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About the Virginia Coastal Policy Center

The Virginia Coastal Policy Center (VCPC) at William & Mary Law School provides science-based legal and policy analysis of ecological issues affecting the state's coastal resources, by offering education and advice to a host of Virginia's decision-makers, from government officials and legal scholars to non-profit and business leaders.

With two nationally prominent science partners – the Virginia Institute of Marine Science and Virginia Sea Grant – VCPC works with scientists, local and state political figures, community leaders, the military, and others to integrate the latest science with legal and policy analysis to solve coastal resource management issues. VCPC activities are inherently interdisciplinary, drawing on scientific, economic, public policy, sociological, and other expertise from within the University and across the country. With access to internationally recognized scientists at VIMS, to Sea Grant's national network of legal and science scholars, and to elected and appointed officials across the nation, VCPC engages in a host of information exchanges and collaborative partnerships.

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Please contact Elizabeth Andrews (eaandrews@wm.edu) if you have comments, questions, or suggestions.

VCPC grounds its pedagogical goals in the law school's philosophy of the Citizen Lawyer. VCPC students' highly diverse interactions beyond the borders of the legal community provide the framework for their efforts in solving the complex coastal resource management issues that currently face Virginia and the nation.

I. BACKGROUND: FLOODING RESILIENCY FUNDING

"Global average sea level has risen by about 7-8 inches (about 16-21cm) since 1990, with about 3 of those inches (about 7 cm) occurring since 1993."[1] Since both the ocean and the atmosphere are getting warmer, global sea levels are projected to rise at an increased rate over the coming centuries.[2] Unsurprisingly, rise in sea level disproportionately negatively impacts coastal communities.[3] For instance, a combination of high magnitude storms and sea level rise causes dangerous flooding to occur farther inland than in the past.[4] Higher sea levels will also cause communities to flood more frequently around high tide even in the absence of precipitation, a phenomenon known as "sunny day flooding."[5] "In the United States, almost 40 percent of the population lives in relatively high-population-density coastal areas, where sea level plays a role in flooding, shoreline erosion, and hazards from storms."[6]

The aforementioned situation has forced the federal government to take a larger role in ensuring that coastal communities become more "resilient."[7] Government agencies facilitate this objective by providing federal grants to states and localities or partnering in infrastructure projects to achieve resilience in local communities. To qualify for federal funding, federal agencies require that applicants include a benefit-cost analysis (BCA)[8] in their grant applications, or as part of the project feasibility study. Numerous factors, including the method used to conduct the BCA can influence low to moderate income (LMI) communities' ability to receive funding. In an effort to shed more light on this issue, this white paper analyzes select federal funding programs of three government agencies: the Federal Emergency Management Agency (FEMA), United States Department of Housing and Urban Development (HUD), and the United States Army Corps of Engineers (USACE). The paper also aims to summarize how these agencies conduct their BCAs, illustrating their similarities and differences; demonstrate how BCAs are used in real-life application through the case studies of City Line Apartments, Chesterfield Heights, and Norfolk and the Lafayette River; provide recommendations to localities on how to more effectively apply for grants or project funding; and lastly, make recommendations on how to better structure federal agencies' BCAs to ensure that projects involving LMI communities are fairly evaluated.

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[1] *Sea Level Rise*, GLOBALCHANGE.GOV, https://www.globalchange.gov/browse/indicators/global-sea-level-rise (last visited Oct. 20, 2019).
[2] *See Is Sea Level Rising?*, NAT'L OCEAN SERV., https://oceanservice.noaa.gov/facts/sealevel.html.
[3] *See id.*
[4] *See id.*
[5] *See* Carolyn Gramling, *'Sunny Day' High Tide Floods are on the Rise Along U.S. Coasts*, SCI. NEWS (July 15, 2019, 1:01 PM), https://www.sciencenews.org/article/sunny-day-high-tide-floods-are-rise-along-us-coasts (explaining that "such events can devastate coastal infrastructure – for example by disrupting traffic, inundating septic systems and salting farmlands.").
[6] *See* NAT'L OCEAN SERV., *supra* note 2.
[7] *See* National Disaster Resilience Competition, U.S. DEP'T OF HOUS. AND URBAN DEV., 1, 2 (June 2015), https://www.hud.gov/sites/documents/NDRCFACTSHEETFINAL.PDF ("A resilient community is able to resist and rapidly recover from disasters or other shocks with minimal outside assistance.").
[8] Different programs utilize varying names to address their benefit-cost analysis or comparison. For example, USACE uses the term "benefit-cost ratio" (BCR) when addressing the benefit-cost analysis process for USACE-sponsored projects, whereas FEMA uses the term "benefit-cost analysis." For simplicity, this paper will utilize benefit-cost analysis (BCA) in reference to all federal programs' benefit-cost analysis process.

II. FEDERAL GRANT PROGRAMS

A. Federal Emergency Management Agency

1. Background and Mission

In 1979, the Federal Emergency Management Agency (FEMA) was created by Executive Order 12127 with the broad objective of protecting the American people from catastrophes.[9] Today, FEMA "coordinates the federal government's role in preparing for, preventing, mitigating the effects of, responding to, and recovering from all domestic disasters, whether natural or man-made, including acts of terror."[10] FEMA's agency responsibilities are reflected in its mission statement, which is "helping people before, during, and after disasters," including flooding.[11]

2. FEMA Grant Programs

Even though FEMA is often known for its flood insurance program, the agency has three different grant programs that address minimizing future hazard risk and increasing resilience to flooding,[12] collectively known as Hazard Mitigation Assistance Grant Programs.[13] FEMA's mitigation and resilience programs are the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation Grant Program (PDM), while their Flood Mitigation Assistance (FMA) program targets structures with flood insurance.[14]

HMGP funding can only be distributed after the President asserts a disaster declaration as delineated by the Robert T. Stafford Disaster Relief and Emergency Assistance Act.[15] Conversely, the PDM grant program is not triggered by a natural disaster, and funds are awarded to states on a yearly basis, through a nationally competitive process.[16] Similarly, FMA funds are distributed to states annually through a nationally competitive process; however, the program is funded through

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[9] *About the Agency*, FEMA, https://www.fema.gov/about-agency.
[10] *Id.*
[11] *Id.*
[12] *Flood Resilience and Risk Reduction: Federal Assistance and Programs*, CONG. RESEARCH SERV., 1, 9-10 (July 15, 2018), https://fas.org/sgp/crs/misc/R45017.pdf.
[13] *See id.* at 10.
[14] *See id; see also Flood Mitigation Assistance Grant Program*, FEMA, https://www.fema.gov/flood-mitigation-assistance-grant-program:

> The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to states, territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually.

Id.
[15] CONG. RESEARCH SERV., *supra* note 12, at 10; *see also Robert T. Stafford Disaster Relief and Emergency Relief Act*, FEMA, https://www.fema.gov/robert-t-stafford-disaster-relief-and-emergency-assistance-act-public-law-93-288-amended (explaining that the Robert T. Stafford Disaster Relief and Emergency Assistance Act "constitutes the statutory authority for most Federal disaster response activities especially as they pertain to FEMA and FEMA programs").
[16] *See* CONG. RESEARCH SERV., *supra* note 12, at 10.

the National Flood Insurance Program's (NFIP) policyholders' insurance premiums, and applicants have to participate in the NFIP to receive funding.[17] Moreover, "the FMA Grant Program is focused on mitigating repetitive loss (RL) properties and severe repetitive loss (SRL) properties."[18]

3. FEMA BCA

FEMA requires its grant applicants[19] to perform a benefit-cost analysis (BCA) for any structural project.[20] Mitigation projects need to be "cost effective and designed to substantially reduce injuries, loss of life, hardship, or the risk of future damage and destruction of property."[21] Furthermore, the final step in the BCA is a benefit-cost ratio (BCR), and FEMA requires the BCR to be greater than or equal to 1.0 for a project to be considered for funding.[22] Additionally, the agency requires a seven percent discount rate to be used when calculating a project's BCR.[23]

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[17] *See id.*; *see also* Telephone Interview with Robert Coates, Hazard Mitigation Planning Coordinator, VA Dept. of Emergency Management (Sept. 25, 2019) (FMA funding is only available to those individuals who have a NFIP policy. If a home has this policy, FEMA does not distinguish between primary or secondary homes when distributing funds. If a home floods frequently, and the benefits to mitigate the home outweigh the costs, the homes, regardless of primary or secondary status, are likely to receive federal funding. This creates a situation where FEMA is unable to prioritize assisting needier individuals whose primary homes are being flooded on a regular basis as compared to those who have a flood insurance policy for their secondary homes.); FEMA, *supra* note 14.

[18] *Fact Sheet: FY 2017 Flood Mitigation Assistance (FMA) Grant Program*, FEMA, 1,1, https://www.fema.gov/media-library-data/1499793315357-c31fef3839ece1533d9fccfe5caee71d/FMA_FactSheet_FY2017_508.pdf; *see also Severe Repetitive Loss (SRL) Grant Program Resources (8)*, FEMA, https://www.fema.gov/media-library/resources-documents/collections/14 ("The Severe Repetitive Loss (SRL) grant program provides funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss structures insured under the National Flood Insurance Program."); *Repetitive Flood Claims Grant Program Fact Sheet*, FEMA, https://www.fema.gov/repetitive-flood-claims-grant-program-fact-sheet ("The Repetitive Flood Claims (RFC) grant program provides funding to reduce or eliminate the long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP) that have had one or more claim payment(s) for flood damages.").

[19] *Hazard Mitigation Assistance Guidance*, FEMA 1, 5 (Feb. 27, 2015), https://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf ("States, territories, and federally-recognized tribes are eligible Applicants for HMA programs.").

[20] *Understanding the FEMA Benefit-Cost Analysis Process*, Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures, FEMA, B-1, B-1, https://www.fema.gov/media-library-data/20130726-1506-20490-9382/fema259_app_b.pdf.

[21] *See id.*

[22] *See id.* (The BCR is a "project's total net benefits divided by its total project costs.").

[23] *See Benefit-Cost Analysis*, FEMA, https://www.fema.gov/benefit-cost-analysis; *see also Guidelines and Benefits for Benefit-Cost Analysis of Federal Programs, Circular A-94*, 1, 9, WHITE HOUSE, https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A94/a094.pdf.

To perform the BCA, FEMA requires applicants to consider risks,[24] benefits,[25] and costs.[26] Unlike other government agencies, FEMA allows grantees to download a BCA tool to streamline the calculation.[27] The tool was designed to evaluate an individual structure and its risk of flooding, but does not take into account social justice considerations, like vulnerabilities of the individual property owner.[28] FEMA's BCA approach is justified through their "statutory and regulatory requirements [that] require that [FEMA] fund projects to save lives, avoid damages to structure, avoid damages to infrastructure, and protect all of these built infrastructures."[29]

Moreover, the most recent Toolkit, Version 6.0, changed how BCAs are conducted.[30] The first step in the new Toolkit is to choose a structure type[31] regardless of the hazard or methodology applied.[32] Then, the user chooses one of the following flooding "hazards:" Riverine Flood; Coastal A Flood; Coastal V Flood; or Coastal Unknown Flood.[33] Finally, to assess projects relevant to mitigating those hazards, applicants can choose one of three different methodologies to calculate

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[24] FEMA, *supra* note 20, at B-1-B-2.

> Risk is defined in terms of expected probability and frequency of the hazard occurring, the people and the property exposed, and the potential consequences.....For example, the benefits of avoiding flood damage for a building in the 10-percent-annual-chance of flooding floodplain will be enormously greater than the benefits of avoiding flood damage for an identical building situated at the 0.001-percent-annual-chance of flooding level.....Property owners must understand how the choices they make could potentially reduce the risk of it being damaged by a natural disaster.

Id.

[25] *Id.* at B-2. Benefits are the "future damages or losses that are expected to be avoided as a result of the proposed mitigation project." Depending on mitigation project type some benefits may include: "building," "content," "displacement," "loss of business or rental income," "value of service," or "other," such as "debris removal costs."). *See id.* at B-2-B-3.

[26] *Id.* at B-4.

[27] *See* FEMA, *supra* note 23. *See generally Benefit Cost Toolkit Version 6.0*, FEMA, https://www.fema.gov/media-library/assets/documents/179903 (linking to downloadable toolkit for FEMA's Hazard Mitigation Assistance Grant Programs).

[28] Coates, *supra* note 17.

[29] *Climate Resilient Mitigation Activities (CRMA) Benefit-Cost Analysis Approaches*, FEMA, 1, 9 (2015), https://www.fema.gov/media-library-data/1468328601382-aaa5a22169a3c04c795edda845f36708/UPDATED_Benefit_Cost_CRMA_Projects_508.pdf.

[30] *See FEMA Benefit-Cost Analysis (BCA) Toolkit Version 6.0 User Guide*, FEMA, 1, 5 (May 2019), https://www.fema.gov/media-library-data/1571164308638-adf025324225d699f7d9ee53bc618fa8/Version_6.0_User_Guide.pdf.

[31] *See id.* at 17 (detailing that structures include the following: Residential Structure, Non-Residential Structure, Critical Facility, Utilities, Roads and Bridges).

[32] *See id.*

[33] *See id.* at 18; *see also Region II Coastal Analysis and Mapping*, FEMA, http://www.region2coastal.com/resources/coastal-mapping-basics/. Coastal A zones are defined as follows:

> Portions of the SFHA [Special Flood Hazard Area] landward of V zone (*i.e.*, areas where wave heights are computed as less than 3 feet) are mapped as 'A zones' on the FIRM [Flood Insurance Rate Map]. While the wave forces in coastal A zones are not as severe as those in V zones, there is still an added risk of damage or destruction of buildings.

Id. Coastal V zones are defined as follows:

> Coastal high hazard areas, labeled as 'V zones' on the FIRM, are the areas where the computed wave heights for the 1%-annual-chance flood are 3 feet or more. V zones are subject to more stringent building requirements and different flood insurance rates than other zones shown on the FIRM because these areas have a higher level of risk from flooding than other areas.

Id.

the BCR.[34] These methodologies are the Modeled Damages, Historic Damages and Professional Estimated Damages.[35]

The "full data" hazard modules in the previous Toolkit, like "Long-Form Flood," are now known as the "Modeled Damages" approach.[36] This methodology is not available for every analysis and depends on which hazard type and structure are chosen.[37] Additionally, the previous Damage Frequency Assessment module is now broken out into two new methodologies.[38] These methodologies are Historic Damages and Professional Expected Damages.[39] Both of these analyses are accessible under any aforementioned hazard, and which methodology is utilized depends on available data.[40] Regardless of which methodology is applied, a BCR of 1.0 or greater will be sufficient for applicants to meet FEMA's requirements in applying for hazard mitigation funds.[41]

On both the state and national level, FEMA uses mechanisms to evaluate projects that take into account more than just a BCR, factoring in social justice considerations.[42] On the state level, the Virginia Department of Emergency Management (VDEM) uses the Fiscal Stress Index, which "illustrates a locality's ability to generate additional local revenues from its current tax base relative to the rest of the commonwealth" in their project ranking.[43] Furthermore, VDEM also created a process for distributing mitigation funds that increased insight into the practice and encouraged stakeholder involvement.[44] Similarly, prior to the 2008 recession, FEMA invited state and local governments from all over the country to participate in a national review process to

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[34] *See id.* at 19.
[35] *See id.* (explaining that the "Damage Frequency Assessment (DFA) method is no longer a stand-alone module [like before] but is now contained within every hazard option as two separate analysis methods, based on available data").
[36] *See id.* at 20.
[37] *See id.* ("For example, the Modeled Damages Approach is available for a residential structure acquisition in the riverine flood hazard but is not available for a utilities or road drainage project.").
[38] *See id.* at 25.
[39] *See id.*
[40] *See id.* ("If your analysis is based on historic damage amounts and years with either known or unknown recurrence intervals, then you would use the "Historical Damages" method. If your analysis is based on damage estimates from a licensed professional with known recurrence intervals, then you would use the "Professional Expected Damages" approach.)
[41] Telephone Interview with FEMA BCA Helpline (Oct. 16, 2019).
[42] Coates, *supra* note 17.
[43] *Fiscal Stress Index*, VA. DEPT. OF HOUS. AND CMTY. DEV., https://www.dhcd.virginia.gov/fiscal-stress ("The three components are: 1) Revenue capacity per capita (the theoretical ability of the locality to raise revenue)[;] 2) Revenue effort (the amount of theoretical revenue capacity that the locality actually collects through taxes and fees[;][and] (3) Median household income."); *see also* Coates, *supra* note 17.
[44] 2019 Hazard Mitigation Assistance Stakeholder Workshop Summary from Va. Dept. of Hous. and Cmty. Dev. to Regional Staff (Oct. 10, 2019) (on file with author).

> The multi-step process includes 1) convening a stakeholder workshop to discuss grant topics and application evaluation criteria, 2) submission of proposals by applicants, 3) screening of projects by VDEM and solicitation of requests for information as needed, 4) conducting peer reviews, 5) performing model calculations, 6) conducting analysis, 7) making funding decisions, and 8) submitting selected projects to FEMA.

Id.; see also Coates, *supra* note 17.

distribute mitigation grants; however this comprehensive evaluation is seemingly no longer feasible on a nationwide scale.[45]

Today, on a national level, through the PDM program, FEMA can prioritize "small and impoverished communities" while operating within their statutory and regulatory guidelines.[46] Therefore, "[s]mall and impoverished communities may receive a Federal cost share of up to 90 percent of the total amount approved under the Federal award to implement eligible approved activities in accordance with the Stafford Act," but these communities must meet stringent criteria to receive funding.[47]

B. U.S. Department of Housing and Urban Development

1. Background and Mission

The Great Depression and its consequences drove the creation of the Department of Housing and Urban Development (HUD) as a federal agency.[48] During the 1930s, federal programs were enacted as a response to housing issues after the Great Depression.[49] In 1934, Congress created the Federal Housing Administration, which enabled a greater proportion of the population to afford homes through the creation of "mortgage insurance programs."[50] Then, in 1937, the U.S. Housing Act began assisting low income individuals through the development of public housing.[51] Decades later, in 1965, Congress created the cabinet-level agency known as

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[45] Va. Dept. of Hous. and Cmty. Dev, *supra* note 44; Coates, *supra* note 17.

[46] *See* FEMA, *supra* note 19, at 114; *see also Fact Sheet: Federal Insurance and Mitigation Administration*, FEMA, 1, 4 (Aug. 19, 2019), https://www.fema.gov/media-library-data/1566838030892-2ce88be44262b32999aecba3e383aa05/PDMFactSheetFY19Aug2019.pdf.

[47] FEMA, *supra* note 19, at 114.

> A small and impoverished community must:
>
> - Be a community of 3,000 or fewer individuals identified by the Applicant as a rural community that is not a remote area within the corporate boundaries of a larger city or jurisdictional area or boundary
> - Be economically disadvantaged, with residents having an average per capita annual income not exceeding 80 percent of the national per capita income, based on best available data . . .
> - Have a local unemployment rate that exceeds by 1 percentage point or more the most recently reported, average yearly national unemployment rate . . .
> - Meet other criteria required by the Applicant
>
> Applicants must certify and provide documentation of the community or jurisdictional status with the appropriate subapplication to justify the 90 percent cost share. If documentation is not submitted with the subapplication, FEMA will provide no more than the standard 75 percent of the total eligible costs.

Id. See also supra text accompanying note 15 (defining Stafford Act).

[48] *A Brief Historical Overview of Affordable Rental Housing*, NAT'L LOW INCOME HOUS. COAL., 1, 1, https://nlihc.org/sites/default/files/Sec1.03_Historical-Overview_2015.pdf.

[49] *Id.*

[50] *Id.* ("These programs made possible the low down payments and long-term mortgages that are commonplace today but were almost unheard of at the time.").

[51] *Id.*

HUD.[52] Today, HUD "oversees federal programs designed to help Americans with their housing needs," and "seeks to increase homeownership, support community development and increase access to affordable housing free from discrimination."[53] The agency's responsibilities are reflected in HUD's mission to "create strong, sustainable, inclusive communities and quality affordable homes for all," demonstrating HUD's goal of providing assistance for those in need.[54]

2. HUD Grant Programs

Even though HUD's goals are not specifically related to flooding or natural disasters, the agency has grant programs that provide funding opportunities for mitigation and resilience projects.[55] HUD offers different types of Community Development Block Grants (CDBG).[56] CDBG is a wide-ranging program that aids communities in meeting their development necessities.[57] Under this annually funded grant program,[58] HUD provides funding for twenty-seven different categories, one being "public works."[59] Flood resilience projects can fall under this "public works" category.[60] Additionally, at the state and local level, "buyouts of damaged properties in a floodplain and relocating residents to safer areas" may be eligible for funding as well.[61] Even though state and local government leaders may choose which types of resilience projects to employ in their respective geographic areas under CDBG, the program and what it funds is extremely broad; therefore, targeted grant programs may be more effective for applicants whose focus is on flood resilience.[62]

Even though the CDBG is funded annually, individual grant programs that are a part of the broad-based CDBG program are not.[63] First, Community Development Block Grants-Disaster Recovery (CDBG-DR) "has been funded at times through supplemental appropriations legislation

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[52] *Department of Housing and Urban Development*, ALLGOV, http://www.allgov.com/departments/department-of-housing-and-urban-development?detailsDepartmentID=572 (last visited Oct. 20, 2019) (explaining that the "FHA became part of the new Department of Housing and Urban Development created in September 1965").
[53] *Id.*
[54] *Mission*, U.S. DEP'T OF HOUS. AND URBAN DEV., https://www.hud.gov/about/mission.
[55] CONG. RESEARCH SERV., *supra* note 12, at 31.
[56] *See id.* at 31; *see also* National Disaster Resilience, U.S. DEP'T OF HOUS. AND URBAN DEV., https://www.hudexchange.info/programs/cdbg-dr/resilient-recovery/.
[57] Community Development Block Grant Program – CDBG, U.S. DEP'T OF HOUS. AND URBAN DEV., https://www.hud.gov/program_offices/comm_planning/communitydevelopment/programs.
[58] *Id.* ("The CDBG program provides annual grants on a formula basis to 1209 general units of local governments and states."); *Section 108 Loan Guarantee Program*, U.S. DEP'T OF HOUS. AND URBAN DEV., https://www.hudexchange.info/programs/section-108/. Additionally, the Section 108 Loan Guarantee Program

> offers [CDBG] recipients the ability to leverage their annual grant allocation to gain access to guaranteed loans large enough to pursue physical and economic development projects capable of revitalizing entire neighborhoods. This critical public investment is often needed to catalyze private economic activity in underserved areas in cities and counties across the nation. Section 108 loan guarantees are often the initial resource that provides the confidence private firms and individuals need to finance projects in areas that have experienced disinvestment.

Id.
[59] CONG. RESEARCH SERV., *supra* note 12, at 31.
[60] *Id.*
[61] *Id.*
[62] *See id.*
[63] *Id.*

and is tied to a specific disaster (and affected areas) or set of disasters."[64] The grant program targets "states, units of local government, and Indian tribes" that do not have the resources to rebound after a disaster, including flooding.[65] Under this program, grantees often have to use "at least 70 percent of the funds for activities that principally benefit . . . [LMI] persons or areas," demonstrating the agency's application of its mission statement to assist all Americans in need.[66]

Similar to the CDBG-DR, the Community Development Block Grant – National Disaster Resilience Competition (CDBG-NDRC) was a contest that focused on LMI communities after a natural disaster had occurred in either 2011, 2012, or 2013.[67] "On September 17, 2014, HUD released a Notice of Funding Availability (NOFA) for" CDBG-NDRC, which "awarded almost $1 billion in funding for disaster recovery and long-term community resilience through a two-phase competition process."[68] Moreover, in addition to demonstrating HUD's commitment to LMI communities, the competition also gives tremendous insight into how HUD assesses BCAs and resilience programs generally.

3. HUD BCA

HUD uses the BCA as a "[c]onsideration of the total costs and benefits of a project in present dollar value over the useful life of the proposal."[69] The agency requires both a Benefit-Cost Ratio (Benefits/Costs = BCR) and a Net Present Value (Benefits – Costs = NPV) to be included in the application.[70] HUD requires a BCR to be greater than 1.0 or an NPV to be greater than 0.[71] Similar to other federal agencies, HUD requires a 7 percent discount rate to be used when performing the BCA.[72] To streamline the BCA process, HUD has a Cost/Benefit Template that

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[64] *Id.* ("Congress has appropriated more than $84.7 billion since 1999 for CDBG-DR in supplemental funds for CDBG-DR to support disaster relief, mitigation, and recovery activities.").
[65] *Id.*
[66] *Id.*
[67] *See HUD-NDRC: Phase 2 Application*, COMMONWEALTH OF VA., 1, 6, https://dhcd.virginia.gov/sites/default/files/Docx/virginia-resiliency-plan/phase-II-narrative.pdf.; U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 56.
[68] U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 56.

> All states and units of general local governments with major disasters declared in 2011, 2012, and 2013 were eligible to participate in Phase 1 of the competition.
> Based on a review of the Phase 1 application, 40 states and communities were invited to compete in the second and final phase of the National Disaster Resilience Competition. Applicants were required to tie their proposals back to the eligible disaster from which they were recovering. Additionally, applicants were required to complete a benefit-cost analysis for the proposed projects.

Id.
[69] *See National Disaster Resilience Competition (NDRC) Benefit Cost Analysis: Appendix H*, U.S. DEP'T OF HOUS. AND URBAN DEV., 1, 6 (July 2, 2015), https://files.hudexchange.info/course-content/ndrc-nofa-specific-benefit-cost-analysis-appendix-h-overview/NDRC-BCA-Appendix-H-overview-Webinar-Slides.pdf.
[70] *Id. at 7*; HUDchannel, *National Disaster Resilience Competition (NDRC) Benefit Cost Analysis: Appendix H*, YOUTUBE (June 25, 2015), https://www.youtube.com/watch?v=rFoBhl4ztK4&feature=youtu.be.
[71] *Id.*
[72] *See* U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 69, at 9.

grant applicants can use to more easily quantify benefits with additional comments inserted by HUD to assist the user.[73]

For the NDRC, HUD has different requirements than it listed in the NDRC NOFA Appendix H for grant applicants to qualify for the competition.[74] Furthermore, the agency required that the BCA include both quantitative and qualitative components.[75] The quantitative piece comprised standard calculations performed in accordance with the applicable discount rate and an easily understood *narrative* describing the calculations, plus a table displaying benefits and costs.[76] Applicants could also submit a qualitative component to describe benefits and costs that were hard to monetize.[77]

Because HUD heavily emphasized the narrative in this competition, the following eight categories needed to be included in that BCA narrative component: process for preparing the BCA; full proposal cost; current situation and problem to be solved; proposed project or program, including useful life; risks to the community; a list of all benefits and costs including rationale; risks to ongoing benefits from the proposal; and challenges to implementing the proposal.[78] In the narrative description category, HUD required the following benefits and costs to be taken into consideration regardless of whether the project was "covered"[79] or not.[80] These included: life cycle costs (*e.g.*, project/investment costs); resilience value (*e.g.*, reduction of expected property damages due to future/repeat disasters); environmental value (*e.g.*, ecosystem and biodiversity effects); social value (*e.g.*, reductions in human suffering and HUD-specific factors, like greater housing affordability); and economic revitalization (*e.g.*, direct effects on local or regional economy net opportunity costs).[81] Because four of the five metrics are benefits, mathematically, the amount of benefits included seemed to drive up the BCRs and NPVs.[82] The table below illustrates how localities presented the benefits required for the NDRC; this table is derived from the BCA portion of the *ThRIVe: Resilience in Virginia* grant proposal:[83]

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[73] *See Cost/Benefit Analysis*, U.S. DEP'T OF HOUS. AND URBAN DEV., https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjo_pmF97DlAhXMwVkKHRuuCMYQFjAAegQIBRAC&url=https%3A%2F%2Fwww.hud.gov%2Fsites%2Fdocuments%2FDOC_15127.DOC&usg=AOvVaw36peoEezn9oYFewXR7qRA9 (describing how some standard costs include "development costs" and "operational costs," while some benefits include "non-recurring benefits" and "value enhancement.").
[74] *See* U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 69, at 5; *see also Attachment F: Benefit-Cost Analysis*, COMMONWEALTH OF VA., I.2, I.10, https://dhcd.virginia.gov/sites/default/files/Docx/virginia-resiliency-plan/phase-II-benefit-cost-analysis.pdf.
[75] *See* U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 69, at 14.
[76] *Id.* (emphasis added).
[77] *Id.*
[78] *Id* at 18.
[79] *See id.* at 10 ("Covered project: a major infrastructure project or two or more related infrastructure projects having an estimated total cost (or combined total cost) of $50 million or more (including at least $10 million of CDBG-DR or CBDG-NDR funds.")); *see also* HUDchannel, *supra* note 70.
[80] U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 69, at 14; *see also* HUDchannel, *supra* note 70.
[81] *See* U.S. DEP'T OF HOUS. AND URBAN DEV., *supra* note 69, at 25-29; *see also* HUDchannel, *supra* note 70.
[82] *See* COMMONWEALTH OF VA., *supra* note 74, at I.11.
[83] *See id.*

Table I.1 Overview of Benefits Calculated and Included in the Benefit Cost Ratio

Benefit Category	Benefit Calculated	Description
Resiliency Benefits	Direct Physical Damages to Buildings, Contents, and Inventory	Analysts applied USACE depth-damage functions (DDFs) to vulnerable structures, critical/essential facilities, and modes of transportation in the benefitting area. The DDFs consider the type of structure/asset, structure or contents replacement value, and expected flood depth within the structure to determine the dollar value of contents or structure damage. Economic losses also use DDFs to evaluate the economic impact of natural disasters. Natural disasters threaten or cause direct impact to structures but can also seriously harm health, social, and economic resources, which lead to psychological distress. Methodologies to calculate expected losses avoided for Human Impacts are a product of flood depth and damage to people's homes.
	Essential Facility and Critical Infrastructure Service Loss	
	Human Impacts	
	Economic Losses	
Environmental Benefits	Provisioning Services	Environmental benefits are gained heavily from the implementation of the projects, which are designed to incorporate expansion of park spaces/wetlands, provide connectivity between neighborhoods and the waterfront, and offer aesthetically pleasing public gathering spaces.
	Regulating Services	
	Supporting Services	
	Cultural Services	
Social Benefits	Recreational Benefits	Social benefits are based on added recreational and community gathering space. There are health cost reductions and willingness to pay values associated with these amenities.
	Health Benefits	
	Aesthetic Benefits	
Economic Revitalization	Economic Revitalization	Economic gains are based on the addition of new retail and commercial space and expected job growth and gains as a result.

The next table shows which costs that were included in the BCA portion of the *ThRIVe: Resilience in Virginia* grant proposal:[84]

Table I.2 All Applicable Costs included in the Benefit Cost Analysis

Activity	Capital Costs*	Operations and Maintenance	Post-Irene Resiliency Actions	Total Costs
Newton's Creek	$141,820,312	$9,209,300	$20,320,364	$171,349,975
Ohio Creek	$97,073,808	$10,049,763	$3,319,739	$110,443,311
Total	$238,894,120	$19,259,063	$23,640,103	$281,793,286

Capital costs are presented as net present value, as the capital costs are broken out over a 7 year implementation period; thus, the costs represented in this table vary from those in **Appendix F-2.*

[84] *See id.* at I.12.

C. United States Army Corp of Engineers

1. Background and Mission

The United States Army Corp of Engineers (USACE) is a federal agency under the Department of Defense tasked with the mission to "[d]eliver vital public and military engineering services; partnering in peace and war to strengthen our Nation's security, energize the economy and reduce risks from disasters."[85] Through its Civil Works programs, USACE engages in water resource development activities that provide flood protection, coastal protection, recreational opportunities, and navigable waters.[86]

2. USACE Project Programs

Congress expanded the USACE's flood control and flood risk management role in the Flood Control Act of 1936, making flood control a nationwide mission of the USACE.[87] The expansion of flood control activities includes the USACE's current Flood Risk Management Program, which works towards reducing overall flood risk.[88] Through construction of structural measures (*e.g.*, levees, flood walls, diversion channels, pumping plants and bridge modifications) and non-structural measures (*e.g.*, floodproofing, relocation of structures and flood warning systems), the Flood Risk Management Program aims to "reduce the risk of loss of life, reduce long-term economic damages to the public and private sector, and improve the natural environment."[89] With congressional approval, the USACE and a non-federal sponsor share the cost of studying the feasibility of a project and implementing the project.[90]

Additionally, the Section 205 Continuing Authorities Program (CAP) of the 1948 Flood Control Act, as amended, authorizes the USACE to develop and construct small flood risk

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[85] *Mission and Vision*, U.S. ARMY CORPS OF ENG'RS, https://www.usace.army.mil/About/Mission-and-Vision/.
[86] *Civil Works*, U.S. ARMY CORPS OF ENG'RS, https://www.usace.army.mil/Missions/Civil-Works/.
[87] *Economics Primer IWR Report 09-R-3*, U.S. ARMY CORPS OF ENG'RS, 1, 1 (June 2009), https://www.iwr.usace.army.mil/portals/70/docs/iwrreports/iwrreport_09-r-3.pdf.
[88] *Flood Risk Management Program*, U.S. ARMY CORPS OF ENG'RS, https://www.iwr.usace.army.mil/Missions/Flood-Risk-Management/Flood-Risk-Management-Program/.
[89] *Id.*
[90] *Flood Risk Management*, U.S. ARMY CORPS OF ENG'RS, https://www.mvr.usace.army.mil/Business-With-Us/Outreach-Customer-Service/Flood-Risk-Management/. A non-federal sponsor is

> a public entity that is a legally constituted public body with full authority and capability to perform the terms of its agreement as the non-Federal partner of the Corps for a project, and able to pay damages, if necessary, in the event of its failure to perform. A non-federal sponsor may be a State, County, City, Town, Federally recognized Indian Tribe or tribal organization, Alaska Native Corporation, or any political subpart of a State or group of states that has the legal and financial authority and capability to provide the necessary cash contributions and LERRDs necessary for the project.

33 CFR § 203.15. LERRDs refers to all lands, easements, rights-of-way, relocation and disposal areas necessary for construction, operation and maintenance of a project. *Non-Federal Sponsorship of a U.S. Army Corps of Engineers Project*, U.S. ARMY CORPS OF ENG'RS (Mar. 2014), https://www.nww.usace.army.mil/Portals/28/docs/assistanceprograms/2014/FS_Non-federalSponsor_140305.pdf.

management projects, defined as projects limited to a federal cost of $10,000,000.[91] Section 205 CAP allows the USACE to partner with a non-federal sponsor to implement small projects that have not previously been authorized by Congress and are not part of larger projects.[92]

3. USACE's BCA

The Flood Control Act of 1936 was important in establishing the USACE's BCA because in it Congress specified that the federal government should participate in flood control projects "if the benefits to whomsoever they may accrue are in excess of the estimated costs, if the lives and social security of people are otherwise adversely affected."[93] "This law established the criterion of economic benefits exceeding economic costs and the need to consider social . . . impact in the decision making process."[94] In the 1950's, the USACE began to develop specific sets of standards and procedures for evaluating economic benefits and costs of projects.[95] *Proposed Practices for the Economic Analysis of River Basin Projects*, a report first issued in 1950, advocated using economic resources "to maximize net economic returns and human satisfaction from the economic resources used in the project."[96]

This basic principle is seen through today's National Economic Development (NED) analysis, in accordance with the *Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies*, referred to as the *Principles and Guidelines*.[97] The NED is a policy that guides federal water resource planners.[98] Its objective "is to maximize increases in the net value of the national output of goods and services" through the use of economics.[99] For the USACE, this is done by comparing the value produced by a project to the cost of resources needed to construct the project.[100] For flood control projects, NED benefits include reducing property damage and emergency costs and avoiding structural losses, while NED costs include materials, labor and other direct construction costs, operation and maintenance costs over a project life, real estate needed for the project, and environmental mitigation costs.[101] The NED policy requires that federal funds be invested in a way that achieves the greatest national benefit.[102] Since infrastructure projects by the USACE require a national perspective, regional

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[91] *Flood Risk Management, Section 205 of the 1948 Flood Control Act, as amended*, U.S. ARMY CORPS OF ENG'RS, 1, 1 (November 2015), https://www.nab.usace.army.mil/Portals/63/docs/Civil%20Works/CAP/CAP%20Section%20205.pdf?ver=2017-02- 03-162305-917.

[92] *Continuing Authorities Program Section 205 – Small Flood Damage Reduction Projects*, U.S. ARMY CORPS OF ENG'RS, 1, 1 (March 2014), https://www.nww.usace.army.mil/Portals/28/docs/assistanceprograms/2014/FS_Section205SmFloodDamage_140324.pdf.

[93] U.S. ARMY CORPS OF ENG'RS, *supra* note 87, at 1.

[94] *Id.*

[95] *Id.*

[96] *Id.* at 2.

[97] *Id.*; *How Project Selection In the Corps of Engineers Is Affected By Benefit-Cost Ratio (BCR) Analysis*, CTR. FOR PORTS AND WATERWAYS, 1, 12 (Revised Aug. 2018), http://www.nationalwaterwaysfoundation.org/TTI%20BCR%20FINAL%20STUDY.pdf.

[98] U.S. ARMY CORPS OF ENG'RS, *supra* note 87, at 4.

[99] *Id.*

[100] *Id.*

[101] *Id.* at 4-5.

[102] *Id.* at 5.

economic development (RED) benefits that may result from a project are not considered in the BCA.[103] While a new flood protection structure may increase economic activity in a region, this regional benefit is generally a transfer from other parts of the country.[104] From a federal perspective, regional economic transfers are a "zero sum game."[105] However, RED, environmental and social benefits may be considered in the selection of the plan, but are beyond the scope of the economic analysis.[106] While project plans are generally implemented to maximize the NED, alternatives may be permitted if there are overriding reasons for another plan "based on other Federal, State, local, or international concerns." [107] However, these "locally preferred plans" require the sponsor to fund the additional costs that are not part of the NED project plan.[108] USACE projects must be specifically funded by Congress if they are outside the scope of the Section 205 CAP.[109]

The USACE evaluates allocation of resources by comparing without- and with-project conditions.[110] The period of analysis for projects extends fifty years into the future.[111] Conditions are not considered as a static basis, but instead the USACE compares "the *changes* between the future *without*-project conditions and the future *with* a particular alternative (with project condition)."[112] Project costs are primarily acquired at the time of construction, while benefits are assessed over the course of the project life.[113] Monetary values are "discounted" to equate monetary benefits in the future at the value of current dollars.[114] This "discounting procedure employs a formula that includes an interest rate . . . reflecting the rate at which people are assumed to be willing to trade-off future consumption for current consumption."[115] The interest rate used to formulate the discount rate for civil works studies is calculated by the U.S. Treasury annually.[116] Valuation of benefits relies heavily on predictive models and monetarization techniques.[117] For projects where the total cost "including inflation is $40 million or greater, or complex small projects having numerous work elements with differing unknown conditions and uncertainties," detailed risk analyses are required.[118] These analyses include risk identification, quantitative and qualitative studies, and sensitivity analysis using a Monte Carlo simulation method.[119]

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[103] *See* id. at 5.
[104] *Id.*
[105] *Id.*
[106] *Id.* at 6.
[107] CTR. FOR PORTS AND WATERWAYS, *supra* note 97, at 13.
[108] *ASCE Federal Project BCR and Scoring Paper Information*, AM. SOC'Y OF CIVIL ENG'RS, 1, 1 (Apr. 27, 2018), https://www.asce.org/uploadedFiles/News_Articles/asce-bcr-paper-2018.pdf.
[109] CONG. RESEARCH SERV., *supra* note 12, at 3.
[110] U.S. ARMY CORPS OF ENG'RS, *supra* note 87, at 12.
[111] *Id.*
[112] *Id.* (emphasis added).
[113] *Id.*
[114] *Id.*
[115] *Id.* at 25.
[116] *Id.*
[117] CONG. RESEARCH SERV., *supra* note 12, at 12.
[118] *Id.* at 32.
[119] *Id.* at 32. The Monte Carlo simulation is a computerized modeling technique that accounts for risk in quantitative analysis and decision making. *Monte Carlo Simulation*, PALISADE, https://www.palisade.com/risk/monte_carlo_simulation.asp. The simulation is used in a variety of fields, such as finance, project management, energy, engineering, transportation, and insurance. *Id.*

In recent years, due to budget constraints and large numbers of authorized projects, the Administration has used a BCR of 2.5 to focus only on projects with the highest returns.[120] For those projects that achieve this higher BCR, there is still the challenge of actually receiving funding from Congress once approved. "The rate of annual federal discretionary appropriations for USACE projects has not kept pace with the rate of authorization for these projects; therefore, there is competition for annual USACE construction funds."[121] As of 2018, there is a $96 billion backlog of authorized USACE projects.[122] Due to these congressional constraints, politics may "play an outsize[d] role in shaping the Corps's priorities,"[123] with the possibility that powerful members of Congress may use their influence to push particular projects to the top of the list.[124] While the USACE states that a flood risk management project that does not provide a positive NED benefit may be considered under certain circumstances, for example, if it protects a disadvantaged community, the competition for construction funding may decrease the number of these special consideration projects that are actually funded.[125]

III. CASE STUDIES

Three case studies from Virginia illustrate the role that BCAs play in federal funding and grant applications, highlighting the different ways that BCAs are calculated and utilized by FEMA, HUD, and USACE.

A. City Line Apartments

The City Line Apartments are located in the Newmarket Creek watershed in Newport News, Virginia, and participate in HUD's Section 8 Rental Certificate Program.[126] These apartment buildings are two stories, with the bottom floor being the only section of the building that floods.[127] Therefore, even though floods knock out the power via the ground transformers for the second floor tenants, forcing those tenants to evacuate, the second floor is not included in the flood loss avoided calculation.[128] Because flood losses avoided on the second floor cannot be

[120] AM. SOC'Y OF CIVIL ENG'RS, *supra* note 108, at 1.
[121] CONG. RESEARCH SERV., *supra* note 12, at 14.
[122] *Id.* at 18.
[123] Jon Gertner, *Should the United States Save Tangier Island from Oblivion?*, N.Y. TIMES MAG. (July 6, 2016), https://www.nytimes.com/2016/07/10/magazine/should-the-united-states-save-tangier-island-from-oblivion.html?_r=1.
[124] *Id.*
[125] *See* U.S. ARMY CORPS OF ENG'RS, *supra* note 87, at 20.
[126] *See City Line Apartments*, AFFORDABLE HOUS., https://affordablehousingonline.com/housing-search/Virginia/Newport-News/City-Line-Apartments/10006174; COMMONWEALTH OF VA., *supra* note 67, at 92. *See generally* Section *8 Rental Certificate Program*, U.S. DEP'T OF HOUS. AND URBAN DEV., https://www.hud.gov/programdescription/cert8 ("The Section 8 Rental Certificate Program increases affordable housing choices for very low-income households by allowing families to choose privately owned rental housing. Families apply to a local public housing authority (PHA) or administering governmental agency for a Section 8 certificate. The PHA pays the landlord the difference between 30% of the household's adjusted income and the unit's rent.").
[127] Telephone Interview with Skip Stiles, Executive Director, Wetlands Watch & Mary-Carson Stiff, Policy Director, Wetlands Watch (Sept. 23, 2019).
[128] *See* COMMONWEALTH OF VA., *supra* note 67, at 92 (explaining that "some retrofits" were made to City Line's HVAC system to avoid the damage caused by repetitive flooding because the apartments are located in a high hazard, flood prone area).

factored into the benefits portion of the ratio, City Line's potential BCR is lower than it otherwise might be under existing FEMA methodology.[129]

Although City Line's potential BCR may be lower and impact the ability of a proposal to successfully achieve FEMA funding, after Hurricane Matthew in 2016, President Obama "declared Newport News and three South Hampton Roads cities eligible for disaster grants and loans related to the hurricane damage."[130] Inferentially, the former President was able to move funds to assist in the disaster recovery under FEMA's HMGP.[131]

B. Chesterfield Heights

1. Background on Chesterfield Heights

The Ohio Creek Watershed in Norfolk is comprised of the Chesterfield Heights and Grandy Village neighborhoods.[132] The Ohio Creek Watershed Project, which was part of the *ThRIVe*: *Resilience in Virginia*[133] grant proposal, won $112 million in HUD's CDBG-NDRC.[134] This project

> is part of Norfolk's Resilience Strategy and supports its three goals: design a coastal community capable of dealing with the increased risk of flooding, create economic opportunity by advancing efforts to grow existing and new industry sectors, and advance initiatives to connect communities, deconcentrate poverty and strengthen neighborhoods.[135]

Chesterfield Heights and Grandy Village are two primarily African American neighborhoods with distinctive identities.[136] More specifically, Chesterfield Heights has 400 homes on the National Register of Historic Places, while Grandy Village has a "public housing

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[129] *See* FEMA, *supra* note 20, at B1-B2. (FEMA notes that "[e]stimated flood damages for a one-story building will typically be greater than that of a multi-story building," implying that benefits from flood losses avoided will be greater in a one-story building than a multi-story building.).

[130] Hillary Smith, *After yet Another City Line Apartments Flood, FEMA Steps in to Help*, DAILY PRESS (Nov, 12, 2016), https://www.dailypress.com/news/newport-news/dp-nws-fema-city-line-20161112-story.html.

[131] *Id. (*explaining that funds were used to "cover damage and broken items, hotel stays, and any related medical bills").

[132] *The City of Norfolk's Ohio Creek Watershed Pro*ject, VA. DEPT. OF HOUS. AND CMTY. DEV., https://www.dhcd.virginia.gov/city-norfolks-ohio-creek-watershed-project.

[133] *National Disaster Resilience Competition*, HAMPTON RD. PLANNING DIST. COMM'N, https://www.hrpdcva.gov/departments/national-disaster-resilience-competition/thrive:-resiliency-in-virginia/.

> *ThRIVe: Resilience in Virginia* aligns with HUD's National Objective to directly benefit low-and-moderate income persons and households, by focusing on unmet recovery needs, as well as build regional resilience capacity to manage extreme weather events and adapt to sea level rise. *ThRIVe: Resilience in Virginia* has five major goals: (i) Unite the Region, (ii) Create Coastal Resilience, (iii) Build Water Management Solutions, (iv) Improve Economic Vitality, and (v) Strengthen Vulnerable Neighborhoods.

Id.

[134] VA. DEPT. OF HOUS. AND CMTY. DEV., *supra* note 132.

[135] *Id.*

[136] *See id.*; *see also National Register of Historic Places*, NAT'L PARK SERV., https://www.nps.gov/subjects/nationalregister/index.htm.

community with more than 300 units."[137] The Ohio Creek Watershed floods frequently as a result of both "tidal and precipitation flooding,"[138] which means that with only two roads leading to the community, residents are often isolated from the remainder of the city.[139]

This map outlines two of the target areas considered for HUD's NDRC competition.[140]

2. Analysis of HUD Grant Proposal

To competitively partake in Phase II of HUD's NDRC competition, the Commonwealth of Virginia teamed up with Norfolk, Chesapeake, and Newport News, the only cities that could meet HUD's objectives of targeting impacted areas with unmet recovery needs, its income threshold pre-requisite.[141] The competition had several requirements. First, the competition required a natural disaster to have occurred prior to submission.[142] Here, the disaster was Hurricane Irene, which struck Hampton Roads in 2011.[143] Second, the purpose of the NDRC was to help LMI communities recover from natural disasters and to mitigate disasters' impacts in the future.[144] Norfolk, Chesapeake, and Newport News all had populations that were comprised of more than 50 percent LMI persons, meeting the target threshold to compete.[145] Lastly, as previously mentioned, a BCA and the requirements associated with it were met for each project.[146] Overall,

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[137] VA. DEPT. OF HOUS. AND CMTY. DEV., *supra* note 132; NAT'L PARK SERV., *supra* note 136 ("The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.").
[138] VA. DEPT. OF HOUS. AND CMTY. DEV., *supra* note 132.
[139] *Id.*
[140] COMMONWEALTH OF VA., *supra* note 74, at I.13.
[141] COMMONWEALTH OF VA., *supra* note 67, at 27.
[142] *Id.* at 1.
[143] *Id.* (explaining that Hampton Roads "was declared a major disaster area by the President.").
[144] *See id.* at 6.
[145] *Id.*
[146] *See id.* at 1; *see* Part II.B.3.

six different projects within the Hampton Roads region were submitted for HUD evaluation under the singular *ThRIVe: Resilience in Virginia* grant proposal, with only the City of Norfolk succeeding.[147]

The Hampton Roads area is unusual because its waters are key to its economic vitality.[148] Throughout the area, there are high risks to economic assets including the Port of Virginia, Newport News Shipbuilding, and Naval Station Norfolk.[149] Similarly, Norfolk houses other expensive real estate, including "the regional medical trauma center, two universities, biotechnical and information technology firms, and a multi-modal transportation network connecting the region."[150] Moreover, the City of Norfolk, where the Ohio Creek Watershed is located, seems particularly vulnerable and in need of federal funding to become resilient,[151] since it is "[s]urrounded by water with 144 miles of shoreline, low-lying and flat topography and rising sea levels," and it "has the highest concentration of poverty in the region."[152] Unfortunately, Norfolk has approximately 2,000 units of public housing that lie in areas that are prone to flooding.[153] Therefore, because Norfolk features valuable infrastructure, but suffers from high levels of poverty, it seemingly meets the objectives of HUD's competition better than other localities.[154]

Even though the Ohio Creek Watershed had a lower BCR than other areas, "[p]er the notice of funding availability (NOFA) dated June 15, 2015, it is understood that the results of the BCA alone are not cause to *reject* or *approve* a proposal."[155] The table below shows the Ohio Creek Watershed's BCRs based on differing scenarios that accounted for sensitivity in the analysis:[156]

Table I.3 Benefit Cost Analysis Results

Activity	Scenario	All Applicable Costs	Net Present Value of Benefits	Benefit-Cost Ratio
Newton's Creek	Low	$141,820,312	$1,085,286,303	6.33
	Medium	$141,820,312	$1,791,992,285	10.46
	High	$141,820,312	$2,881,102,025	16.81
Ohio Creek	Low	$97,073,808	$116,968,617	1.06
	Medium	$97,073,808	$189,377,673	1.71
	High	$97,073,808	$224,119,946	2.03
Total	Low	$238,894,120	$1,202,254,920	4.27
	Medium	$238,894,120	$1,981,369,958	7.03
	High	$238,894,120	$3,105,221,971	11.02

[147] *See id.* at 1; VA. DEPT. OF HOUS. AND CMTY. DEV., *supra* note 132.
[148] COMMONWEALTH OF VA., *supra* note 67, at 28.
[149] *Id.* at 28-29 ("The Port of Virginia and related employment produce nearly 10% of Virginia's workforce opportunities," while the Naval Station Norfolk is "the largest military base in the world, with a plant replacement value of over $4.2B. Nearly a quarter of the nation's active-duty military personnel are stationed in the region, and 31% of US naval shipbuilding and repair capacity is in the region.").
[150] *Id.* at 30.
[151] *See id.*
[152] *Id.* ("More than 53% of its residents are LMI, 19.2% live in poverty, and the city is rated the 13th most fiscally stressed locality in Virginia.").
[153] *Id.*
[154] *See* Part II.B.3.
[155] COMMONWEALTH OF VA., *supra* note 74, at I.2 (emphasis added).
[156] *See id.* at I.10. & I.12. Note that the logic behind why Ohio Creek was chosen over Newton's Creek, which are both located in Norfolk, is not information that is available to the public online.

Due to the HUD funding provided through the Ohio Creek Watershed Project, USACE determined that Chesterfield Heights did not need to be studied as part of the Norfolk Coastal Storm Risk Management Study discussed below and therefore, no BCR was calculated.[157] However, the USACE study did (1) "consider flow paths in the Chesterfield Heights area to appropriately assess any measures that need to tie-in to the Ohio Creek Watershed Project;" and (2) "receive updates on the Ohio Creek Watershed Project design changes to ensure appropriate alignment."[158]

C. Norfolk and the Lafayette River

Following Hurricane Sandy in October 2012, Congress directed the USACE to prepare a project-performance evaluation report and comprehensive study of vulnerable coastal populations in areas affected by the hurricane as a way to address flood risk.[159] Norfolk was identified as one of nine high-risk areas on the Atlantic Coast, warranting an in-depth investigation into potential coastal storm risk-management solutions.[160] The resulting Norfolk Coastal Storm Risk Management Study (NCSRMS), completed in February 2019, "recommends a $1.4 billion project, including storm-surge barriers, nearly 8 miles of floodwall, a 1-mile levee, 11 tide gates, and seven pump and power stations"[161] for the Lafayette River, along with a variety of non-structural measures.[162] These project components are described in the table below.[163] Economists anticipate an annual net benefit of $122 million from the entire project, resulting in a BCR of 3.2.[164]

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[157] *Norfolk Coastal Storm Risk Management Feasibility Study*, U.S. ARMY CORPS OF ENG'RS, i, 30, https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/7534.; *see supra* Part III.C.
[158] *Id.*
[159] *Norfolk Coastal Storm Risk Management*, U.S. ARMY CORPS OF ENG'RS (Mar. 21, 2018), https://www.nao.usace.army.mil/NCSRM/. There also is a Newmarket Creek feasibility study authorized under Section 205, Continuing Authorities Program (CAP). *See generally Newmarket Creek Section 205 CAP Study*, U.S. ARMY CORPS OF ENG'RS, https://www.nao.usace.army.mil/About/Projects/Newmarket-Creek-CAP-205/. Completion of the feasibility study is currently pending while USACE and the City of Hampton determine whether potential recommendations, such as acquisition of homes, potentially through eminent domain, is politically palatable for the city. Interview with Susan Conner, Chief, Planning & Policy, U.S. Army Corps of Engineers, Norfolk District (Oct. 18, 2019).
[160] *Norfolk Coastal Storm Risk Management*, U.S. ARMY CORPS OF ENG'RS, *supra* note 159.
[161] *Id.*
[162] *See Norfolk Coastal Storm Risk Management Feasibility Study, Plan Formulation Appendix*, U.S. ARMY CORPS OF ENG'RS, A-1, A-58-A-68, https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/7535.
[163] U.S. ARMY CORPS OF ENG'RS, *supra* note 157, at 100.
[164] *Id.*

Table 9-5. Cost Estimate by Measure within the Recommended Plan.

Description	Economic Reach	Annual Benefits ($1000's)	Project First Costs	Annual O&M Costs ($1000's)	Total Average Annual Costs ($1,000)	Annual Net Benefits ($1,000)	BCR
Broad Creek Surge Barrier	BC-1 S	$15,451	$174,578	$375	$6,930	$8,520	2.2
Ghent-Downtown-Harbor Park Barrier System	EB S	$63,776	$477,183	$585	$19,260	$44,516	3.3
Campostella & Berkley Nonstructural	EB-4 All*	$1,926	$43,753	$0	$1,621	$305	1.2
Ingleside Rd. Nonstructural	EB-7 N	$1,056	$12,512	$0	$463	$593	2.3
Elizabeth Park Nonstructural	EB-8 N	$3,887	$80,960	$0	$2,999	$888	1.3
Lafayette River Outer Surge Barrier	LR-1a S	$65,632	$414,354	$613	$16,829	$48,803	3.9
Norfolk International Terminal Nonstructural	MS-2 N	$1,147	$208	$0	$8	$1,139	149
Pretty Lake Upper Surge Barrier	PL-2 S	$17,212	$91,009	$186	$3,651	$13,562	4.7
Willoughby Bay Nonstructural	WB-1 N	$7,649	$71,706	$0	$2,656	$4,992	2.9
Critical Infrastructure**	Various	-	$2,635	-	$98	-	106
Recommended Plan	All of the above	$174,740	$1,368,897	$ 1,759	$54,514	$120,226	3.2

*EB-4 All is the combination of EB-4N, EB-4aN, and EB-4bN for neighborhood cohesiveness

**Critical infrastructure benefits are included in each CI facility's respective economic reach

For construction planning and feasibility study purposes, the city was divided into four areas.[165] Various structural, non-structural, and nature-based flood management measures were evaluated as potential solutions for these locations.[166] Norfolk and the USACE's Project Delivery Team developed an array of alternative plans based on study constraints, economics, and other social effects (OSE):[167]

[165] U.S. ARMY CORPS OF ENG'RS, *supra* note 157, at iii.

[166] *Id.*

[167] *Id.* at 75. "Other social effects" include health and safety, economic vitality (*i.e.*, tax revenue), regional, national, and global impact, community cohesion, historic structures and districts (*i.e.*, historic structures), socially vulnerable populations, recreation, military readiness, and critical infrastructure. *Id.* at 76. Additionally, in 2014, the White House's Council of Environmental Quality updated the Principles, Requirements and Guidelines for Water and Land Related Resource Implementation (PR&G) to govern how select Federal agencies evaluate proposed water resource department projects. *See* Council on Environmental Quality, *Updated Principles, Requirements and Guidelines for Water and Land Related Resources Implementation Studies*, WHITE HOUSE, https://obamawhitehouse.archives.gov/administration/eop/ceq/initiatives/PandG. The PR&G provides guidance for how agencies should consider project alternatives that take into consideration economic, social, and environmental factors. *See id.* If USACE were to adopt the PR&G, the project alternatives would impact cost for BCA, as each proposed project would have different material and construction costs associated with its implementation. However, benefits for purposes of a BCA would still be restricted to the monetary value of structural damage avoided by a project. *See generally*, *supra* Part II.C.3.

> First, the team reviewed the economic analysis and engineering information available to determine the viability of each alternative. Then, an OSE ranking was performed to ensure that any decisions based on economics and engineering would not negatively impact life/safety, critical infrastructure, and/or cause disproportionate negative impacts to socially vulnerable populations.[168]

An example of how OSE influenced USACE's recommendation for an area can be seen with the Campostella and Berkley neighborhoods. The USACE considers these communities as connected.[169] USACE treated the whole area as a single unit when considering structural and non-structural measures in order to maintain neighborhood cohesiveness.[170]

Now that the feasibility study has been completed and signed by District Commander Col. Patrick Kinsman, and Norfolk City Manager Doug Smith, the USACE and Norfolk are poised to start the Preconstruction Engineering and Design (PED) phase.[171] However, the project must be authorized by Congress, budgeted, and a Project Partnership Agreement executed with the City before construction may begin.[172] The PED phase is estimated to cost $8.3 million, with USACE covering 65 percent of the cost and Norfolk, as the non-federal sponsor, covering the remaining 35 percent.[173] Upon completion, the project is will prevent anticipated future flooding, as shown in the maps below.

[168] U.S. ARMY CORPS OF ENG'RS, *supra* note 157, at 75.
[169] *Id.* at 80.
[170] *Id.* at 79-80.
[171] Vince Little, *Leaders Sign Norfolk Coastal Storm Risk Management Design Agreement*, DEF. VISUAL INFO. DISTRIB. SERV. (July 1, 2019), https://www.dvidshub.net/news/329941/leaders-sign-norfolk-coastal-storm-risk-management-design-agreement.
[172] *Id.*
[173] *Leaders Sign Norfolk Coastal Storm Risk Management Design Agreement*, DREDGING TODAY, https://www.dredgingtoday.com/2019/07/03/leaders-sign-norfolk-coastal-storm-risk-management-design-agreement/.

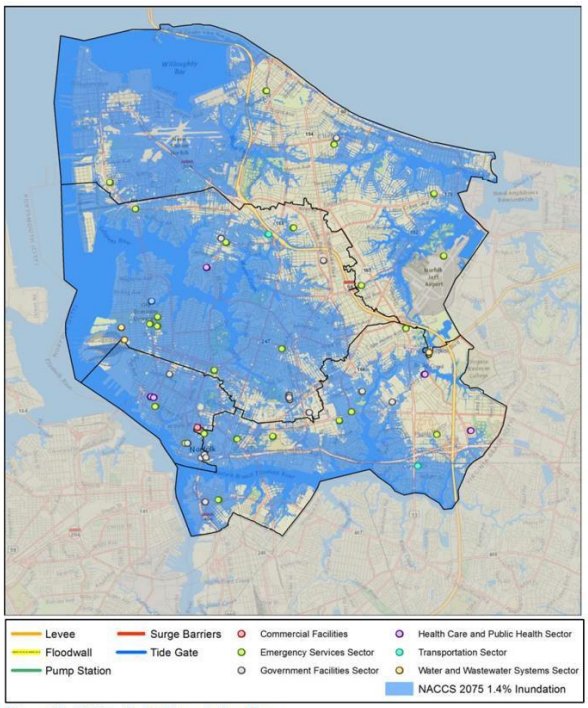

Figure 25. 2075 1.4% ACE Inundation Map

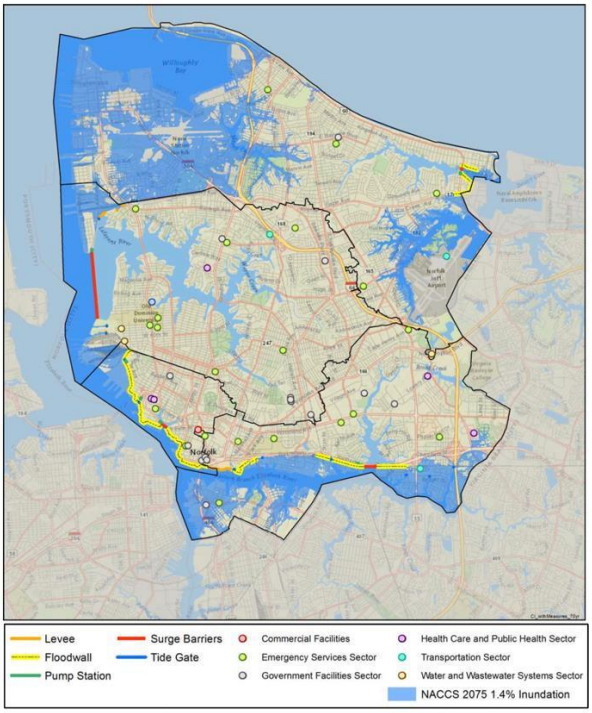

Figure 26. 2075 1.4% ACE Inundation Map with the Recommended Plan

USACE Projections of Norfolk in 2075 without the implementation of the Recommendation Plan (on the left) and with the implementation of the Recommendation Plan (on the right).[174]

IV. CONCERNS AND RECOMMENDATIONS

A. Resource Constraints' Impact on Small Localities

1. HUD and FEMA Barriers

For localities considering flood resiliency grants through HUD or FEMA, there may be resource barriers that make it impractical for small localities to be successful in applying for and implementing these federal grants. First, significant amounts of data are needed to complete the various BCAs, which localities may not have.[175] The lack of records on flooding events presents challenges for localities attempting to complete a BCA.[176] Even for grants that target specific localities, such as HUD's CBDG-NDRC, specific data is required to be competitive.[177] In addition to a lack of data, localities with limited staff and budget also frequently lack in-house expertise with grant writing and performing BCAs.[178] This lack of expertise creates a reliance on consulting firms to complete grant applications with accompanying BCAs.[179] Consulting firms are an additional expense for localities that can be a non-recoverable cost if a project proposal is never

[174] *See* U.S. ARMY CORPS OF ENG'RS, *supra* note 162, at A-75-A-76.
[175] Coates, *supra* note 17.
[176] *Id.*
[177] *See supra* Part III.B.2.
[178] Telephone Interview with Meg Pittenger, Environmental Manager, City of Portsmouth & Brian Swets, Planning Administrator, City of Portsmouth (Oct. 9, 2019).
[179] *Id.*; *see, e.g.*, COMMONWEALTH OF VA., *supra* note 74, at I.2.

funded.[180] The need to spend money to apply for money creates a significant hurdle for some localities, particularly those that do not have a large tax revenue base. Further, since each agency has a different approach to BCAs, a federal grant application produced by a consulting firm for one competition will seemingly not be reusable for other federal grant applications.

In addition to the challenges of applying for grants, small localities face challenges implementing a grant once funded.[181] Different grants have varying requirements for implementation, including providing project status updates to the grantor.[182] Grant management may require localities to obtain additional personnel, increasing implementation costs.[183]

2. USACE Barriers

While localities who partner with USACE on a project do not need to conduct their own BCA, there are other financial disadvantages for the non-federal sponsor. First, the locality sponsor must have the legal and financial capability to fulfill the requirements of cost sharing and local cooperation."[184] A financial analysis is required before any local cooperation agreement can be signed to ensure that the locality can meet its financial commitment.[185] The analysis must include a financial plan and a statement of financial capacity prepared by the locality, as well as an assessment of financial capacity prepared by the USACE District Engineer.[186] The locality must provide, without cost to the federal government, "all lands, easements, rights-of-way, relocation and disposal areas (LERRD) necessary for construction, operation and maintenance of a project, including provision of all necessary access routes and utility relocations."[187] Further, the non-federal sponsor" must also contribute 50 percent of feasibility study costs that exceed $100,000; plus 25-35 percent of preconstruction, engineering and design costs; and 100 percent of operation and maintenance costs," in accordance with a Project Partnership Agreement.[188] A portion of the cost-share requirement may be achieved through work-in-kind, and credits towards the cost-share responsibilities may be earned through acquiring real estate necessary for implementation of a project.[189] Finally, some projects may also require a minimum cash contribution.[190] While non-federal sponsors have significant flexibility how they raise funds for their share of a civil works project, the mandatory cash contribution may be a challenge for localities with lower tax revenue or poor credit.[191]

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[180] Coates, *supra* note 17; Pittenger & Swets, *supra* note 178.
[181] Pittenger & Swets, *supra* note 178.
[182] *Id*.
[183] *Id*.
[184] U.S. ARMY CORPS OF ENG'RS, *supra* note 90.
[185] *Who Pays, and Where does the Money Come From?*, U.S. ARMY CORPS OF ENG'RS, 15, 23, https://www.mvr.usace.army.mil/Portals/48/docs/RE/Guide/WhoPays.pdf.
[186] *Id.*
[187] U.S. ARMY CORPS OF ENG'RS, *supra* note 90.
[188] *Id*.
[189] *Id*.
[190] *Id*.
[191] *See* U.S. ARMY CORPS OF ENG'RS, *supra* note 185, at 21-22 (examples of financing options include, but are not limited to, tax receipts, bonds, grants and loans from financial institutions, or federal, state or other government agencies, cash donations, cash in hand, donation of land, and borrowed funds.).

Additionally, for localities that hire a consulting firm to complete the BCA for grant applications, the analysis produced might not be useable by the USACE to calculate their own BCR if the analysis does not meet certain requirements. Information produced by a consulting firm may be used in a USACE benefit-cost study to reduce the burden on the USACE, bringing down the study's expense;[192] however, the data that the USACE can use for their own feasibility studies must meet certain standards set by regulations.[193]

3. Strategy for Grant Applications

Disadvantaged and small localities that are considering applying for these federal grants should be strategic when considering which grant programs to target. Localities that have not invested in data collection might want to identify and apply for state, local, or private grants that do not require a BCA.[194] Until a locality can implement data collection techniques, competitive federal grant programs may be better avoided. Small localities that have invested in data collection necessary to compete a BCA, but who lack the resources to independently complete a grant application, should consider partnering with larger municipalities in the same geographic region. Localities within the same watershed or water source area may benefit from seeking support from municipalities with more resources, who may also benefit from applying jointly for a particular grant.

B. BCA Fail to Factor in Non-Quantitative Benefits

An additional drawback for some USACE and FEMA flood resilience programs is their primary use of objective factors in reaching a BCR.[195] This current BCA calculation process considers only a subset of potential benefits.[196] While some grant processes, like FEMA, may consider more subjective factors in determining which proposals with acceptable BCRs may warrant funding, this is only after they have reached a threshold BCR based on objective factors.[197] Maximizing the difference between benefits and costs might miss important equity considerations, as well as social or environmental factors that are not addressed by this maximization.[198] For instance, density and property values affect the benefit calculated for flood damage risk reduction.[199] Areas with lower property value or low density may result in lower benefits for purposes of a BCA.[200] This inequity prevents low density and low socioeconomic status areas from competing with more affluent urban areas.[201] Additionally, objective factors do not consider the circumstances of individuals within residential areas. For example, an objective BCA does not consider whether a residential structure is a primary or a secondary home.[202] Therefore, the primary

[192] Conner, *supra* note 159.
[193] *Id.*
[194] *See* Pittenger & Swets, *supra* note 178.
[195] *See supra* Part II.A. and Part II.C.
[196] NAT'L ACAD. OF SCI., ANALYTICAL METHODS AND APPROACHES FOR WATER RESOURCES PROJECT PLANNING, 61 (2004) (referring to USACE's cost-benefit analysis specifically).
[197] *See supra* Part II.A.
[198] CONG. RESEARCH SERV., *supra* note 12, at 11; AM. SOC'Y OF CIVIL ENG'RS, *supra* note 108, at 1.
[199] CONG. RESEARCH SERV., *supra* note 12, at 11.
[200] *Id.*
[201] *See id.*
[202] Coates, *supra* note 17.

use of objective factors to determine BCA results has a disparate impact on individuals of lower socioeconomic status.

While HUD's NDRC grant program still presents challenges for small localities in applying for and implementing the grant due to monetary, expertise, and data limitations, the program's additional subjective quantitative benefits and qualitative benefits do allow for a wider scope of benefits that assist LMI communities in meeting the necessary BCR to qualify for the funding.[203] These additional considerations, such as the social and environmental value of a proposed project, help to counteract the way lower property values can reduce an overall BCR in a purely objective BCA.[204] The inclusion of subjective factors in the narrative component and the initial threshold requirements to be eligible for HUD's NDRC grant contest can make LMI communities more competitive for these grant programs than for others.[205]

Other federal programs may better serve LMI communities because they take into account social, environmental, and political considerations. For example, on a different scale, the Hampton Roads Planning District Commission is considering ways to quantify social factors for local resilience project funding.[206] Factors such as military benefit of a project, income level, and protection of disadvantaged communities could be given numeric values to be added to an overall benefit score.[207] Federal programs may better capture benefits a project offers to a locality by taking a comparable approach.

While BCAs based on objective, monetary factors provide valuable information about the potential cost effectiveness of a program, these should not be the only decision criteria. Instead additional social, environmental, and political considerations should be recognized and factored into evaluations of grant or project proposals.[208]

V. CONCLUSION

As coastal cities and localities continue to face the challenges associated with rising sea levels, communities will continue to look to the federal government for aid in funding and implementing resiliency measures. While localities have multiple options for potential funding sources, various federal agencies utilize different BCAs to decide which grants and projects to fund.[209] However, many BCAs only consider objective factors to determine benefits, resulting in a narrow view of how a particular grant or program will benefit a locality.[210] This approach disadvantages LMI communities that already struggle with limited resources.[211] Additionally,

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[203] *See supra* Part II.B.3.
[204] CONG. RESEARCH SERV., *supra* note 12, at 11; AM. SOC'Y OF CIVIL ENG'RS, *supra* note 108, at 1.
[205] Under HUD's NDRC grant application, which targeted LMI communities, only 40 applicants were eligible for the Phase II competition. *See* COMMONWEALTH OF VA, *supra* note 69, at 3.
[206] Memorandum from the Hampton Rd. Planning Dist. Comm'n to the Hampton Rd. Planning Dist. Comm'n Coastal Resiliency Comm. on Draft Criteria for Funding Local Resilience Projects (Sept. 27, 2019) (on file with the authors).
[207] *See id.*
[208] NAT'L ACAD. OF SCI., *supra* note 196, at 70.
[209] *See supra* Part II.A.3, Part II.B.3, and Part II.C.3.
[210] *See e.g.*, *supra* Part II.A.3 and Part II.C.3.
[211] *See supra* Part IV.A.1.

localities with limited staff and budgets face challenges in applying for and implementing grants due to limited data collection, resources, and expertise needed to complete BCAs and grant applications.[212] Even for federal funding that does not require a grant application with a BCA, like USACE grants, localities may still struggle meeting non-federal sponsorship funding obligations.[213]

As localities continue to seek ways to increase resiliency, they will need to be strategic in applying for grants and projects, targeting those that they may be the most adequately prepared to apply for and implement. Federal agencies should consider subjective and objective factors to measure benefits. This approach may assist LMI communities that struggle to meet high BCR requirements under a purely objective standard. These changes may foster a more equitable approach to addressing the threats presented by increasing sea level rise for *all* localities along the East Coast.

[212] *See id.*
[213] *See supra* Part IV.A.2.

VI. APPENDIX

A. BCA Summary Chart by Federal Program[214]

	HUD	FEMA	USACE
Agency Goals	**Mission Statement:** "Create strong sustainable, inclusive communities, and quality affordable homes for all."	**Mission Statement:** "Helping people before, during, and after disasters."	**Mission Statement**: "Deliver vital public and military engineering services; partnering in peace and war to strengthen our nation's security, energize the economy and reduce risks from disasters."
Federal Funding Options	• **CDBG:** Addresses a wide range of community issues aimed at community development needs. There are 27 different categories that can be funded under CDBG. • **CDBG-DR:** Objective is to assist communities (mostly LMI communities) in recovering from a disaster while also using some of the funding for future resilience and hazard mitigation. • **CDBG-NDRC:** Awarded 13 states more than $1B in CDBG-DR funds for different resilience efforts based on a structured competition.	• **HMGP:** Requires a Major Disaster Declaration before funds are given to state and local governments to implement hazard mitigation strategies. • **FMA**: Only available to those who have a federal flood insurance policy under NFIP. • **PDM**: PDM program is not triggered by a natural disaster, and funds are awarded to states on a yearly basis, through a competition. PDM is nationally competitive.	• **Flood Damage Reduction Projects:** Allows non-federal sponsors and USACE to partner in funding and implementing infrastructure projects, including structural and non-structural measures. Projects not authorized under CAP require specific congressional approval for a project. • **CAP**: Similar to FDRP, but allows for projects costing less than $10M to proceed without congressional approval.

[214] *See generally supra* Part II; *Research and Evaluation, Demonstrations and Data Analysis and Utilization Program (HUDRD) FR-6200-N-29*, U.S. DEP'T OF HOUS. AND URBAN DEV., 1, 3, https://www.hud.gov/sites/dfiles/SPM/documents/FU18_FR_6200N29_HDRD_NOFA.pdf; Coates, *supra* note 17.

BCA	• Requires both a BCR and NPV calculation. • BCR needs to be greater than 1.0 and NPV needs to be greater than 0. • Discount rate is OMB Circular A-94's 7% unless justification warrants otherwise. • NDRC required quantitative and qualitative analysis in the grant proposal.	• BCR = 1.0 or greater. • Discount Rate is OMB Circular A-94's 7% period. • Version 6.0 Toolkit is used to calculate BCRs.	• Benefits are only measured by flood losses and damage avoided • Costs and benefits looked at over 30-50 years. • BCR = Requires only 1.0 or greater, but due to congressional and funding constraints, 2.5 or greater is needed in practice.
Main Issues	• HUD targets LMI communities more generally. • Information about HUD's BCA is only analyzed through the lens of the NDRC competition.	• A lot of localities do not have enough data to put into the Toolkit to perform the BCA calculation. • Version 6.0 Toolkit is difficult to use and localities often lack the data to effectively use it.	• Funding goes to the most valuable building. • Types of buildings are not differentiated (*e.g.* no difference between a hospital and a military base). Only damage to building is considered.
Impact on Low- and Moderate-Income Communities	• HUD as an agency focuses on this target group more than other federal grant programs.	• FEMA recognizes a need to assist LMI communities, but statutory and regulatory requirements interfere with this objective.	• Not a consideration in accessing BCR. May be a factor for selection of project measures to be implemented.