Guidelines for Implementing Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input

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Version Highlights

The *Guidelines for Implementing Executive Order 11988, Floodplain Management, and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* replaces *Floodplain Management Guidelines for Implementing E.O. 11988* published February 10, 1978. Throughout this document, the term "Guidelines" refers to the current version of the document, and the "1978 Guidelines" will be used to refer to the previous version. Similarly, the references to E.O. 11988 refer to the most current version of E.O. 11988, as amended by E.O. 13690. Where there is a reference to the initial version of E.O. 11988, the Guidelines will reference the "1977 version of E.O. 11988" for clarity.

The Guidelines continue to include key concepts from the 1978 Guidelines, including the following:

- The Guidelines continue to be advisory. They do not create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States. The use of any mandatory language in the Guidelines is intended to capture elements of E.O. 11988 and E.O. 13690. The Guidelines provide broad guidance in the implementation of these Executive Orders and offer a common point of reference so that each agency can issue or amend their E.O. 11988 regulations and procedures, as appropriate.
- The scope of E.O. 11988 applies to Federal agencies and actions as defined in the Glossary.
- The minimum standard for Federal actions that are not federally funded projects is the 1-percent-annual-chance flood elevation and corresponding horizontal floodplain for non-critical actions. Agencies should continue to use the 0.2-percent-annual-chance flood elevation and corresponding horizontal floodplain for critical actions.
- The phrase "regulations and procedures" continues to be used throughout the document to be consistent with the language in E.O. 11988. This phrase is meant to refer to any regulations or procedures agencies may have issued to implement E.O. 11988 and should not imply that agencies must have both regulations and procedures. As a result, agencies should review and update any regulations and procedures, as appropriate, to reflect updates to E.O. 11988.

The Guidelines contain important updates and new concepts, including:

- The Guidelines incorporate the Federal Flood Risk Management Standard (FFRMS) and amendments found in E.O. 13690, including the following:

    - Agencies, where possible, shall use natural systems, ecosystem processes, and nature-based approaches in the development of alternatives for all actions to which E.O. 11988 applies.
    - Agencies are required to expand management from the base flood elevation to a higher vertical flood elevation and corresponding horizontal floodplain for federally funded projects. Federally funded projects are actions where Federal funds are used for new construction, substantial improvement, or to address substantial damage to structures and facilities.
    - Agencies will use higher standards for actions that they determine to be critical actions.

- Although the FFRMS describes various approaches for determining the higher vertical flood elevation and corresponding horizontal floodplain for federally funded projects, it is not meant to be an "elevation" standard. The FFRMS is a resilience standard. The vertical flood elevation and corresponding horizontal floodplain determined using the approaches in the FFRMS establish the level to which a structure or facility must be resilient. This may include using structural or nonstructural methods to reduce or prevent damage; elevating a structure; or, where appropriate, designing it to adapt to, withstand and rapidly recover from a flood event.
- The Guidelines include the phrase "vertical flood elevation and corresponding horizontal floodplain" as a substitute for the phrase "elevation and flood hazard area" used in E.O. 13690 and the FFRMS when referring to the elevation approaches that must be used for federally funded projects. This was done to emphasize that the resilience standard is based on both the vertical elevation and the horizontal extent of the floodplain and to avoid any confusion with the term Special Flood Hazard Area.
- The Guidelines now make a distinction between actions and federally funded projects. As noted above, the requirements of E.O. 11988 still apply to all actions as defined in the Glossary. The approaches for determining the vertical flood elevation and corresponding horizontal floodplain described in the FFRMS must be used for federally funded projects.
- The Guidelines include a new floodplain definition to reflect the approaches for determining the vertical flood elevation and corresponding horizontal floodplain described in the FFRMS. Specifically, the Guidelines now refer to the FFRMS floodplain in addition to floodplains associated with the 1-percent-annual-chance and 0.2-percent-annual-chance floods.
- The Guidelines describe a new exception for actions that are considered to be in the interest of national security. Excepted actions will not be subject to the new approaches for determining the floodplain included in the FFRMS; however, agencies are still required to follow the E.O. 11988 decision-making process using the 1-percent-annual-chance floodplain and should use the 0.2-percent-annual-chance floodplain for critical actions. Agencies should also consider the following floodplain management principles

for these actions: anticipating a changing environment, supporting regional resilience, adopting sustainable solutions, and supporting holistic approaches to floodplain management.

- The Guidelines recognize the importance of considering impacts to and engagement of vulnerable populations. These populations include those who are especially at risk to impacts of flooding due to their location, or because they are overburdened and lack resources or have less access to services.

Agencies were directed to update their regulations and procedures, as appropriate, for implementing EO 11988 after these Guidelines were finalized. Each agency may have a different schedule for these updates based on the form of their agency-specific procedures. Agencies will continue to comply with the requirements of the 1977 version of E.O. 11988 until they update their regulations and procedures to incorporate the amendments from E.O. 13690. These regulations and procedures will describe an agency's schedule for applying any new requirements.

Glossary

Throughout this document, the following basic definitions shall apply:

- *1-percent-annual-chance flood* – the flood having one chance in 100 of being equaled or exceeded in any one-year period (also known as the 100-year flood or base flood).
- *1-percent-annual-chance floodplain* – the area subject to flooding by the 1-percent-annual-chance flood (also known as the 100-year floodplain or base floodplain).
- *1-percent-annual-chance flood elevation* – the computed elevation to which floodwater is anticipated to rise during the 1-percent-annual-chance flood (also known as the 100-year flood elevation or the base flood elevation).
- *0.2-percent-annual-chance flood* – the flood that has a 0.2-percent chance of being equaled or exceeded in any given year (also known as the 500-year flood).
- *0.2-percent-annual-chance floodplain* – the area subject to flooding by the 0.2-percent-annual-chance flood (also known as the 500-year floodplain).
- *0.2-percent-annual-chance Flood Approach (See definition under Federal Flood Risk Management Standard.)*
- *0.2-percent-annual-chance flood elevation* – the computed elevation to which floodwater is anticipated to rise during the 0.2-percent-annual-chance flood (also known as the 500-year flood elevation).
- *Action* – any of the following Federal activities: (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
- *Agency* – means an "Executive Agency" as defined in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in E.O. 11988, however, are meant to apply only to those agencies which perform the activities described in Section 1 (of E.O. 11988) which are located in or affecting floodplains.
- *Base flood* – the flood that has a one percent chance of being equaled or exceeded in any given year (also known as the 1-percent-annual-chance or 100-year flood).
- *Base flood elevation* – the computed elevation to which floodwater is anticipated to rise during the base flood (also known as the 1-percent-annual-chance or 100-year flood).
- *Base floodplain* – the area subject to flooding by the base flood (also known as the 100-year floodplain).
- *Climate-informed Science Approach (See definition under Federal Flood Risk Management Standard.)*
- *Climate science* – processes and products related to all components of Earth's linked climate system (the atmosphere, hydrosphere, cryosphere, lithosphere, and biosphere)

that play a role in average weather over a generally accepted time interval, usually 30 years. Common variables include daily temperature ranges and extremes, mean and extreme precipitation duration and intensity, and ocean sea level. (See the Glossary in Appendix H for more information.)

- *Critical action* – any activity for which even a slight chance of flooding would be too great. (See Part I, Section 6 for an expanded description of "critical action.")
- *Facility* – any man-made or man-placed item other than a structure. (Examples include but are not limited to bridges and roads.) (The term "structure" is defined later in the Glossary.)
- *Federal Flood Risk Management Standard (FFRMS)* – the national flood risk management standard established by Executive Order 13690 to be incorporated into existing processes used to implement Executive Order 11988.
- *Federal real property* – any real property owned, leased, or otherwise managed by the Federal Government.
- *Federally funded projects* – actions where Federal funds are used for new construction, substantial improvement, or to address substantial damage to structures and facilities.
- *FEMA BFE* – the 1-percent-annual-chance flood elevation, also referred to as the base flood elevation, determined by the Federal Emergency Management Agency (FEMA) for the National Flood Insurance Program (NFIP). FEMA BFEs are shown on the FEMA Flood Insurance Rate Maps (FIRMs) and on the flood profiles in the FEMA Flood Insurance Study (FIS) reports.
- *Flood* or *Flooding* – a general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland and/or tidal waters, and/or the unusual and rapid accumulation or runoff of surface waters from any source.
- *Floodplain* – the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands. For the purposes of E.O. 11988, the floodplain will be established based on the type of action and whether the action is critical.
- *FFRMS floodplain* – the area subject to flooding as determined by one of the following approaches:
    - *Climate-informed Science Approach (CISA)* – The elevation and flood hazard area that result from using a climate-informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science. This approach will also include an emphasis on whether the action is a critical action as one of the factors to be considered when conducting the analysis.
    - *Freeboard Value Approach (FVA)* – The elevation and flood hazard area that result from using the freeboard value, reached by adding an additional 2 feet to the base flood elevation for non-critical actions and from adding an additional 3 feet to the base flood elevation for critical actions.

    - *0.2-percent-annual-chance Flood Approach (0.2PFA)* – The area subject to flooding by the 0.2-percent-annual-chance flood.
    - *The elevation and flood hazard area that results from using any other method identified in an update to the FFRMS.*
- *Floodproofing* – the modification of individual structures and facilities, their sites, and their contents to protect against structural failure, to keep water out or to reduce the effects of water entry.
- *Freeboard Value Approach (See definition under Federal Flood Risk Management Standard.)*
- *Harm* – negative impacts to people, property or natural systems such as injury, loss of life, damage to property or natural resources, or impairment of beneficial floodplain functions.
- *Minimize* – to reduce to the smallest possible amount or degree.
- *National security* – a collective term that encompasses both national defense and foreign relations of the United States. Specifically, national security is a condition that is provided by either (a) a military or defense advantage over any foreign nation or group of nations; (b) a favorable foreign relations position; or (c) a defense posture capable of successfully resisting hostile or destructive action from within or without, overt or covert.
- *Natural features* – characteristics of a particular environment (e.g. barrier islands, sand dunes, wetlands) that are created by physical, geological, biological and chemical processes and exist in dynamic equilibrium. Natural features are self-sustaining parts of the landscape that require little or no maintenance to continue providing their ecosystem services (functions).
- *Nature-based approaches* – features (sometimes referred to as "green infrastructure") designed to mimic natural processes and provide specific services such as reducing flood risks and/or improving water quality. Nature-based approaches are created by human design (in concert with and to accommodate natural processes) and generally, but not always, must be maintained in order to reliably provide the intended level of service.
- *Natural and beneficial values of floodplains* – features or resources that provide environmental and societal benefits. These values include, but are not limited to, storing and conveying floodwaters, maintaining water quality, providing habitats and enhancing biodiversity, creating rich soils for agriculture, and providing open space for recreation and environmental education. (Note that water and biological resources are often referred to as "natural functions of floodplains.")
- *Practicable* – capable of being done within existing constraints. What is practicable will be context specific and include consideration of the pertinent factors, such as environment, statutory authority, legality, cost, technology, and engineering. A "practicable" alternative in the context of E.O. 11988 varies and, depending on each action, could include carrying out the proposed action outside of the floodplain, accomplishing the same objective using other means, or taking no action at all. If there

are no practicable sites outside the floodplain, there can be alternative sites within the floodplain that may need to be evaluated.

- *Preserve* – to prevent modification to the natural floodplain environment or to maintain it as closely as possible to its natural state.
- *Regulatory floodway* – the channel of the river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.
- *Resilience* – the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies.
- *Restore* – to re-establish a setting or environment in which the natural functions of the floodplain can again operate.
- *Special Flood Hazard Area (SFHA)* – is a FEMA-designated floodplain within a community subject to a 1-percent or greater chance of flooding in any given year.
- *Structure* – a walled and roofed building, including a gas or liquid storage tank, that is principally aboveground, as well as a manufactured home (as defined by the NFIP). (The related term "facility" is defined earlier in the Glossary.)
- *Wetlands* – those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Acronyms, Abbreviations and Commonly Used Terms

Throughout this document, the following acronyms and abbreviations shall apply:

ABFE	Advisory Base Flood Elevations
FEMA BFE	Federal Emergency Management Agency Base Flood Elevation
CDBG	Community Development Block Grant
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CISA	Climate-informed Science Approach
CZMA	Coastal Zone Management Act of 1972
E.O.	Executive Order
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHBM	Flood Hazard Boundary Map
FIFM-TF	Federal Interagency Floodplain Management Task Force
FIA	Federal Insurance Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FVA	Freeboard Value Approach
GMSLR	Global Mean Sea-level-rise
HUD	Department of Housing and Urban Development
LRSL	Local Relative Sea-level
MitFLG	The Mitigation Framework Leadership Group
NCA	National Climate Assessment
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NID	National Inventory of Dams
NLD	National Levee Database
NOAA	National Oceanic and Atmospheric Administration
PFA	Percent-annual-chance Flood Approach
PR&G	Principles, Requirements and Guidelines
SFHA	Special Flood Hazard Area
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
WRC	Water Resources Council

The terms or phrases listed below are used throughout this document in the following ways:

- "Guidelines" refers to the current version of this Guidelines document, *Guidelines for Implementing Executive Order 11988, Floodplain Management and Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*. The term "1978 Guidelines" will be used to describe the previous version of this document, *Floodplain Management Guidelines for Implementing Executive Order 11988*.
- "E.O. 11988" refers to current E.O. 11988, as amended by E.O. 13690. Where there is a reference to the initial version of E.O. 11988, the Guidelines will reference the "1977 version of E.O. 11988" for clarity.
- "Vertical flood elevation and corresponding horizontal floodplain" is used in the Guidelines as a substitute for the phrase "elevation and flood hazard area," which is used in E.O. 13690 and the FFRMS when referring to the elevation approaches that must be used for federally funded projects. This was done to emphasize that the resilience standard is based on both the vertical elevation and the horizontal extent of the floodplain and to avoid any confusion with the terms *flood hazard area* and *Special Flood Hazard Area* that are also used in the document.
- "Regulations and procedures" refers to any regulations or procedures agencies may have issued to implement E.O. 11988 and should not imply that agencies must have both regulations and procedures. As a result, agencies should review and update any regulations and procedures, as appropriate, to reflect updates to E.O. 11988.

Introduction

Executive Order 11988 – Floodplain Management (E.O. 11988) was signed May 24, 1977. It revoked and replaced Executive Order 11296 (E.O. 11296), which was issued August 10, 1966. E.O. 11988 establishes a general policy and cites specific requirements for compliance by Federal executive departments and agencies (hereafter referred to as agencies). Executive Order 11988 requires agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid the direct or indirect support of floodplain development whenever there is a practicable alternative. The simplest way to satisfy this requirement is to avoid sites in the floodplain. If an action must be located in a floodplain, E.O. 11988 requires that agencies minimize potential harm to people and property and to natural and beneficial floodplain values. Losses caused by flooding affect public health and safety, the environment, and economic prosperity – each of which affects our national security.

E.O. 11988 is based in part on and can be integrated with the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA). When E.O. 11988 was issued, it added new prominence to the environmental aspects of floodplain management that were not present in the Executive Order it replaced (E.O. 11296). E.O. 11988 achieved this by requiring that decision-making by Federal agencies clearly recognize that floodplains have unique and significant public values. Because of E.O. 11988, consideration must be given to natural and beneficial floodplain values and to the public benefit to be derived from their restoration or preservation.

E.O. 11988 also directs implementation of *A Unified National Program for Floodplain Management* (originally published in 1976 and updated in 1979, 1986, and 1994), which sets forth a conceptual framework and recommends Federal and State actions for a continuing unified program for planning and action at all levels of government to reduce the risk of flood losses through floodplain management. The Unified National Program includes a broad Federal effort, both directly and by example, to pursue the wise and nonhazardous use of floodplains, including recognition of natural and beneficial floodplain values.

To assure compliance with E.O. 11988, there must be an opportunity for the public and other entities to review proposed actions. Early public notice, a NEPA review, and notice of findings are vehicles for providing information and opportunity for engaging members of the public and other entities. In addition to this public notice, E.O. 11988 describes additional processes that may also contribute to compliance. These include periodic reviews of agency procedures, as described in Section 5 of E.O. 11988, and additional information included in new authorization or appropriation requests that are transmitted to the Office of Management and Budget (OMB). The additional information indicates whether the proposed action is in accord with E.O. 11988, as described in Section 2(b) of E.O. 11988.

E.O. 13690 – *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, issued January 30, 2015, amended E.O. 11988 and established the Federal Flood Risk Management Standard (FFRMS) to improve the Nation's resilience to current and future flood risks, which are anticipated to increase over time due to the effects of climate change and other threats. E.O. 13690 and the FFRMS reinforce the important tenets and concepts articulated in E.O. 11988, such as avoiding adverse impacts associated with actions in a floodplain and minimizing potential harm if an action must be located in a floodplain. E.O. 13690 and the FFRMS expand upon these tenets and concepts by calling for agencies to use a higher vertical flood elevation and corresponding horizontal floodplain than the base flood for federally funded projects to address current and future flood risk and ensure that projects last as long as intended.

The Guidelines are advisory. They do not create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States. The use of any mandatory language in the Guidelines is intended to capture elements of E.O. 11988 and E.O. 13690. The Guidelines provide broad guidance in the implementation of these Executive Orders and offer a common point of reference so that each agency can issue or amend their E.O. 11988 regulations and procedures, as appropriate. These Guidelines recognize: (1) the impossibility of anticipating the full range of individual program situations affected by E.O. 11988 and (2) the responsibility for individual agencies to tailor their procedures to meet both their legislatively prescribed missions and the requirements of E.O. 11988 and E.O. 13690. The Guidelines also recognize other requirements and guidelines governing agency decisions, including the *Principles and Guidelines for Water and Land Related Resources Implementation Studies (now updated and referenced as Principles, Requirements and Guidelines or PR&G)*[1], Federal Emergency Management Agency's (FEMA's) *Federal Guidelines for Dam Safety*, and the Federal Energy Regulatory Commission's *Engineering Guidelines for the Evaluation of Hydropower Projects*. In addition, the Guidelines acknowledge the relationship between E.O. 11988 and NEPA. The Guidelines encourage agencies preparing E.O. 11988 implementing procedures to integrate those procedures with their NEPA implementing procedures (see 40 C.F.R. 1500.2(c)). When considering a proposed action, an agency must evaluate whether E.O. 11988 applies and whether NEPA applies. Where a proposed action is subject to review under E.O. 11988 and NEPA, an agency should include any relevant analysis prepared under E.O. 11988 in the resulting NEPA document.

The Guidelines are presented in two parts. Part I: Interpretation of Executive Order 13690 and Executive Order 11988 provides a section-by-section explanation and interpretation of these

[1] The Principles & Standards, which was referenced in the 1978 Guidelines, was changed in 1983 to the Principles & Guidelines (P&G). In 2014, the Principles & Guidelines was updated and is referenced as Principles, Requirements and Guidelines or PR&G. These documents are referenced in Appendix C. Agency-specific regulations and procedures should address the relationship between the PR&G or P&G requirements and E.O. 11988 and associated Guidelines. At the time of publication of the Guidelines for Implementing E.O. 11988 and E.O. 13690, some agencies continue to follow the 1983 Principles & Guidelines.

Orders. Part II: Decision-Making Process discusses the decision-making process designed to address the requirements in Section 2(a) of E.O. 11988, and is critical to the development of agency procedures. Part II also includes more detailed explanations of how the FFRMS should be incorporated into this decision-making process. The Guidelines do not intend to prohibit floodplain development in all cases, but rather to promote a consistent government policy that discourages such development where there are practicable alternatives.

Appended to the Guidelines are descriptions of agency programs providing floodplain information, related programs and references, and the President's Policy Statement and copies of E.O. 11988 and E.O. 13690 (Appendices E and F, respectively). The FFRMS is also included (Appendix G), along with an appendix that further describes the scientific foundation for the Climate-informed Science Approach (CISA) – one of the methods included in the FFRMS to determine the vertical flood elevation and corresponding horizontal floodplain for federally funded projects. The CISA Appendix (Appendix H) provides the scientific foundation of the approach, from the impacts of climate change on coastal and riverine flooding to other processes known to affect future flood risk (e.g., land use change, long-term erosion, subsidence). The CISA Appendix also provides information on uncertainty in flood hazard analyses and links to key resources and tools available to aid agencies in applying this approach.

It is important to note that the language used in the Policy section of E.O. 13690 and the FFRMS reflects a transition beyond a former emphasis on *flood control and protection* to a broader focus on *flood risk management*. This includes an array of methods for managing floodwaters to reduce the risk of flooding and managing and regulating floodplain development to reduce the impacts of flooding. Changes in terminologies from "protection" to a broader focus on resilience and risk management reflect the recognition that floodwaters cannot be fully controlled, full protection from floods cannot be provided by any measure or combination of measures, and risk cannot be completely eliminated. Instead, management techniques involving coordinated efforts of individuals, property owners, businesses, and Federal, State and local governments can be used to manage the level of risks in a floodplain. The term "resilience" was not commonly used when E.O. 11988 was written in 1977, but it is consistent with the concepts of avoidance, minimization, preservation, and restoration as described in the Guidelines.

In addition to E.O. 11988 and E.O. 13690, the following Executive Orders are also referenced in the Guidelines:

- E**xecutive Order 11514 – *Protection and Enhancement of Environmental Quality.*** Clarifies the public notice aspects of E.O. 11988.
- **Executive Order 11990 – *Protection of Wetlands*.** Most of the Nation's wetlands are located in floodplains. Both the floodplain and wetland E.O.s were issued as part of the *President's Message on the Environment*, May 24, 1977. Thus, the guidance provided in this document and agency regulations and procedures for floodplain

management will frequently apply to wetlands. Agencies may wish to develop a single set of procedures for these E.O.s.

- **Executive Order 12372 – *Intergovernmental Review of Federal Programs*.** Directs agencies to establish mechanisms to communicate and coordinate with State and local elected officials based on State-established processes and to send the notices explaining a proposed action to the State single point of contact. This serves as a successor to the A-95 clearinghouse process that was referenced in the 1977 version of E.O. 11988.
- **Executive Order 13653 – *Preparing the United States for the Impacts of Climate Change.*** Provides context for Federal efforts to improve the Nation's preparedness and resilience in response to the impacts of climate change.

Part I: Interpretation of Executive Order 13690 and Executive Order 11988

This part of the Guidelines provides a detailed, section-by-section discussion of E.O. 13690 and E.O. 11988 and references key concepts in the decision-making process in Part II. Although the interpretations in the 1978 Guidelines were developed by the Council on Environmental Quality (CEQ), Water Resources Council (WRC), and Department of Housing and Urban Development/Federal Insurance Administration (HUD/FIA), the current Guidelines were developed through a broader interagency process and reflect a unified Federal perspective. The views of stakeholders are also reflected as a result of input provided during the public review of the draft Guidelines (dated January 28, 2015).

E.O. 13690 SECTION 1. POLICY

It is the policy of the United States to improve the resilience of communities and Federal assets against the impacts of flooding. These impacts are anticipated to increase over time due to the effects of climate change and other threats. Losses caused by flooding affect the environment, our economic prosperity, and public health and safety, each of which affects our national security.

The Federal Government must take action, informed by the best-available and actionable science, to improve the Nation's preparedness and resilience against flooding. Executive Order 11988 of May 24, 1977 (Floodplain Management) requires executive departments and agencies (agencies) to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The Federal Government has developed processes for evaluating the impacts of Federal actions in or affecting floodplains to implement Executive Order 11988.

As part of a national policy on resilience and risk reduction consistent with my Climate Action Plan, the National Security Council staff coordinated an interagency effort to create

a new flood risk reduction standard for federally funded projects. The views of Governors, mayors, and other stakeholders were solicited and considered as efforts were made to establish a new flood risk reduction standard for federally funded projects. The result of these efforts is the Federal Flood Risk Management Standard (Standard), a flexible framework to increase resilience against flooding and help preserve the natural values of floodplains. Incorporating this Standard will ensure that agencies expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk and ensure that projects funded with taxpayer dollars last as long as intended.

This order establishes the Standard and sets forth a process for further solicitation and consideration of public input, including from Governors, mayors, and other stakeholders, prior to implementation of the Standard.

Section 1 of E.O. 13690 reiterates and expands upon the purpose of E.O. 11988. It cites the need for Federal agencies to continue to enhance community resilience and better protect Federal assets from the impacts of flooding. These steps are critical to address rising costs associated with floods – costs that are likely to continue to increase as a result of the impacts of climate change and other threats. These other threats include increases in development in areas susceptible to flooding, increases in runoff, and other factors that increase the potential for flooding and associated losses.

Section 1 of E.O. 13690 also sets out a new national policy for resilience and risk reduction that is specifically focused on a new flood risk management standard for "federally funded projects." Federally funded projects, for the purpose of the FFRMS, are actions where Federal funds are used for new construction, substantial improvement, or to address substantial damage. The FFRMS will help ensure that federally funded projects are more resilient by establishing a higher vertical flood elevation and corresponding horizontal floodplain than the base floodplain called for in the 1977 version of E.O. 11988. The FFRMS takes into account current and future flood risk to help ensure that projects last as long as intended. (See Part I, E.O. 11988 Section 6 and Part II, Step 1 for more information on the FFRMS.)

Agencies must take actions that are informed by "best-available and actionable science." Best-available generally refers to science, data or information that is:

- **Transparent** – clearly outlines assumptions, applications, and limitations.
- **Technically credible** – transparent subject matter or more formal external peer review, as appropriate, of processes and source data.
- **Usable** – relevance and accessibility of the information to its intended users.
- **Legitimate** – perceived by stakeholders to conform to recognized principles, rules, or standards. Legitimacy might be achieved by existing government planning processes with the opportunity for public comment and engagement.

Actionable science includes theories, data, analyses, models, projections, scenarios and tools that are:

- Relevant to the decision under consideration.
- Reliable in terms of its scientific or engineering basis and appropriate level of peer review.
- Understandable to those making the decision.
- Supportive of decisions across wide spatial, temporal, and organizational ranges, including those of time-sensitive operational and capital investment decision-making.
- Co-produced by scientists, practitioners, and decision-makers, and meet the needs of and are readily accessible by stakeholders.

These concepts of best-available and actionable science are further described in Part II, Step 1, in the context of the various approaches for determining a floodplain and in Appendix H specifically as it relates to the CISA.

The final paragraph in this section references the process by which the public and other stakeholders were engaged prior to implementation of the FFRMS. This process is more fully described in Section 3 of E.O. 13690.

It is important to note that, in addition to introducing the new flood risk management standard for federally funded projects, E.O. 13690 and the FFRMS also include other updates and changes that apply to all Federal actions in line with the scope of the 1977 version of E.O. 11988. (See Section 1 of E.O. 11988 for a description of these Federal actions.) The WRC issued these Guidelines to provide guidance to agencies on the implementation of E.O. 11988, including the amendments contained in E.O. 13690.

E.O. 13690 SECTION 2. AMENDMENTS TO EXECUTIVE ORDER 11988

Section 2 of E.O. 13690 details the amendments to E.O. 11988. Specifically, Section 2 of E.O. 13690 makes textual changes to Sections 2, 3, 4, 6 and 8 of E.O. 11988, which are described in more detail later in Part I. The fully amended version of E.O. 11988 is included in Appendix E.

E.O. 13690 SECTION 3. AGENCY ACTION

(a) Prior to any action to implement the Standard, additional input from stakeholders shall be solicited and considered. To carry out this process:

> *(i) the Federal Emergency Management Agency, on behalf of the Mitigation Framework Leadership Group, shall publish for public comment draft amended Floodplain Management Guidelines for Implementing Executive Order 11988 (Guidelines) to provide guidance to agencies on the implementation of Executive Order 11988, as amended, consistent with the Standard;*
>
> *(ii) during the comment period, the Mitigation Framework Leadership Group shall host public meetings with stakeholders to solicit input; and*

(iii) after the comment period closes, and based on the comments received on the draft Guidelines during the comment period, in accordance with subsections (a)(i) and (ii) of this section, the Mitigation Framework Leadership Group shall provide recommendations to the Water Resources Council.

(b) After additional input from stakeholders has been solicited and considered as set forth in subsections (a)(i) and (ii) of this section and after consideration of the recommendations made by the Mitigation Framework Leadership Group pursuant to subsection (a)(iii) of this section, the Water Resources Council shall issue amended Guidelines to provide guidance to agencies on the implementation of Executive Order 11988, as amended, consistent with the Standard.

(c) To the extent permitted by law, each agency shall, in consultation with the Water Resources Council, Federal Interagency Floodplain Management Task Force, Federal Emergency Management Agency, and Council on Environmental Quality, issue or amend existing regulations and procedures to comply with this order, and update those regulations and procedures as warranted. Within 30 days of the closing of the public comment period for the draft amendments to the Guidelines as described in subsection (a) of this section, each agency shall submit an implementation plan to the National Security Council staff that contains milestones and a timeline for implementation of this order and the Standard, by the agency as it applies to the agency's processes and mission. Agencies shall not issue or amend existing regulations and procedures pursuant to this subsection until after the Water Resources Council has issued amended Guidelines pursuant to subsection (b) of this order.

Section 3 of E.O. 13690 describes how stakeholders were to be engaged in the development of these Guidelines and the process by which agencies will implement E.O. 11988 and the FFRMS. The Guidelines were finalized following consideration of stakeholder input that was obtained from written comments and in-person meetings.

Section 3 does not require a specific deadline for agencies to implement the new requirements of E.O. 11988. It recognized that each agency may have a different schedule depending on the form of their agency-specific procedures. However, E.O. 13690 did call for agencies to develop and submit to the National Security Council implementation plans containing milestones and a timeline for updating their regulations and procedures to the extent permitted by law and consistent with their statutory authority, rules, and regulations. Agencies shall develop these regulations and procedures in consultation with the WRC, Federal Interagency Floodplain Management Task Force, FEMA, and CEQ. Information about the FFRMS and the other updates and changes to E.O. 11988 have been incorporated into these Guidelines to aid agencies in development of their revised or new regulations and procedures and to help promote consistency among agencies where appropriate.

Agencies will continue to comply with the requirements of the 1977 version of E.O. 11988 until they update their regulations and procedures to incorporate the amendments from E.O. 13690. The new requirements of E.O. 11988 will not be applied retroactively. Agency-

specific regulations and procedures will describe how and when the new requirements will be implemented for agency projects and programs.

E.O. 13690 SECTION 4. REASSESSMENT

(a) The Water Resources Council shall issue any further amendments to the Guidelines as warranted.

(b) The Mitigation Framework Leadership Group in consultation with the Federal Interagency Floodplain Management Task Force shall reassess the Standard annually, after seeking stakeholder input, and provide recommendations to the Water Resources Council to update the Standard if warranted based on accurate and actionable science that takes into account changes to climate and other changes in flood risk. The Water Resources Council shall issue an update to the Standard at least every 5 years.

The field of floodplain management is dynamic. This section calls for the Mitigation Framework Leadership Group (MitFLG)[2] to consult with the Federal Interagency Floodplain Management Task Force (FIFM-TF)[3] to reassess the FFRMS annually to include requirements based on timely and relevant advances in science that take into account changes to climate and other changes in flood risk. Four areas have been identified that could trigger review and potential revision of the FFRMS:

- **Implementation experience**. In order to ensure that the FFRMS continues to meet its stated objectives, implementation of the policy will be monitored. Federal departments and agencies should collect feedback on implementation from relevant programs and offices, identify potential gaps in the process, and outline areas for improvement with the FFRMS. Such information should be provided to the MitFLG as part of the annual reassessment of the FFRMS.
- **Changes in national consensus standards on flood risk used to inform the policy.** As the International Code Series, published by the International Code Council, and reference standards such as the American Society of Civil Engineers (ASCE)-24 are updated, the Federal Government should consider whether such updates require reconsideration of the FFRMS.
- **Changes in the underlying flood risk information.** Agencies continue to improve their efforts to incorporate projected sea-level rise and other future climate change impacts into the existing flood study process. This may include mapping areas of

[2] The Mitigation Framework Leadership Group (MitFLG) is a national coordinating structure focused on integrating Federal efforts to deliver Mitigation core capabilities identified in the National Mitigation Framework called for in Presidential Policy Directive 8.

[3] The Federal Interagency Floodplain Management Task Force (FIFM-TF) was established in 1975 to promote, support, and encourage Federal agencies to formulate and implement programs and policies that reduce the loss of life and property caused by floods, and protect and restore natural resources and functions of floodplains. The FIFMTF prepared the 1978 Guidelines for issuance by the Water Resources Council, guided the development of the initial Unified National Program in 1976, and produced updates in 1979, 1986, and 1994.

future flood risk and developing methods to inform the potential revision of flood hazard elevations in both riverine and coastal areas. The MitFLG will review progress to identify potential implications to the FFRMS and coordinate with activities undertaken to address the critical data and information gaps noted above.

- **Changes in current climate science that address critical data and information gaps.** In developing the FFRMS and the Guidelines agencies identified data and information gaps. These gaps reflect challenges that agencies will likely face in implementing the FFRMS, as well as other scientific issues that, if addressed in the near term (i.e., within two-to-three years), could be used to review and potentially revise the FFRMS.

The MitFLG will make recommendations to the WRC when the FFRMS should be reissued. The WRC will update the FFRMS at least every 5 years. The WRC will also issue updates and amendments to these Guidelines as warranted.

INTRODUCTION TO E.O. 11988

By virtue of the authority vested in me by the Constitution and statutes of the United States of America, and as President of the United States of America, in furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4001 et seq.), and the Flood Disaster Protection Act of 1973 (Public Law 93-234, 87 Stat. 975), in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered as follows:

The introduction to E.O. 11988 establishes its broad scope that is derived from NEPA and the flood insurance legislation. (Part II – Step 4 discusses impacts associated with the occupancy and modification of floodplains and support of floodplain development. Part II – Step 3 discusses the practicability of alternatives.) Agencies are reminded that they are required to comply with E.O. 11988 for Federal actions in a floodplain that are not expected to have significant effects on the environment, requiring the preparation of an environmental impact statement (EIS) under Section 102(2)(C) of NEPA. (See Part II – Step 2.) For actions in a floodplain requiring an EIS, Environmental Assessment (EA), or Categorical Exclusion (CE) documents under NEPA, the agencies should integrate the NEPA process with E.O. 11988's public notification and comment process. In such cases, agencies should include the relevant results of the evaluation of a proposed action's impacts on the floodplain in any environmental document prepared under NEPA. (See Part I – Section 2 and Part II – Step 7.)

E.O. 11988 SECTION 1

Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its

responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

The basic concepts expressed in Section 1 of E.O. 11988 are: (1) all agencies are covered; (2) all actions as defined in the Glossary are covered; (3) all agencies are to affirmatively carry out, and provide a good example of, sound floodplain management practices; and (4) all agencies are required to not merely consider but to implement measures that reduce risk, minimize adverse impacts, and restore and preserve floodplain values.

The comprehensiveness of E.O. 11988 recognizes that each agency, in carrying out the various types of actions enumerated in this section, can affect the floodplain. The mandate acknowledges the important leadership role that agencies have in carrying out actions that affect the floodplain. An important part of this role is working with other public and private entities to share information and experiences that help achieve the goals of E.O. 11988 and promote broader understanding of good floodplain management practices. (The concepts of reducing risk, minimizing impact, and restoring and preserving floodplain values are discussed in Part II – Step 5.**)**

E.O. 11988 SECTION 2

In carrying out the activities described in Section 1 of this Order, each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain; to ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management; and to prescribe procedures to implement the policies and requirements of this Order, as follows, to the extent permitted by law:

Three concepts are introduced in this section: evaluation, construction versus planning programs, and implementation. Evaluation as discussed in the Guidelines goes beyond identifying the impacts of a specific proposal and includes an ongoing analysis of the effects of agency policies and programs and the development of new or improved policies and programs to carry out E.O. 11988. (The analysis of the full range of their effects is discussed in Part II-Step 4.A.) By including planning programs as a separate item, E.O. 11988 emphasizes that all actions, even those which do not result in a physical change, must be evaluated for their impacts to or within the floodplain. Implementation means that agencies must adopt and carry out evaluation procedures. The relevant results of this evaluation should be included in any applicable environmental review (EIS, EA, or CE documents) prepared under NEPA. (See Part II – Step 7.)

E.O. 11988 SECTION 2(a)(1)

Before taking an action, each agency shall determine whether the proposed action will occur in a floodplain – for major Federal actions significantly affecting the quality of the human environment, the evaluation required below will be included in any statement

prepared under Section 102(2)(C) of the National Environmental Policy Act. To determine whether the action is located in a floodplain, the agency shall use one of the approaches in Section 6(c) of this order based on the best-available information and the Federal Emergency Management Agency's effective Flood Insurance Rate Map.

This subsection emphasizes the importance of determining whether or not an action is in the floodplain early in the planning process. When making this determination, agencies will use the best-available information and FEMA's effective Flood Insurance Rate Maps (FIRMs). The best-available information may vary depending on the type of action. Section 6(c) as amended by E.O. 13690 describes how the vertical flood elevation and corresponding horizontal floodplain should be determined for federally funded projects, subject to the requirements of the FFRMS. (See Part II – Step 1 for more information about how to determine the vertical flood elevation and corresponding horizontal floodplain.) For all other Federal actions, agencies must consult the FEMA FIRMs that include the FEMA BFE, but may choose to utilize one of the following:

- The 1-percent-annual-chance flood elevation and floodplain from another credible source.
- A 1-percent-annual-chance flood elevation and floodplain the agency develops using standard engineering practices.
- One of the approaches for determining the vertical flood elevation and corresponding horizontal floodplain described in the FFRMS. (See Part II, Step 1 for more information on how to determine a floodplain.)

Where multiple agencies are involved in an action, agencies should coordinate early to ensure a consistent approach to the floodplain determination and the other aspects of implementation. This is especially important given that there are multiple options for determining a floodplain. (See Part II, Step 1 for more information on how to determine a floodplain when multiple agencies are involved in an action.)

E.O. 11988 SECTION 2(a)(2)

If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplain. Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

The major concepts here include: (1) consideration of alternatives that will avoid the floodplain, wherever practicable, and alternatives that will avoid adverse effects and incompatible development (development which has adverse effects in the floodplain); (2)

minimization of harm to or within the floodplain resulting from proposed actions; (3) circulation of a notice (finding) to the general public and affected agencies that siting in the floodplain is the only practicable alternative; and (4) where possible, use of natural systems, ecosystem processes, and nature-based approaches when developing alternatives. This direction regarding alternatives is not intended to change the NEPA requirement that agencies analyze reasonable alternatives. The notice requirement introduced in this subsection is part of a larger concern for public notice and review carrying through to Section 4 of E.O. 11988.

When considering alternatives and during planning, design and construction of actions, an agency should pay close attention to relevant flood characteristics at and near the site such as, but not limited to, flood depths, flood velocity, hydrostatic loads, hydrodynamic loads, possible debris impact loads, erosion and localized scour, duration of floodwater, and subsidence. Agencies should also consider other factors such as anticipated life of the project, flood warning time, evacuation time, logistical challenges to evacuation, preparedness, the resilience of a facility or structure, and the potential to function without interruption. When preparing a NEPA document for a proposed action, an agency should discuss these characteristics and other factors or incorporate by reference a relevant discussion from a prior document. Recognition of these characteristics and other factors provides the agency with a better understanding of the nature of the flood hazard at the proposed location. It also enables the agency to make a more informed decision about avoiding the floodplain or increasing the resilience of an action to minimize harm to or within the floodplain for a proposed action that must be located in the floodplain. (See Part II, Steps 1.A. and 4.B. for more information on flood hazards and characteristics.)

This section does not provide a standard for minimizing harm because of the great variety of actions and environments subject to the requirement. Instead, E.O. 11988 expressly recognizes that it is more appropriate for agency procedures to spell this out for specific programs and activities.

Two important points should be noted about the standards to be embodied in agency procedures. First, while minimize means *reduce to the smallest amount or degree*, there is an implicit acceptance of practical limitations. Agencies are required to use all *practicable* means and measures to minimize harm. E.O. 11988 does not expect agencies to employ unworkable means to meet this goal. Second, in addition to the elevation standards required by E.O. 11988, agency procedures are also intended to be consistent with the standards in the National Flood Insurance Program that provide an additional level of protection against the adverse impacts of flooding. For this reason, agencies are required to consult with FEMA before issuing their procedures, and agencies with control over Federal property are required to follow the standards in FEMA's regulations unless they are demonstrably inappropriate. The standards include, but are not limited to, requirements associated with development in high-hazard areas such as floodways and coastal areas; anchoring of structures and facilities to resist flotation, collapse, and lateral movement; enclosures beneath elevated structures and the use of flood openings in

foundation walls to address hydrostatic pressure; floodproofing of non-residential structures; and the use of flood resistant materials. (See Appendix A for additional detail.)

Avoidance is discussed in Part II Steps 3 and 4. Minimization is discussed in Part II-Step 5. Findings and public notice are discussed in Part II Steps 2 and 7.

E.O. 13690 amended Section 2(a)(2) of E.O. 11988, which now states that where possible, agencies shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for a proposed action. This applies to all Federal actions to which E.O. 11988 applies, not just federally funded projects that are subject to the FFRMS approaches for establishing a vertical flood elevation and corresponding horizontal floodplain. The use of nature-based approaches, combined with the preservation and restoration of natural systems and ecosystem processes where appropriate, provides numerous benefits and supports a system-wide, watershed approach[4] to flood risk management that considers the interdependencies of natural systems. Natural features and nature-based approaches should be considered early in the planning and design of Federal actions, consistent with Federal government policies, programs, and best practices including the *Principles, Requirements and Guidelines for Federal Investments in Water Resources; Principles and Guidelines for Water and Land Related Resources Implementation Studies; E.O. 13653, Preparing the United States for the Impacts of Climate Change;* the President's *Climate Action Plan;* and the *Priority Agenda – Enhancing the Climate Resilience of America's Natural Resources*. These and other documents encourage and support use of natural features and nature-based approaches to reduce flood risks and protect the natural and beneficial values of floodplains.

Nature-based systems can include both natural and engineered features. This could include restoration of a system's natural processes, for example, lowering, setting back, or removing levees to allow water to flow naturally, restoring wetland functions along a coastal or riverine system, or creating living shorelines[5]. Nature-based systems can be used with other types of measures where appropriate (such as low-impact development measures to reduce runoff), as well as with actions that have already occurred in the floodplain. Where nature-based approaches are used alone, in conjunction with natural features, or in conjunction with a structure, facility[6], or other action, the agency must consider alternatives when the floodplain cannot be avoided, as well as methods to minimize the impacts such approaches may have on the floodplain. These approaches are further explained in Part II – Steps 3 and 4 of the Guidelines.

[4] Additional guidance on watershed approaches can be found in the most current version of the *Principles and Guidelines for Water and Land Related Resources Implementation Studies now referred to as the Principles, Requirements and Guidelines (PR&G).*

[5] A living shoreline is a shoreline management practice that provides erosion control benefits; protects, restores, or enhances natural shoreline habitat; and maintains coastal processes through the strategic placement of plants, stone, sand fill, and other structural organic materials (e.g., biologs, oyster reefs, etc.). *NOAA Shoreline Website*

[6] Facility is defined in the Glossary and means any man-made or man-placed item other than a structure. (Examples include but are not limited to bridges and roads.)

Although E.O. 11988 states that, where possible, agencies shall use natural systems, ecosystem processes, and nature-based approaches, it does not prevent agencies from using more traditional structural and nonstructural[7] flood risk management approaches.

E.O. 11988 SECTION 2(a)(3)

> *For programs subject to the Office of Management and Budget Circular A-95, the agency shall send the notice, not to exceed three pages in length including a location map, to the State and areawide A-95 clearinghouses for the geographic areas affected. The notice shall include (i) the reasons why the action is proposed to be located in a floodplain; (ii) a statement indicating whether the action conforms to applicable State or Local floodplain protection standards and (iii) a list of the alternatives considered. Agencies shall endeavor to allow a brief comment period prior to taking any action.*

Items (i), (ii), and (iii) are the minimum to be included in the notice. (The notice requirements set out in this subsection are discussed in Part II – Step 7.)

OMB Circular A-95 was revoked by Executive Order 12372 – *Intergovernmental Review of Federal Programs,* dated July 14, 1982. E.O. 12372 directs agencies to establish mechanisms to communicate and coordinate with State and local elected officials based on State-established processes and to send the notices explaining a proposed action to the State single point of contact. This serves as a successor to the A-95 clearinghouse process. Because agencies have developed their own agency-specific approaches for complying with E.O. 12372 and other intergovernmental consultation and coordination requirements, the process for notification should be described in agency-specific procedures for implementing E.O. 11988. See Part II – Step 7 for more information.

E.O. 11988 SECTION 2(a)(4)

> *Each agency shall also provide opportunity for early public review of any plans or proposals for actions in floodplains, in accordance with Section 2(b) of Executive Order No. 11514, as amended, including the development of procedures to accomplish this objective for Federal actions whose impact is not significant enough to require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969, as amended.*

This section requires public notice much earlier than the finding requirement, including notice for actions which do not require environmental impact statements. Integrating the NEPA process with the E.O. 11988 process and using the NEPA scoping process to engage agencies and the public may facilitate this early public review. When agencies are implementing this requirement, the term "public" should be interpreted broadly to include other levels of

[7] Nonstructural alternatives are permanent or contingent measures applied to a structure and/or its contents that prevent or provide resistance to damage from flooding. Nonstructural alternatives focus on reducing the consequences of flooding while Structural alternatives focus on reducing the probability of flooding.

government, interested stakeholders, private-sector entities, and members of the general public. (The notice requirements set out in this subsection are discussed in Part II – Step 2.)

E.O. 11988 SECTION 2(b)

> *Any requests for new authorizations or appropriations transmitted to the Office of Management and Budget shall indicate, if an action to be proposed will be located in a floodplain, whether the proposed action is in accord with this Order.*

This subsection complements the public review element in E.O. 11988 (Subsections 2(a)(2), (3), and (4)). It provides for Federal review and raises the possibility that agency funds may be withheld from proposed actions which are not in accord with the intent of E.O. 11988. "In accord with" means in compliance with the policy and mandatory provisions (the letter and spirit) of E.O. 11988.

E.O. 11988 SECTION 2(c)

> *Each agency shall take floodplain management into account when formulating or evaluating any water and land use plans and shall require land and water resources use appropriate to the degree of hazard involved. Agencies shall include adequate provision for the evaluation and consideration of flood hazards in the regulations and operating procedures for the licenses, permits, loan or grants-in-aid programs that they administer. Agencies shall also encourage and provide appropriate guidance to applicants to evaluate the effects of their proposals in floodplains prior to submitting applications for Federal licenses, permits, loans or grants.*

Each agency shall take floodplain management, as provided for in Section 2(d), into account when: (1) formulating its own water and land use plans, and (2) evaluating the water and land use plans of others where a Federal action is involved.

In the operation of a license, permit, loan, or grant-in-aid program, each agency must make adequate provision for the evaluation and consideration of flood hazards. These provisions shall be included in an agency's regulations and procedures, as appropriate. When the action involves more than one agency, the "lead agency" will be responsible and will obtain input from all agencies. The “lead agency” will be designated by those agencies involved in the process. In all cases, as a minimum, the "practicability" and "minimization" standards of Section 2(a) of E.O. 11988 apply. Therefore, as part of an agency's approval of an application for a license, permit, loan, or grant-in-aid, the agency must assure that these standards in Section 2(a) have been met. Where an agency deems an applicant has not made adequate provision for evaluation and consideration of the flood hazard, the agency shall impose additional requirements.

The flood hazard aspects and, to the degree they are identifiable, the floodplain value aspects should be expressed in terms of: (1) potential (or residuals) for monetary loss; (2) human safety, health, and welfare; (3) shifting of costs or damage to others; and (4) potential for affecting the natural and beneficial floodplain values.

Agencies shall encourage and provide appropriate guidance to applicants to enable them to evaluate the effects of their proposals in floodplains prior to submitting applications for Federal licenses, permits, loans, or grants. It is important that applicants be made aware early in their planning process of the floodplain management parameters which the agency must consider when reviewing the proposed action. In this way, applicants will not go to the trouble of putting together completed plans and submitting them formally before being made aware of the standards to which the agency is subject in reviewing such plans. Agencies are encouraged to refer applicants to the agencies listed in Part II – Table 1 for guidance on floodplain management matters.

E.O. 11988 SECTION 2(d)

> *As allowed by law, each agency shall issue or amend existing regulation and procedures within one year to comply with this Order. These procedures shall incorporate the Unified National Program for Floodplain Management of the Water Resources Council, and shall explain the means that the agency will employ to pursue the nonhazardous use of riverine, coastal and other floodplains in connection with the activities under its authority. To the extent possible, existing processes, such as those of the Council on Environmental Quality and the Water Resources Council, shall be utilized to fulfill the requirements of this Order. Agencies shall prepare their procedures in consultation with the Water Resources Council, the Administrator of the Federal Emergency Management Agency, and the Council on Environmental Quality, and shall update such procedures as necessary.*

Agency regulations and procedures will systematically address each section of E.O. 11988 and will define the extent to which responsibility for compliance is to be delegated by the agency head.

The one-year time frame for compliance with E.O. 11988 is in reference to the development of original agency regulations and procedures in 1977. As directed in Section 3 of E.O. 13690, agencies are expected to update their regulations and procedures, as necessary, in response to the amendments made to E.O. 11988 as quickly as possible but are not given a specific deadline.

As with the original development of regulations and procedures, each agency should ensure their updated regulations and procedures reflect the conceptual framework of floodplain management as set out in *A Unified National Program for Floodplain Management (first published in 1976 and updated in 1979, 1986, and 1994)*. Floodplain management according to the Unified National Program has as its goals the "wise use, conservation, development, and utilization of interrelated land and water resources to serve objectives of economic efficiency, environmental quality, and social well-being as consonant with responsibilities." This concept requires that the floodplain be viewed as having a role to play in the future of its surroundings. Further adjustments in the way floodplain land is used or in the way floods behave must be made in a manner that is supportive of this future. To put this in the context of E.O. 11988, it would mean that Federal agencies should adopt a posture in floodplain management that (1) helps

ensure floodplain values are adequately taken into account when the appropriate floodplain role is being determined and (2) avoids uses that are hazardous or have negative economic consequences as part of this future role. These negative economic consequences also include the concept of costs shifted by floodplain users to others, both directly and indirectly.

Agencies should not employ practices or policies that are hazardous to riverine, coastal and other floodplains. Agencies are required to identify which activities conducted within their authority would pose hazards to floodplain values, as well as the degree of hazard those programs and activities would pose under a possible range of flood conditions. Specific actions or adjustments that would be employed to adjust agency activities such that they do not pose a hazard to floodplain values should be captured to comply with this section.

To the extent possible, agencies will utilize existing processes established under NEPA regulations and guidance and the PR&G in addition to these Guidelines.

When E.O. 11988 was originally issued in 1977, each agency was directed to consult with WRC, CEQ, and the Federal Insurance Administration (FIA) in the preparation of their initial regulations and procedures. WRC was the point of contact, and arranged for consultation as needed with an interagency panel including members from the three agencies cited. Each agency's procedures were to identify those actions, if any, which: (1) typically do not create adverse effects or incompatible development, or (2) normally will not require specific agency and public review.

E.O. 13690 amended E.O. 11988 and directs agencies to consult with WRC, CEQ, FEMA and the Federal Interagency Floodplain Management Task Force when developing or revising their regulations and procedures to help ensure that the new regulations and procedures are consistent with the FFRMS and other requirements of E.O. 11988.

As agencies update their regulations and procedures, they should continue to include relevant material in the following areas: (1) *process requirements* that an agency will use to meet the procedural requirements of the Executive Order, such as timing, routing of documents, preparation and circulation of findings and notices, and specific links between E.O. 11988, and other planning decision-making processes and requirements (e.g., budget process, NEPA, PR&G); (2) *substantive requirements,* such as the method for determining the floodplain, the standards for determining which alternatives are practicable, and the criteria and methods for minimizing harm (using FEMA regulations and the FFRMS as a guide wherever applicable); (3) *policy direction,* such as incorporation by reference of the Executive Order, Unified National Program, NEPA, the PR&G and other relevant requirements; general policies on the agency's approach to implementing E.O. 11988; program-specific policies and commitments to research monitoring and evaluation; and (4) *other information,* such as appendices with a means to identify agency personnel responsible for implementing E.O. 11988, cross references to other

relevant agency procedures and manuals, and other material that will assist agencies and the public to understand what the agency is doing to comply with E.O. 11988.

E.O. 11988 SECTION 3

In addition to the requirements of Section 2, agencies with responsibilities for Federal real property and facilities shall take the following measures:

The requirements of this section are supplemental to those of E. O. 11988 Sections 1 and 2, and must be met by agencies having responsibilities for Federal real property, structures and facilities. The "measures" referred to are included in Sections 3(a) through 3(d).

E.O. 11988 SECTION 3(a)

The regulations and procedures established under Section 2(d) of this Order shall, at a minimum, require the construction of Federal structures and facilities to be in accordance with the standards and criteria and to be consistent with the intent of those promulgated under the National Flood Insurance Program. The regulations and procedures must also be consistent with the Federal Flood Risk Management Standard (FFRMS). They shall deviate only to the extent that the standards of the Flood Insurance Program and FFRMS are demonstrably inappropriate for a given type of structure or facility.

There are three key concepts expressed in this subsection: (1) the relationship of the NFIP and FFRMS requirements to E.O 11988's minimization requirement; (2) the scope and nature of the NFIP and FFRMS requirements, and (3) situations where the NFIP and FFRMS requirements are not applicable to the agency actions. (See Appendix A for more information about consistency with NFIP requirements.)

The intent of this subsection is twofold; first, to assure that the Federal Government will require of itself no less than it requires of non-Federal entities for the protection of property from flood hazards, and second, to assure that the NFIP is not undermined by the actions of the Federal agencies. The positioning of the reference to the NFIP requirements following the avoidance and minimization responsibilities set out in Section 2 is most significant in that it recognizes the precedence of the requirements of Section 2 and limited scope of the NFIP requirements. Of the three areas of concern which E.O. 11988 addresses (minimization of harm to lives, property and floodplain values), the NFIP requirements are primarily directed towards the reduction of risk to property. Thus, an agency's application of the NFIP requirements to proposed actions does not comprise full compliance with the minimization responsibilities of E.O. 11988.

The standards and criteria of the NFIP are directed towards the reduction of risk to structures and facilities from the flood hazard and mitigation of the impacts of new development on existing development. Under the NFIP, residential structures (including basements) are required to be elevated to or above the base flood elevation. Nonresidential structures may be

elevated as described above, or dry floodproofed watertight to or above the FEMA BFE. For the protection of existing development, the NFIP standards and criteria rely on a regulatory floodway (see Glossary). Agencies are reminded that elevation of Federal structures should be consistent with E.O. 13690 and the FFRMS approaches in Part I – Section 6(c).

Under the NFIP, actions involving the placement of facilities are subject to the requirements that the cumulative effect of the proposed action, when combined with all existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community wherein the action is proposed. It should be noted that this standard is a minimum standard for communities participating in the NFIP, and more restrictive standards (less than one foot of rise) that are in effect in States and local communities take precedence as set out in 44 CFR 60.1(d).

E.O. 11988 Section 3(a) allows deviation from the NFIP and FFRMS requirements only to the extent that their standards and criteria are "demonstrably inappropriate" for a given type of Federal structure or facility. Where this can be demonstrated, the proposed Federal structure or facility must satisfy the requirements of Section 2, including designing or modifying the action in order to minimize potential harm to or within the floodplain. For example, consistent with the objectives of the NFIP, the action should not endanger existing development, encourage development which would result in harm to or within the floodplain, or itself be unacceptably vulnerable to flood damage.

E.O. 11988 SECTION 3(b)

> *If, after compliance with the requirements of this Order, new construction of structures or facilities are to be located in a floodplain, accepted floodproofing and other flood protection measures shall be applied to new construction or rehabilitation. To achieve flood protection, agencies shall, wherever practicable, elevate structures above the elevation of the floodplain as defined in Section 6(c) of this Order rather than filling in land.*

The key concepts in this subsection are: (1) requirements for new construction and existing structures; (2) accepted floodproofing measures and other flood protection measures; and, (3) the requirement to achieve flood protection for structures, wherever practicable, without the use of fill. For the purposes of E.O. 11988, the term "new construction" includes construction associated with: (1) new structures and facilities; (2) reconstruction of existing structures and facilities that have been damaged, regardless of the cause (e.g., by fire, flood or other hazard); and (3) major improvement of existing structures and facilities by rehabilitation, repair, alteration or addition. The application of E.O. 11988's requirements to existing structures is emphasized in this section.

Agencies should set thresholds for what constitutes a major improvement and describe these thresholds in their implementing procedures, including the temporal extent to which the

calculation applies. Under the NFIP, for example, the threshold that was established was 50 percent of the market value of the structure (see, for instance, the NFIP definition of substantial improvement (44 CFR 59.1). Where market value does not apply, agencies may use replacement cost of a structure (not including the cost of land) in determining both substantial improvement and substantial damage. The combined cost of all work related to a specific action must be used to make the substantial improvement and substantial damage determination.

Many existing structures are subject to repetitive flood damage, but may not sustain the level of damage that qualifies as substantial damage as a result of each flood event. As a result, agencies may want to consider taking a cumulative approach to substantial improvement and substantial damage calculations over the life of a structure or facility. More information can be found in *Substantial Improvement/Substantial Damage Desk Reference* (FEMA P-758 / May 2010). While this document is primarily for State and local officials, agencies may find it useful in making this determination.

In the case of major improvements, agencies have the opportunity to address previous siting and design decisions that predate E.O. 11988 and may not fully reflect the intent of E.O. 11988. In meeting the responsibility to apply E.O. 11988's requirement to existing structures or facilities, the agencies should consider whether the proposed action would: (1) result in an increase in the useful life of the structure or facility in question; (2) maintain the investment at risk and the exposure of lives to the flood hazard; or, (3) eliminate an opportunity to restore the natural and beneficial floodplain values. Accepted floodproofing measures for structures are defined under the NFIP regulations and are set out in the discussion under Subsection 3(b), above. E.O. 11988 further limits what constitutes accepted floodproofing for structures through additional language in this subsection which requires that, wherever practicable, all structures shall be elevated using open works, e.g., columns, walls, piles, piers, etc. rather than fill (see Appendix C for references to codes, standards, and guidance documents on various flood protection measures, including alternatives to elevating on fill). Accepted floodproofing measures for facilities vary considerably, since the scope of the term facility, as defined in the Glossary, is extremely broad. Floodproofing measures for certain types of facilities, e.g., sewer interceptor lines and other types of piping, and bridges and roads have been developed, and are familiar to agencies having responsibilities in those areas. Other flood protection measures including warning and evacuation plans, etc. are discussed in the *Unified National Program for Flood Plain Management.*

NOTE: The general concept of flood protection articulated in this section, while current at the time, has evolved since 1977 when E.O. 11988 was first written and is now reflected in the broader concept of flood risk management. Flood risk management better conveys the fact that people are never fully "protected" from flood waters. The concept of flood risk management is also important in that it includes a broader array of methods for managing floodwaters to reduce the risk of flooding and managing development in the floodplain to reduce the consequences of flooding. This can include natural features and

nature-based approaches. By considering and applying a broader array of measures in addition to traditional floodproofing measures, agencies may be able to increase the resilience of actions and investments that must occur in a floodplain. These broader approaches may also reduce the level of future risks posed to or by those actions. (See Part II – Steps 3.B. and 5.C. for more information on natural features and nature-based approaches.)

NOTE: E.O. 11988 has always acknowledged differences in the way actions are taken in regard to a structure versus a facility. Similarly, the Guidelines recognize that certain approaches will be appropriate based upon the type of structure or facility. Agencies must consider criteria and requirements of related policies in carrying out their missions and activities. As such, neither E.O. 11988 nor the FFRMS should be construed to establish a required size, crest elevation, or scale for levees, floodwalls, dunes, or other infrastructure features of flood risk management systems. Where applicable, agency procedures should align with related policies, such as the Principles, Requirements and Guidelines or other planning and design requirements.

E.O. 11988 SECTION 3(c)

> *If property used by the general public has suffered flood damage or is located in an identified flood hazard area, the responsible agency shall provide on structures, and other places where appropriate, conspicuous delineation of past and probable flood height in order to enhance public awareness of and knowledge about flood hazards.*

The conspicuous delineation of past and probable flood heights is required on property which has been or could be subjected to flooding. This delineation responsibility applies to all types of property (land, structures and facilities) used by the general public (e.g., park buildings, public museums, etc.). Agencies with responsibilities for Federal real property and facilities must identify in their regulations and procedures the areas where this requirement will be most effective in minimizing the adverse impacts of floods, especially on human safety. Past flood heights can include the high water mark identified after a flood event or from historical records. Probable flood heights could include the 1-percent-annual-chance flood level, the 0.2-percent-annual-chance flood level, or projected flood heights, where available.

E.O. 11988 SECTION 3(d)

> *When property in floodplains is proposed for lease, easement, right-of-way, or disposal to non-Federal public or private parties, the Federal agency shall (1) reference in the conveyance those uses that are restricted under identified Federal, State or Local floodplain regulations; and (2) attach other appropriate restrictions to the uses of properties by the grantee or purchaser and any successors, except where prohibited by law; or (3) withhold such properties from conveyance.*

Three requirements are set out for agencies which dispose of Federal properties (land, structures or facilities) in a floodplain. Of these three, the agencies must meet both requirements 3(d)(1) and 3(d)(2), or they must meet Section 3(d)(3). That is, if both 3(d)(1) and (2) cannot be satisfied, or if the agency does not choose to implement both, then the property must be withheld from conveyance.

Under Section 3(d)(1), the agencies' regulations or procedures must provide for the identification of those uses that are restricted, and how they are restricted under State, tribal, territorial and local floodplain regulations. Such restrictions are generally set out in State shoreline or coastal management plans or regulations, local plans and building codes, zoning and subdivision ordinances. If no such restrictions exist, the agency must note this when it implements the finding and public notice procedures (see Part II-Step 7). Then it still must satisfy *either* 3(d)(2) or 3(d)(3).

Under Section 3(d)(2), the agencies are required to provide appropriate restrictions to the uses of properties by the grantee or purchaser and any successors, which would augment those restrictions referred to in (d)(1), above, or if none, adequately stand on their own. For the purpose of E.O. 11988, the term "appropriate" as it refers to restrictions, means restrictions equal in scope and strictness to those of this Order. Since the property in question is located in the floodplain, then the agency must assure through these restrictions that harm to lives and property and to floodplain values is identified, and such harm is minimized while floodplain values are restored and preserved. Section 3(d)(2) recognizes that these additional restrictions need not be applied to the conveyance where prohibited by law.

Section 3(d)(3) requires that where an agency cannot or does not choose to meet the requirements of either 3(d)(1) or (2), or both, it is prohibited from making the conveyance. Even where the option is open to meet 3(d)(1) or (2), withholding the conveyance may be the most appropriate approach to meeting E.O. 11988's intent. Where, for instance, the existing use is not compatible with the intent of E.O. 11988, or the area in question is not subject to meaningful floodplain management requirements, withholding the land or facility from conveyance may be required.

This section makes it clear that each agency has a requirement to condition or withhold the conveyance of Federal property, unless a specific law expressly prohibits such activity.

E.O. 11988 SECTION 4

> *In addition to any responsibilities under this Order and Sections 102, 202 and 205 of the Flood Disaster Protection Act of 1973, as amended (42 U.S.C. 4012a, 4106 and 4128), agencies which guarantee, approve, regulate, or insure any financial transaction which is related to an area located in an area subject to the base flood shall, prior to completing action on such transaction, inform any private parties participating in the transaction of the hazards of locating structures in the area subject to the base flood.*

This section of E.O. 11988 describes notice requirements related to the mandatory flood insurance purchase requirements of the Flood Disaster Protection Act and, therefore, only apply to actions in the base floodplain. These notification requirements apply to the Federal Housing Administration, the Department of Veterans Affairs, and the six agencies enumerated in the Flood Disaster Protection Act of 1973: the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Comptroller of the Currency, the National Credit Union Administration and the Farm Credit Administration and any Federal entity responsible for the supervision of a lending institution. Other agencies that have responsibilities similar to those described in this section are also subject to its requirements. The notice requirements of this section are in addition to the other responsibilities of these agencies under E.O. 11988 and under Sections 102, 202, and 205 of the Flood Disaster Protection Act of 1973, as amended (42 U.S.C. 4012a, 4106 and 4128).

Further Information for Complying with the Flood Disaster Protection Act Mandatory Purchase Requirement

The Mandatory Purchase Requirement covers any financial transaction guaranteed, approved, regulated or insured by a Federal agency which is or will be located in a Special Flood Hazard Area in which flood insurance is available. If an agency does not operate on an individual transaction basis with private parties, but rather guarantees, approves, regulates or insures the institutions conducting such transactions, then it is the agency's responsibility to require that the institution provide the requisite notice.

The private parties must be informed of the hazards of locating in a Special Flood Hazard Area. Such notice should be given in a way which: (1) explains the chances of being flooded in language readily understandable to the private party; (2) indicates if the property is in a floodway or coastal high-hazard area; (3) indicates if there is a flood insurance purchase requirement; and (4) indicates if the transaction involves the sale of unimproved real estate, that the property may be subject to floodplain management regulations which dictate the manner, and in some cases the location of new construction.

E.O. 11988 SECTION 5

The head of each agency shall submit a report to the Council on Environmental Quality and to the Water Resources Council on June 30, 1978, regarding the status of their procedures and the impact of this Order on the agency's operations. Thereafter, the Water Resources Council shall periodically evaluate agency procedures and their effectiveness.

Agencies may be called on to furnish documentation covering revisions or special applications of procedures in years subsequent to 1978. WRC will involve interested and affected agencies in the review.

E.O. 11988 SECTION 6

As used in this Order:

(a) The term "Agency" shall have the same meaning as the term "Executive agency" in Section 105 of Title 5 of the United States Code and shall include the military departments; the directives contained in this Order, however, are meant to apply only to those agencies which perform the activities described in Section 1 which are located in or affecting floodplains.

(b) The term "Base flood" shall mean that flood which has a one percent or greater chance of occurrence in any given year.

(c) The term "floodplain" shall mean the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands. The floodplain shall be established using one of the following approaches:

(1) Unless an exception is made under paragraph (2), the floodplain shall be:

(i) The elevation and flood hazard area that result from using a climate-informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science. This approach will also include an emphasis on whether the action is a critical action as one of the factors to be considered when conducting the analysis;

(ii) The elevation and flood hazard area that result from using the freeboard value, reached by adding an additional 2 feet to the base flood elevation for non-critical actions and from adding an additional 3 feet to the base flood elevation for critical actions;

(iii) The area subject to flooding by the a 0.2 percent annual chance flood; or

(iv) The elevation and flood hazard area that results from using any other method identified in an update to the Federal Flood Risk Management Standard.

(2) The head of an agency may except an agency action from paragraph (1) where it is in the interest of national security, where the agency action is an emergency action, where application to a Federal facility or structure is demonstrably inappropriate, or where the agency action is a mission-critical requirement related to a national security interest or emergency action. When an agency action is excepted from paragraph (1) because it is in the interest of national security, it is an emergency action, or it is a mission-critical requirement related to a national security interest or an emergency action, the agency head shall rely on the area of land subject to the base flood.

(d) The term "critical action" shall mean any activity for which even a slight chance of flooding would be too great.

E.O. 13690 amended the term “floodplain” as used in the 1977 version of E.O. 11988 to describe the available approaches from the FFRMS for determining the vertical flood elevation and corresponding horizontal floodplain for federally funded projects. One of these approaches must be used for determining the FFRMS floodplain for these types of Federal actions. . The 1-percent-annual-chance flood will be used, at a minimum, for determining the vertical flood elevation and corresponding horizontal floodplain for all other Federal actions. The terms "agency," “federally funded projects,” "base flood," "floodplain," “FFRMS floodplain,” and “critical action” are defined in the Glossary and provide clarity for how these terms are used in this document. The FFRMS seeks to improve upon the standards set forth in E.O. 11988 by providing a higher vertical flood elevation and expanded corresponding horizontal floodplain than the current base flood elevation and floodplain to address current and future flood risk for federally funded projects. The FFRMS includes specific approaches for determining a vertical flood elevation and corresponding horizontal floodplain that are designed to recognize and incorporate future conditions rather than rely solely on existing data and information. The approaches currently described in the FFRMS are the following:

1. *Climate-informed Science Approach (CISA)* – use best available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science and other factors or changes affecting flood risk to determine the vertical flood elevation and corresponding horizontal floodplain in a manner appropriate to policies, practices, criticality, and consequences.
2. *Freeboard Value Approach (FVA)* – use the Base Flood Elevation (or 1-percent-annual-chance flood determined using best available data) and an additional height to calculate the freeboard value. The additional height will depend on whether or not the action is a critical action.
3. *The 0.2-percent-annual-chance Flood Approach (0.2PFA)* – use the 0.2-percent-annual-chance flood elevation (also known as the 500-year flood elevation).

Paragraph (c)(1)(iv) in Section 6 of E.O. 11988 references the fact that the FFRMS can be updated in the future to include additional approaches to reflect advances in science or floodplain management practices. The process for updating the FFRMS is described in Section 4 of E.O. 13690.

The application of the FFRMS approaches may vary based on whether the proposed federally funded project is an area vulnerable to coastal or riverine floods and whether the project is a critical action. Part II – Step 1.B. provides more detail about these approaches and how to apply them. Agencies should use an approach that takes advantage of best available information and data.

The CISA is preferred. Agencies should use this approach when data to support such an analysis are available. As described in detail in Appendix H, the CISA uses existing, sound

science and engineering methods (e.g., hydrologic and hydraulic analysis and methods used to establish current flood elevations and floodplain maps), supplemented with ***best available*** and ***actionable climate science*** and consideration of impacts from projected land cover/land use changes, long-term erosion, and other processes that may alter flood hazards over the lifecycle of the Federal investment. In cases where relevant data are not available, the other two approaches (Freeboard and 0.2-percent-annual-chance) are acceptable methods to determine the FFRMS floodplain, because each of these approaches can improve resilience to current and future flood risk.

Where more than one Federal agency is engaged in a federally funded project, they should begin to coordinate early in the process to select the most appropriate approach for determining the floodplain. Agencies maintain the responsibility and flexibility to tailor their procedures to meet their prescribed missions while fulfilling the requirements of E.O. 11988.

Although the FFRMS provides guidance to agencies regarding specific calculated elevations to address uncertainty and provide for resilience, agencies should consider whether an even higher elevation should be applied depending on the criticality of the action and the other flood characteristics. Agencies may use higher flood elevations where they determine it to be appropriate.

Although the FFRMS describes various approaches for determining the higher vertical flood elevation and corresponding horizontal floodplain for federally funded projects, it is not meant to be an "elevation" standard. The FFRMS is a resilience standard. The vertical flood elevation and corresponding horizontal floodplain determined using the approaches in the FFRMS establish the level to which a structure or facility must be resilient. This may include using structural or nonstructural methods to reduce or prevent damage; elevating a structure; or, where appropriate, designing it to adapt to, withstand and rapidly recover from a flood event.

E.O. 13690 also amended the definition of floodplain to allow an exception where it is the interest of national security, where the agency action is an emergency action, where application to a Federal facility or structure is demonstrably inappropriate, or where the agency action is a mission-critical requirement related to a national security interest or an emergency action. These changes are reflected in E.O. 11988 Section 6(c)(2). These exceptions could apply to actions involving Federal real property as well as actions that agencies may take in facilities or structures that are not federally owned. In developing revised agency-specific regulations and procedures, agencies are directed to either specify which agency actions are excepted or prescribe the process to be used to determine on a case-by-case basis whether an action is excepted. Agencies should also specify what justification, documentation, and tracking is required when an action is excepted. To determine whether the national security exception applies, agencies should refer to the definition of national security provided in the Glossary.

Excepted actions will not be subject to the higher vertical flood elevation and expanded horizontal floodplain determined using the approaches in the FFRMS. However, agencies are still required to use the base floodplain when complying with the requirements of the decision-making process in E.O. 11988. Agencies should also consider applying the following floodplain management principles: anticipating a changing environment, supporting regional resilience, adopting sustainable solutions, and supporting holistic approaches to floodplain management.

E.O. 11988 sets forth a higher level of resilience for critical actions that includes any activity for which even a slight chance of flooding is too great. This is consistent with the 1978 Guidelines. The prominence of critical actions in the E.O. 11988 highlights a continued concern that the impacts of floods on human safety, health, and welfare for many actions could not be minimized unless a higher standard than the base flood was provided. (See Part II – Step 1.)

Federal agencies continue to be responsible for determining whether an action is critical. To assist agencies in determining whether a proposed action is a "critical action," they should consider the example questions below.

- If flooded, would the proposed action create an added dimension or consequence to the hazard?
    - Is the action a structure or facility producing and/or storing highly volatile, toxic, radioactive, or water-reactive materials?
- If the action involves structures such as hospitals, nursing homes, prisons, and schools, would occupants of these structures be sufficiently mobile and have available transport capability to avoid loss of life and injury given the flood warning lead times available?
    - Would emergency services functions be delayed or unavailable as a result of the location of the action?
    - Are there routes to and from the structure that would be inaccessible during a flood and hinder evacuation?
    - Would the location of the structure result in unacceptable hazards to human safety, health, and welfare of the occupants?
- Would essential or irreplaceable resources, utilities, or other functions be damaged beyond repair, destroyed, or otherwise made unavailable?
    - Would utilities, critical equipment, systems, networks, or functions be damaged beyond repair or destroyed?
    - Would physical or electronic records without backups or copies be destroyed or made unavailable as a result of where these items are located in a structure?
    - Would national laboratories' research activities or items of significant value to research communities be damaged or destroyed as a result?
    - Would items or structures of substantial cultural significance be damaged, destroyed, or otherwise harmed?

- Would the damage or disruption from a local flooding event lead to regional or national catastrophic impacts (e.g., a port being closed for a period following a storm event, which has an impact on transportation of goods nationally)?
- Would damage or disruption to a given facility or infrastructure component have potential for cascading damage or disruption to other facilities and infrastructure classes, some of which may already be stressed by flood conditions (e.g., electricity outage due to substation damage resulting in wastewater treatment facility shutdown or gasoline pump outage)?

Beyond these example questions, agencies should note that there are other circumstances and guiding principles that may be relevant to determining if an action is critical. Given these types of questions and considerations, care must be taken by Federal agencies to identify practicable alternatives to locating in the floodplain. When no practicable alternatives exist but to locate a critical action in the floodplain, the agency shall determine the impacts and minimize, restore, and preserve as required. (See Part II, Step 5 for more information on practicable alternatives to actions proposed in floodplains.)

The FFRMS identifies higher standards for critical actions for federally funded projects. For all other Federal actions that are not federally funded projects, agencies should consider using the 0.2-percent-annual-chance floodplain as a minimum standard if an action is determined to be a critical action.

E.O. 11988 SECTION 7

> *Executive Order No. 11296 of August 10, 1966, is hereby revoked. All actions, procedures, and issuances taken under that Order and still in effect shall remain in effect until modified by appropriate authority under the terms of this Order.*

This section of E.O. 11988 provided a "grandfathering" clause for agencies as they transitioned from the previous E.O. 11296 to the E.O 11988 in the late 1970s. It allowed agencies to continue to operate under their existing procedures for E.O. 11296 until they issued their new procedures to reflect the requirements of the 1977 version of E.O. 11988.

E.O. 11988 SECTION 8

> *Nothing in this Order shall apply to assistance provided for emergency work essential to save lives and protect property and public health and safety, performed pursuant to Sections 403 and 502 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (42 U.S.C. 5170b and 5192).*

Although E.O. 11988 Section 8 exempts flood-related and other emergency activities "essential to save lives and protect property and public health and safety" from the provisions of E.O. 11988, (e.g., the requirement to prepare and circulate notice of proposed activity), the meaning and intent expressed in E.O. 11988 Section 1 are still relevant to such activities.

Activities under portions of legislatively directed emergency programs, (e.g., under P.L. 84-99 (33 USC 701n)) covering the same kinds of situations as those sections specifically cited in E.O. 11988, are clearly within the meaning and intent of Section 8 and, therefore, are subject to the same interpretation.

In addition to this exemption, an exception from the elevation component of the FFRMS for actions that are in the interest of national security is described in Part I, Section 6(c). Although agencies are able to allow an exception where it is in the interest of national security, agencies are still required to adhere to the requirements of the decision-making process in E. O. 11988 when undertaking these actions.

E.O. 11988 SECTION 9

> *To the extent the provisions of section 2(a) of this Order are applicable to projects covered by Section 104(h) of the Housing and Community Development Act of 1974, as amended (88 Stat. 640), 42 U.S.C. 5304(h)), the responsibilities under those provisions may be assumed by the appropriate applicant, if the applicant has also assumed, with respect to such projects, all of the responsibilities for environmental review, decision-making, and action pursuant to the National Environmental Policy Act of 1969, as amended.*

This section allows States and units of general local government which may assume the status of Federal agencies for purposes of NEPA compliance under the HUD Community Development Block Grant (CDBG) Program to assume the responsibility for carrying out the provisions of Section 2(a) of this Order for specific projects under CDBG as part of their overall NEPA responsibilities. Thus, the provisions of Section 2(a) of this Order will be carried out in conjunction with NEPA compliance, and one responsibility may not be assumed without the other also being assumed by a grantee. Compliance with Section 2(a) of E.O. 11988 will be completed prior to the grantee's certification of compliance with NEPA. The provisions of Section 104(h) of the Housing and Community Development Act of 1974, referenced in E.O. 11988, have been redesignated and currently appear at Section 104(g) (42 U.S.C. 5304(g)).

Part II: Decision-Making Process

INTRODUCTION

This part of the Guidelines is structured in eight steps and reflects the decision-making process (Figure 1) required in section 2(a) of E.O. 11988. This section and relevant steps have been revised to address amendments to E.O. 11988 by E.O. 13690 and the FFRMS such as:

- *Approaches for determining the FFRMS floodplain.* E.O. 13690 amends the definition of floodplain to describe the available approaches for determining the vertical flood elevation and corresponding horizontal floodplain for federally funded projects. The amendments may expand the area in which agencies must assess impacts of proposed federally funded projects and establish a new level to which these projects must be resilient.
- *Recognition of critical action determinations by agencies.* The concept of critical action reflects a concern that the impacts of flooding on human safety, health, and welfare for many activities could not be minimized unless a higher degree of resilience was provided.
- *The use of natural features and nature-based approaches*. These approaches have the potential to reduce flood risks, as well as minimize the impacts of Federal actions to natural and beneficial floodplain values and to lives and property.

E.O. 11988 and the Guidelines recognize that each agency's action will be driven by a specific need, function, and situation, and that the nature and scope of the agency's action is defined by the specific statutory authority. The eight-step process is designed to help agencies evaluate the type of action they are taking, where that action will be located, what impacts it may have in the floodplain and how those impacts can be avoided or minimized consistent with their statutory authority. In addition, factors such as actions of insignificant impacts or actions of a short duration may allow for an altered or shortened decision-making process, as indicated in the statement at the end of the summary of the eight-step decision-making process provided below. Regardless of the decision-making process that is used under E.O. 11988, an agency must consider whether NEPA applies to the proposed action and, if so, what level of NEPA review is appropriate. Before starting the eight-step decision-making process, agencies may want to consider the following questions that will help guide their decisions:

Is the action a critical action?

Federal agencies will be responsible for determining whether an action is critical and, if so, whether it is located in the floodplain. Agencies are to consider critical actions in more detail as a means to minimize risks posed to those actions that must occur in a floodplain. Critical actions include any activity for which even a slight chance of flooding is too great. The concept of critical action reflects a concern that the impacts of flooding

on human safety, health, and welfare for many activities could not be minimized unless a higher degree of resilience was provided. To assist agencies in determining whether a proposed action is a "critical action," they should consider the example questions included in Part I, E.O. 11988 Section 6.

Does an action qualify for a general area review?

Agencies planning to conduct a series of actions in a defined geographic area may consider conducting a general area review. An area-wide compliance process may be substituted for individual compliance actions where a series of individual actions is proposed or contemplated over an indefinite period of time. The area-wide compliance process should comply with the full decision-making process in E.O. 11988.[8]

Federal agencies undertaking general area reviews should consider the following safeguards in order to avoid unintended consequences and/or the inadvertent implementation of unwise actions.

1. General area reviews should include consultation and coordination with States, tribes, and local government(s). Federal agencies should consider involving the State, tribal or local floodplain manager, building officials, and the environmental protection departments as appropriate.
2. General area reviews may be performed jointly with one or more Federal departments or agencies, or appropriate Federal designee;
3. General area reviews should include a scoping process to determine the scope of issues to be addressed and for identifying the significant issues for the entire floodplain or wetland sector.
4. Federal agencies undertaking general area reviews should establish a mechanism to assure that the terms and approval of individual actions (e.g., concerning structures and facilities) are consistent with the expectations established under the general (area) review, and that to the extent different treatment for individual actions is necessitated, such nonconformance will be communicated to local government entities as appropriate.
5. General area reviews should be limited to those areas where the State, tribal or local government(s) are in full compliance with the requirements of the Regular Program of the NFIP. See the appropriate FEMA Regional Office in Appendix C to determine NFIP community compliance.

[8] As described, a general area review is an example of a programmatic analysis prepared outside of the NEPA process that may inform a subsequent NEPA review, either through incorporation by reference or as a starting point for developing the NEPA review. The agency would use the NEPA review in making decisions on a proposed action. Alternatively, an agency may prepare a general area review and a programmatic NEPA review at the same time, through an integrated E.O. 11988 and NEPA process, to inform decisions on a series of proposed actions in an area. See Council on Environmental Quality, "Effective Use of Programmatic NEPA Reviews" (Dec. 18, 2014).

Consistent with NEPA, Federal agencies undertaking a general area review should expect to conduct continual reviews for changed circumstances, including impacts of climate change, redefined floodplains, or recurring flooding.

Will the action have limited impact?

When a proposed Federal action is temporary or incidental, has limited exposure to flooding, causes insignificant impacts on the floodplain, or involves the installation of measures to reduce flood hazards there may be adjustments that can be made to the process. Examples of such Federal actions include, but are not limited to: financial assistance for signs, trails, and paths; land acquisition for (but not development of) parks and open spaces; a "roll over" of a loan from an existing to a new owner; or weatherization or energy conservation improvements to a single family property previously elevated and floodproofed to the standard of the National Flood Insurance Program (44 CFR Part 60.3).

When a proposed action is temporary, incidental to the mission of the Federal agency, requires access to the floodplain and is easy to completely remove from the floodplain at the threat of flooding, the requirements of E.O. 11988 and/or the FFRMS may be satisfied by an alternate process. The agency should prepare a plan for evacuation of the action from the floodplain and provide public notice of the intention to implement the evacuation plan in the event of a threat of flooding. Examples of these kinds of actions could include temporary survey towers, temporary stream gaging equipment, mobile construction offices, geological investigation equipment, etc.

When the proposed action has very limited exposure to flooding or causes insignificant impacts on the floodplain, some adjustments may be made in the intensity of analysis and extent of distribution of public notices. If the Federal agency determines that the proposed action has such limited impact that any other practicable alternative would cause equal or more serious impacts to the floodplain and its natural values, the requirements in Steps 3 and 6 of the decision-making process (to develop and evaluate practicable alternatives) may be considered complete. The agency must document the determination. The public notice requirements for such an action may be considered satisfied when residents of the local community and State floodplain management agency have had sufficient opportunity to be informed and to comment on the proposed action.

If the proposed action is to install measures intended to reduce flood hazards, such as on-site detentions or stream gaging components of flood warning systems, then fulfilling the requirements of relevant and applicable environmental statutes, including NEPA, and following the planning procedures in the PR&G may satisfy the requirements of E.O. 11988. Such an action would need to be consistent with the provisions of E.O. 11988 – an examination of practicable alternatives to the floodplain location would need to be completed and minimization, restoration and preservation would need to be provided.

Is the action a repetitive action?

To improve efficiency but maintain compliance with E.O. 11988, agencies may perform a floodplain evaluation class review for certain routine or recurring actions, known as "repetitive actions." In considering whether to undertake such a class review and which actions may qualify, agencies should examine past actions that have been reviewed on an individual basis, pursuant to agency procedures, with public notice and opportunity to comment. If the results of the individual reviews have indicated uniformly that the actions would not have an adverse impact individually or cumulatively on floodplain values placing property and persons at risk, and little or no public comments to the contrary were received, a class review to streamline agency coordination and processing efforts may be appropriate. As a part of the class review, the agency would establish a set of minimum review criteria that ensure natural and beneficial floodplain values are not significantly affected. The agency would no longer be required to make findings of no practicable alternative or to publish public notices for subsequent actions in the class.

Class review may be made of routine or recurring actions when: 1) consideration of whether to locate in a floodplain is substantially similar; 2) there is no practicable alternative(s), consistent with any Executive Orders and applicable agency codes, to siting in a floodplain for each action within the class; 3) all practical measures to minimize harm to the floodplain are included in the review criteria that, if followed, will minimize any adverse impacts that may be associated with the individual actions covered in the class review.

If an action would be exposed to increased risk or cause an increased risk to other areas of the floodplain, a class review cannot be undertaken. The following are situations or conditions which will trigger the entire eight-step decision-making process:

- The proposed action is located in a high hazard area (i.e. a floodway or coastal high hazard area)
- The proposed action involves a structure whose lowest floor is *two feet* below that of the FFRMS floodplain elevation or the base floodplain elevation, depending on the type of action.
- The proposed action involves a structure whose lowest floor has experienced flooding, or flood-induced damage reimbursed under the National Flood Insurance Program.

Whether an agency uses a class review or the full decision-making process, the agency must consider whether NEPA applies to each proposed action and if so, what level of NEPA review is appropriate. Where an agency prepares a class review outside of the NEPA process, the class review could inform a subsequent NEPA review. For example,

the agency could incorporate it by reference in the NEPA document or use the class review as a starting point for developing the NEPA review.

Can you take advantage of natural features or nature-based approaches?
Where possible, agencies shall use natural features, ecosystem processes, and nature-based approaches when developing alternatives for a proposed action in a floodplain and when this is within an agency's authorities. Nature-based approaches include engineered features and restored natural features to mimic or restore natural processes that are created by human design. Examples include restored habitat for fish and wildlife, a constructed impounded wetland, or a beach and dune system site specifically engineered for coastal storm damage reduction. Nature-based approaches generally, but not always, must be maintained in order to reliably provide the intended level of services. Nature-based approaches can be used in combination with or instead of new, existing, or other similar measures. A nature-based approach could also substitute for proposed actions, or could be used in combination with a proposed action.

Avoidance of floodplains is preferred, but if an agency determines that an action must occur in a floodplain a nature-based approach would help to minimize the adverse impacts of the action to the natural and beneficial values. If designed properly, a nature-based approach would also help to protect and restore the physical, geological, biological, and chemical processes that naturally occur in floodplains. Use of natural features, in particular, may be beneficial as they may not require any maintenance, and may restore a functioning portion of the natural physical, geological, biological, and chemical processes of a system.

Is the action in a coastal state?
Federal agencies are required to follow the Federal floodplain management standards set forth in E.O. 11988, for all Federal actions. It is possible that Federal actions may have to be consistent with higher State or local standards if the standards are approved by Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) as enforceable policies of State coastal management programs pursuant to the Coastal Zone Management Act of 1972 (CZMA). Section 307 of the CZMA, called the "Federal consistency" provision, gives coastal states (including the Great Lakes and U.S. territories) authority to review certain Federal actions that may affect a State's coastal uses or resources. Generally, Federal consistency requires that Federal actions, within and outside the coastal zone, which have reasonably foreseeable effects on any coastal use (land or water) or natural resource of the coastal zone be consistent with the enforceable policies of a State's federally approved coastal management program. In this context, Federal actions include Federal agency activities, Federal license or permit activities, and Federal financial assistance activities. Federal agency activities must be consistent to the maximum extent practicable with the enforceable policies of a State coastal management

program, while license and permit and financial assistance activities must be fully consistent.

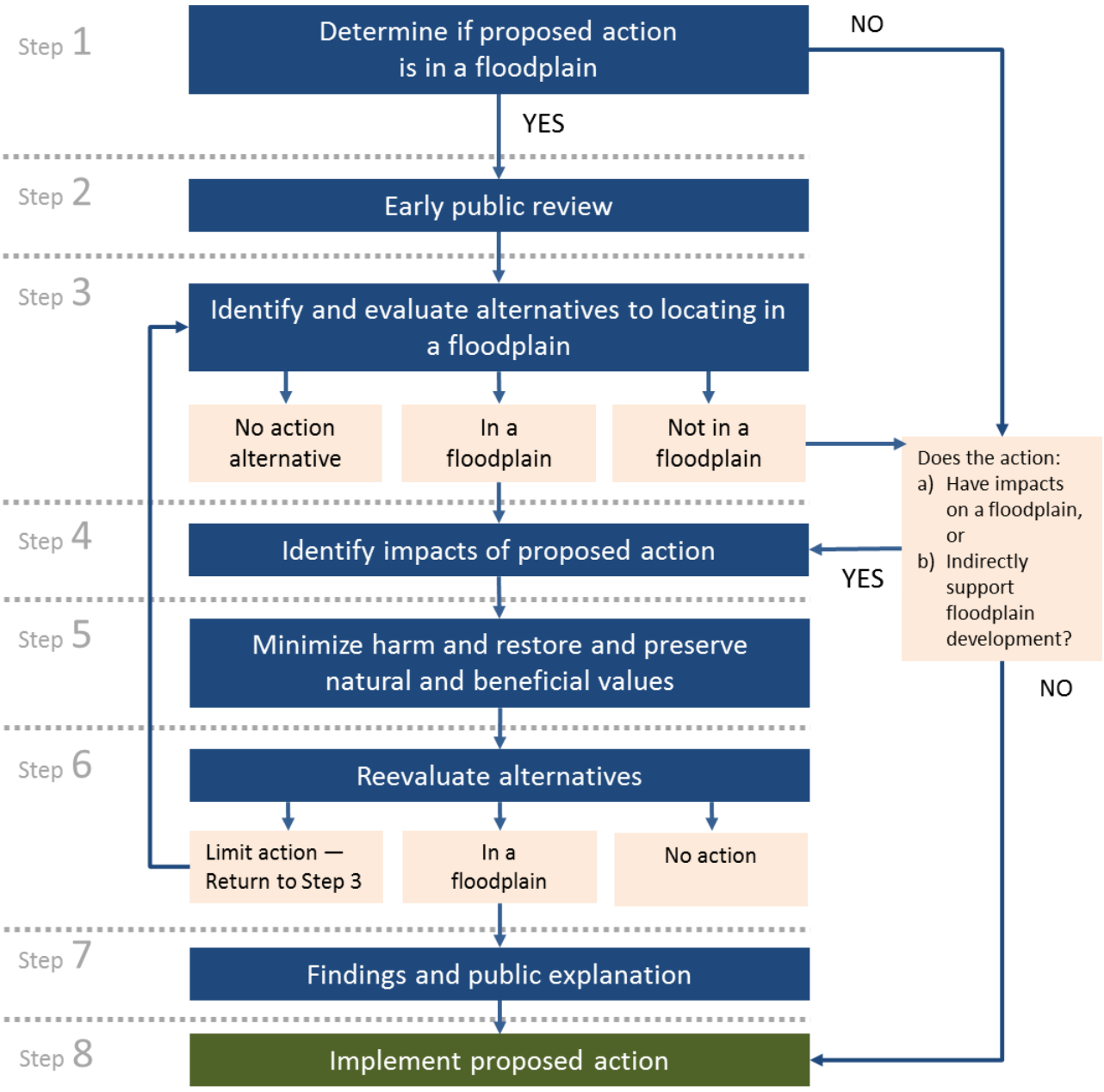
In addition to identifying the specific need, function, and situation for the action and determining whether it is a critical action, agencies should follow the eight-step decision-making process summarized below and discussed in more detail in the sections that follow.

1. The first step of the decision process is to determine if a proposed agency action is located in a floodplain – the vertical flood elevation and corresponding horizontal extent of the floodplain will depend on whether the action is a federally funded project and whether the action is critical. This discussion references various resources for determining floodplains and their boundaries. If the proposed action is not in a floodplain, proceed to Step 4.
2. The agency must make public its intent to locate a proposed action in a floodplain. This notice must provide a description of the proposed action with ample lead time for meaningful input from the public and other entities.
3. If the action is in a floodplain, the third step is to identify and evaluate practicable alternatives. This determination requires the agency to consider whether a floodplain can be avoided either through alternative siting outside of the floodplain; through alternate actions which would perform the intended function but would minimize harm to or within a floodplain; or by taking no action.
4. For the proposed alternative, the agency must identify if the action has impacts in a floodplain or directly or indirectly supports floodplain development that has additional impacts. If the proposed action is outside a floodplain and has no identifiable impacts and does not support direct or indirect development, the action can be implemented and the agency can proceed to Step 8.
5. If the proposed action has identifiable impacts or supports direct or indirect floodplain development, these effects must be minimized. Further, natural and beneficial floodplain values must be restored and preserved.
6. The proposed alternative can now be reevaluated taking into account the identified impacts, the steps necessary to minimize these impacts and opportunities to restore and preserve floodplain values. In a floodplain: if this reevaluation shows that the proposed action is no longer feasible, consider limiting the action to make a non-floodplain site practicable or taking no action. Outside the floodplain: if the action has impacts or support, consider modifying or relocating the action to eliminate or reduce these effects or taking no action.
7. If the agency head, or designee, finds that the only practicable alternative is locating in a floodplain, public notice of the reasons must be given for this finding (including the alternatives considered).

8. After a reasonable period to allow for public response, the proposed action can be implemented.

Note that depending on the situation, this process may be carried out with fewer steps if all of the objectives of the decision-making process can be achieved.

Figure 1: Eight-step Decision-making Process for E.O. 11988



STEP 1 – DETERMINE IF A PROPOSED ACTION IS IN A FLOODPLAIN

The first step in complying with E.O. 11988 is to determine whether or not a proposed action is located in a floodplain. The following discussion includes information about types of flood hazards in the floodplain (1.A.) and determination of the vertical flood elevation and corresponding horizontal floodplain (1.B.). Throughout the process of determining whether or not an action is in a floodplain as described in Step 1.B., agencies are responsible for identifying and using best available and actionable data or information. What constitutes "best available" and "actionable" will depend on a variety of factors; however, "best-available" generally refers to science, data or information that is transparent, technically credible, usable, and legitimate as described in Part I, E.O. 13690 Section 1.

1.A. TYPES OF FLOOD HAZARDS WITHIN THE FLOODPLAIN

The general types of land area where flood hazards are encountered are riverine floodplains and coastal floodplains. A floodplain is not limited to areas surrounding large bodies of water such as coastal areas and the shores of large rivers. A floodplain can be any land area susceptible to being inundated from any source of flooding, including those that can be flooded from small and often dry watercourses. Small watercourses can become sources of major flood damage when their watersheds experience rapid runoff from intense rain or melting snow.

Areas adjacent to any size stream or river can be covered by floodwaters. Flooding in these areas can result from excessive rainfall, snowmelt, or a combination thereof. If runoff is increased to the point that the carrying capacity of the channel is exceeded, flooding occurs. Flooding may also occur when the capacity of the stream channel is reduced by natural obstructions (e.g., ice or debris dams, sediment, and vegetation) and human-made obstructions (e.g., structures, fill, and facilities). Some areas flood either from tributary stream overflow, backwater from a major stream, or from both simultaneously.

Coastal flooding occurs in areas that border oceans, estuaries, some lakes, or similar large bodies of standing water. Flooding in these areas is due to landward flows caused by unusually high tides, waves from high winds, storm surges, tsunamis (large waves in the sea associated with very strong earthquakes or other impulsive disturbances), or by a combination of these causes.

Aggravating factors such as land-use changes, climate variability, and climate change contribute to the flood hazard in many riverine and coastal areas. This is particularly true in riverine situations where high velocity flow causes flood-related erosion. In other areas where sheet flow has high velocity, sheet flow erosion may occur. Unusually high waves and tides are the most frequent agents of coastal erosion. Ice flooding can also contribute to structural damages. Land subsidence may occur with extensive withdrawals of groundwater or other substances producing a relative increase in flood levels.

1.B. DETERMINATION OF THE FLOODPLAIN

For purposes of E.O. 11988, each agency will determine if the proposed action is located in a floodplain. Agencies must first determine what type of action is being proposed because E.O. 13690 and the FFRMS added new approaches for determining the vertical flood elevation and corresponding horizontal floodplain for federally funded projects. For federally funded projects, agencies must, at a minimum, use one of the following approaches to determine the vertical flood elevation and corresponding horizontal floodplain for a given action:

1. *Climate-informed Science Approach (CISA)* – use the best available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science.
2. *Freeboard Value Approach (FVA)* –use the Base Flood Elevation (or 1-percent-annual-chance flood determined using best available data) and an additional height to calculate the freeboard value. The additional height will depend on whether or not the action is a critical action.
3. *The 0.2-percent-annual-chance Flood Approach (0.2PFA)* – use the 0.2-percent-annual-chance flood elevation (also known as the 500-year flood elevation).
4. Use any other method identified in an update to the FFRMS.

Agencies should use an approach that takes advantage of best-available data and information. Agencies should use the CISA approach when data to support such an analysis are available. Regardless of which approach is selected, there are distinctions within the approach for critical versus non-critical actions and actions proposed for locations vulnerable to flooding from riverine versus coastal flood hazards.

For Federal actions other than federally funded projects, agencies must use, at a minimum, the 1-percent-annual-chance flood to determine the vertical flood elevation and corresponding horizontal floodplain. Agencies should use the 0.2-percent-annual-chance flood for critical actions. This is consistent with the guidance provided in the 1978 Guidelines.

There are several important concepts that agencies should keep in mind as they develop procedures for determining the vertical flood elevation and corresponding horizontal floodplain. These include the importance of considering the best-available data and information as well as State, tribal, territorial, or local government standards. These concepts are explained in more detail later in this section.

When determining whether or not an action is in a floodplain, agencies should draw on existing resources where possible. FEMA products, such as flood maps and Flood Insurance Studies (FIS), may serve as a good starting source. Many of the communities that have a FIRM also have a FIS report containing detailed flood information. For further information regarding the information available from FEMA and for direction interpreting FEMA products, please refer to Appendix B.

If a decision involves an area or location within extensive Federal or State holdings, it is unlikely that FIS reports and FIRM or Flood Hazard Boundary Maps (FHBMs) would be available. In this event, information should be sought from the land administering agency before information and/or assistance is sought from the agencies listed in Table 1. If none of these agencies has information or can provide assistance, the services of an experienced consulting engineer should be obtained.

Table 1: Resources for Floodplain Information and Technical Assistance

The agencies listed in the table below may be able to provide information that can assist decision-makers in determining whether a potential action will be located in a floodplain. The information types and levels of technical assistance vary greatly. Appendix D provides additional detail on resources that these agencies have and how they can be accessed.

AGENCY*	Maps and Profiles		Technical Assistance Services
	Riverine	Coastal	
U.S. Department of Agriculture: Natural Resources Conservation Service	✓	✓	✓
Department of Defense: U.S. Army Corps of Engineers (USACE)	✓	✓	✓
Department of Commerce: National Oceanic and Atmospheric Administration (NOAA)	✓	✓	✓
Department of Homeland Security: Federal Emergency Management Agency (FEMA)	✓	✓	✓
Department of Housing and Urban Development	-	-	✓
Department of the Interior:			
Bureau of Reclamation	-	-	✓
U.S. Fish and Wildlife Service	✓	✓	✓
United States Geological Survey	-	-	✓
Department of Transportation	✓	✓	✓
Environmental Protection Agency			✓
General Services Administration	✓	✓	✓
Tennessee Valley Authority	✓	-	-
State and Regional Agencies	State and Regional agencies such as Departments of Transportation, Departments of Water Resources, Departments of Natural Resources, or Flood Control Districts, Local Public Works, and Local Planning Commissions may have developed floodplain data for smaller streams or reaches of streams impacted by a flood control or drainage project.		

1.B.1. Procedures for Applying Best-Available Data or Information

Use of Best-available, Actionable Hydrologic and Hydraulic Data and Methods that Integrate Current and Future Changes in Flooding Based on Climate and Related Science for the CISA

Climate change can affect property, human health and welfare, and the natural and beneficial functions of floodplains in various ways, one of which is through increased risk of flooding. E.O. 11988 anticipates increases in both climate change impacts and the intensity of

those impacts over time. As a result, the Guidelines encourage agencies to apply best-available and actionable climate science into their hydrologic and hydraulic engineering models and methods. In addition to the criteria for best available science, data, and information noted earlier, flexibility is a key aspect in the context of the CISA. Scientific, engineering, and planning practices to address climate change and related information are evolving. To respond, agencies need to adapt and continuously update their approaches consistent with agency guidelines and principles.

As the research community continues to increase its understanding of climate change processes and impacts, additional work is often needed to translate the research results into "actionable" data and information. Thus, only a subset of the resources meeting the above criteria for "best-available" will also be actionable. To be considered actionable, the data and information must be:

- Relevant to the decision under consideration.
- Reliable in terms of its scientific or engineering basis and appropriate level of peer review.
- Understandable to those making the decision.
- Supportive of decisions across wide spatial, temporal, and organizational ranges, including those of time-sensitive operational and capital investment decision-making.
- Co-produced by scientists, practitioners, and decision-makers, and meet the needs of and are readily accessible by stakeholders.

The CISA (further described in Appendix H) utilizes the best-available, actionable hydrologic and hydraulic methods and data that integrate current and future changes in flooding based on climate and related science to determine the vertical flood elevation and corresponding horizontal floodplain. It is important to note that while "climate science" is specifically called out in E.O. 13690, the FFRMS refers to climate-informed science and climate-related science to ensure that agencies using this approach account for climate variability and change and a variety of factors that may impact flood risk as input to the existing science and engineering processes. In applying the CISA, agencies should:

- Use existing sound science and engineering methods (e.g., hydrologic and hydraulic analysis and methodologies) as have historically been used to implement E.O.11988, supplemented with best-available, climate-related scientific information when appropriate (depending on the agency-specific procedures and type of Federal action);
- Be consistent with the climate science and related information found in the latest National Climate Assessment (NCA) report or other best available, actionable science;

- Combine information from different disciplines (e.g., new perspectives from the atmospheric sciences, oceanographic sciences, coastal sciences, and hydrologic sciences in the context of climate variability and change) in addition to traditional science and engineering approaches; and
- Include impacts of future land cover and land use changes (which may alter hydrology due to increased impervious surface), long-term coastal and/or riverine erosion, and vertical land movement (for determining local changes to sea level) expected over the lifecycle of the action.

Using scientific information to prepare for climate change can help agencies evaluate alternatives to locating in the floodplain and to better manage the flood risk and minimize impacts and costs over time if there are no alternatives to locating in the floodplain. Climate science and related information continues to grow and evolve, and it is the intent of this standard that agencies will use the latest science, in consideration of policies, procedures, criticality and consequences, to make their determinations of the vertical flood elevation and corresponding horizontal floodplain.

Agencies using the CISA may find that because of the nature of the specific climate change processes and other physical factors affecting flood risk at the project site, the resulting flood elevation may be equal to or lower than the current 1-percent-annual-chance flood elevation. Such an outcome could occur in areas where relative sea level change is negligible or falling, or where watershed precipitation patterns yield lower flood discharges. In these cases, agencies must manage for flood hazards expected over the lifecycle of the Federal action, including current conditions, so the flood elevation used should not be lower than the current 1-percent-annual-chance flood elevation.

Use of Best-available Information for Floodplain Determination Approaches other than CISA

Agencies must use the best-available information and the FEMA FIRM when using any of the following to determine if a proposed action will be located in a floodplain: the Freeboard Value Approach, the 0.2-percent-annual-chance floodplain, or the 1-percent-annual-chance floodplain. FEMA's FIRMs and FISs are established as the starting point for making this determination. When an effective FIRM or FIS is revised, FEMA draft work maps and preliminary FIRMs and FIS are developed during a study. The information from a draft map or preliminary FIRM and FIS may serve as best-available information if the information shows that a site previously located outside the floodplain is now in the floodplain or that the existing FEMA BFE at the site has increased. If the preliminary study shows that the FEMA BFE has decreased, it is recommended that agencies wait until a Letter of Final Determination has been issued to use the new, lower FEMA BFE as best-available information. For example, if FEMA's preliminary FIS indicates that the FEMA BFE at a site has increased by 1.5 feet, then the two-foot freeboard or three-foot freeboard for critical actions would be added to the 1.5-foot increase in the FEMA BFE when using the Freeboard Value Approach.

To find information on whether an FIS is underway in a community and whether preliminary FIRMs and FIS are available, agencies can check FEMA's Flood Map Service Center website. Agencies may also contact the FEMA Regional Offices listed in Appendix D regarding draft work map information or other information about the flood hazards in a particular community.

Advisory Base Flood Elevations (ABFEs) are developed under certain situations to guide recovery efforts. FEMA may develop ABFEs after a major disaster in order to assist communities and property owners in making rebuilding decisions. These ABFEs may be higher or lower than effective information. Agencies should consider using the ABFEs as best available information, where available, if the ABFE is higher. ABFEs that are lower should not be used as best available information until a letter of final determination is released for an updated study. Agencies can contact the FEMA Regional Offices to find out if ABFEs have been developed after a disaster.

When the FEMA FIRM, FIS, or FHBM show a Special Flood Hazard Area (SFHA) without FEMA BFEs or these maps are not available from FEMA for the proposed location, the agency may seek information about the 1-percent-annual-chance flood elevation and the 0.2-percent-annual-chance flood from other Federal, State, or local agencies. The agency also may seek the services of a professional engineer with the ability to develop information about the floodplain. As an alternative, agencies could also consider using the CISA if there is available actionable science to determine the vertical flood elevation and corresponding horizontal floodplain.

Use of State, Tribal, Territorial, or Local Government Standards

The elevation standards of the FFRMS are not intended to supplant applicable State, tribal, territorial, or local floodplain protection standards. A Federal agency will consider State, tribal, territorial, and local laws and regulations to determine whether their floodplain management standards exceed the FFRMS. If such standards exceed the FFRMS, the Federal agency should apply such standards if the agency determines the application of the standards is reasonable in light of the goals of E.O. 11988 and any amending Executive Orders. A modification of Federal action to meet such State, tribal, territorial, or local standards does not necessarily mandate an increase of the Federal financial investment in the action, particularly where State, tribal, territorial, or local entities have non-Federal cost-sharing requirements. (See Part II, Introduction, for a description of how State and local government standards are addressed in the NFIP and under the CZMA.)

When Multiple Agencies are Involved in an Action

As noted in Part I in the interpretation of E.O. 11988 Section 6, agencies are encouraged to coordinate early in the process when multiple agencies are involved in an action. This is especially important when the action is subject to the FFRMS and agencies must select an approach for determining the floodplain. The processes for coordination are typically determined

on a project-specific basis and/or will be described in an agency's implementing procedures. Some of these coordination processes may be governed by interagency Memoranda of Agreement or may be called out in regulations. Other coordination may happen more informally.

In addition to defining general coordination on an action, agencies also will determine the most appropriate process for resolving conflicts that may arise during a project. These processes will also vary. For example, some agencies defer to a particular agency that may have the lead on the project. Additionally, Memoranda of Understanding or other interagency agreements governing certain sectors of Federal activity may contain escalation procedures, such as the Unified Federal Review that governs Disaster Recovery Projects.

1.B.2. Climate-Informed Science Approach

Non-critical Actions

The CISA utilizes the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate and related science to determine the vertical flood elevation and corresponding horizontal floodplain in a manner appropriate to policies, practices, criticality and consequences. This approach ensures that expected future changes, including changes in climate, land use, or other watershed characteristics, are incorporated into calculations of expected flood levels. Calculations are different for areas that may experience riverine or coastal flood hazards. More detail on the data, information, and resources to use in implementing the CISA can be found in Appendix H.

Coastal Flood Hazards

The CISA for areas vulnerable to coastal flood hazards incorporates scenarios of time-dependent regional sea-level change into the best-available hazard information considering the anticipated lifecycle of the action and risk associated with that action. An example approach may be to use the interagency (Parris et al., 2012)[9]) Appendix H or similarly developed global mean sea-level-rise (GMSLR) scenarios, adjusted to local relative sea-level (LRSL) conditions to determine possible future conditions. The LRSL conditions should be combined with surge, tide, and wave data to determine the vertical flood elevation and corresponding horizontal floodplain using state-of-the-art science in a manner appropriate to policies, practices, criticality, and consequences.

As another example, an agency could start with the best-available coastal flood hazard information, which in many cases could be FEMA-mapped stillwater elevations (i.e., storm surge only, with no addition of local wave effects), and add the plausible changes in sea level using scenarios from sources such as Parris et al. (2012) or the LRSL to determine a future 1-percent-annual-chance stillwater elevation. The agency would

[9] Parris, A., P. Bromirski, V. Burkett, D. Cayan, M. Culver, J. Hall, R. Horton, K. Knuuti, R. Moss, J. Obeysekera, A. Sallenger, and J. Weiss (2012) *Global Sea Level Rise Scenarios for the U.S. National Climate Assessment*. NOAA Technical Report OAR CPO-1. Washington, DC: National Oceanic and Atmospheric Administration, Climate Program Office. http://cpo.noaa.gov/sites/cpo/Reports/2012/NOAA_SLR_r3.pdf

project this future elevation inland to determine the horizontal extent of the floodplain. This is a simplified approach that may address agency needs to identify the CISA floodplain quickly and with relatively low up-front cost.

In following this methodology, the agency must consider a number of factors about the action, including an assessment of the risk to which the action will be exposed, the anticipated level of investment, the anticipated lifecycle of the action, and the consequences of exposure of the action to flood hazards. These factors should help inform choices the agency makes in determining the flood elevation, such as which GMSLR scenario to use, the time horizon to consider, and level of rigor to apply in the analyses. As discussed earlier, flood elevations determined with the CISA could be equal to or less than the current 1-percent-annual-chance flood; to manage for both current and future flood hazards, agencies should use current 1-percent-annual-chance flood elevation as a minimum elevation in these circumstances.

Riverine Flood Hazards

The CISA for areas vulnerable to riverine flood hazards combines an agency's actionable hydrologic and hydraulic methodologies with the plausible future conditions resulting from changes in climate, land use, or other watershed characteristics. Specifically, the agency should conduct a hydrology study that is informed by expected changes in climate and land-use factors. This future-oriented hydrologic analysis should be incorporated into the current process used by the agency to calculate vertical flood elevation and corresponding horizontal floodplain.

In using this approach, the agency should again consider numerous factors about the action, including anticipated level of investment, anticipated life of the action, and the consequences of exposure of the action to flood hazards. These factors should assist the agency in making appropriate decisions about data sources to use in their analyses, methodologies, level of rigor to apply in analyses, and the time horizon to consider. As discussed earlier, flood elevations determined with the CISA could be equal to or less than the current 1-percent-annual-chance flood; to manage for both current and future flood hazards, agencies should use current 1-percent-annual-chance flood elevation as a minimum elevation in these circumstances.

Critical Actions

For critical actions affected by coastal or riverine flood hazards, the flood elevations informed by the CISA can be adjusted to be higher to account for the increased consequences associated with flood damage. The CISA for critical actions will use the same methodology as used for other actions, but with emphasis on criticality as one of the factors for agencies to consider. For example, for coastal systems, agencies can take a more conservative approach for critical actions by choosing a higher sea-level rise scenario that will result in a higher flood

elevation. For riverine systems, agencies could assume a larger impervious surface that would increase the potential runoff to the river and result in a higher potential flood elevation.

1.B.3. Freeboard Value Approach

Determination of Elevation

The Freeboard Value Approach is based upon the current 1-percent-annual-chance flood elevation, with the addition of freeboard to account for uncertainties in future conditions. For non-critical actions in areas prone to either riverine or coastal flood hazards, a freeboard of two (2) feet should be added to the 1-percent-annual-chance flood elevation. For critical actions, a freeboard of three (3) feet should be added to the 1-percent-annual-chance flood elevation to determine the vertical flood elevation and corresponding horizontal floodplain for actions.

Determination of Horizontal Floodplain Extent

There are several methods that can be used to approximate the extent of the horizontal floodplain without first calculating the elevation using one of the approaches described in section 6(c) of E.O. 11988. Two examples that would pertain to federally funded projects are listed below.

1. The first such approach would be to review existing FEMA FIRMs and FIS reports to determine whether the proposed action is located within the effective Special Flood Hazard Area (SFHA), the areas subject to a 1 percent or greater chance of flooding in any given year. A determination may be made based on the best available information (See Step 1) depicting the area subject to the 1-percent-annual-chance flood obtained from another credible source. If the proposed action is located within the effective SFHA or is subject to the 1-percent-annual-chance flood based on best available information, then the proposed action will be located within the floodplain. The agency should then add the appropriate freeboard to the 1-percent-annual-chance flood elevation to determine the floodplain elevation.
2. If the proposed location is not within effective SFHA or subject to the 1-percent-annual-chance flood based on best available information, but is close to the floodplain boundaries as depicted on the existing FIRM or other maps, the agency may consult a topographic map or seek the services of a professional surveyor to determine the ground elevation of the location. The agency should then add the appropriate freeboard to the 1-percent-annual-chance flood elevation to determine the required flood elevation. If the lowest ground elevation touching the structure or facility (or proposed structure or facility location) is lower than the floodplain elevation, the action should be considered to be in the floodplain and the requirements of E.O. 11988, apply to the proposed action. (See Part II, Step 1.B.6 for more information about how to assess areas behind flood risk management infrastructure.)

1.B.4. 0.2-percent-annual-chance Flood Approach

The 0.2-percent-annual-chance Flood Approach allows an agency to use the 0.2-percent-annual-chance flood elevation to determine the vertical flood elevation and corresponding horizontal floodplain. In some areas, FEMA has already calculated the 0.2-percent-annual-chance flood elevation and mapped the corresponding floodplain on a FIRM, and is supported by the FIS report. If such data does not exist, an agency may obtain calculations of the 0.2-percent-annual-chance flood elevation and floodplain extent from another existing source (See Table 1) or by making their own calculations. While this approach may be used for both riverine and coastal floodplains, it is important to evaluate the 0.2-percent-annual-chance flood data you are using in coastal areas, and conduct an analysis of coastal flood hazards at the site that incorporates the local effects of wave action, scour and erosion, wave run-up, and overtopping. Thus, agencies are encouraged to ensure that this approach will achieve an appropriate level of flood resilience for the proposed action. This approach may be used for either non-critical or critical actions.

1.B.5. Additional Guidance when Selecting from Among the FFRMS Approaches

When an agency is not using the CISA in areas subject to coastal flood hazards, the agency must use, at a minimum, the applicable freeboard elevation. In some instances, the FEMA 0.2-percent-annual-chance flood elevation, which does not consider wave action, will be lower than the current base flood elevation or the base flood elevation plus the applicable freeboard; the 0.2-percent-annual-chance flood elevation should not be used in these cases. When an agency is not using the Climate-informed Science Approach in riverine flood hazard areas, the agency may select either the Freeboard Value Approach or the 0.2-percent-annual-chance elevation, as appropriate, and is not required to use the higher of the two.

Actions that may be vulnerable to flooding from lakes present special challenges for agencies when selecting an approach to determine the vertical flood elevation and corresponding horizontal floodplain. The Great Lakes shorelines are modeled by FEMA for flood risk similar to other U.S. coastal regions in that they account for surge (seiche) and waves; therefore, there is current flood risk information for the Great Lakes shorelines from the NFIP. Future flood risk in the Great Lakes will be determined by future fluctuations in lake levels. As described in further detail in Appendix H, there is significant uncertainty as to trends in future lake levels because water level projections for the individual lakes vary by several feet among the available climate models. As a result, there is not currently a recommended approach for determining the vertical flood elevation or corresponding horizontal floodplain for the Great Lakes shoreline. Generally speaking, the applicability of an approach to other lakes, including whether they should be considered as riverine or coastal, should be handled on a case-by-case basis. If considering lakes as coastal floodplains, sea-level-rise scenarios do not apply.

1.B.6. Structural Flood Risk Management Systems

Structural flood risk management systems are man-made physical works which have been constructed in conformance with sound engineering practices to modify the probability of flooding by reducing flood depths, the extents of flood hazards, and/or the consequences of flooding within a community or communities. These structural systems, also known as structural flood risk management systems, may include levees, floodwalls, embankments, dikes, dams, reservoirs, hurricane tidal barriers, and interior drainage facilities (e.g., pump stations or channels). Areas landward of a structural flood risk management system can still be susceptible to flooding depending on the storm or flood event and characteristics, and the status of that system; therefore, special consideration should be given to these areas.

Because structural flood risk management systems are intended to reduce flood risk, they often serve the purpose of removing the landward area from the regulatory SFHA defined by FEMA. This often results in a misperception that the area landward of these systems is no longer subject to the risk of flooding. In fact, flood risk does remain in these areas and should be considered when Federal actions are proposed in these areas. As such, an understanding of the risk in these areas is needed in order to determine whether the requirements of the Executive Order should be adhered to when developing proposed Federal actions.

When considering these areas for the purposes of determining whether an action is in a floodplain, agencies should consult information beyond what is captured in the currently effective FEMA FIRMs to assess the future flood risk. The precision of the flood hazard information represented on the effective FIRMs can change over time due to the potential effects of climate change, development, land use, the condition of the structural flood risk management system, and other factors; and therefore may not be indicative of the current floodplain as defined by the FFRMS.

In order to assess whether the proposed action is at risk of flooding, agencies should consider evaluating information related to structural flood risk management systems in addition to the effective FEMA FIRMs. This information could include the following, as appropriate:

- Historic performance data of the system during prior loading/high water events.
- Design reports and construction records for the system (such as previously completed feasibility or planning study reports for the system).
- Maintenance, repair, replacement, and rehabilitation records and inspection reports from both the flood risk management system owner and/or the responsible Federal entity, if applicable, that identify documented deficiencies, improvements, or other relevant information.
- Results of system risk assessments.
- Draft, preliminary and effective FEMA Flood Insurance Studies, FIRMs, or other map revisions.

- Current status of ongoing studies and/or reconstruction projects.

Agencies should coordinate with other Federal agencies, States, tribes, communities, and flood risk management system owners, maintenance personnel and operators to obtain and consider relevant information to assess the likelihood that the system will perform as intended. Considering these factors relevant to the performance of an existing flood risk management system will aid agencies when identifying the risks associated with a proposed action landward of the system, and when determining the level to which that action may need to be made resilient (see sections 1.B.1. to 1.B.3. for more information about determining the necessary level of resilience).

When an agency is considering making a Federal investment near a flood risk management system owned and operated by another Federal agency, the investing agency should reach out to the agency managing the system to ensure the best-available flood risk information is used to make the investment decision and meet the requirements of E.O. 11988. The flood risk management system owner should provide all relevant and available data. In these areas, Federal investors must take into consideration the impact of the levee system in determining if it is in the "floodplain" as defined in section 6(c).

Additional resources and information are available to assist agencies when assessing the area landward of a structural flood risk management system. Some examples of existing resources that can be used when seeking information to consult beyond the FEMA FIRM and FIS include the following:

- **The National Levee Database** (NLD) (http://nld.usace.army.mil) was developed by USACE to serve as the national resource of levee information. The NLD contains information and reports on levee location, the last inspection rating, and other relevant information that could assist with characterizing the level to which the given system is providing the intended level of service, and, therefore, the effects the system performance has on the potential for flooding.
- **The National Inventory of Dams** (NID) (http://nid.usace.army.mil) was developed by USACE to inventory dams in the United States. The NID contains information on dams that likely pose a significant threat to human life or property or equal or exceed 25 feet in height, or impound at least 50 acre-feet in storage. This national resource can be used to consider whether there are dams located near a proposed action. Registered government users can also view dam condition and hazard potential data.
- **System owners, maintainers and operators** may have information regarding the design and construction of the system, past performance, improvements underway, and/or studies to determine the level of risk reduction that the system provides.
- **State and local governments** may have information regarding past performance, improvements underway, and/or studies to determine the level of risk reduction that

the system provides. The local community will also have effective and, when available, preliminary FEMA FIS report and FIRM panels.

- **Local USACE District offices** (http://www.usace.army.mil/Locations) may have historical information or detailed studies, design and construction documentation, inspection reports (routine and periodic), Risk Assessments, System Wide Improvement Framework documentation (http://www.iwr.usace.army.mil/Portals/70/docs/frmp/SWIF_2011-11-19.pdf), levee system summaries, and evaluations, among other sources of information that could be used to consult when considering an area landward of a flood risk management system. These resources can be used to understand the likely performance of the system and the potential consequences if the system does not perform as intended.
- **The Local FEMA Regional Office** can provide additional information on effective and planned flood insurance studies and FIRMs in the area that may impact the depiction of hazards, have established relationships and contacts within local communities, and can provide assistance obtaining information supporting the current FIRM panels.
- **The FEMA Map Service Center** (www.msc.fema.gov) provides access to digital versions of effective, historic, and preliminary FIRM panels and associated Flood Insurance Study reports. Other flood risk products may also be available for the community. The Map Service Center also has digital information available to use in GIS applications. Access the above link for more information on these products.

1.B.7. Procedures if Site is in a Floodplain

For actions proposed in a floodplain, all of the requirements of E.O. 11988 must be met as outlined in Figure 1. If the location of the proposed action is within a floodplain, alternative sites outside the floodplain and alternative actions are to be identified and evaluated as part of Step 3.

Existing maps do not always capture high ground within a floodplain. If a ground elevation for a proposed site is higher than the determined flood elevation, agencies should consider reviewing surrounding sites and their ground elevation relative to that flood elevation. Agencies should evaluate such factors as whether the proposed action will be unusable or inaccessible when surrounded by flood water, whether it is a critical action, proposed use (if it is not a critical action), flood characteristics, access roads, and flood warning to determine whether the site is still appropriate.

1.B.8. Procedures if Site is Outside of a Floodplain

Actions outside of a floodplain would generally meet the minimum requirements and no further action is required for compliance with E.O. 11988. However, actions, including critical actions, located outside a floodplain that impact a floodplain or indirectly support floodplain development should apply the decision-making process in E.O. 11988. In the absence of a

finding to the contrary, agencies may want to consider structures or facilities that have been flooded as being located in a floodplain.

For actions proposed outside of a floodplain, E.O. 11988 does not require that the public notice and findings discussed in Steps 2 and 7 be prepared. Similarly, since in these cases the action causing the impacts in a floodplain is located outside of it, the practicability test (Step 3) is not required. As a minimum, however, the agencies should identify these impacts and minimize ensuing harm to or within the floodplain which would result if the action is taken as proposed. Because there is no requirement for public notice or the practicability test, the minimization responsibility (Step 5) takes on added significance. This should be reflected in agency procedures.

Though not required, agencies are strongly encouraged to apply the public notice procedures (Step 2) and alternate sites and action evaluations (Step 3) to actions proposed outside of the floodplain that will result in impacts to the floodplain. These types of actions can clearly benefit from public input as well as the alternate site and action evaluation. It has been recognized that public input in agency decision-making processes has improved the environmental soundness of decisions. The evaluation of alternatives to the proposed action provides a better opportunity to explore the range of possibilities for avoiding adverse impacts to or within the floodplain than the more narrowly focused concepts of minimization, restoration and preservation discussed in Step 5. For example, the overall costs involved in locating a highway interchange, sewer interceptor line, airport facility, etc., at a location less directly affecting the floodplain could be less than the costs incurred in attempting to minimize the impact of the proposed action and to restore and preserve floodplain values.

1.C. FEDERAL ACTIONS INVOLVING WATERWAYS ALONG OR CROSSING AN INTERNATIONAL BOUNDARY

When a Federal action involves waterways along or crossing an International boundary and has the potential to affect the waterways or floodplains of a foreign Nation, the agency should ensure that consultations with responsible authorities in the affected foreign Nation take place regarding the means to apply this standard in a manner consistent with International obligations.

STEP 2 – EARLY PUBLIC REVIEW

Early public review is one of several requirements of E.O. 11988 directed at the objective of public, stakeholder, and inter-governmental involvement. It should be considered in the context of the whole public involvement process for the Federal action, including any applicable NEPA process.

The objective of public involvement is to provide sufficient information early enough in the process of making decisions affecting floodplains so that the public, government officials,

private parties, and other interested stakeholders can have impact on the decision outcome – this includes any decisions that were made in Step 1 regarding the determination of the floodplain. E.O. 11988 includes requirements that the public be provided adequate information, opportunity for review and comment, and an accounting for the rationale for proposed actions affecting floodplains. Specifically, Section 2 of E.O. 11988 requires agencies to:

- Provide opportunity for early public review prior to taking any action.
- Provide notice explaining a proposed action.
- Prepare and circulate a notice of findings and explanation prior to taking an action.

Although not required, it is recommended that agencies provide an explanation and source information for their floodplain determination as part of this public notice, especially where projects are required to use the approaches for determining a floodplain that are included in the FFRMS.

Agency procedures should provide an integrated process for involving the public, government officials, private parties, and other interested stakeholders in the floodplain management decision-making process. Thus, to ensure that adequate information and opportunities are provided for these entities to effectively participate in floodplain decisions, and to meet the requirements of E.O. 11988, the following elements should be incorporated in agency public involvement procedures:

- A description of the overall audience, including specific segments to whom notice information will be targeted (e.g., floodplain residents, elected officials, basin residents, interest groups, other agencies, etc.). The responsibility is to reach as broad an audience as appropriate.
- A description of the vehicles or information mechanisms that will be utilized to reach the target audience (e.g., public hearings, newsletters, workshops, advisory groups, etc.). The responsibility is to provide continuing interaction and involvement opportunities during the floodplain decision-making process.
- A description of the purpose for which various public notice actions will be undertaken and assurance that input will be integrated into the decision-making process (e.g., specific efforts to provide one-way information dissemination, two-way public communication or interaction, etc.). The responsibility is to provide information which promotes the fullest understanding of the proposed plan or action.
- A statement explaining the timing of notice actions to promote understanding and provide opportunities for the public and other entities to affect a proposed action or plan before alternative actions have been precluded.

It is recognized that the public involvement process must be tailored to specific program types (permits, direct federally assisted projects, etc.) and will vary. Nevertheless, agency procedures must be compatible with section 2(b) of Executive Order 11514, and must apply to

actions which require preparation of an EIS, EA, or any CE documentation under NEPA, as appropriate.

If there is a reasonable likelihood that a plan or proposed action or its alternatives will impact a floodplain, then it should be announced as early as that is known and not delayed until much more detailed information is developed.

It is recognized that variations in program types will determine the earliest time in the floodplain decision-making process when the public and other entities can be notified. Agencies may also specify separate engagement processes for project sponsors or partners in their implementing procedures. For example, a facility such as a proposed regional wastewater treatment facility that is seeking Federal funds requires considerable expenditure for site evaluation, engineering, and design. Public notice by the agency providing funds must precede major site identification and analysis so the public can have an input early in the decision-making process of preliminary site screening and selection. If not, public choice options may be foreclosed, or decisions will not be based on similarly detailed information bases.

Early public notice is the first in a series of public information and stakeholder involvement activities. This would logically be followed by continuing communication at Step 4, in identifying impacts, Step 6, reevaluating alternatives through the environmental review process, and at Step 7, in the issuance of findings and explanation of why the proposed plan or action must impact the floodplain. While there is not a formal process for non-Federal entities to administratively appeal decisions made during the decision-making process for an action, this continuing involvement provides multiple opportunities for individuals and organizations to express their questions and concerns.

Specific efforts should be made (early and often) to provide opportunities for effective public participation by communities that are most affected by flooding, which may include minority, tribal, and low-income communities in the decision making process that directly affect their environment and community. These efforts include identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings, documents, and notices. Further, decision-making methods should eliminate any biases and fully display the effects of alternative actions on affected minority, tribal, and low-income communities.

STEP 3 – IDENTIFY AND EVALUATE PRACTICABLE ALTERNATIVES TO LOCATING IN A FLOODPLAIN

Having determined that a proposed action is located in a floodplain, the agency is required by E.O. 11988, to identify and evaluate practicable alternatives to locating in a floodplain. Alternatives to be evaluated include: (1) carrying out the proposed action at a location outside the floodplain (alternative sites); (2) other means which accomplish the same

purpose as the proposed action (alternative actions); and (3) no action. Steps 3.A., 3.B., and 3.C. explain these E.O. 11988 requirements. Where a proposed action is subject to NEPA, these guidelines do not change an agency's obligation to analyze reasonable alternatives as NEPA requires.

3.A. ALTERNATIVE SITES

Alternative sites must be identified and the practicability of such sites evaluated. If a practicable site exists outside the floodplain, the proposed action must not be located in the floodplain. Whenever a floodplain site is the only practicable alternative, the agency analysis leading to this conclusion should be fully documented. In determining the practicability of a non-floodplain site, the general concepts of site feasibility apply. At a minimum, practicability of the site shall be addressed in the light of the following:

- Natural (topography, habitat, hazards, etc.)
- Social (aesthetics, historic and cultural values, land use patterns, etc.)
- Economic (cost of space, construction, services, relocation)
- Legal (deeds, leases, etc.)
- Agency authorities

3.B. ALTERNATIVE ACTIONS

Alternative actions must be considered before a decision is made to carry out an action in the floodplain. These are actions which substitute for the proposed action in that they comprise new solutions or approaches which serve the same function or purpose as that proposed, but which have less potential for harm. For example, where an agency has proposed the construction of a document storage facility within the floodplain to handle expanding record keeping needs, the alternative of storing documents offsite electronically could allay the need for a new structure. Similarly, rather than providing expanded waste treatment capacity for an area by constructing a new or larger facility in the floodplain, the alternative of using surplus capacity in a neighboring locale could serve the need for a new or expanded facility.

When considering alternative actions that can serve the same function or purpose as the proposed action but that would result in less potential harm, an action that completely avoids the floodplain, as illustrated in the above examples, may be the simplest way to fulfill the requirements of E.O. 11988. However, when considering alternative actions, agencies should consider whether existing natural features/ecosystem processes, or the restoration of natural features/ecosystem processes could be an appropriate alternative action. Specifically, agencies should consider the use of nature-based or nonstructural alternatives where these actions could appropriately be used in lieu of actions proposed in a floodplain. For example, an alternative to construction of a sea wall for shoreline stabilization could be the creation of a "living shoreline" using strategic placement of habitat components to accomplish the same purpose. When a nature-based approach is implemented in lieu of or to complement a proposed action in a floodplain,

there may be reduced flood risk as well as less potential for degradation to the natural and beneficial floodplain values. In addition, there will likely be improvements over time to the natural and beneficial values of floodplains when preserving or restoring natural features or using nature-based approaches. If a nature-based approach is the preferred alternative action, this would still be an action in the floodplain subject to the remaining eight steps of the decision-making process.

3.C. NO ACTION

No action is also an alternative, and assessment of this course is required. The alternative of no action probably cannot be fully evaluated until a determination has been made in Step 4 of the harm to or within the floodplain resulting from the proposed action.

STEP 4 – IDENTIFY IMPACTS OF THE PROPOSED ACTION

Agencies must identify the impacts of a proposed action if it is located in a floodplain or if it will affect a floodplain. Agencies are required to identify impacts of their proposed actions on lives, property, and the natural and beneficial values of floodplains. The potential impacts of any nature-based approaches or restoration activities being considered should still be evaluated as part of the action and in consideration of the types of impacts outlined in the Guidelines.

E.O. 11988 is based primarily on NEPA, so agencies can draw upon the impact identification and assessment experience and guidance they developed in their implementation of NEPA. While most of the impact assessment requirements for NEPA and E.O. 11988 are similar, certain aspects of the impact assessment required for E.O. 11988 are more narrowly focused on impacts as a result of occupancy and modification of floodplains. The following sections address general concepts of impact identification and assessment; the potential flood hazards; and the potential impacts of an action on lives, property, and floodplain values.

4.A. GENERAL CONCEPTS

In their regulations and procedures, agencies must identify the means by which they will address the following impact-related issues:

- Although the modification of floodplains and ensuing impacts most clearly result from actions located in the floodplain or at its periphery, it can also result from actions outside of the floodplain.
- Certain types of agency actions may support subsequent actions which have additional impacts of their own.
- E.O. 11988 focuses on the adverse impacts of proposed actions on lives and property, and on natural and beneficial floodplain values.
- There are various types of impacts, which include: (a) positive and negative; (b) concentrated and dispersed; (c) regional and (d) short- and long-term.

4.A.1 Direct and Indirect Support of Floodplain Development

All versions of E.O. 11988 have required agencies to avoid the direct and indirect support of floodplain development whenever there is a practicable alternative. For the purposes of the Guidelines, an action supports floodplain development if it encourages, allows, serves or otherwise facilitates additional floodplain development. The agencies may also reflect in their regulations and procedures, the manner in which agency actions similarly accommodate the maintenance of existing uses in the floodplain. That is, a proposed action can reinforce existing land use patterns which generally have developed without reflecting the concepts of hazard and risk minimization and restoration and preservation of natural floodplain values which form the basis of E.O. 11988.

Direct support results from actions located in the floodplain, while indirect support results from those outside the floodplain. For example, the location of a major public service structure or facility (a post office, library or office building), in the floodplain, requires new or additional investment in or construction of support facilities for food service, parking, etc. Further, simply through their location, such actions would foster additional developments in the floodplain. Indirect support of floodplain development could occur when building infrastructure outside the floodplain. Possible examples of infrastructure-related actions that could relate result in indirect support of floodplain development include the construction or improvement of water and waste water systems, power supplies, mass transit systems, airports, or highway and road networks that provide interchanges to undeveloped floodplain areas.

It is the intent of E.O. 11988 that agencies evaluate the impacts of Federal actions and the impacts of actions supported by Federal actions. However, the identification and evaluation of these positive and negative changes to the systems of flood losses, threats to life and property, and environmental values are often both difficult and even speculative. Moreover, the process by which an agency tries to describe the actions supported by their actions is both complex and often not well addressed in accepted methodologies. As a result, there is little chance to identify the impacts without a clear conceptualization of the supported action. On the other hand, when the supported actions are describable in terms of growth experience in the area or from experience with similar actions elsewhere, the agency can identify the impacts of the supported actions as they do for the proposed action.

4.A.2. Types of Impacts

There are several types of impacts that agencies should address, including: (a) positive and negative; (b) concentrated and dispersed; (c) regional and (d) short- and long-term.

Positive and negative impacts: both must be identified, even though the focus of impact identification and assessment is on negative or adverse impacts. This is necessary in order to identify the full range of impacts against which to weigh the practicability of a proposed action. In addition, it must be recognized that impacts which are beneficial to some, may be harmful to

others. For example, draining wetlands establishes an environment which is suitable for certain uses, but at the expense of the beneficial values of the wetland.

Concentrated and dispersed impacts: both may result from any action. The impact is concentrated if it occurs at or near the site of the action and is dispersed if it occurs at a site remote from the action. For example, a concentrated impact of constructing a building on a wooded area is the loss of vegetation at the site. A dispersed impact of the same action could be sedimentation downstream caused by erosion at the site.

Regional impacts: watersheds and floodplains are interconnected systems that do not follow political boundaries and are part of larger regions that encompass multiple jurisdictions. To help limit the transfer of impacts, risks, or costs onto others, agencies should also consider actions that increase *regional* resilience to reduce unacceptable risks to structures, facilities, and communities. Such regional approaches to actions foster long-term resilience.

Short- and long-term impacts: both must be analyzed in order to evaluate the total impact of an action. Short-term impacts are temporary changes occurring during or immediately following an action and usually persist for a short while. Long-term impacts occur during or after an action and may take the form of delayed changes or changes resulting from the cumulative effects of many individual actions. Long-term impacts may persist for a considerable time and may continue indefinitely. An example of a short-term impact could be sedimentation at or below a construction site. A long-term impact could be the loss of valley floodwater storage resulting from the cumulative effect of floodplain development.

In addition to the above impacts, agencies should be aware that occupancy and other uses of the floodplain can disproportionately impact vulnerable populations.[10] For example, those in lower income brackets often live in housing most vulnerable to flooding and lack the resources (financial or other) to undertake recommended loss-reduction, evacuation, or recovery measures. The elderly, children, individuals with existing health conditions, non-English speaking or illiterate groups, groups lacking access to public or private transportation, or those with disabilities may be unable to undertake self-protective actions before, during, or after a flood. Agencies should ensure that Federal actions proactively avoid environmental injustices by identifying any disproportionately high and adverse impacts to the public safety, human health, or environmental resources of such vulnerable populations.

4.B. ASSESSMENT OF FLOOD HAZARDS

After determining that a proposed action is in a floodplain, agencies must determine the impact of the action to lives and property and to the natural values of the floodplain. To

[10] Vulnerable populations are groups of people – which may include minority, low-income, and tribal/indigenous communities, among others – who are especially at risk to impacts of flooding due to, for example, their location, or because they are overburdened and lack resources or have less access to services. Vulnerable populations may also include populations or communities that experience disproportionate environmental harms and risks as a result of greater vulnerability to environmental hazards.

understand these impacts, agencies must first have a clear understanding of the nature and consequences of flooding that can be expected at or near the site of the action. Agencies must establish procedures to evaluate these flood hazards. This evaluation serves to express clearly the hazard involved and provides the basis for carrying out the succeeding phases of the decision-making process. Key questions that should be addressed in agency-specific procedures for the evaluation of flood hazard include the following:

- Is the proposed action to be located in the floodway portion of the riverine floodplain, or the coastal high-hazard area?
- Is the proposed action at the edge of a riverine floodplain or in the backwater areas of a coastal floodplain?
- Is the flood hazard aggravated by the presence of, or potential for, destructive velocity flows, flood-related erosion, subsidence or other special problems?
- Is there a combination of flood sources present, which may flood simultaneously in the area (e.g., river and ocean, or shallow overland runoff and river, etc.)?

These questions assist agencies in considering the types of hazards their actions may be exposed to depending on their location and other factors.

4.B.1. The Role of Past and Probable Floods in Determining Flood Hazards

Two basic types of floods are often used in determining flood hazards: observed or historic floods and probability floods. Agencies should note that there are cases where either the historic or probability flood will not accurately capture the potential flood hazards in a particular location or case. Agencies should consider factors beyond historical or probabilistic flood determinations.

Historic Floods: Often these can be the basis for deciding whether a proposed site is prone to flooding. However, the fact that a certain level of flooding has been observed indicates little about how floods are likely to occur in the future. The highest observed flood must not be used as the only guide for decision-making, even where records extend over a long period of time. With very few exceptions, flooding at any site can be expected to reach higher levels than those previously recorded because of larger storms, urbanization, floodplain encroachment, or other factors that affect flooding.

Probability Floods: These are statistically derived floods expressed in the probability of occurrence of a flood event of a particular magnitude being equaled or exceeded in a given year. FEMA uses the 1-percent-annual-chance flood as the minimum acceptable level to which a community must regulate the floodplain in order to qualify for the National Flood Insurance Program. As stated previously, the 1-percent-annual-chance flood is the term which describes the magnitude of flooding used by FEMA as the minimum acceptable level to which a community must regulate the floodplain in order to qualify for the National Flood Insurance Program. As

stated previously, this magnitude flood has a one percent chance of being equaled or exceeded in any one-year period. The likelihood of exceeding the 1-percent-annual-chance flood magnitude increases with time periods longer than one-year period. For example the probability is about one in four that the one percent chance flood will be exceeded during the life of a 30-year mortgage.

4.B.2. High-hazard Areas

High-hazard areas are those portions of riverine and coastal floodplains nearest the source of flooding. These are the frequently flooded areas that become arenas of major flood dynamics during large floods. Here, floodwaters exert their maximum pressures, erosion is greatly accelerated, and the potential loss to lives and property is increased. Additionally, these are the areas of coastal and riverine floodplains within which many of the most critical floodplain values are concentrated. In riverine situations, the high-hazard area is that portion of the floodplain where impedance to flood flow resulting from human activity can increase flood heights and consequently the area subject to flooding. In coastal floodplains, the high-hazard area is usually confined to the beach area in front of high bluffs or the crest of primary or foredunes, where wave impact is the most significant inducing factor. In light of the high loss potential and the likelihood of significant adverse effects to floodplain values associated with the conduct, support, or allowance of actions in these portions of the floodplain, agencies should pay special attention to resilience approaches that best align with the high level of potential hazard.

4.C. LIVES AND PROPERTY

After determining that a proposed action is in the floodplain, the risk to lives and property involved in using that site must be determined. Actions that are in a floodplain have the potential to increase the consequences to human populations, alter the ways in which people live, or unnecessarily endanger lives due to the nature of a hazard. Consideration of whether the action impacts lives and property should be assessed in relationship to the nature and proximity of the hazard as well as the nature of the action. The flood hazards are described in more detail in Section 4.B. in the context of historical and probable floods. Agencies should note that there can be cascading impacts that directly or indirectly impact societal values (including property, lifestyle, livelihood, safety, cultural resources, etc.).

4.D. NATURAL AND BENEFICIAL FLOODPLAIN VALUES

Water and the adjacent floodplain exist in nature in a state of dynamic equilibrium; when coastal or riverine systems are disturbed, the environmental effects may affect areas far from the original site of the disturbance and can last for decades. Thus, floodplain actions must be viewed with caution and a careful assessment made of their impact on natural and beneficial floodplain values. Floodplains in their natural or relatively undisturbed state serve water resources values (natural moderation of floods, water quality maintenance, and groundwater recharge), climate-regulating values, living resource values (fish, wildlife, and plant resources), cultural resource values (open space, natural beauty, scientific study, outdoor education, and recreation), and cultivated resource values (agriculture, aquaculture, and forestry).

4.D.1. Water Resources

Floodplains provide for the natural storage of surface and ground waters and the natural improvement of water quality.

Natural Moderation of Floods: The characteristics of the floodplain and of flooding are closely interdependent. Floods shape floodplain topography and soils and influence the ecology of the aquatic and floodplain systems. In turn, the physical characteristics of the floodplain shape flood flows. Except for some steep valley and coastal bluff landscapes, naturally vegetated floodplains can provide a broad area to spread and slow floodwaters, thereby reducing velocities and flood peaks. Stream meander, dune formation in coastal areas, and other natural processes which reduce the force of floodwaters are also accommodated in undisturbed floodplains.

Floodplain encroachment modifies these processes. The effects of such modification are complex and not fully understood. Although in some cases encroachments may interact with natural processes to aid in the reduction of flood forces, their predominant effect has been to aggravate the flood hazard.

In coastal floodplains, natural barriers such as sand dunes and certain vegetation (e.g., mangrove stands and wetlands) reduce the impact of both episodic flooding from high tides, storm surges, tsunamis, and chronic flooding due to subsidence and sea level rise. Alteration or removal of the barriers themselves, or the vegetative and drainage systems which support them, reduces or eliminates their role in the reduction of flood forces. In addition, excessive withdrawal of groundwater may result in land subsidence thereby increasing flood depths and exposing greater areas to flooding.

Water Quality Maintenance: Floodplain vegetation and soils maintain the physical and chemical integrity of the water that ultimately supports biological communities. Runoff is slowed by vegetation, allowing the water to deposit not only sediments originating on land but also those scoured from the channel bank and bed. Sediment deposition may add rich nutrients to the floodplain soil and also keep sediment-associated pathogens from the water.

However, siltation can destroy or degrade biological communities within floodplains because it contributes to eutrophication (nutrient overloading), decreased dissolved oxygen, increased water temperature, and serious impairment of photosynthetic productivity. Vegetation shades stream banks and decreases daily water temperature fluctuations thereby alleviating temperature stress to the biota. Vegetation slows the flow of water and provides slack waters that give the aquatic biota a greater chance to survive flooding. Floodplain storage and vegetation provides additional benefits such as reducing siltation in downstream reservoirs and breaking down pollutants in the floodwaters that are deposited during flooding.

Groundwater Recharge: An additional value of floodplain vegetation's role in slowing runoff is in groundwater recharge. Slowing the floodwater allows it to infiltrate through the generally porous floodplain soil. Base streamflow and the level of standing water bodies are

regulated naturally by groundwater. During periods of excessive precipitation, runoff enters the groundwater system as well as stream channels and standing water bodies, thereby reducing peak flows; during the dry season, water generally flows from the groundwater system into surface waters, augmenting low flows.

4.D.2. Climate Regulation Resources

Ecosystems, particularly floodplains, serve as climate-regulating resources. They influence climate on both local and global scales. Locally, changes in land cover can affect precipitation and temperature patterns. Globally, floodplain wetlands serve as important sinks or sources of greenhouse gases, which are key drivers of global climate change.

4.D.3. Living Resources

The Nation's coastal and riverine floodplains support large and diverse populations of flora and fauna which represent valuable resources of great importance to society.

The floodplain is biologically very productive because it is here that land and water meet and the elements of both terrestrial and aquatic habitats interact. For example, unspoiled tidal marshes rank well above intensively farmed croplands in the magnitude and-diversity of biological productivity. Marsh-rimmed estuaries and adjacent floodplains are vital to marine fisheries as breeding, nursery, and feeding grounds. Inland ponds, prairie potholes, marshes, and other wetland areas may provide highly important habitat for waterfowl and other wildlife.

Fish and wildlife resources are highly susceptible to human-induced disruption of the floodplain because of their high sensitivity to the resulting impacts. For example, drainage of wetlands, channelization of natural water courses, clearing of vegetation, especially bottomland forests, all have short- and long-term and direct and indirect impacts on plant and animal communities. Other changes that limit food, water supplies, or protective cover have similar effects. Modification of the floodplain at one location can affect living resources throughout the floodplain.

4.D.4. Cultural and Community Resources

Floodplains contain cultural resources important to the Nation and to individual localities. Because Native American settlements and early cities were located along coasts and rivers for access to water transportation, supply, and power, floodplains include most of the Nation's earliest archeological and historical sites.[11] In addition to cultural richness, floodplains may be valuable sources for scientific research. For example, because they may contain unique habitats, they are ideal areas for ecological study. Floodplains are used for open space and green belt parks in cities to vary the pattern of the urban scene, to absorb noise, to clean air, and to lower air temperatures. They also are well-suited as venues for environmental education and are often

[11] For proposed Federal actions in the floodplain which may affect historic buildings, Federal agencies must continue to fulfill their Federal historic preservation compliance requirements, including responsibilities outlined in Sections 106 and 110 of the National Historic Preservation Act, as amended.

attractive areas that can serve as a base for recreation (hiking and camping) and for water-oriented sports such as boating and swimming. In addition, floodplain wildlife resources can be managed for recreational hunting and fishing. Where they remain in relatively pristine condition, floodplains can be valued as a part of the "wilderness experience" so important to American culture.

4.D.5. Agricultural, Aquacultural and Forestry Resources

Floodplains generally provide excellent resources for agricultural, aquacultural, and forestry production.

The natural processes of sediment renewal that takes place in floodplains replenish soil and their nutrients. Thus, with proper management, floodplain soils generally require less artificial fertilization than upland sites. Level or gently rolling floodplain terrain facilitates agricultural operations. Surface and groundwater sources are usually easily accessible. Well-drained, deep soil suitable to most economic crops are often prevalent in the floodplain. Soils well-suited to specialty crops are also found on floodplains (e.g., the poorly drained areas of the Sacramento Valley where rice is a major crop).

However, certain agricultural uses and practices in the floodplain may adversely affect natural floodplain values. They may be incompatible with wildlife production; may induce aggravated erosion and sedimentation; or may result in the drainage of inland and tidal wetlands to increase the amount of arable land. Excessive fertilization and poor feedlot practices can result in nutrient pollution in local water bodies. Thus, proper management practices are essential where agriculture is proposed in sensitive floodplain areas.

The use of floodplain areas for aquacultural operations has grown into a viable industry producing a wide variety of aquatic crops. Aquaculture is subject to similar limitations to those noted for agriculture, but if properly managed, can be compatible with the natural values of floodplains and may offer opportunities for the restoration of damaged floodplain values.

Many of the Nation's valuable forest resources are found within floodplains. Bottomland hardwoods and other riparian species (those which can only flourish in close proximity to water) are important to the timber industry and the overall economy of the country. Thus, sound management of forest resources in the floodplain is also essential.

STEP 5 – MINIMIZE, RESTORE, PRESERVE

The requirements of E.O. 11988 to minimize, restore, and preserve apply if a proposed action will result in harm to or within the floodplain. The term "harm," as used in the context of E.O. 11988, applies to both lives and property (Step 4.B.), and natural and beneficial floodplain values (Step 4.C.). The concept of minimization (Step 5.A.), applies to harm. The concept of restoration and preservation (Step 5.B.) applies only to floodplain values. Step 5.C. discusses some mechanisms which may be applied to achieve these three requirements.

5.A. MINIMIZE

Minimize is a demanding standard and requires the agency to reduce harm to the smallest possible degree, thus establishing a far more rigorous standard than other terms which often are used in similar contexts, e.g., alleviate (to lessen), mitigate (to moderate the severity of), ameliorate (to improve), etc. From the standpoint of lives and property, potential harm to or within the floodplain must be reduced to the smallest possible amount or degree. Where a critical action is proposed (see Step 2.C.) the goal is associated with higher levels of flooding. Similarly, from the standpoint of floodplain values, minimization requires that harm to such values be reduced to the smallest possible amount or degree. Agencies should refer to additional guidance in Part I, E.O. 11988 Section 2(a)(2) on how to apply the concept of minimization.

E.O. 11988's requirement to minimize potential harm applies to (1) the investment at risk, or the flood loss potential of the action itself, (2) the impact the action may have on others, and (3) the impact the action may have on floodplain values. The agencies must specify in their regulations and procedures, how actions will be designed and modified to minimize harm to or within the floodplain.

5.B. RESTORE AND PRESERVE

In the context of E.O. 11988, “restore" focuses upon conditions existing as a result of prior actions, while "preserve" focuses upon the impacts of a proposed action.

Restore means to reestablish a setting or environment in which the natural and beneficial values of floodplains could again function. Where floodplain values have been degraded by past actions, the agency must identify, evaluate, and implement measures to restore the values diminished or lost. The functions of many of the Nation's degraded floodplains can be partially or fully restored through remedial action.

Preserve means to prevent modification to the natural floodplain environment, or to maintain it as closely as possible to its natural state. This term applies foremost to floodplains showing little or no disruption by man. If an action will result in harm to or within the floodplain, the agency must design or modify the action to assure that it will be carried out in a manner which preserves as much of the natural and beneficial floodplain values as is possible.

5.C. METHODS TO MINIMIZE, RESTORE AND PRESERVE

A wide range of methods have been developed over time to minimize harm to lives and property from flood hazards. In the recent past, other methods directed toward minimizing harm to natural and beneficial environmental values, including those associated with the floodplain, have also been developed. The technology and methodologies for achieving restoration and preservation of natural values have advanced significantly since the 1970’s and are much better understood, although additional work in this regard is still needed. The tools and approaches, which are directed toward attaining these three goals of E.O. 11988, should be considered and

applied at all stages of a proposed action, as appropriate, e.g., during the planning, design, construction, operation and maintenance of a proposed project.

Agencies are required by E.O. 11988 to reduce the risk of flood loss; to minimize the impact of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values served by floodplains, including natural systems such as wetlands, when taking actions in a floodplain. Natural features and nature-based approaches are tools for both minimizing harm and restoring the natural and beneficial values of floodplains. For example, if a system has degraded natural features, agencies should consider incorporating nature-based approaches to restore these natural features, such as modifying or removing levees and restoring wetland functions along a coastal or riverine system. In addition to restoring the natural and beneficial values of the system, such activities would assist in moderating flood flows, which would minimize the harm caused by the action.

The extent to which natural and beneficial values can be restored will depend on the nature of the action, existing conditions, and anticipated future conditions. For example, if a proposed action includes restoration of a tidal wetland along a coast experiencing high rates of relative sea level rise, the agency should anticipate how increasing water levels will trigger changes in ecosystem distribution and function (including key floodplain values, such as flood regulation) over the project lifecycle. In some instances, it may not be possible or appropriate, in light of future flooding conditions, to restore an area to historic conditions. However, agencies should still use information about historic conditions, projected climate impacts, and other factors affecting future flood risk (e.g., land use change) to inform project planning, design, and implementation.

Although E.O. 11988 emphasizes the importance of avoiding the floodplain for meeting its intent to avoid harm to or within the floodplain, the following examples are provided as additional guidance. The agencies should not be limited by the scope and level of detail of the examples in Sections 5.C.1 – 5.C.8. Additionally, agencies should note that the activities described in these examples would provide multiple benefits including the reduction of flood risks and the preservation and restoration of natural systems and ecosystem processes.

The activities listed in Sections 5.C.1 – 5.C.8 may be carried out through many types of administrative measures, depending in part upon the agency programs and authority, including the following:

- Engineering and realty section standards and procedures.
- Contract, grant, loan, permit, and license stipulations.
- Application of appropriate encumbrances during land conveyance.
- Information transfer and education of employees and the public.

- Delegation of responsibility for floodplain activities to a specific office with sufficient authority to play an active leadership role both within and outside of the agency.
- Systematic review of existing agency programs to identify opportunities for floodplain value preservation and restoration.
- Site surveys to identify opportunities for floodplain preservation and restoration.
- Provision of coordination methods within and outside of agency to enable the implementation of unified floodplain management measures.

5.C.1. Natural Moderation of Floods

- Minimize floodplain fills and actions that require fills such as construction of dwellings, factories, highways, etc.
- Require that structures and facilities on wetlands provide for adequate flow circulation.
- Use minimum grading requirements and save as much of the site from compaction as possible.
- Relocate nonconforming structures and facilities out of the floodplain.
- Return site to natural contours.
- Preserve free, natural drainage when designing and constructing bridges, roads, fills, and large built-up centers.
- Prevent intrusion on and destruction of beach and estuarine ecosystems and restore damaged dunes and vegetation.
- Preserve watershed functions of riverine or coastal systems when designing and constructing bridges, roads, fills, and large built-up centers.
- Prevent intrusion on and destruction of beach and riverine ecosystems and restore ecological features such as damaged dunes, vegetation, and wetlands.
- Preserve or restore natural features such as barrier islands, dunes, wetlands, and native vegetation to attenuate waves, stabilize sediment, and store floodwaters.

5.C.2. Water Quality

- Maintain wetland and floodplain vegetation buffers to reduce sedimentation and delivery of chemical pollutants to the water body.
- Control agricultural activities to minimize nutrient inflow.
- Control urban runoff, other storm water, and point and nonpoint discharges.
- Design and plan water treatment facilities to withstand or quickly recover from a flood event.

- Control methods used for grading, filling, soil removal and replacement, etc., to minimize erosion and sedimentation during construction.
- Prohibit the location of potential pathogenic and toxic sources in the floodplain, such as sanitary landfills and septic tanks, etc.
- Use green infrastructure for stormwater management to improve water quality and reduce flood flows.
- Preserve and restore wetland functions and riparian areas to facilitate groundwater recharge, improve water quality, and protect fish and wildlife habitats.
- Modify or remove a structure to reconnect rivers to their floodplain.

5.C.3. Groundwater Recharge

- Require the use of pervious surfaces where practicable.
- Design construction projects for runoff retention in addition to any detention requirements.
- Dispose of spoils and waste materials so as not to contaminate ground or surface water or change land contours.

5.C.4. Living Resources

- Identify and protect wildlife habitat and other vital ecologically sensitive areas from disruption.
- Require topsoil protection programs during construction.
- Control wetland drainage, channelization, and water withdrawal.
- Reestablish degraded floodplain ecosystems.
- Minimize tree cutting and other native or non-invasive vegetation removal.
- Design floodgates and seawalls to allow natural tidal activity and estuarine flow.

5.C.5. Cultural and Community Resources

- Provide public access to and along the waterfront for recreation, scientific study, educational instruction, etc.
- Locate and preserve from harm historical cultural resources; consult with appropriate State, local, tribal or territorial governmental agencies or private groups.

5.C.6. Agricultural Resources

- Minimize soil erosion on cropped areas within floodplains.
- Promote soil health and water quality principles.
- Promote the nature-based approach to restore and protect wetlands.
- Promote cover crops, shelter belts, and buffers.

- Strengthen conservation reserve and wetland programs to provide alternate opportunities for the use of agricultural land.
- Minimize irrigation return flows and improve water application efficiency.

5.C.7. Aquacultural Resources

- Construct impoundments to minimize any alteration in natural drainage and flood flow. Existing natural impoundments such as oxbow lakes and sloughs could be utilized under proper management.
- Limit the use of exotic species, both plant and animal, to those organisms already common to the area or those known not to compete unfavorably with existing natural populations.
- Discourage mechanized operations.
- Minimize environmental problems such as sediment loading to adjacent watercourses that can result from use of machinery (e.g., dredgers, weeders, and large-scale harvesting equipment).

5.C.8. Forestry Resources

- Control the practice of clear-cutting, depending upon the species harvested, topography, and location.
- Complement State law governing other aspects of harvest operations: proximity to watercourses, limits on roadbuilding, equipment intrusions, etc.
- Include fire management in any overall management plans. Selective fire use may reduce the probability of major destructive fires.
- Require erosion control plans on all timber allotments, roads, and skidways.

STEP 6 – RE-EVALUATE ALTERNATIVES

Having identified the impacts the proposed action would have on the floodplain (Step 4), methods to minimize these impacts, and opportunities to restore and preserve floodplain values (Step 5); the proposed action should now be reevaluated. For proposed actions in the floodplain, the reevaluation should consider if the action is still feasible at this site. If not, consider limiting the action to make non-floodplain sites practicable. If neither is acceptable, the alternative is no action. If the proposed action is outside the base floodplain but has impacts which cannot be minimized (Step 5), consider whether the action can be modified or relocated to eliminate or reduce the identified impacts, or if the no action alternative should be chosen.

The reevaluation should also include a provision for comparison of the relative adverse impacts associated with the proposed action located in and out of the floodplain. The comparison should fully present floodplain values. A site out of the floodplain should not be chosen if the overall harm is measurably greater than that associated with the floodplain site.

6.A. LOCATION IN THE FLOODPLAIN

In determining whether the proposed action will be located in the floodplain, the agency must ascertain that the floodplain site is the only practicable alternative. Further, the importance of the location must clearly outweigh the requirements and intent of E.O. 11988 to:

- Avoid direct or indirect support of floodplain development wherever there is a practicable alternative;
- Reduce the risk of flood loss;
- Minimize the impact of floods on human safety, health and welfare; and
- Restore and preserve the natural and beneficial floodplain values.

6.B. LIMIT ACTION

If an action proposed to be located in the floodplain cannot satisfy the four requirements in Step 6.A., consider reducing the criteria for the proposed action. This would lower the threshold for what constitutes a practicable alternative. New alternative actions and sites could then be identified and previously rejected ones reevaluated for practicability based on scaled-down expectations.

6.C. NO ACTION

If neither of the above courses of action is feasible, the agency should reevaluate the no action alternative.

STEP 7 – FINDINGS AND PUBLIC EXPLANATION

If reevaluation results in the determination that there is no practicable alternative to locating in or impacting the floodplain, a statement of findings and public explanation must be provided for the proposed action. As with Step 2, agencies should interpret the term "public" broadly to include members of the general public, stakeholders, other levels of government, and any interested parties. Each agency should explain how any tradeoff analysis was conducted by the agency in making its findings. Some existing agency public notice procedures may already satisfy part of the requirements of E.O. 11988 (section 2(a)(2)(ii)) through such mechanisms as E.O. 12372 and NEPA procedures. However, agency regulations and procedures for E.O. 11988 must incorporate the development and issuance of a written statement of findings and public explanation which includes the following items as articulated in E.O. 11988:

1. A description of why the proposed action must be located in the floodplain.
2. A description of all significant facts considered in making the determination, including alternative sites and actions.
3. A statement indicating whether the actions conform to applicable State or local floodplain protection standards.

In addition, and in keeping with the concept of the overall public involvement process discussed in Step 2, the following items should be included in the statement of findings and public explanation:

4. If appropriate for the action being taken, a statement indicating why the NFIP criteria are demonstrably inappropriate for the proposed action.
5. A statement about how the public will be involved, such as publishing the findings and public explanation in an appropriate vehicle and providing for a brief comment period prior to agency action.
6. A description of how the activity will be designed or modified to minimize harm to or within the floodplain.
7. A statement indicating how the action affects natural or beneficial floodplain values.
8. A statement listing other involved agencies and individuals.

7.A. INTERGOVERNMENTAL NOTICE

Agencies may have existing intergovernmental notice procedures that should be integrated with those required by E.O. 11988, where possible.

7.A.1 Programs Subject to E.O. 12372

For programs subject to E.O. 12372, the agency shall follow its agency-specific procedures when sending a notice to State and local officials in compliance with E.O. 11988. The notice shall include (as a minimum) items 1, 2, and 3 from above. It would also be helpful to the reviewer, and consistent with the intent of E.O. 11988, to include items 4 through 9.

7.A.2. Other Programs

For programs not subject to E.O. 12372 requirements, agencies must develop or ensure other existing procedures provide for similar notice and explanation to State and local governments of why a proposed action is to be located in a floodplain. This notice must be circulated among relevant or interested organizations and also made available to the general public for review. Tribal governments may also participate in these intergovernmental reviews.

7.B. ACTIONS SUBJECT TO NEPA

For agency actions subject to NEPA which take place in the floodplain, the public review requirements discussed above as set out in Section 2(b) of E.O. 11514, as amended, should include the nine items listed in the introduction to the step. Section 2(a)(4) of E.O. 11988 requires the same public notice procedures as E.O. 11514 for actions in the floodplain even though impacts are not significant enough to require the public review required for preparation of an environmental impact statement (EIS) under Section 102(2)(C) of NEPA (Public Law 91-190).A final EIS should explain, if appropriate, why the responsible official has recommended or why the agency might support an action located in a floodplain.

7.C. ALL ACTIONS LOCATED IN THE FLOODPLAIN

A statement of findings (including the explanatory information discussed in 7.A.) must be issued by the agency head, or designee, in compliance with Section 2(a)(2) of E.O. 11988. This applies to all proposed actions located within or impacting the floodplain, including proposed actions with environmental impacts that are not significant or for which the agency is not otherwise required to complete an EIS.

STEP 8 – IMPLEMENT ACTION

With the conclusion of the decision-making process described in Steps 1-7, the proposed action can be implemented. However, there is a continuing responsibility for insuring that the action is carried out in compliance with E.O. 11988. This is especially important for projects with long-term operation, maintenance and repair programs such as reservoirs or waste treatment facilities.