁶⁴ Additionally, Norfolk political leadership has been unafraid to publicly address the problem.¹⁶⁵ For example, Norfolk Mayor Paul Fraim has even publicly raised the possibility of a “managed retreat.”¹⁶⁶

Like at the state level, there is measured progress. However, there is still work to be done. Current gaps exist in local abilities to meet high-cost adaptation demands as well as a coherent region-wide response that goes beyond the planning stage to actual implementation.¹⁶⁷ Again, these issues are important to consider from a defense perspective based on the need for a concerted effort across all levels of government to address the sea level rise issue.

C. *Legal Issues with the Current Sea Level Rise Response*

In the face of Congressional inaction, the President has taken several executive actions to spur federal agencies into taking into account

is the federally mandated Metropolitan Planning Organization for the Hampton Roads area. It has the mission “to conduct a continuing, cooperative and comprehensive transportation planning process.”)

¹⁵⁹ Pollard, *supra* note 89, at 388–89.

¹⁶⁰ See VA. CODE ANN. §§ 15.2-2223 to 2223.3 (2016).

¹⁶¹ See Stiles et al., *supra* note 141, at 25 (Table 2).

¹⁶² *Id.* at 16, 27.

¹⁶³ Atkinson et al., *supra* note 41, at 14.

¹⁶⁴ Pollard, *supra* note 89, at 389 (including examples of “conducting flooding studies, adopting a coastal resilience strategy, and developing a billion-dollar package of floodwalls, tide gates, elevated roadways, and other projects to protect houses and infrastructure.”).

¹⁶⁵ See Stiles et al., *supra* note 141, at 26.

¹⁶⁶ *Id.*

¹⁶⁷ See Pollard, *supra* note 89, at 389.

climate change resilience planning.¹⁶⁸ While a lot of this Note up to this point has examined the specific, “on-the-ground” causes/effects of sea level rise, as well as responses at various levels of government, this subject actually invokes large, overarching, and consequential legal issues. Because much activity up to this point has occurred without explicit Congressional authorization, this implicates both the power of the Executive to act within its discretion outside of explicit Congressional authority and the amount of discretion agencies have when acting within existing statutory frameworks.

1. Constitutional Considerations

Both the Legislature and the Executive have explicit powers granted by the Constitution regarding the military. Implicated in the context of the DoD’s response to sea level rise, Congress generally has the power “[t]o raise and support Armies”¹⁶⁹ as well as “[t]o provide and maintain a Navy.”¹⁷⁰ This refers to Congress’ so-called “power of the purse” or spending power for national defense.¹⁷¹ The President, on the other hand, is expressly designated as the Commander-in-Chief of the Armed Services.¹⁷² Additionally, the President “shall take [c]are that the Laws be faithfully executed.”¹⁷³ With this basic foundation of constitutional powers, one can easily see the conflict that could arise with these potentially conflicting powers.

Commander Mark Nevitt, writing in the *Cardozo Law Review*, described the implications that can arise with an active President responding to climate change scenarios regarding the military in the face of an inactive Congress.¹⁷⁴ He outlines the full range of needed responses to climate change by the military, from increased humanitarian assistance operations, to increased domestic support to civil authorities, to responding to sea level rise on coastal military installations.¹⁷⁵ He concludes that

¹⁶⁸ See *supra* Part II.A.

¹⁶⁹ U.S. CONST. art. I, § 8, cl. 12.

¹⁷⁰ *Id.* art. I, § 8, cl. 13.

¹⁷¹ Mark P. Nevitt, *The Commander in Chief’s Authority to Combat Climate Change*, 37 *CARDOZO L. REV.* 437, 452 (2015).

¹⁷² U.S. CONST. art. II, § 2, cl. 1 (stating: “The President shall be Commander in Chief of the Army and Navy of the United States, and of the Militia of the several States, when called into the actual Service of the United States . . .”).

¹⁷³ *Id.* at art. II, § 3.

¹⁷⁴ See Nevitt, *supra* note 171.

¹⁷⁵ See *id.* at 443–48.

the President has far more power to respond outside of America's borders to the effects of climate change than the President does to impacts climate change has on military installations.¹⁷⁶

Nevitt's analysis centered on the landmark U.S. Supreme Court case *Youngstown Sheet & Tube Co. v. Sawyer*, also commonly known as the Steel Seizure Case.¹⁷⁷ Justice Jackson's famous concurrence in this opinion breaks down the President's relative power to pursue certain courses of action in relation to Congress into three broad categories: when the President (1) pursues an action that is directly authorized by Congress; (2) pursues an action that Congress has neither expressly denied or outright authorized; and (3) pursues an action that Congress has prohibited.¹⁷⁸ The President's power is most legally secure when he is acting with the authority of Congress,¹⁷⁹ and is at its "lowest ebb" when acting "incompatible with the expressed or implied will of Congress."¹⁸⁰

The *Youngstown* analysis is instructive here. Unlike when the President orders the military to respond to a natural disaster abroad or even within America's borders, funding sea level adaptation projects falls squarely within Congress' spending power.¹⁸¹ It is clear then, if Congress, for example, specifically prohibited sea level rise adaptation efforts, the President would be under the third and weakest *Youngstown* category.¹⁸² Outside of simply refusing to sign or threatening to veto such a bill,¹⁸³ the President would have little power to overcome a specific prohibition passed by Congress under its mandate to fund the military.¹⁸⁴ This separation of powers analysis is a highly important consideration as it is entirely possible that Congress' passive inaction may turn to a concerted effort to limit or prohibit the DoD from pushing forward with adaptation efforts.¹⁸⁵

¹⁷⁶ See *id.* at 475–76.

¹⁷⁷ See *id.* at 473–76.

¹⁷⁸ *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 635–38 (1952).

¹⁷⁹ *Id.* at 635.

¹⁸⁰ *Id.* at 637.

¹⁸¹ Nevitt, *supra* note 171, at 473 (noting that "[i]nvesting in climate resilient infrastructure requires congressional approval because it ultimately flows from Congress's constitutional power of the purse.").

¹⁸² *Id.* at 474.

¹⁸³ See U.S. CONST. art. I, § 7, cl. 2 (describing the President's role in approving or vetoing bills).

¹⁸⁴ See Nevitt, *supra* note 171, at 474.

¹⁸⁵ See Goodell, *supra* note 2.

2. Statutory Considerations

In addition to the broader separation of powers issues, questions also arise regarding how much discretion the DoD already has to pursue adaptation efforts through both the regular defense appropriations process, and additionally through already-existing statutes. Since sea level rise adaptation mainly centers on military construction projects, this issue implicates existing laws that govern both appropriations and authorizations for defense spending.¹⁸⁶

Congress legally authorizes the DoD through the “increasingly complex” annual National Defense Authorization Act (“NDAA”).¹⁸⁷ As authorizing legislation, it sets parameters and gives legal basis for DoD undertakings and expenditures.¹⁸⁸ Following this is the regular Department of Defense Appropriations Act and sometimes other appropriations bills that Congress passes in order to fund the Department’s authorizations.¹⁸⁹ Finally, “DoD must also continually spend the money appropriated by Congress consistent with fiscal law principles governing purpose, time, and amount.”¹⁹⁰

While these authorizations and appropriations bills “appropriate funds for baseline military operations” and “provide maximum amounts . . . and additional purposes for which the funds may be drawn,” military construction projects are specifically funded under the Military Construction and Veterans Affairs, and Related Agencies Appropriations Act.¹⁹¹ Construction projects are generally approved by the individual services and are ultimately authorized and appropriated by Congress through this distinct fiscal process.¹⁹² A statute also allows that “minor military projects” can either be: (1) taken by the service secretary from appropriations for “operation and maintenance” for up to \$1,000,000¹⁹³ and (2) the DoD

¹⁸⁶ Nevitt, *supra* note 171, at 468.

¹⁸⁷ *Id.* at 466–67.

¹⁸⁸ See JESSICA TOLLESTRUP, THE CONGRESSIONAL APPROPRIATIONS PROCESS: AN INTRODUCTION 11 (Congressional Research Service ed. 2014) (noting that “[a]uthorization acts establish, continue, or modify agencies or programs.”).

¹⁸⁹ *Id.* at 12 (stating “[a]ppropriations measures provide new budget authority for programs, activities, or agencies previously authorized.”).

¹⁹⁰ Nevitt, *supra* note 171, at 468.

¹⁹¹ *Id.*

¹⁹² *Id.* at 468–69 (citing the statute that defines a military construction project as “construction, development, conversion, or extension of any kind carried out with respect to a military installation, whether to satisfy temporary or permanent requirements . . .” 10 U.S.C. § 2801(a) (2016)).

¹⁹³ Nevitt, *supra* note 171, at 469–70 (citing 10 U.S.C. § 2805(c)).

has the discretion to implement an “unspecified” development for up to \$3,000,000, and can increase that amount to \$4,000,000 if it “is intended solely to correct a deficiency that is life-threatening, health-threatening, or safety-threatening.”¹⁹⁴ All the various complex fiscal legal constraints are beyond the scope of this Note, but these broad funding statutes are some of the more significant ones that affect and ultimately constrain sea level rise adaptation efforts taken by the DoD on its own.

III. ADAPTING EXISTING FRAMEWORKS TO COMBAT SEA LEVEL RISE

While much has already been done to begin to address the sea level rise issue, much work certainly lies ahead. Assuming the absence of an overarching statutory response from Congress, the question then becomes—what more can be done under existing frameworks to further address the issue? Along with that inquiry, other questions arise such as the legal questions regarding the proper levels of authority.

In Hampton Roads (and the DoD broadly), there are three areas in which progress can be made under existing frameworks. First, Hampton Roads installations can continue to maximize discretionary use of construction and repair money in order to fund future adaptation projects. Additionally, the DoD needs to finish revising its Unified Facilities Criteria to more fully implement adaptation and resiliency concepts. Second, as has already been suggested in the recent DoD Climate Change Directive,¹⁹⁵ installations and the local region need to take advantage of the existing Joint Land Use Study (“JLUS”) program to better close coordination gaps. Finally, the DoD needs to recommend that Congress authorize a new Base Realignment and Closure (“BRAC”) Commission, and the Commission needs to use sea level rise and climate change factors as important criteria when formulating recommendations.

A. *Adapting Installations: Maximizing Use of the Unified Facilities Criteria and the Military Construction Appropriations System*

As has already been discussed, large or “major,” military construction projects require congressional approval, which may present issues in the current political environment. This forces the military to reach

¹⁹⁴ 10 U.S.C. § 2805(a)(2).

¹⁹⁵ See DOD ADAPTATION DIRECTIVE, *supra* note 127, at 5.

into other appropriations in order to fund adaptation. For new projects, the Services still have discretion to spend within one million and three-to-four million dollar caps for “minor” developments.¹⁹⁶ While this doesn’t sound like much, it could at least be a partial solution continuing forward and would ensure that smaller adaptation projects are implemented.

However, this is ultimately not a strong solution for a couple of reasons. Many of the adaptation projects that need to be completed are vastly more expensive than what these small levels allow.¹⁹⁷ For example, at Naval Station Norfolk, the cost of updating one pier has been estimated at thirty-five to forty million dollars.¹⁹⁸ Also, the current DoD directive for military construction discourages the overuse of discretionary categories.¹⁹⁹ Balanced against other policy considerations such as overall fiscal constraints, this policy should probably stay unchanged.

What may prove more effective are the Services’ repair funds.²⁰⁰ Title 10 allows the Secretary of a military department to spend up to \$7.5 million for a repair project drawn from operation and maintenance funds without congressional notification.²⁰¹ Installations could use this larger amount to better fund adaptation efforts concerning existing facilities, especially when restoring facilities damaged by sea level rise effects, for example. Examples might include some of the adaptation-focused repairs at Langley discussed *supra* in the introduction²⁰². It is important to note here that while Congress has been absent on many climate change issues, this does not mean the institution has been halting all military construction that represents progress in the adaptation effort. For example, the recently passed 2016 budget allocated large sums of money for military-wide construction projects that included repairs to Naval Station Norfolk piers.²⁰³

¹⁹⁶ See *supra* Part II.C.

¹⁹⁷ Nevitt, *supra* note 171, at 440 n. 10 (noting one estimate that places upgrading Naval Station Norfolk’s infrastructure as high as \$460 million, citing FORBES TOMPKINS & CHRISTINA DECONCINI, WORLD RES. INST., SEA-LEVEL RISE AND ITS IMPACT ON VIRGINIA 2 (2014)).

¹⁹⁸ Matt Connolly, *Hampton Roads, Virginia and the Military’s Battle Against Sea Level Rise*, 27 BRIEFER 1, 3 (2015).

¹⁹⁹ UNDERSEC’Y OF DEF. FOR ACQUISITION, TECH. & LOGISTICS, DOD DIRECTIVE 4270.5: MILITARY CONSTRUCTION 2 (2005) [hereinafter DOD CONSTRUCTION DIRECTIVE], <http://www.dtic.mil/whs/directives/corres/pdf/427005p.pdf> [<https://perma.cc/N38C-DH9G>].

²⁰⁰ 10 U.S.C. § 2811(e) (defining repair projects as “a project to restore a real property facility, system, or component to such a condition that it may effectively be used for its designated functional purpose.”).

²⁰¹ *Id.* § 2811(d).

²⁰² See *supra* Introduction.

²⁰³ Hugh Lessig, *Defense policy bill passes, allows funding for projects in Hampton Roads*,

Since the prioritization task falls on the Services themselves, this part of the process becomes very important as well. A Government Accountability Office (“GAO”) study released in 2014 found that adaptation projects were being severely under-prioritized next to other construction projects.²⁰⁴ A lot of this had to do with institutional considerations as “[i]n-stallation officials explained that they generally have not proposed projects to address potential climate change impacts or vulnerabilities because they believe that adaptation projects will not compete well in the . . . processes for approving and funding potential projects.”²⁰⁵ It next points out that this will leave large gaps between the Department’s overall goals (as outlined in the stacks of policy papers and studies that have been released since 2009) and what is actually being achieved at the installation level.²⁰⁶

The study gives an example of a Navy shipyard needing to build up flood protection in order to prevent damage to vessels in dry dock.²⁰⁷ While the study does not specifically identify where this shipyard is located, this type of project would be very applicable to somewhere like Norfolk Naval Shipyard. The study recommends that climate change effects need to be made an explicit criteria for proposing and funding construction projects—whether they be new, individual projects, or parts of existing projects.²⁰⁸ In some of the DoD’s responses to the study’s recommendations, it affirmed that among other initiatives, it was working to revise one such mechanism that can potentially help work climate change adaptation more firmly into everyday decision-making—the Unified Facilities Criteria.²⁰⁹

The UFC is “analogous to state and local zoning and building regulations, and is utilized by military planners and engineers to design and build new military construction.”²¹⁰ The UFC “is [also] de-linked from

DAILY PRESS (Oct. 7, 2015), <http://www.dailypress.com/news/military/dp-nws-ndaa-hampton-roads-20151007-story.html> [<https://perma.cc/Z6CG-DKSE>].

²⁰⁴ U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-14-446, CLIMATE CHANGE ADAPTATION: DoD CAN IMPROVE INFRASTRUCTURE PLANNING AND PROCESSES TO BETTER ACCOUNT FOR POTENTIAL IMPACTS 39 (2014) [hereinafter 2014 GAO Report], <http://www.gao.gov/assets/670/663734.pdf> [<https://perma.cc/R2KT-WHQA>].

²⁰⁵ *Id.* at 43 (stating that “[i]f installation officials believe that potential adaptation projects will not be approved, the number of adaptation projects they propose is likely to be fewer than it might otherwise be . . .”).

²⁰⁶ *Id.* at 39.

²⁰⁷ *Id.* at 39–40.

²⁰⁸ 2014 GAO REPORT, *supra* note 204, at 45–46.

²⁰⁹ *Id.* at 47.

²¹⁰ Nevitt, *supra* note 171, at 470.

the . . . service-focused military construction and funding process.”²¹¹ For these two reasons, it is a great vehicle to ensure resiliency and adaptation measures are factored into any new military construction project.

The current UFC master planning document, released in 2012, refers to “climatic conditions” that need to be taken into account, and also refers to the National Climate Assessment as a source of data for future conditions.²¹² However, the document does not go further than that and does not define the terms, nor does it make climate change planning a requirement.²¹³ As stated earlier, the GAO tied its recommendations to the UFC, and the DoD stated it was in the process of revising these planning documents.²¹⁴ This was partially achieved in the release of the recent Climate Change Adaptation and Resiliency Directive,²¹⁵ but the criteria itself is in need of updating with the completion of the sea level rise studies. Once the UFC contains specified adaptation requirements, military construction efforts will then take it into account regardless of the funding source.²¹⁶

B. Coordination with Relevant Localities: DoD Should Expand the Use of the Joint Land Use System Program to Address Sea Level Rise

The JLUS program stems from initiatives begun in the 1970s and has been a useful tool for both the DoD and local communities.²¹⁷ The studies are administered by the Office of Economic Adjustment (“OEA”) and provide a mechanism through which DoD and local communities can coordinate and develop joint plans to both decrease the impacts of military activities and ensure local development does not hinder installation effectiveness.²¹⁸ The process usually begins when a military base alerts the OEA that there may be impacts on mission readiness due to local

²¹¹ *Id.*

²¹² DEP’T OF DEF., UNIFIED FACILITIES CRITERIA (UFC) 2-100-01: INSTALLATION MASTER PLANNING ¶ 3-5.6.2.3 (2012), http://www.wbdg.org/ccb/DOD/UFC/ufc_2_100_01.pdf [<https://perma.cc/2CUR-U7WK>].

²¹³ Nevitt, *supra* note 171, at 470.

²¹⁴ 2014 GAO REPORT, *supra* note 204, at 56–57.

²¹⁵ See DOD ADAPTATION DIRECTIVE, *supra* note 127, at 5.

²¹⁶ See DOD CONSTRUCTION DIRECTIVE, *supra* note 199, at 5.

²¹⁷ OFFICE OF ECONOMIC ADJUSTMENT, DEP’T OF DEF., JOINT LAND USE STUDY PROGRAM 2 (2007), http://www.mrrpc.com/Misc_pdfs/JLUS_Program_overview_1.pdf [<https://perma.cc/22LS-A9K4>].

²¹⁸ *Id.* at 1.

development, referred to as encroachment.²¹⁹ The OEA will then evaluate the situation based on available studies (usually looking at issues like jet noise).²²⁰ If both the installation and localities feel that a JLUS process would be beneficial, the process will go forward.²²¹ The process includes a study for which the OEA can provide technical assistance and potentially funding for under Title 10.²²² The final product is a set of recommendations that can affect, for example, a locality's land use ordinances and building codes.²²³ Essentially, a JLUS is utilized to build accord between the installation and neighboring communities.²²⁴

Encroachment has been defined broadly as "the cumulative result of any and all outside influences that inhibit normal military training and testing."²²⁵ One such example is the increase of urban and suburban sprawl near military bases that both interferes with neighboring localities' use and enjoyment of their land and also in some cases may inhibit military readiness.²²⁶ This broad definition could potentially leave an opening to utilize JLUS to develop coordinated sea level rise adaptation plans to a region like Hampton Roads.

What would be innovative about such a plan is both that it targets a problem like sea level rise, which is normally outside the usual definition of encroachment,²²⁷ and it would bring in both regional and local actors from across a large area. A Hampton Roads sea-level-rise-focused JLUS would involve not just multiple regional planning bodies and local governments, it would likely involve multiple installations across differing branches of service.

A Hampton Roads sea-level-rise JLUS could have multiple positive outcomes. First, it could serve as a way to increase information flow between the DoD and local communities. Sometimes it is hard for the military to communicate its needs due to security concerns, but within

²¹⁹ *Id.*

²²⁰ *Id.*

²²¹ *Id.*

²²² OFFICE OF ECONOMIC ADJUSTMENT, *supra* note 217, at 2–3; 10 U.S.C. § 2391 (2016).

²²³ OFFICE OF ECONOMIC ADJUSTMENT, *supra* note 217, at 2–3.

²²⁴ *Id.* at 3.

²²⁵ Ryan Santicola, *Encroachment: Where National Security, Land Use, and the Environment Collide*, 10 ALBANY L. ENVTL. OUTLOOK J. 329, 331 (2005) (internal quotes omitted).

²²⁶ *Id.* at 335.

²²⁷ See EDAAW, INC., EXECUTIVE SUMMARY: HAMPTON ROADS JOINT LAND USE STUDY (2005), <http://www.vbgov.com/government/offices/green/land-development/Documents/hr-joint-land-use-study.pdf> [<https://perma.cc/5M6F-D25G>] (showing an example of a JLUS that was conducted looking at usual issues like jet noise).

reason, DoD installations would now have a mechanism to let localities know what their concerns are from a readiness standpoint (i.e., communications or electricity redundancy). Second, it can increase information flow between localities and agencies. Some localities have put into place more adaptation measures than others.²²⁸ This forum will be one in which localities can identify common shortfalls and then produce plans to put into place coordinated solutions. Third, JLUS has a funding component that will provide grants to help fund the months-long study.²²⁹ This will be a help to the more resource-strapped localities.

As of this writing, just such a JLUS has been proposed and is slated to get started in Hampton Roads.²³⁰ Hopefully, this process will be a positive one and identify solutions to some of the areas outlined. Its results will hopefully provide concrete ways forward to neighboring areas.

C. *Retreat as Adaptation: Base Closures and Realignment*

Congress passed the Defense Base Realignment and Closure Act (“BRAC”) initially to establish a process to make cost-saving decisions on installation management more efficient and less political.²³¹ In the past, an independent commission has been appointed to review a list of DoD-recommended base closures and realignments.²³² The Commission then publishes its recommendations that will automatically take effect unless Congress and the President pass a law that rejects the recommendations within a certain period of time.²³³ This commission system is no longer authorized by statute, with the last authorized round of BRAC closures

²²⁸ Stiles et al., *supra* note 141, at 25–27.

²²⁹ See 10 U.S.C. § 2391 (2016).

²³⁰ See CAPTAIN J.P. RIOS, CEC, USN, HOW NAVAL FACILITIES IN HAMPTON ROADS ARE COPING WITH RISING RELATIVE SEA LEVELS 5–7 (2015), http://www.centerforsealevelrise.org/wp-content/uploads/2015/12/Rios_NAVFAC.pdf [<https://perma.cc/45R3-8PAZ>] (describing a recently proposed JLUS that would tentatively be complete in 2017).

²³¹ See George Schlossberg, *How Congress Cleared the Bases: A Legislative History of BRAC*, 1 J. OF DEF. COMMUNITIES 1, 11 (2012).

²³² See *id.* at 2–9; see also 10 U.S.C. § 2687(g)(3) (2016) (defining realignment as “any action which both reduces and relocates functions and civilian personnel positions, but does not include a reduction in force resulting from workload adjustments, reduced personnel or funding levels, skill imbalances, or other similar causes.”).

²³³ CHRISTOPHER M. DAVIS, “FAST TRACK” LEGISLATIVE PROCEDURES GOVERNING CONGRESSIONAL CONSIDERATION OF A DEFENSE BASE CLOSURE AND REALIGNMENT (BRAC) COMMISSION REPORT 1 (CRS 2013), <https://www.fas.org/sgp/crs/natsec/R43102.pdf> [<https://perma.cc/2PKW-PLYD>].

occurring in 2005.²³⁴ The law still allows the DoD the ability to close and to realign bases on its own within certain constraints.²³⁵

Essentially, whether future base closures/realignments are pursued solely by the DoD or through the Commission, sea level rise projections must be included as important criteria. A future BRAC round (if authorized) could, among other priorities, clearly articulate a need for long-range sea level rise planning. Bases that are in the path of irreversible rising seas that threaten readiness at those locations should be scrutinized for closure/realignment. One such example in Hampton Roads is Langley Air Force Base. Many of the key commands based at Langley could be reassigned to inland, existing Air Force installations. Obviously, a base like Naval Station Norfolk, that berths ships, cannot be easily realigned. However, creative solutions, such as “hybrid floating piers,” have been put forward to retreat from a scenario where the base has become permanently compromised.²³⁶

CONCLUSION: CONGRESS, THE INDISPENSABLE PARTNER

As described in this Note, DoD and local communities have already done much and made some progress, albeit slow, in adapting Hampton Roads’ military installations to the rising seas. What should also be readily apparent is that Congress is the indispensable partner in this effort. While DoD has much room to act within its own power and the President can issue far-reaching Executive Orders, a real adaptation effort will not get underway until Congress gets on board. Until then, the military will continue to make any strides it can and hopefully maintain the highest levels of military readiness despite the ever-increasing problems of sea level rise.

²³⁴ See Schlossberg, *supra* note 231, at 4.

²³⁵ See 10 U.S.C. § 2687 (2016); see also Anthony J. Principi, *Time for a new BRAC*, CONGRESS BLOG (Sep. 3, 2015), <http://thehill.com/blogs/congress-blog/homeland-security/252594-time-for-a-new-brac> [<https://perma.cc/2MFA-KZAH>] (arguing for a new BRAC round and reminds readers that the DoD can still close bases through what he calls a “stealth BRAC,” written by a former BRAC Commission chairman).

²³⁶ KATHLEEN PAULSON & DALLAS MEGGITT, US NAVAL FACILITIES ENGINEERING SERVICE CENTER ENVIRONMENTAL PROGRAM ON CLIMATE CHANGE 5 (2008), <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA501921> [<https://perma.cc/6976-5B5K>].