

# Stanford Law School

## Coastal Policy Lab Practicum

### Legal Analysis of Eligibility of Nature-Based Flood Mitigation Strategies for FEMA Hazard Mitigation Funding

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## Executive Summary

Climate change poses significant challenges for coastal regions. Sea level rise, compounded by increased storm frequency, raises a growing need for coastal resiliency efforts to minimize the flood risk exposure of coastal communities. Traditionally, coastal cities and municipalities have focused on structural mitigation methods to protect coastal communities, such as hard-armoring and rebuilding in-place. Hard-armoring can alter the flow of sand that nourishes beaches or prevent the coastline from migrating landward, thereby harming coastal ecosystems, narrowing beaches, and destroying public access to beaches and associated resources such as fishing and recreation.

Nature-based coastal flood mitigation strategies present an opportunity to build long-term coastal resiliency while supporting critical coastal ecosystems. And the hazard mitigation funding programs administered by the Federal Emergency Management Agency (FEMA) present a source of funds to support these efforts. However, in California to date, local jurisdictions have declined to apply for FEMA hazard mitigation funding in support of nature-based strategies. This appears to be due to a belief that nature-based strategies (NBS) would not be eligible for FEMA funding.<sup>i</sup>

This paper assesses the laws, regulations, and policies of FEMA's Hazard Mitigation Assistance (HMA) program to identify any potential requirements that would prohibit FEMA from funding NBS. The purpose of the HMA is to provide funding for activities that reduce community vulnerability to disasters, promote community and individual safety and resilience, and promote community recovery and vitality after a disaster. Our assessment concludes that there are no legal barriers that would prevent NBS, particularly property acquisition and conversion to open space, from being funded through the HMA. In fact, several recent decisions by FEMA suggest that the agency should be prioritizing NBS for flood mitigation. FEMA has identified coastal ecosystem services as an agency priority, and in its most recent Hazard Mitigation Assistance Guidance (27 February 2015), FEMA specifically adjusted the program to address climate change and sea level rise, efforts that would benefit from the use of NBS.

The main hurdle to FEMA funding NBS appears to be a communication issue regarding cost-effectiveness. FEMA has decided to include environmental value in the benefit-cost analysis (BCA), which makes it highly likely NBS would meet the cost-effective requirements in the Robert T. Stafford Disaster Relief and Emergency Act. However, FEMA's BCA process is less than transparent, and it contributes to confusion by local planners. Cost effectiveness is not, therefore, a barrier due to any laws or regulations but due to lack of clarity in FEMA's implementation protocols.

As a general matter, NBS align with the overarching goals of FEMA, and FEMA has significant authority to promote NBS, both in the way it interprets and designs its own regulations and policies and in the way it communicates with state and local jurisdictions. Any barriers to the use of FEMA funds to promote NBS are therefore within the power of FEMA to address.

## Introduction

With over two-thirds of Californians living near the coastline,<sup>ii</sup> natural disasters and hazards pose a real threat to public safety and infrastructure. Coastal resilience and hazard mitigation are increasingly necessary to protect coastal communities. Traditionally, hazard mitigation has focused on structural approaches such as hard armoring and rebuild-in-place. Hard armoring techniques can alter the flow of sand that nourishes beaches or prevent the coastline from migrating landward, thereby harming coastal ecosystems, narrowing beaches, and destroying public access to beaches and associated resources such as fishing and recreation.<sup>iii</sup>

Nature-based coastal flood mitigation strategies present an opportunity to build long-term coastal resiliency while supporting critical coastal ecosystems. Nature-based strategies solutions, including wetland barriers, beach nourishment, setbacks, and living coastlines, can reduce risk of coastal flooding to protect people and property throughout California's coast, while maintaining the coastal ecosystems that are so important to the state's economy and character.

And the hazard mitigation funding programs administered by the Federal Emergency Management Agency (FEMA) present a source of funds to support these efforts. However, in California to date, local jurisdictions have declined to apply for FEMA hazard mitigation funding in support of nature-based strategies. This appears to be due to a belief that nature-based strategies (NBS) would not be eligible for FEMA funding.<sup>iv</sup>

This paper assesses the laws, regulations, and policies of FEMA's Hazard Mitigation Assistance (HMA) program to identify any potential requirements that would prohibit FEMA from funding NBS. The purpose of the HMA is to provide funding for activities that reduce community vulnerability to disasters, promote community and individual safety and resilience, and promote community recovery and vitality after a disaster. We assessed statutes, regulations, and policy documents associated with HMA (a full table of the documents is provided in the appendix).<sup>1</sup> Specifically, we looked for guidance and regulations on where FEMA is limited in providing mitigation funding for nature-based solutions and where FEMA has flexibility to fund such projects.

This paper is presented in five parts. The first section explains the relevant statutes and regulations that govern mitigation funding. The second sets out the federal directions that encourage FEMA to prioritize environmental benefits and thereby nature-based strategies. The third identifies FEMA's legal and policy obligations<sup>2</sup> that may limit the use of HMA funds for NBS. Our assessment concludes that there are no legal barriers that would prevent NBS, particularly property acquisition and conversion to open space, from being funded through the HMA. In fact, several recent decisions by FEMA suggest that the agency should be prioritizing NBS for flood mitigation. In the fourth section, we explore FEMA's ability to use agency discretion to fund NBS and identify opportunities for FEMA to promote NBS as a priority for mitigation within the Agency. With a stronger understanding of its legal obligations, FEMA can begin to better disseminate knowledge to planners on how to begin using nature-based solutions.

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<sup>1</sup> This analysis focuses on mitigation funding and does not consider limitations that may come from environmental statutes including the National Environmental Policy Act, the National Historic Preservation Act, the Endangered Species Act, and 44 CFR part 10, among others. A full table of the documents analyzed is presented in the appendix.

<sup>2</sup> Legal obligations are those created by law or regulation, which FEMA is legally required to fulfill (although we will also discuss FEMA's authority to interpret legal obligations). Policy obligations are those created by internal FEMA documents or guidelines and which FEMA has full authority to amend.

### III. Regulatory System for FEMA’s Hazard Mitigation Funding

Mitigation, according to Robert T. Stafford Disaster Relief and Emergency Assistance Act is “the process of systematically evaluating the nature and extent of vulnerability to the effects of natural hazards present in society and planning and carrying out actions to minimize future vulnerability to those hazards to the greatest extent practicable.”<sup>v</sup> Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, (“Stafford Act”), 42 U.S.C. §§ 5121 et seq., and the National Flood Insurance Act of 1968 (“NFIA”), 42 U.S.C. §§ 4001 et seq., FEMA has authority to provide grant assistance to states for hazard mitigation. How FEMA decides to provide that assistance is left mainly to Agency discretion.

FEMA’s Hazard Mitigation Assistance (HMA) funding is awarded through three grant programs: the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation Program (PDM) and Flood Mitigation Assistance Program (FMA). The HMGP program, authorized under Section 404 of the Stafford Act,<sup>vi</sup> provides funding for mitigation measures in areas where a presidential disaster has been declared. The purpose of the HMGP program is to ensure that mitigation for future disasters is considered during reconstruction following a disaster.

The PDM program, authorized by Section 203 of the Stafford Act,<sup>vii</sup> provides funds annually to States, Territories, Indian Tribal governments, and local governments. The goal of the PDM projects is to reduce risk of loss due to natural hazards before a disaster occurs. The FMA program, authorized by Section 1366 of the NFIA,<sup>viii</sup> is focused exclusively on flood mitigation and designed to reduce claims (and thereby costs) made through the National Flood Insurance Program (NFIP) (also administered by FEMA).

In addition to these HMA programs, FEMA administers the Public Assistance Program, authorized by Section 406 of the Stafford Act, intended to provide relief for damage to public infrastructure (e.g. water, sewage, electricity) following a major disaster. Sections 404 and 406 both concern “repair, restoration, reconstruction, or replacement” of a public facility or private nonprofit facility “damaged or destroyed by a major disaster.”<sup>ix</sup> However, Section 404 is used to provide protection to the undamaged parts of the facility, while Section 406 is applied to parts of a facility that were actually damaged by the disaster. The mitigation measure under Section 406 is intended to provide protection from subsequent events. In either case, the mitigation work must be cost effective reduce the potential for damage from future disaster events.<sup>x</sup>

**Table 1. FEMA-Administered Hazard Mitigation Programs and Authorizing Statutes**

Programs	Laws
Hazard Mitigation Grant Program	Section 404 Robert T. Stafford Disaster Relief and Emergency Act 42 U.S.C. 5170c
Pre-Disaster Mitigation	Section 203 of the Stafford Act 42 U.S.C. 5133
Flood Mitigation Assistance Program	Section 1366 of the National Flood Insurance Act of 1968 42 U.S.C. 4104c
Public Assistance Program	Section 406 of the Stafford Act 42 U.S.C. 5172

#### **IV. Federal Priorities Encourage Consideration of Nature-Based Mitigation Strategies**

FEMA’s regulations prioritize the need to consider environmental concerns, a goal that is consistent with using nature-based solutions as a strategy to address coastal flood hazards. Regulations promulgated by the Agency emphasize the need to favor environmentally friendly approaches, particularly wetlands and floodplains, whenever possible.<sup>xi</sup> These regulations recognize the value of wetlands and floodplains in mitigating flood risks.

Such policies align with presidential direction for the protection of wetlands and floodplain management. Executive Order 11990 on Protection of Wetlands, requires agencies to:

“avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative” and “provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.”<sup>xii</sup>

Executive Order 11988 on Floodplain Management similarly requires federal agencies to take steps to avoid development in floodplains by considering “alternatives to avoid adverse effects and incompatible development in the floodplains.”<sup>xiii</sup> Nature-based strategies are alternative strategies that do not result in the same destruction and modification of wetlands or other floodplain harms.

FEMA’s own environmental regulations, such as 44 CFR Part 9, FEMA’s policy on Floodplain Management and Protection of Wetlands, stipulate that FEMA’s actions must:

“avoid long- and short-term adverse impacts associated with the occupancy and modification of floodplains and the destruction and modification of wetlands” and “restore and preserve the natural and beneficial values served by floodplains.”<sup>xiv</sup>

The HMA guidance requires mitigation projects to be consistent with these environmental aims.<sup>xv</sup> Furthermore, FEMA encourages projects that are “designed to accomplish multiple objectives including damage reduction, environmental enhancement, and economic recovery.”<sup>xvi</sup>

This regulatory emphasis on environmental concerns suggests that, when given the opportunity to interpret statutory guidance, FEMA should do so in a way that is consistent with promoting environmental enhancement, including through the use of nature-based flood mitigation strategies.

#### **III. Regulatory Requirements for Mitigation Projects do not Preclude Nature-Based Strategies, but FEMA Policies Raise Challenges**

This section assesses the statutory, regulatory, and policy requirements for hazard mitigation funding that could limit the ability of FEMA to fund nature-based strategies (NBS). Based on this assessment, it is unlikely that any laws or regulations would preclude FEMA from supporting NBS. FEMA’s own independent policies present the largest barrier to NBS, and FEMA has the authority<sup>xvii</sup> (and, in light of the federal priority for environmental protection, perhaps even the responsibility) to revise these policies and their implementation to further promote NBS.

### **3. 1. Nature-based Solutions Must be Framed as Beneficial to Both People and the Environment**

FEMA’s current policies on hazard mitigation projects present potential challenges for nature-based flood mitigation projects. One such challenge for nature-based mitigation projects is FEMA policy that “projects that do not reduce the risk to people, structure, or infrastructure” are ineligible for HMA funding.<sup>xviii</sup> While nature-based mitigation strategies can do just this, further agency guidance on hazard mitigation funding indicates that the agency may not undertake nature-based activities in areas that lack an existing structure on the land. This would present a challenge to nature-based strategies that are exclusively in un-developed areas, such as wetland restoration, even if these actions have benefits for development in other areas of the coast.

Further, under FEMA policy, mitigation funding cannot be awarded for projects “with the sole purpose of open space acquisition of unimproved land.” This limits the ability of local jurisdictions to use FEMA funding to acquire *undeveloped* land to create and maintain natural flood buffer zones, even though FEMA allows these same jurisdictions to purchase *developed* land, destroy the existing structures, and maintain that land as a natural buffer. These policies are likely intended to prevent jurisdictions from using mitigation funding to pursue environmental conservation goals, but they effectively limit the ability of jurisdictions to pursue mitigation strategies that would otherwise be well-aligned with FEMA’s environmental and hazard mitigation priorities.

Fortunately, this limitation is mostly a matter of how nature-based mitigation projects are framed. Rather than describing nature-based strategies as an environmental enhancement project, they need to be framed as a dual-use strategy where communities are using NBS to prevent harms to people and infrastructure from natural hazards.

### **3. 2. Projects Must be Feasible, Effective, and Cost-effective**

FEMA policies require hazard mitigation projects to meet three criteria: feasibility, technical effectiveness, and cost-effectiveness.

#### **3.2.1 Feasible**

FEMA requires that “[m]itigation projects submitted for the HMA grants must *be both feasible and effective at mitigating the risks of the hazard for which the project was designed.*”<sup>xx</sup> Feasibility is “demonstrated through conformance with accepted engineering practices, established codes, standards, modeling techniques, or best practices.”<sup>xx</sup> Beyond these suggestions, there is no explicit language on what demonstrates feasibility. Rather, it appears that FEMA is able to interpret what is considered a “best practice.” Thus, FEMA has the discretion to include nature-based flood mitigation strategies, as long as such projects are consistent with best practices of their field, even in the absence of standardized engineering codes. Moreover, as the U.S. Army Corps of Engineers and National Ocean and Atmospheric Administration (NOAA) also use nature-based flood mitigation strategies in their operations, it is perhaps time the agencies work together to develop a set of technical standards for nature-based strategies.<sup>xxi</sup>

### 3.2.2 Technically Effective

Effective projects create either long-term or permanent solutions for the hazard that the project was designed to mitigate.<sup>xxii</sup> For example, the effectiveness requirement prohibits funding that would procure and store sandbags to use as a last-minute effort to counter a flooding event.

There is some question as whether nature-based strategies are truly “permanent,” in the sense that flooding events and natural coastal processes will affect nature-based strategies. Indeed, this is the primary advantage of NBS. However, as these are long-term strategies that are intended to survive for the life of the coastal ecosystem, and not temporary actions to be taken during the disaster, they are likely to be acceptable under this requirement.

Particular strategies, like beach re-nourishment or dune building that would be destroyed during a disaster, may have particular problems meeting this requirement. However, as a general statement, this requirement does not preclude nature-based strategies. Moreover, FEMA could revise its 2016 Guidance document to clarify the effectiveness requirement specifically with regards to common nature-based strategies such as wetland restoration, living shorelines, beach nourishment, and dune strengthening.

### 3.2.3 Cost Effective

Finally, FEMA statutes,<sup>xxiii</sup> policies,<sup>xxiv</sup> and regulations for the HMGP program require that eligible projects are “cost-effective and substantially reduce the risk of future damage, hardship, loss, or suffering resulting from a major disaster.”<sup>xxv</sup> This cost-effective requirement is the most likely barrier to FEMA awarding HMA funds to nature-based flood mitigation projects.

The cost-effective requirement is met if the anticipated value of the reduction in flood damages and associated negative impacts if future floods were to occur in a given area, exceeds the cost of the mitigation activity for that area.<sup>xxvi</sup> FEMA policy requires applicants for HMA funding “use a FEMA-approved methodology to demonstrate cost-effectiveness.”<sup>xxvii</sup> This may be calculated using FEMA-provided software that performs a benefit-cost analysis (BCA) by calculating a benefit-cost ratio (BCR), in which total annualized project benefits are divided by total annualized project cost.<sup>xxviii</sup> A project is cost-effective when benefits, including avoided damages, loss of function, and displacement, exceed costs for a given project, i.e. when the BCR exceeds one.

FEMA has modified the cost-effective requirements over time, to encompass environmental benefits provided by mitigation activities.<sup>xxix</sup> Nontraditional benefits conferred via certain mitigation projects have traditionally been outside of calculation in FEMA’s BCA Tool. However, the 2015 HMA Guidance explicitly incorporates environmental benefits into the BCA:

“Incorporating environmental benefits into the overall quantification of benefits for acquisition-related activities supports [the agency’s] mission of risk reduction, environmental compliance, and preservation of the natural and beneficial functions of the floodplain.”<sup>xxx</sup>

In light of this policy, FEMA’s most recent software includes environmental benefits in the calculation. For example, within BCR determinations for mitigation projects involving property acquisition, once a project BCR exceeds 0.75, green open space and riparian benefits are included within the calculation according to values pre-determined by FEMA (see Table 2 for example values).<sup>xxxi</sup> The threshold of a

BCR of .75 is to ensure that projects receiving grants are primarily for mitigation activities, as projects with such a ratio are primarily associated with hazard risk reduction.<sup>xxxii</sup>

Table 1: Green Open Space and Riparian Benefits Land Use		
	Total Estimated Benefits (per acre per year)	Total Estimated Benefits(1) (per square foot)
Green Open Space	\$7,853	\$2.57
Riparian	\$37,493	\$12.29

Additionally, in accordance with the President’s Executive Order on Climate Change and FEMA’s Climate Change Adaptation Policy, the most recent FEMA Guidance allows the agency to fund mitigation projects that account for sea-level rise.<sup>xxxiii</sup> Mitigation projects that are applying for HMA funds can now input different floodplain elevations to account for sea-level rise, although notably applicants are not required to account for sea level rise. As with including valuation for green open space and riparian benefits, this is a positive change for BCA calculations and makes funding nature-based mitigation projects more likely.

At the moment, FEMA limits applying environmental benefit values to “acquisition-related activities”.<sup>xxxiv</sup> While many nature-based solutions, include reconstruction of floodplains and wetlands, will involve property acquisition, this requirement precludes calculating benefits for non-acquisition projects such as beach nourishment, and it also fails to include environmental costs in the BCA for structural solutions like seawalls, which could push the BCR below one for these traditional approaches. By expanding the allowable inputs for the BCA software to include environmental benefits for all mitigation projects, FEMA would better be able to promote novel flood mitigation strategies, including nature-based, and reduce the use of harmful structural approaches.

However, despite the positive inclusion of environmental benefits and sea level rise impacts – changes that are likely to make nature-based strategies even more attractive from a benefit-cost analysis perspective – the BCA process is so confusing to local planners and grant applicants that it remains a practical, rather than regulatory, barrier.<sup>xxxv</sup> Confusion around the requirements and the inputs used in the BCA is preventing planners from applying for HMA grants for nature-based projects. Planners contacted as part of research for this paper stated categorically that FEMA’s BCA requirements prohibit using environmentally consistent mitigation techniques. One resource planner from Southern California stated that, after having had an application for HMA funding for a nature-based project rejected, she was unaware of any recent changes to FEMA’s BCA inputs and believed the BCA would prevent any future nature-based projects from being funded. However, the planner said that, if the agency were to allow for calculation of environmental benefits in the BCA, then her department would be likely to apply for mitigation grants for nature-based strategies. The barrier is therefore one of communication and awareness, rather than a regulatory barrier.

In order to further federal priorities of protection and reconstruction of wetlands and floodplains, FEMA should clarify its BCA calculation and software. Beyond a short description within the HMA Guidance, the agency does not provide much specific information on the inputs for the BCA software until one goes into the software. Even then, after repeated attempts to use and assess the software, the authors were not able to ascertain what environmental inputs are used or how environmental valuation is calculated. The agency could help planners apply for HMA grants if there was a document, such as a

handbook or factsheet, on the specific inputs that go into the BCA calculation, the associated values for each input. This would help planners know ahead of time, before starting the software, what information they need to provide in their application and if their project is likely to meet the cost-effective requirement. Along these lines, in order to promote the use of nature-based mitigation strategies, FEMA could hold in-person trainings and workshops for coastal, city, and emergency planning officials that would provide information on how to meet the BCA requirements for such projects. In-person trainings would better publicize changes FEMA has made, allow FEMA to give advice on the application process specific to nature-based projects, and allow planners to make connections and exchange best practices and lessons learned.

#### **IV. FEMA Has the Opportunity to Promote Nature-Based Flood Mitigation Strategies**

##### **4. 1. Eligible Projects**

FEMA will award HMA funds for mitigation activities, hazard mitigation planning and management costs.<sup>3</sup> In its annual HMA Guidance, FEMA defines which types of mitigation projects are eligible for HMA funds. The policy on what type of mitigation activities are eligible is not identified in statute or regulation, rather is up to the discretion of the agency. FEMA thus has the authority to specifically identify nature-based strategies as eligible projects, thereby removing all doubt for potential grant applicants.

The 2015 HMA Guidance expanded the list of eligible mitigation activities to twenty categories. While nature-based flood mitigation projects could have likely been encompassed within the definitions of categories of eligible projects found in prior HMA Guidance documents, the current policy has even greater flexibility to award HMA grants to these sort of activities. In this expansion, FEMA took steps to allow projects that address climate change adaptation and resiliency by creating a Miscellaneous/Other category for eligible projects. FEMA's rationale is that "[m]itigation projects must adapt to new challenges posed by more powerful storms, frequent heavy precipitation, heat waves, prolonged droughts, extreme flooding, higher sea levels, and other weather events."<sup>xxxvi</sup> This category allows for mitigation strategies, such as nature-based solutions, that were not encompassed in prior iterations of FEMA policy with the goal of promoting "projects that could benefit from sustainable development practices focusing on ecosystem-based and hybrid approaches to disaster risk reduction."<sup>xxxvii</sup> FEMA further clarified that additional projects, beyond those listed, could be eligible if they meet FEMA's requirements including feasible, effective and cost-effective. These changes make nature-based strategies even more clearly supported by FEMA's hazard mitigation programs.

In addition, as discussed above, FEMA's requirement that projects be cost-effective is a potential challenge for using nature-based flood mitigation strategies. However, FEMA will exempt a small number of HMGP mitigation projects from the BCA requirements. Under the "5 Percent Initiative" category, "up to 5 percent of the Grantee's HMGP ceiling may be used for mitigation measures that are difficult to evaluate against traditional program cost-effectiveness criteria."<sup>xxxviii</sup> Nature-based solutions

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<sup>3</sup> Environmental studies that are integral to the implementation of a mitigation project are only eligible if they are included as part of that project. This can be a problem for planners who want to incorporate environmental planning systematically, rather than on a parcel-by-parcel or project-based approach. See FEMA Memorandum, *HMGP: Inclusion/Exclusion of Federal and Local Costs in Cost Effectiveness Evaluations* (1996), available at [http://www.fema.gov/media-library-data/20130726-1651-20490-5808/hmgp\\_inclusion\\_exclusion\\_of\\_federal\\_and\\_local\\_costs.txt](http://www.fema.gov/media-library-data/20130726-1651-20490-5808/hmgp_inclusion_exclusion_of_federal_and_local_costs.txt).

that are not supported by the environmental benefit calculations (such as non-acquisition programs) could potentially fall into this category. This would be particularly useful for new and novel nature-based strategies: FEMA identifies eligible 5 Percent Initiative projects as “the use, evaluation, and application of new, unproven mitigation techniques, technologies, methods, procedures, or products.”<sup>xxxix</sup> However, projects eligible for funding under this category must satisfy “a reasonable expectation that future damage or loss of life or injury will be reduced or prevented by the activity.”<sup>xl</sup> So there will still be a need to frame nature-based strategies as a benefit to people and infrastructure, as noted in the beginning of this assessment.

## **Conclusion**

Analysis of the statutes, regulations, and policies that regulate FEMA’s activities reveals no hard legal limitations that would prevent FEMA from awarding HMA funds to nature-based strategies for coastal flood mitigation. Projects must still be feasible, technically effective and cost-effective. However, FEMA has authority to interpret and implement these requirements consistent with agency priorities, and recent alterations to FEMA policy provide even greater support for nature-based strategies as a flood mitigation priority moving forward.

Instead of regulatory limitations, the main barrier instead is lack of communication. Despite efforts to alter its benefit-cost analysis, the implementation still remains unclear to local officials, and uncertainty prevents communities from investing the time and resources necessary to apply for HMA grants for nature-based strategies. FEMA has made changes in agency policy to better incorporate nature-based flood mitigation projects, but further outreach and education efforts to inform local officials about these changes would help FEMA reach its goals of environmental protection and hazard mitigation.

## REFERENCED REGULATIONS, DIRECTIVES AND GUIDANCE

Reference	Description
A. Guidance	
Hazard Mitigation Assistance Guidance (February 2015)	Introduces the three HMA programs, identifies roles and responsibilities and outlines the organizations of the document.
B. Statutes	
National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4001 et seq.	The NFIA created the Federal Insurance Administration and made flood insurance available for the first time. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property located in the Special Flood Hazard Area.
Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121 et seq.	This Act constitutes the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and FEMA programs.
C. Regulations	
44 CFR Part 9, Floodplain Management and Protection of Wetlands	Sets forth policy, procedure and responsibilities to implement and enforce Executive Order (EO) 11988, Floodplain Management, and EO 11990, Protection of Wetlands.
44 CFR Part 10, Environmental Considerations	FEMA procedures for implementing the National Environmental Policy Act. Provides policy and procedures to enable FEMA officials to account for environmental considerations when authorizing/approving major actions that have a significant impact on the environment.
44 CFR Part 79, Flood Mitigation Grants	Prescribes actions, procedures, and requirements for the administration the Flood Mitigation Assistance (FMA) program.
44 CFR Part 80, Property Acquisition and Relocation for Open Space	Provides actions, procedures and requirements for the administration of FEMA mitigation assistance for projects to acquire property for open space purposes under all Hazard Mitigation Assistance (HMA) programs.
44 CFR Part 201, Mitigation Planning	Provides information on requirements and procedures for mitigation planning as required by the Stafford Act, specifically Section 201.4 Standard State Mitigation Plans, Section 201.5 Enhanced State Mitigation Plans, Section 201.6 Local Mitigation Plans, and Section 201.7 Tribal Mitigation Plans.
44 CFR Part 206, Federal Disaster Assistance for Disaster Declared On or After November 23, 1988	Prescribes policies and procedures for implementing the sections of Public Law 93-288 (the Stafford Act) that are delegated to the director of FEMA, including the administration of the Hazard Mitigation Grant Program (HMGP).
44 CFR Part 207, Management Costs	Implements Section 324, Management Costs, of the Stafford Act, providing actions, procedures, and policies for HMGP management costs.

## REFERENCES

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- <sup>i</sup> See Stanford Coastal Policy Lab White Paper, *Local Barriers to Nature-Based Strategies*, 2015 for a related assessment of the local barriers to the use of nature-based flood mitigation strategies in California.
- <sup>ii</sup> Wilson, Steve G., and Thomas R. Fischetti, *Coastline Population Trends in the United States: 1960 to 2008*, CURRENT POPULATION REPORTS (2010), 1, available at <http://www.census.gov/prod/2010pubs/p25-1139.pdf>.
- <sup>iii</sup> See, e.g., YOUNG, R.S., A BROAD PERSPECTIVE ON THE IMPACTS OF SEAWALLS ON BEACHES FROM A SCIENTIFIC AND REGULATORY PERSPECTIVE WITH IMPLICATIONS FOR THE SOUTHAMPTON TOWN TRUSTEES' COASTAL EASEMENT (2011); Caldwell, Meg, and Craig Holt Segall, *No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access Along the California Coast*, 34 ECOLOGY LAW QUARTERLY, 533 (2007); Pace, N.L., *Wetlands or Seawalls? Adapting Shoreline Regulation to Address Sea Level Rise and Wetland Preservation in the Gulf of Mexico*, 26 J. LAND USE 327 (2006).
- <sup>iv</sup> See Stanford Coastal Policy Lab White Paper, *Local Barriers to Nature-Based Strategies*, 2015 for a related assessment of the local barriers to the use of nature-based flood mitigation strategies in California.
- <sup>v</sup> 44 C.F.R. 300.1
- <sup>vi</sup> 42 U.S.C. 5170c
- <sup>vii</sup> 42 U.S.C. 5133
- <sup>viii</sup> 42 U.S.C. 4104c
- <sup>ix</sup> 42 U.S.C. 5172 (a) (1)
- <sup>x</sup> See 42 U.S.C. 5172; and 44 C.F.R. § 206.226.
- <sup>xi</sup> See, e.g., 44. C.F.R. 206.435(c), and 44 C.F.R. § 9.6(b) (laying out an 8-step decision making process for development in wetlands and floodplains that highlights the need to identify possible development alternatives outside of the floodplain and, if no such alternatives exist, minimize the impact from floodplain development and restore or preserve the value provided by floodplains and wetlands).
- <sup>xii</sup> Exec. Order No. 11990, 42 FR 26961, 3 CFR, 1977 Comp. (1977) (Protection of Wetlands).
- <sup>xiii</sup> Exec. Order No. 11988, 42 FR 26951, 3 CFR, 1977 Comp. (1977) (Floodplain Management).
- <sup>xiv</sup> 44 C.F.R. § 9.2(b).
- <sup>xv</sup> 44 C.F.R. § 206.434(5).
- <sup>xvi</sup> 44 C.F.R. § 206.435(c).
- <sup>xvii</sup> The ability of federal agencies to interpret their statutory guidance within reason, as necessary to carry out their duties, is well established within administrative law. Federal agencies are generally entitled to deference from courts when agencies interpret statutes that they implement, unless Congress has clearly delivered guidance on the issue. See, e.g., *Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984); *National Cable & Telecommunications Ass'n v. Brand X Internet Services (Brand X)*, 545 U.S. 967, 982 (2005). See also, generally, Mashaw, J.L., *Between Facts and Norms: Agency Statutory Interpretation as an Autonomous Enterprise*, YALE LAW SCHOOL FACULTY SCHOLARSHIP SERIES 1-1-2005.
- <sup>xviii</sup> FEMA, FISCAL YEAR 2015 HAZARD MITIGATION ASSISTANCE GUIDANCE AND ADDENDUM (2015) (hereinafter "2015 Guidance"), 42, available at <https://www.fema.gov/media-library/assets/documents/103279>.
- <sup>xix</sup> 2015 Guidance at 44 (emphasis added). See also 42 U.S.C.A. § 5170c (West); 44 C.F.R. § 206.434(5); 44. C.F.R. § 78.5(d).
- <sup>xx</sup> 2015 Guidance at 51.
- <sup>xxi</sup> The U.S. Army Corps of Engineers provides a list of potential performance metrics to measure the success of a nature-based project in various coastal ecosystems, but there are few examples where these metrics have been quantified. However, these could serve as a starting point for the development of nature-based technical standards. See, US Army Corps of Engineers, *Coastal Risk Reduction and Resilience*, CIVIL WORKS DIRECTORATE (2013).
- <sup>xxii</sup> 2015 Guidance at 44.
- <sup>xxiii</sup> Flood Mitigation Assistance, 42 U.S.C. 4104c; Pre-Disaster Hazard Mitigation, 42 U.S.C. 5133; Hazard Mitigation, 42 U.S.C. 4170c.
- <sup>xxiv</sup> 2015 Guidance at 44.
- <sup>xxv</sup> 44 C.F.R. § 206.434
- <sup>xxvi</sup> 44 C.F.R. § 78.11(a); see also FEMA, *Selecting Appropriate Measures for Floodprone Structures*, Appendix D: *Determining Cost-Effectiveness* (FEMA 551, February 2007), available at [http://www.fema.gov/media-library-data/20130726-1608-20490-8248/fema551\\_appxd.txt](http://www.fema.gov/media-library-data/20130726-1608-20490-8248/fema551_appxd.txt).

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<sup>xxvii</sup> 2015 Guidance at 64.

<sup>xxviii</sup> FEMA requires the use of approved BCA software (Version 5.0 or greater). The FEMA BCA software uses the OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal programs. 2015 Guidance at 64.

<sup>xxix</sup> See 2015 Guidance at 66; FEMA Policy FP-108-024-01, CONSIDERATION OF ENVIRONMENTAL BENEFITS IN THE EVALUATION OF ACQUISITION PROGRAMS UNDER THE HAZARD MITIGATION PROGRAMS (2014), available at <https://www.fema.gov/media-library/assets/documents/33295>.

<sup>xxx</sup> 2015 Guidance at 66.

<sup>xxxi</sup> 2015 Guidance at 66.

<sup>xxxii</sup> 2015 Guidance at 50.

<sup>xxxiii</sup> See Exec. Order No. 13653, 78 FR 215 (2013) (Preparing the United States for the Impacts of Climate Change); FEMA, FEMA Policy FP-2011-OPPA-01, FEMA Climate Change Adaptation Policy (2011); FEMA, *Incorporating Sea Level Rise (SLR) into Hazard Mitigation Assistance (HMA) Benefit-Cost Analysis Frequently Asked Questions (FAQs)* (2013), available at <http://www.fema.gov/media-library/assets/documents/89659>. Note, Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (2015), may provide even further initiative for federal agencies to pursue nature-based flood mitigation strategies, but it is not included in this analysis due to time constraints.

<sup>xxxiv</sup> 2015 Guidance at 66.

<sup>xxxv</sup> See Stanford Coastal Policy Lab White Paper, *Local Barriers to Nature-Based Strategies*, 2015 for a related assessment of the local barriers to the use of nature-based flood mitigation strategies in California.

<sup>xxxvi</sup> 2015 Guidance at 38.

<sup>xxxvii</sup> 2015 Guidance at 38.

<sup>xxxviii</sup> 2015 Guidance at 39.

<sup>xxxix</sup> 2015 Guidance at 84.

<sup>xl</sup> 2015 Guidance at 84,