

Revised Guidelines for Implementing Executive Order 11988, Floodplain Management

DRAFT FOR PUBLIC COMMENT

1/28/2015

1

2

3	Contents	
4	Glossary	2
5	Introduction	5
6	Part I: Interpretation of Executive Order 11988	9
7	Introduction	9
8	Section 1	9
9	Section 2	10
10	Section 2(a)(1)	10
11	Section 2(a)(2)	11
12	Section 2(a)(3)	12
13	Section 2(a)(4)	13
14	Section 2(b)	13
15	Section 2(c).....	14
16	Section 2(d)	15
17	Section 3	16
18	Section 3(a).....	17
19	Section 3(b)	18
20	Section 3(c).....	19
21	Section (3)(d).....	20
22	Section 4	21
23	Section 5	21
24	Section 6	22
25	Section 7	25
26	Section 8	25
27	Section 9	26
28	Part II: Decision-Making Process	27
29	Introduction	27
30	Step 1 – Determine if a Proposed Action is in the Floodplain	32
31	Step 2 – Early Public Review	47
32	Step 3 – Identify and Evaluate Practicable Alternatives to Locating in the Floodplain	48
33	Step 4 – Identify Impacts of the Proposed Action.....	50
34	Step 5 – Minimize, Restore, Preserve.....	57
35	Step 6 – Re-evaluate Alternatives.....	61
36	Step 7 – Findings and Public Explanation.....	62
37	Step 8 – Implement Action.....	64
38		

39 **Revised Guidelines for Implementing Executive Order**
40 **11988, *Floodplain Management***
41 **(Updated January 28, 2014)**

42 **Glossary**

43 Throughout this document, the following basic definitions shall apply:

- 44 • *1-percent-annual-chance Flood* – the flood having a one chance in 100 of being equaled
45 or exceeded in any one-year period (also known as the “100-year” flood or “base flood”).
- 46 • *1-percent-annual-chance Flood Elevation* – the computed elevation to which floodwater
47 is anticipated to rise during the 1-percent-annual-chance flood (also known as the “100-
48 year flood” elevation or the “base” flood elevation).
- 49 • *1-percent-annual-chance Floodplain* – the area subject to flooding by the 1-percent-
50 annual-chance flood (also known as the “100-year” floodplain or “base” floodplain).
- 51 • *0.2-percent-annual-chance Flood* – that flood which has a 0.2-percent chance of being
52 equaled or exceeded in any given year (also known as the “500-year” flood).
- 53 • *0.2-percent-annual-chance Flood Elevation* – the computed elevation to which
54 floodwater is anticipated to rise during the 0.2-percent-annual-chance flood (also known
55 as the “500-year” flood elevation).
- 56 • *0.2-percent-annual-chance Floodplain* – the area subject to flooding by the 0.2-percent-
57 annual-chance flood (also known as the “500-year” floodplain).
- 58 • *“500-year” Elevation Approach (See definition under Federal Flood Risk Management*
59 *Standard.)*
- 60 • *Action* – any Federal activity including “(1) acquiring, managing, and disposing of
61 Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted
62 construction and improvements; and (3) conducting Federal activities and programs
63 affecting land use, including but not limited to water and related land resources planning,
64 regulating, and licensing activities.” (from E.O. 11988 Section 1)
- 65 • *Agency* – an executive department, a government corporation, or an independent
66 establishment and includes the military departments.
- 67 • *Base Flood* – that flood which has a one percent chance of being equaled or exceeded in
68 any given year (also known as a “100-year” flood).
- 69 • *Base Flood Elevation* – the computed elevation to which floodwater is anticipated to rise
70 during the base flood. Base Flood Elevations (BFEs) are shown on the Flood Insurance
71 Rate Maps (FIRMs) and on the flood profiles in the Flood Insurance Study (FIS).
- 72 • *Base Floodplain* – the area subject to flooding by the base flood (also known as the “100-
73 year” floodplain).

- 74 • *Climate-informed Science Approach* (See definition under *Federal Flood Risk*
75 *Management Standard.*)
- 76 • *Critical Action* – any activity for which even a slight chance of flooding would be too
77 great.
- 78 • *Facility* – any man-made or man-placed item other than a structure.
- 79 • *Flood* or *Flooding* – a general and temporary condition of partial or complete inundation
80 of normally dry land areas from the overflow of inland and/or tidal waters, and/or the
81 unusual and rapid accumulation or runoff of surface waters from any source.
- 82 • *Flood Fringe* – that portion of the floodplain outside of the regulatory floodway (often
83 referred to as “floodway fringe”).
- 84 • *Floodplain* – the lowland and relatively flat areas adjoining inland and coastal waters
85 including flood prone areas of offshore islands. For the purposes of this Order, the
86 floodplain shall be established using the Federal Flood Risk Management Standard
87 (FFRMS).
- 88 • *Federal Flood Risk Management Standard (FFRMS)* – When complying with this Order,
89 the floodplain shall be established using one of the following approaches:
 - 90 ○ *Climate-informed Science Approach* – The elevation and flood hazard area that
91 result from using a climate-informed science approach that uses the best-
92 available, actionable hydrologic and hydraulic data and methods that integrate
93 current and future changes in flooding based on climate science. This approach
94 will also include an emphasis on whether the action is a critical action as one of
95 the factors to be considered when conducting the analysis.
 - 96 ○ *Freeboard Value Approach* – The elevation and flood hazard area that result from
97 using the freeboard value, reached by adding an additional 2 feet to the base flood
98 elevation for non-critical actions and from adding an additional 3 feet to the base
99 flood elevation for critical actions.
 - 100 ○ *“500-year” Elevation Approach* – The area subject to flooding by the 0.2-
101 percent-annual-chance flood.
- 102 • *Floodproofing* – the modification of individual structures and facilities, their sites, and
103 their contents to protect against structural failure, to keep water out or to reduce the
104 effects of water entry.
- 105 • *Freeboard Value Approach* (See definition under *Federal Flood Risk Management*
106 *Standard.*)
- 107 • *Minimize* – to reduce to the smallest possible amount or degree.
- 108 • *National Security* – a collective term that encompasses both national defense and foreign
109 relations of the United States. Specifically, national security is a condition that is
110 provided by either (a) a military or defense advantage over any foreign nation or group of
111 nations; (b) a favorable foreign relations position; or (c) a defense posture capable of
112 successfully resisting hostile or destructive action from within or without, overt or covert.

- 113 • *Natural Features* – characteristics of a particular environment (e.g. barrier islands, sand
114 dunes, wetlands) that are created by physical, geological, biological and chemical
115 processes and exist in dynamic equilibrium. Natural features are self-sustaining parts of
116 the landscape that require little or no maintenance to continue providing their ecosystem
117 services (functions).
- 118 • *Nature-based Approaches* – features (sometimes referred to as “green infrastructure”)
119 designed to mimic natural processes and provide specific services such as reducing flood
120 risks and/or improving water quality. Nature-based approaches are created by human
121 design (in concert with and to accommodate natural processes) and generally, but not
122 always, must be maintained in order to reliably provide the intended level of service.
- 123 • *Natural and Beneficial Values of Floodplains* – features or resources that provide
124 environmental and societal benefits. These values include, but are not limited to, storing
125 and conveying floodwaters, maintaining water quality, providing habitats and enhancing
126 biodiversity, creating rich soils for agriculture, and providing open space for recreation
127 and environmental education. (Note that water and biological resources are often referred
128 to as “natural functions of floodplains.”)
- 129 • *Practicable* – capable of being done within existing constraints. The test of what is
130 practicable depends upon the situation and includes consideration of the pertinent factors,
131 such as environment, cost or technology.
- 132 • *Preserve* – to prevent modification to the natural floodplain environment or to maintain it
133 as closely as possible to its natural state.
- 134 • *Regulatory Floodway* – the channel of the river or other watercourse and the adjacent
135 land areas that must be reserved in order to discharge the base flood without cumulatively
136 increasing the water surface elevation more than a designated height.
- 137 • *Resilience* – the ability to adapt to changing conditions and withstand and rapidly recover
138 from disruption due to emergencies.
- 139 • *Restore* – to re-establish a setting or environment in which the natural functions of the
140 floodplain can again operate.
- 141 • *Structures* – a walled and roofed building, including a gas or liquid storage tank, that is
142 principally aboveground, as well as a manufactured home (as defined by the NFIP).
- 143 • *Wetlands* – “those areas that are inundated by surface or groundwater with a frequency
144 sufficient to support and under normal circumstances does or would support a prevalence
145 of vegetative or aquatic life that require saturated or seasonally saturated soil conditions
146 for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and
147 similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and
148 natural ponds” (as defined in Executive Order 11990, *Protection of Wetlands*).

149

Introduction

150

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

163 E.O. 11988 is based in part on the National Environmental Policy Act of 1969. When the
164 Order was issued, it added new prominence to the environmental aspects of floodplain
165 management that were not present in the Executive Order it replaced (E.O. 11296). E.O. 11988
166 achieved this by requiring that decision-making by Federal agencies clearly recognize that
167 floodplains have unique and significant public values. Because of the Order, consideration must
168 be given to natural and beneficial floodplain values and to the public benefit to be derived from
169 their restoration or preservation.

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

177 To assure compliance with the Order, provision is made for both public and Federal
178 review of proposed actions. Early public notice, an environmental impact statement or its
179 equivalent, and notice of findings are vehicles for providing information and opportunity for
180 public participation. Budgetary review of compliance with the Order and periodic review of
181 agency procedures provide for further review. In providing opportunity for these reviews, the
182 potential for withholding of budget approval should be minimized.

183 E.O. XXXXX – *Establishing a Federal Flood Risk Management Standard and a Process*
184 *for Further Soliciting and Considering Stakeholder Input*, issued January XX, 2015, amended
185 E.O. 11988 to improve the Nation’s resilience to current and future flood risk, which is
186 anticipated to increase over time due to the effects of climate change and other threats. E.O.

187 XXXXX, and the Federal Flood Risk Management Standard (FFRMS), reinforce the important
188 tenets and concepts articulated in E.O. 11988, such as avoiding actions in or impacting the base
189 floodplain and minimizing potential harm if an action must be located in the base floodplain.
190 E.O. XXXXX and the FFRMS, however, call for agencies to use a higher flood elevation and
191 expanded flood hazard area than the base flood previously described in the Order to ensure that
192 climate change and other future changes are more adequately accounted for in agency decisions.

193 These Guidelines are advisory. They provide broad guidance in the implementation of the
194 Order and offer a common point of reference for each agency to prepare implementing
195 procedures for compliance with the Order. The interpretations in the Guidelines are built upon a
196 strong Executive Order and directed at development of demonstrable Federal leadership in
197 floodplain management. These Guidelines recognize: (1) the impossibility of anticipating the full
198 range of individual program situations affected by the Order, and (2) the responsibility for
199 individual agencies to tailor their procedures to meet both their legislatively prescribed missions
200 and the requirements of the Order. The Guidelines also recognize other requirements governing
201 agency decisions, including the *Principles and Guidelines for Water and Land Related*
202 *Resources Implementation Studies (now updated and referenced as Principles, Requirements*
203 *and Guidelines or PR&G)*, FEMA’s *Federal Guidelines for Dam Safety*, and the Federal Energy
204 Regulatory Commission Engineering *Guidelines for the Evaluation of Hydropower Projects*.

205 E.O. XXXXX states that prior to any action to implement the Standard, additional input
206 from stakeholders shall be solicited and considered. To carry out this process, the Federal
207 Emergency Management Agency, on behalf of the Mitigation Framework Leadership Group,
208 shall publish for public comment a draft version of these Implementing Guidelines and hold
209 public meetings to further solicit stakeholder input. At the conclusion of the public comment
210 period, the Mitigation Framework Leadership Group shall revise the draft Implementing
211 Guidelines, based on comments received during the public comment period, and provide
212 recommendations to the Water Resource Council. The Water Resources Council shall issue
213 amended Guidelines to provide guidance to agencies on the implementation of Executive Order
214 11988, as amended, consistent with the Standard. Agencies shall not issue or amend existing
215 regulations or procedures until after the Water Resource Council has issued amended Guidelines
216 informed by stakeholder input.

217 These Guidelines are advisory. To the extent permitted by law and consistent with their
218 statutory authority, each agency shall draft or update their own rules and regulations in
219 consultation with the Water Resources Council, Federal Interagency Floodplain Management
220 Task Force, Federal Emergency Management Agency, and the Council on Environmental
221 Quality. E.O. XXXXX provides agencies with a 30-day timeframe from the close of the public
222 comment period for the Implementing Guidelines to develop an implementation plan for
223 updating their procedures. The implementation plan will be submitted to the National Security
224 Council and contain milestones and a timeline for implementation. Information about the

225 FFRMS has been incorporated into the Guidelines to aid agencies in development of their
226 revised or new procedures and to promote consistency among agencies.

227 The Guidelines are presented in two sections. Part I: Interpretation of Executive Order
228 11988, provides a section-by-section explanation and interpretation of the Order. Part II:
229 Decision-Making Process, discusses the decision-making process required by Section 2 of the
230 Order and is critical to the development of agency procedures. Part II also includes more detailed
231 explanations of how the FFRMS should be incorporated into this decision-making process. The
232 Guidelines do not intend to prohibit floodplain development in all cases, but rather to create a
233 consistent government policy against such development under most circumstances.

234 Appended to the Guidelines are descriptions of agency programs providing floodplain
235 information, related programs and references, and the President's Policy Statement and copies of
236 the complete Executive Orders – *Floodplain Management, Protection of Wetlands, and*
237 *Protection and Enhancement of Environmental Quality*, and *Preparing the United States for the*
238 *Impacts of Climate Change* as well as E.O. XXXXX – *Establishing a Federal Flood Risk*
239 *Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*
240 *and the Federal Flood Risk Management Standard.*

241 Executive Order 11990 – *Protection of Wetlands* has been included because most of the
242 Nation's wetlands are located on floodplains. Also, both the floodplain and wetland orders were
243 issued as part of the *President's Message on the Environment*, May 24, 1977. Thus the guidance
244 provided in this document and the agency procedures for floodplain management will frequently
245 apply to wetlands. Agencies may wish to develop a single set of procedures for these orders.

246 Executive Order 11514 – *Protection and Enhancement of Environmental Quality* has
247 been included to clarify the public notice aspects of the Order.

248 Executive Order 13653 – *Preparing the United States for the Impacts of Climate Change*
249 has been included to provide context for Federal efforts to improve the Nation's preparedness
250 and resilience in response to the impacts of climate change.

251 Executive Order XXXXX – *Establishing a Federal Flood Risk Management Standard*
252 *and a Process for Further Soliciting and Considering Stakeholder Input* and the *Federal Flood*
253 *Risk Management Standard* have been included, which expands management from the base flood
254 level to a higher vertical flood elevation and corresponding horizontal floodplain to address
255 current and future flood risks. The language used in E.O. XXXXX and the FFRMS reflects a
256 transition beyond a former emphasis on *flood control and protection* to a broader focus on *flood*
257 *risk management*. This includes an array of methods for managing floodwaters to reduce the risk
258 of flooding and managing and regulating floodplain development to reduce the impacts of
259 flooding. Changes in terminologies from “protection” to a broader focus on resilience and risk
260 management reflect the recognition that floodwaters cannot be fully controlled, full protection
261 from floods cannot be provided by any measure or combination of measures, and risk cannot be

262 completely eliminated. Instead, management techniques involving coordinated efforts of
263 individuals, property owners, businesses, and Federal, State and Local governments can be used
264 to manage the level of risks in a floodplain. The term “resilience” was not commonly used when
265 E.O. 11988 was originally written, but the Order’s emphasis on avoidance, minimization,
266 preservation, and restoration align well with this concept of resilience.

267

268 **Part I: Interpretation of Executive Order 11988**

269 This part of the Guidelines provides a detailed, section-by-section discussion of the
270 Order. Although the original interpretations in the Guidelines were developed by CEQ, WRC,
271 and HUD/FIA, the current Guidelines were developed through a broader interagency process to
272 reflect a unified Federal perspective. Key concepts are discussed and reference is made to the
273 decision-making process (Part II).

274 **INTRODUCTION**

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

284 The introduction establishes the broad scope of the Order derived from NEPA and the
285 flood insurance legislation. (Part II – Step 4 discusses impacts associated with the occupancy
286 and modification of floodplains and support of floodplain development. Part II – Step 3
287 discusses the practicability of alternatives.) Agencies are reminded that they are required to
288 comply with E.O. 11988 for Federal actions in a floodplain that are not significant enough to
289 require the preparation of an environmental impact statement (EIS) under Section 102(2)(C) of
290 NEPA. (See Part II – Step 2) For actions in the floodplain requiring an EIS, or Environmental
291 Assessment (EA), or documented Categorical Exclusion (CE) under NEPA, the agencies can run
292 the NEPA process in parallel with the Order’s public notification and comment process. In such
293 cases, agencies should include the results of the evaluation of a proposed action’s impacts on the
294 floodplain in any environmental assessment prepared under NEPA. (See Part I – Section 2 and
295 Part II – Step 7).

296 **SECTION 1**

297 *Each agency shall provide leadership and shall take action to reduce the risk of flood*
298 *loss, to minimize the impact of floods on human safety, health and welfare, and to restore*
299 *and preserve the natural and beneficial values served by floodplains in carrying out its*
300 *responsibilities for (1) acquiring, managing, and disposing of Federal lands, and*
301 *facilities; (2) providing Federally undertaken, financed, or assisted construction and*
302 *improvements; and (3) conducting Federal activities and programs affecting land use,*
303 *including but not limited to water and related land resources planning, regulating, and*
304 *licensing activities.*

305 The basic concepts expressed in Section 1 of the Order are: (1) all agencies are covered;
306 (2) all actions are covered; (3) all agencies are to affirmatively carry out efforts to, and provide a
307 good example of, sound floodplain management practices; and (4) all agencies are required to
308 act, not merely consider, reducing risk, minimizing adverse impacts, and restoring and
309 preserving floodplain values.

310 The comprehensiveness of the Order recognizes that each agency, in carrying out the
311 various types of actions enumerated in this section, can affect the floodplain through any of its
312 actions. The mandate that the agencies take a leadership role places them in a unique position
313 relative to State, Tribal, Regional, and Local levels of government in carrying out actions which
314 affect the floodplain. This role requires the agencies to lead other public and private entities in
315 achieving the goals of the Order by setting a good example. (The concepts of reducing risk,
316 minimizing impact, and restoring and preserving floodplain values are discussed in Part II – Step
317 5.)

318 SECTION 2

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

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

334 SECTION 2(a)(1)

335 *Before taking an action, each agency shall determine whether the proposed action will*
336 *occur in a floodplain – for major Federal actions significantly affecting the quality of the*
337 *human environment, the evaluation required below will be included in any statement*
338 *prepared under Section 102(2)(C) of the National Environmental Policy Act. To*
339 *determine whether the action is located in a floodplain, the agency shall use one of the*
340 *approaches in Section 6(c) of this order based on the best-available information and the*
341 *Federal Emergency Management Agency’s effective Flood Insurance Rate Map.*

342 The intent of this subsection is that agencies use the best available information in
343 determining whether a proposed action will be located in a floodplain. Section 6(c) as amended
344 by E.O. XXXXX describes how the flood elevation and flood hazard area should be determined
345 for purposes of the Order. (See Part II – Step 1 for more information about how to determine the
346 flood elevation and flood hazard area.)

347 **SECTION 2(a)(2)**

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

359 The major issues here include: (1) consideration of alternatives which will avoid the
360 floodplain, wherever practicable, and alternatives which will avoid adverse effects and
361 incompatible development (development which has adverse effects); (2) minimization of harm to
362 or within the floodplain resulting from proposed actions; and (3) circulation of a notice
363 ("finding") to the general public and affected agencies that siting in the floodplain is the only
364 practicable alternative. The notice requirement introduced in this subsection is part of a larger
365 concern for public notice and review carrying through to Section 4.

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

370 Two important points should be noted about the standards to be embodied in agency
371 procedures. First, while minimize means reduce to the smallest amount or degree; there is an
372 implicit acceptance of practical limitations. Agencies are required to use all *practicable* means
373 and measures to minimize harm. The Order does not expect agencies to employ unworkable
374 means to meet this goal. Second, agency procedures are intended to be consistent with the
375 standards in the National Flood Insurance Program. For this reason, agencies are required to
376 consult with FEMA before issuing their procedures, and agencies with control over federal
377 property are required to follow the standards in FEMA's regulations unless they are
378 demonstrably inappropriate.

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

381 E.O. XXXXX amended Section 2(a)(2) to encourage the use of natural systems,
382 ecosystem processes, and nature-based approaches when developing alternatives for a proposed
383 action. The use of nature-based approaches, combined with the preservation and restoration of
384 natural systems and ecosystem processes where appropriate, provide numerous benefits and
385 support a system-wide, watershed approach¹ to flood risk management that considers the
386 interdependencies of natural systems. Encouraging the use of natural features and nature-based
387 approaches earlier in the planning and design of Federal actions is consistent with Federal
388 government policies, programs, and best practices including the *Principles, Requirements and*
389 *Guidelines for Federal Investments in Water Resources, Principles and Guidelines for Water*
390 *and Land Related Resources Implementation Studies, E.O. 13653, Preparing the United States*
391 *for the Impacts of Climate Change, and the President’s Climate Action Plan, and the Priority*
392 *Agenda – Enhancing the Climate Resilience of America’s Natural Resources. These and other*
393 *documents encourage and support use of natural features and nature-based approaches to reduce*
394 *flood risks and protect the natural and beneficial values of floodplains.*

395 Nature-based systems can include both natural and engineered features. This could
396 include restoration of a system’s natural processes, for example, lowering or removing levees to
397 allow water to flow naturally, restoring wetland functions along a coastal or riverine system, or
398 creating living shorelines.² Agencies are encouraged to consider nature-based approaches, not
399 limited to the examples provided in this document, early in the planning process. They can be
400 used with other types of measures where appropriate (such as low-impact development measures
401 to reduce runoff), as well as with actions that have already occurred in the floodplain. Where
402 nature-based approaches are used alone, in conjunction with natural features, or in conjunction
403 with a structure, facility, or other action, the agency must consider alternatives when the
404 floodplain cannot be avoided, as well as methods to minimize the impacts such approaches may
405 have on the floodplain. These approaches are further explained in Part II – Steps 3 and 4 of the
406 Guidelines.

407 **SECTION 2(a)(3)**

408 *For programs subject to the Office of Management and Budget Circular A-95, the agency*
409 *shall send the notice, not to exceed three pages in length including a location map, to the*
410 *State and areawide A-95 clearinghouses for the geographic areas affected. The notice*

¹ 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)*.

² 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*

411 *shall include (i) the reasons why the action is proposed to be located in a floodplain; (ii)*
412 *a statement indicating whether the action conforms to applicable State or Local*
413 *floodplain protection standards and (iii) a list of the alternatives considered. Agencies*
414 *shall endeavor to allow a brief comment period prior to taking any action.*

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

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

427 **SECTION 2(a)(4)**

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

434 This section requires public notice much earlier than the finding requirement, including
435 notice for actions which do not require environmental impact statements. (The notice
436 requirements set out in this subsection are discussed in Part II – Step 2.)

437 **SECTION 2(b)**

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

441 This subsection complements the public review element in the Order (Subsections 2(a)
442 (2), (3), and (4)). It provides for Federal review and raises the possibility that agency funds may
443 be withheld from proposed actions which are not in accord with the intent of the Order. "In
444 accord with" means in compliance with the policy and mandatory provisions (the letter and
445 spirit) of the Order.

446

SECTION 2(c)

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

455 Each agency shall take floodplain management, as provided for in Section 2(d), into
456 account when: (1) formulating its own water and land use plans, and (2) evaluating the water and
457 land use plans of others.

458 In the operation of a license, permit, loan, or grant-in-aid program, each agency must
459 make adequate provision for the evaluation and consideration of flood hazards. These provisions
460 shall be included in agency's regulations and procedures. When the action involves more than
461 one Federal agency, the "lead agency" will be responsible and will obtain input from all
462 agencies. In all cases, as a minimum, the "practicability" and "minimization" standards of
463 Section 2(a) of the Order apply. Therefore, as a precondition for an agency's approval of an
464 application for a license, permit, loan, or grant-in-aid, the agency must assure that the
465 requirements of Section 2(a) have been met. To the extent that an agency deems the requirements
466 of Section 2(a) not to constitute adequate provision for evaluation and consideration of the flood
467 hazard, the agency shall impose additional requirements.

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

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

481

SECTION 2(d)

482
483
484
485
486
487
488
489
490
491
492

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.

493
494
495

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

496
497
498
499
500
501
502
503
504
505
506
507
508
509

Each agency is to reflect the conceptual framework of floodplain management as set out in *A Unified National Program for Flood Plain Management (first published in 1976 and updated in 1979, 1986, and 1994)* in its regulations and procedures developed in response to provisions of the Order. 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. Within it, 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. From the standpoint of this Order, the Federal posture in floodplain management would be one of overcoming the apparent inertia in environmental value recognition when the appropriate floodplain role is being determined, as well as one of avoiding hazardous and uneconomic uses as part of this future role. The term "uneconomic" also includes the concept of costs shifted by floodplain users to others, both directly and indirectly.

510
511
512
513
514

In order to comply with the requirement that the means to be employed to pursue nonhazardous use be identified, each agency will be required to assess the degree of hazard associated with its program activities under a possible range of flood conditions. Then the agency must state the specific kinds of actions or adjustments that would be employed to comply with this section.

515 To the extent possible, agencies will utilize existing processes established under the
516 CEQ’s NEPA regulations and guidance and WRC's Principles, Requirements and Guidelines
517 (PR&G)³ in addition to these Guidelines.

518 When E.O. 11988 was originally issued, each agency was directed to consult with WRC,
519 CEQ, and the Federal Insurance Agency (FIA) in the preparation of their initial regulations and
520 procedures in response to the Order. This consultation included any issue relevant to compliance
521 with the Order. WRC was the point of contact, and arranged for consultation as needed with an
522 interagency panel including members from the three agencies cited. Each agency's procedures
523 were to identify those actions, if any, which: (1) typically do not create adverse effects or
524 incompatible development, or (2) normally will not require specific agency and public review
525 under the Order. E.O. XXXXX amended E.O. 11988 and directs agencies to consult with WRC,
526 CEQ, FEMA and the Federal Interagency Floodplain Management Task Force when developing
527 their revised regulations and procedures to help ensure that the new regulations and procedures
528 are consistent with the FFRMS.

529 Agency regulations or procedures should include relevant material in the following areas:
530 (1) *mechanical requirements* that an agency will use to meet the procedural requirements of the
531 Executive Order, such as timing, routing of documents, preparation and circulation of findings
532 and notices, and specific links between the Order and other planning decision-making processes
533 and requirements (e.g., budget process, NEPA, PR&G); (2) *substantive requirements*, such as the
534 standards for determining which alternatives are practicable, and the criteria and methods for
535 minimizing harm (using FEMA regulations and the FFRMS as a guide wherever applicable); (3)
536 *policy direction*, such as incorporation by reference of the Executive Order, Unified Program,
537 NEPA, and other relevant requirements; general policies on the agency's approach to
538 implementing the Order; program-specific policies and commitments to research monitoring and
539 evaluation; and (4) *other information*, such as appendices identifying the agency contacts in
540 Washington and in the field who are principally responsible for implementing the Order, cross-
541 references to other relevant agency procedures and manuals, and other material that will assist
542 agencies and the public to understand just what the agency is doing to comply with the Order.

543 **SECTION 3**

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

³ The Principles & Standards referenced in the original E.O. 11988 Implementing Guidelines was changed in 1983 to the Principles & Guidelines. In 2014, the Principles & Guidelines was updated and is referenced as Principles, Requirements and Guidelines or PR&G. These documents are referenced in Appendix B. Agency-specific guidance should address the relationship between such requirements, and the Order and Implementing Guidelines. At the time of publication of these Guidelines, some agencies continue to follow the 1983 Principles & Guidelines.

584 noted that the NFIP's one foot stage rise standard is a minimum standard, and more restrictive
585 stage rise standards that are in effect in States and Local communities take precedence over the
586 NFIP standard as set out in 44 CFR 60.1(d) of the NFIP regulations.

587 This subsection allows deviation from the NFIP and FFRMS requirements only to the
588 extent that their standards and criteria are "demonstrably inappropriate" for a given type of
589 structure or facility. Where this can be demonstrated, the proposed structure or facility must
590 satisfy the requirements of Section 2, and must not endanger existing development, encourage
591 development which would result in harm to or within the floodplain, or itself be vulnerable to
592 flood damage.

593 SECTION 3(b)

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

600 The key concepts in this subsection are: (1) requirements for new construction and
601 existing structures; (2) accepted floodproofing measures and other flood protection measures;
602 and (3) the requirement to achieve flood protection for structures, wherever practicable, without
603 the use of fill. For the purposes of the Order, the term "new construction" includes construction
604 associated with: (1) new structures and facilities; (2) the reconstruction of existing structures and
605 facilities following damage caused by fire, flood or other hazard; and (3) the improvement of
606 existing structures and facilities by rehabilitation, repair, alteration or addition. The application
607 of the Order's requirements to existing structures is emphasized in this section.

608 Floodplain management practices have set thresholds for what constitutes a major
609 improvement. Under the NFIP, the threshold that was established was 50 percent of the market
610 value of the structure or facility (see, for instance, the NFIP definition of substantial
611 improvement (44 CFR 59.1). In the case of major improvements, agencies are offered an
612 opportunity to compensate for previous siting and design decisions which did not reflect the
613 intent of the Order. In meeting the responsibility to apply the Order's requirement to existing
614 structures, the agencies shall consider whether the proposed action would: (1) result in an
615 increase in the useful life of the structure or facility in question; (2) maintain the investment at
616 risk and the exposure of lives to the flood hazard; or (3) eliminate an opportunity to restore the
617 natural and beneficial floodplain values.

618 Accepted floodproofing measures for structures are defined under the NFIP regulations
619 and are set out in the discussion under Subsection 3(a), above. The Order further limits what
620 constitutes accepted floodproofing for structures through additional language in this subsection

621 which requires that, wherever practicable, all structures shall be elevated using open works, e.g.,
622 columns, walls, piles, piers, etc. rather than fill (see Appendix B). Accepted floodproofing
623 measures for facilities vary considerably, since the scope of the term facility, as defined in the
624 Glossary, is extremely broad. Floodproofing measures for certain types of facilities, e.g., sewer
625 interceptor lines and other types of piping, and bridges and roads have been developed, and are
626 familiar to agencies having responsibilities in those areas. Other flood protection measures
627 including warning and evacuation plans, etc. are discussed in the *Unified National Program for*
628 *Flood Plain Management*.

629 **NOTE: The general concept of flood protection articulated in this section, while**
630 **current at the time, has evolved since the Executive Order was written and is now reflected**
631 **in the broader concept of flood risk management. Flood risk management better conveys**
632 **the fact that people are never fully “protected” from flood waters. The concept of flood risk**
633 **management is also important in that it includes a broader array of methods for managing**
634 **floodwaters to reduce the risk of flooding and managing development in the floodplain to**
635 **reduce the consequences of flooding. This can include natural features and nature-based**
636 **approaches, which are encouraged in the Order. By considering and applying a broader**
637 **array of measures in addition to traditional floodproofing measures, agencies may be able**
638 **to increase the resilience of actions and investments that must occur in a floodplain. These**
639 **broader approaches may also reduce the level of future risks posed to or by those actions.**
640 **(See Part II – Steps 3.B. and 5.C. for more information on natural features and nature-**
641 **based approaches.)**

642
643 **NOTE: The Order acknowledges differences in the way actions are taken in regard**
644 **to a structure versus a facility. Similarly, these updated Guidelines recognize that certain**
645 **approaches will be appropriate based upon the type of structure or facility. Where**
646 **required, agency procedures should align these updated Guidelines with related policies.**

647 **SECTION 3(c)**

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

652 The conspicuous delineation of past and probable flood heights is required on property
653 which has been or could be subjected to flooding and is used by the general public. This
654 delineation responsibility applies to all types of property (land, structures and facilities).
655 Agencies must identify in their regulations and procedures the areas where this requirement will
656 be most effective in minimizing the adverse impacts of floods, especially on human safety. The
657 “100-year” flood level and the flood of record should be shown where available. The “500-year”
658 flood should also be shown where appropriate.

659

SECTION (3)(d)

660
661
662
663
664
665

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.

666
667
668
669
670

Three requirements are set out for agencies which dispose of Federal properties (land, structures or facilities) in the 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.

671
672
673
674
675
676
677

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).

678
679
680
681
682
683
684
685
686

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 this Order, 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 and 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.

687
688
689
690
691
692
693

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 the Order's intent. Where, for instance, the existing use is not compatible with the intent of the Order, or the area in question is not subject to meaningful floodplain management requirements, withholding the land or facility from conveyance may be required.

694
695

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

696

SECTION 4

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

703 This section applies to the Federal Housing Administration, the Veterans Administration,
704 and the six agencies enumerated in the Flood Disaster Protection Act of 1973: the Board of
705 Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the
706 Comptroller of the Currency, the National Credit Union Administration and the Farm Credit
707 Administration and any Federal entity responsible for the supervision of a lending institution.
708 Other agencies that have responsibilities similar to those described in this section are also subject
709 to its requirements. The notice requirements of this section are in addition to the other
710 responsibilities of these agencies under the Order and under Sections 102, 202, and 205 of the
711 Flood Disaster Protection Act of 1973, as amended (42 U.S.C. 4012a, 4106 and 4128).

712 This section covers any financial transaction guaranteed, approved, regulated or insured
713 by a federal agency which is and which pertains to an area subject to the base flood. If an agency
714 does not operate on an individual transaction basis with private parties, but rather guarantees,
715 approves, regulates or insures the institutions conducting such transactions, then it is the agency's
716 responsibility to require that the institution provide the requisite notice.

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

724

SECTION 5

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

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

733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771

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.

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

774 The terms "agency," "base flood," "floodplain" and “critical action” are defined in the
775 Glossary. E.O. XXXXX amended the term “floodplain” to incorporate the different approaches
776 that can be used to determine a flood elevation and flood hazard area based on the FFRMS. The
777 FFRMS seeks to improve upon the standards set forth in Executive Order 11988 by providing a
778 higher flood elevation and expanded flood hazard area to address current and future flood risk.
779 The FFRMS includes three specific approaches for determining a flood elevation and flood
780 hazard area that are designed to recognize and incorporate future conditions rather than rely
781 solely on existing data and information. It also can be expanded in the future to include
782 additional approaches. The three approaches currently described in the FFRMS are the
783 following:

- 784 (1) *Climate-informed Science Approach* – Agencies shall use the best available,
785 actionable hydrologic and hydraulic data and methods that integrate current and
786 future changes in flooding based on climate and related science to determine the
787 flood elevation and flood hazard area in a manner appropriate to policies, practices,
788 criticality, and consequences. (In some cases, this flood elevation could correspond
789 to the projected 1-percent-annual-chance flood.)
- 790 (2) *Freeboard Value Approach* – Agencies shall use the Base Flood Elevation (or 1-
791 percent-annual-chance flood determined using best available data) and an additional
792 height to calculate the freeboard value. The additional height will depend on
793 whether or not the action is a critical action.
- 794 (3) *The “500-year” Elevation Approach* – Agencies shall use the 0.2-percent-annual-
795 chance flood elevation (also known as the “500-year” flood elevation).

796 The three approaches may vary based on whether the proposed action is an area
797 vulnerable to coastal or riverine floods and whether the action is a critical action. Part II – Step
798 1.B. provides more detail about these approaches and how to apply them. Agencies should use an
799 approach that takes advantage of best available information and data. When actionable climate
800 science is available, the Climate-informed Science Approach is preferred. In cases where
801 relevant data are not available, the other two approaches are acceptable methods to determine the
802 elevation and floodplain. Each of these approaches can improve resilience to current and future
803 flood risk. Where multiple Federal agencies are jointly engaged in an action, they should begin
804 to coordinate early in the process to select the most appropriate approach for determining the
805 flood elevation and flood hazard area that will be applied to the action. Agencies maintain the
806 responsibility and flexibility to tailor their procedures to meet their prescribed missions while
807 fulfilling the requirements of the Order.

808 Although the FFRMS provides guidance to agencies regarding specific calculated
809 elevations to address uncertainty and provide for resilience, agencies should consider whether an
810 even higher elevation should be applied depending on the criticality of the action and the other

811 flood characteristics. The FFRMS encourages agencies to use higher flood elevations where an
812 agency determines it to be appropriate.

813 E.O. XXXXX also amended the definition of floodplain to include an exception for
814 national security and emergency actions as stated in Section 6(c)(2). The exception from the
815 FFRMS provided for in Subsection 6(c)(2) does not preclude agencies from also determining
816 that structures or facilities are demonstrably inappropriate requiring deviation from both the
817 FFRMS and NFIP standards as provided for in Subsection 3(a). In developing revised individual
818 agency implementing procedures, agencies are directed to either specify which agency actions
819 are excepted, or prescribe the process to be used to determine on a case-by-case basis whether an
820 action is excepted. Agencies should also specify what justification, documentation, and tracking
821 is required when an action is excepted. To determine whether the national security exception
822 applies, agencies should refer to the definition of national security provided in the Glossary.

823 Excepted actions will not be subject to the higher FFRMS standard. However, agencies
824 are still required to follow the eight-step process outlined in the original E.O. 11988
825 Implementing Guidelines and should also consider the following floodplain management
826 principles: anticipating a changing environment, supporting regional resilience, adopting
827 sustainable solutions, and supporting holistic approaches to floodplain management.

828 Consistent with the 1978 Implementing Guidelines for the Order, E.O. XXXXX and the
829 FFRMS set forth a higher level of resilience for critical actions that includes any activity for
830 which even a slight chance of flooding is too great. The prominence of critical actions highlights
831 a continued concern that the impacts of floods on human safety, health, and welfare for many
832 actions could not be minimized unless a higher standard than the base flood was provided. (See
833 Part II – Step 1.)

834 Federal agencies continue to be responsible for determining whether an action is critical.
835 To assist agencies in determining whether a proposed action is a “critical action,” they should
836 consider the example questions below. However, agencies may have other types of questions that
837 are relevant to determine if an action is critical.

- 838 • If flooded, would the proposed action create an added dimension to the disaster as
839 could be the case for facilities producing and/or storing highly volatile, toxic, or
840 water-reactive materials?
- 841 • Would the occupants of buildings such as hospitals, nursing homes, prisons, and
842 schools be sufficiently mobile and have available transport capability to avoid
843 loss of life and injury given the flood warning lead times available?
- 844 • Would essential and irreplaceable records, utilities, emergency services, national
845 laboratories, items or structures of substantial cultural significance, and structures
846 that may house critical equipment, systems, networks, and functions be lost?
- 847 • If flooded, would the resulting damage or disruption lead to regional or national
848 catastrophic impacts beyond the local impacts?

849 Given these types of questions and considerations, care must be taken by Federal
850 agencies to identify practicable alternatives to locating in the floodplain. When no practicable
851 alternatives exist but to locate a critical action in the floodplain, the agency shall determine the
852 impacts and minimize, restore, and preserve as required. (See Part II, Step 5.)

853 During planning, design and construction of critical actions, an agency should pay close
854 attention to flood characteristics at and near the site such as, but not limited to, flood depths,
855 flood velocity, hydrostatic loads, hydrodynamic loads, possible debris impact loads, erosion and
856 localized scour, duration of floodwater, and subsidence. Agencies should also consider other
857 factors such as flood warning time, evacuation time, logistical challenges to evacuation,
858 preparedness, and the potential to function without interruption. Recognition of these
859 characteristics and other factors provides the agency with a better understanding of the nature of
860 the flood hazard at the proposed location. It also enables the agency to make a more informed
861 decision about avoiding the floodplain or increasing the resilience of an action to minimize harm
862 to or within the floodplain for a proposed critical action that must be located in the floodplain.

863 SECTION 7

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

867 The previous E.O. 11296 is revoked, but agencies are allowed to operate under existing
868 procedures until they can be revised to reflect this Order. At the latest, this revision must be
869 accomplished by May 24, 1978.

870 SECTION 8

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

875 Although Section 8 exempts flood related and other emergency activities "essential to
876 save lives and protect property and public health and safety" from the provisions of the Order,
877 (e.g., the requirement to prepare and circulate notice of proposed activity), it does not exempt
878 them from the spirit of the Order expressed in Section 1. Activities under portions of legislatively
879 directed emergency programs, (e.g., under P.L. 84-99 (33 USC 701n)) covering the same kinds
880 of situations as those sections specifically cited in the Order, are clearly within the meaning and
881 intent of Section 8 and therefore are subject to the same interpretation.

882 In addition to this exemption, an action that is in the interest of national security, is an
883 emergency action, is "demonstrably inappropriate" where applied to a Federal facility or
884 structure, or is a mission-critical requirement related to a national security interest or emergency

885 action is excepted from the higher standards in the FFRMS that apply to E.O. 11988. Although
886 agencies are able to except those actions from compliance with the higher standard, agencies are
887 still required to adhere to the requirements of E.O. 11988 when undertaking these actions. See
888 Part I Section 6(c) for more information.

889 **SECTION 9**

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

897 This section allows units of general purpose, Local government which may assume the
898 status of Federal agencies for purposes of NEPA compliance under the for certain HUD
899 Community Development Block Grant (CDBG) Program to assume the responsibility for
900 carrying out the provisions of Section 2(a) of this Order for specific projects under CDBG as part
901 of their overall NEPA responsibilities. Thus, the provisions of Section 2(a) of this Order will be
902 carried out in conjunction with NEPA compliance, and one responsibility may not be assumed
903 without the other also being assumed by a grantee. Compliance with Section 2(a) of the Order
904 will be completed prior to the grantee's certification of compliance with NEPA.

905

Part II: Decision-Making Process

INTRODUCTION

This part of the Guidelines is structured in eight steps to reflect the decision-making process (Figure 1) required in section 2(a) of the Order for all actions in and affecting floodplains. This section and relevant steps have been revised to address amendments to E.O. 11988 by E.O. XXXXX and the FFRMS such as:

- *A new definition of floodplain.* E.O. XXXXX changes the definition of floodplain in E.O. 11988, expanding the area in which agencies must assess impacts of proposed actions and establishing a new level to which that action must be resilient. The new definition describes three approaches to determine the flood elevation and flood hazard area when carrying out the eight-step decision-making process outlined in this part of the Guidelines.
- *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 minimize impacts to natural and beneficial floodplain values and to lives and property.

The Order and 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 or affecting 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. 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

942 proposed action is a “critical action,” they should consider the example questions below.
943 However, agencies may have other types of questions that are relevant to determine if an
944 action is critical.

- 945 • If flooded, would the proposed action create an added dimension to the disaster as
946 could be the case for facilities producing and/or storing highly volatile, toxic, or
947 water-reactive materials?
- 948 • Would the occupants of buildings such as hospitals, nursing homes, prisons, and
949 schools be sufficiently mobile and have available transport capability to avoid
950 loss of life and injury given the flood warning lead times available?
- 951 • Would essential and irreplaceable records, utilities, emergency services, national
952 laboratories, items or structures of substantial cultural significance, and structures
953 that may house critical equipment, systems, networks, and functions be lost?
- 954 • If flooded, would the resulting damage or disruption lead to regional or national
955 catastrophic impacts beyond the local impacts?

956 ***Does an action qualify for a general review?***

957 Agencies planning to conduct a series of actions may consider conducting a general area
958 review. This is an area-wide compliance process that may be substituted for individual
959 compliance actions where a series of individual actions is proposed or contemplated over
960 an indefinite period of time. The area-wide compliance process shall comply with the full
961 decision-making process for avoiding floodplain locations. Additional guidance on this
962 topic is provided in *Further Advice on Executive Order 11988 Floodplain Management*
963 *(1987 or more current version)*.

964 ***Will the action have limited impact?***

965 When the proposed activity has very limited exposure to flooding or causes rather
966 insignificant impacts on the floodplain, some adjustments could be made in the intensity
967 of analysis and extent of distribution of public notices. Examples of actions with limited
968 impact on the floodplain typically include those involving approval of financial
969 assistance for signs, trails, and land acquisition for parks and recreation. Additional
970 guidance on this topic is provided in *Further Advice on Executive Order 11988*
971 *Floodplain Management (1987 or more current version)*.

972 ***Is the action a repetitive action?***

973 Agencies may perform class reviews for certain repetitive actions. For class reviews,
974 agencies should review its past activities to determine whether a class review would be
975 appropriate for certain activities. To improve efficiency but yet maintain a desirable level
976 of compliance with the Executive Order, a floodplain evaluation class review may be
977 made of certain routine or recurring action. Additional guidance on this topic is provided
978 in *Further Advice on Executive Order 11988 Floodplain Management (1987 or more*
979 *current version)*.

980 *Can you take advantage of natural features or nature-based approaches?*
981 Agencies are encouraged to consider the use of natural features and nature-
982 based approaches when developing alternatives for a proposed action in a floodplain.
983 Nature-based approaches include engineered features and restored natural features to
984 mimic or restore natural processes that are created by human design. Examples include
985 restored habitat for fish and wildlife, a constructed impounded wetland, or a beach and
986 dune system site specifically engineered for coastal storm damage reduction. Nature-
987 based approaches generally, but not always, must be maintained in order to reliably
988 provide the intended level of services. Nature-based approaches can be used in
989 combination with or instead of new, existing, or other similar measures. A nature-based
990 approach could also substitute for proposed actions, or could be used in combination with
991 a proposed action.

992 Avoidance of floodplains is preferred, but if an agency determines that an action must
993 occur in a floodplain a nature-based approach could help to minimize the adverse impacts
994 of the action to the natural and beneficial values. If designed properly, a nature-based
995 approach could also help to restore some of the physical, geological, biological, and
996 chemical processes of the floodplain. Natural features in particular may not require any
997 maintenance, but rather restore a functioning portion of the natural physical, geological,
998 biological, and chemical processes of a system.

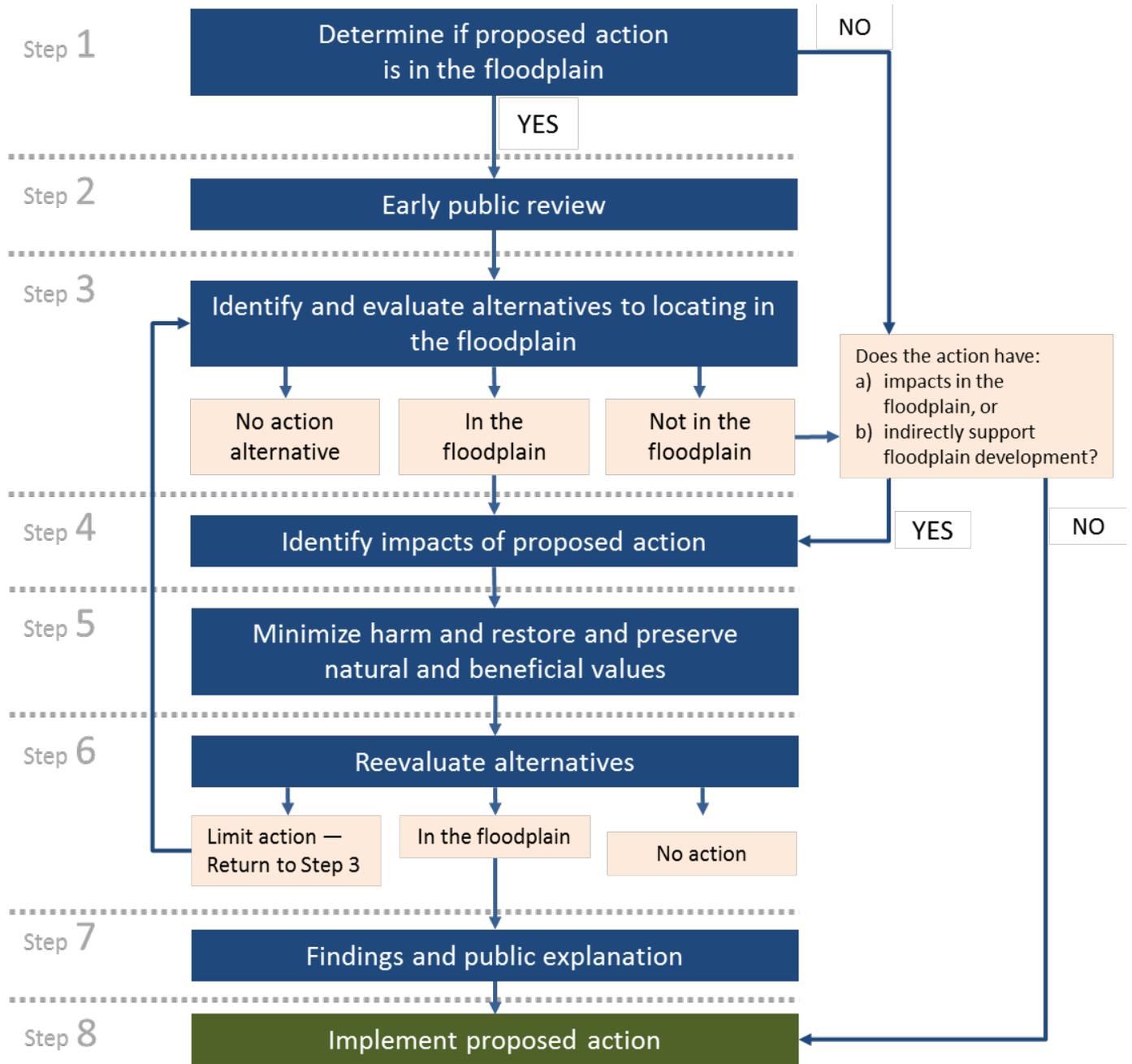
999 In addition to identifying the specific need, function, and situation for the action and
1000 determining whether it is a critical action, agencies should follow the eight-step decision-making
1001 process summarized below and discussed in more detail in the sections that follow.

- 1002 1. The first step of the decision process is to determine if a proposed agency action is
1003 located in or will impact the floodplain. This discussion identifies various types of
1004 floodplains and their boundaries. If the proposed action is not in the floodplain, proceed
1005 to Step 4.
- 1006 2. The agency must make public its intent to locate a proposed action in the floodplain. This
1007 notice must provide a description of the proposed action with ample lead time for
1008 meaningful input from the public.
- 1009 3. If the action is in the floodplain, the third step is to identify and evaluate the practicable
1010 alternatives to locating in the floodplain. This determination requires the agency to
1011 consider whether the floodplain can be avoided either through alternative siting; through
1012 alternate actions which would perform the intended function but would minimize harm to
1013 or within the floodplain; or by taking no action.
- 1014 4. For the proposed alternative, the agency must identify if the action has impacts in the
1015 floodplain or directly or indirectly supports floodplain development that has additional
1016 impacts. If the proposed action is outside the floodplain and has no identifiable impacts
1017 or support, the action can be implemented, Step 8.

- 1018 5. If the proposed action has identifiable impacts or support, these effects must be
1019 minimized. Further natural and beneficial floodplain values must be restored and
1020 preserved.
- 1021 6. The proposed alternative can now be reevaluated taking into account the identified
1022 impacts, the steps necessary to minimize these impacts and opportunities to restore and
1023 preserve floodplain values. In the floodplain: if this reevaluation shows that the proposed
1024 action is no longer feasible, consider limiting the action to make a non-floodplain site
1025 practicable or taking no action. Outside the floodplain: if the action has impacts or
1026 support, consider modifying or relocating the action to eliminate or reduce these effects
1027 or taking no action.
- 1028 7. If the agency head finds that the only practicable alternative is locating in the floodplain,
1029 public notice of the reasons must be given for this finding (including the alternatives
1030 considered).
- 1031 8. After a reasonable period to allow for public response, the proposed action can be
1032 implemented.

1033 Note that depending on the situation this process may be carried out with fewer steps if
1034 all of the objectives of the decision-making process can be achieved.

1035 **Figure 1: Eight-step Decision-making Process for E.O. 11988**



1036

1037

1038
1039

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

1040
1041
1042

The first step in complying with the Order is to determine whether or not a proposed action is located in the floodplain. The following discussion includes information about types of floodplains (1.A.) and determination of the flood elevation and flood hazard area (1.B.).

1043

1.A. TYPES OF FLOODPLAINS

1044
1045
1046
1047
1048
1049
1050

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. In this document, a floodplain can be any land area susceptible to being inundated from any source of flooding, including those which 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 adds.

1051
1052
1053
1054
1055
1056
1057

Aggravating factors such as land-use changes, climate variability, and climate change contribute to the flood hazard in many riverine, coastal, and sheet flow 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.

1058
1059
1060
1061
1062

In addition to the flood characteristics described above, other flood characteristics, such as rate of rise and flood depth, need to be considered. The flood characteristics regarding a new action or impacting an existing structure or facility should be used to evaluate the feasibility of the proposed action or critical action and the performance of different resilience approaches based on the potential hazards associated with each flood characteristic.

1063

1.A.1. Flood Mapping Process

1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074

FEMA’s Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs) are a widely available and easily accessible source for agencies to determine the Base Flood Elevation (BFE). In producing and updating FISs, FEMA typically uses a combination of two study approaches (approximate and detailed) in identifying a community’s flood hazards. The results of the FIS are presented on a map, referred to as a FIRM, and presented in the FIS report in a narrative, as well as graphically, as flood profiles attached to the narrative. Detailed study methods typically employ the use of engineering models which, at a minimum, result in the determination of BFEs or flood depths and regulatory floodways that will be displayed on the FIRM. The regulatory floodway is defined as the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the entire base flood (1-percent-annual-chance flood) discharge can be conveyed with no greater than a 1.0-foot increase in the

1075 BFE. NFIP communities are required to adopt regulatory floodways that must be designed to
1076 carry the waters of the base flood, without increasing the water surface elevation of that flood
1077 more than one foot at any point. A number of States have more restrictive floodway standards
1078 from a .001 to 0.5 foot rise that communities in those States must adopt. Flood hazard
1079 information for flooding sources that affect developed or developing areas are based on detailed
1080 studies whenever possible; approximate study methods, which are less rigorous than detailed
1081 methods and do not determine BFEs or floodways, may be used for undeveloped or sparsely
1082 developed areas. In general, the decision whether to use the approximate method or detailed
1083 method is based on existing and anticipated development in and near the floodplain. FISs used to
1084 develop BFEs and designate floodways and risk zones for developed areas of the floodplain have
1085 been produced for most NFIP communities.

FEMA's Flood Insurance Rate Maps and Flood Insurance Studies are a widely available and easily accessible source for agencies to determine the Base Flood Elevation. However, agencies may choose to utilize the 1-percent-annual-chance flood elevation from another credible source or choose to develop their own Base Flood Elevation using standard engineering practices.

1086

1.A.2. Riverine Floodplains

1087

1088 Riverine floodplains or valley areas adjacent to any size stream or river can be covered
1089 by floodwaters (Figure 2). Flooding in these areas results from excessive rainfall, snowmelt, or a
1090 combination thereof. If runoff is increased to the point that the carrying capacity of the channel is
1091 exceeded, flooding occurs. Flooding also occurs when the capacity of the stream channel is
1092 reduced by natural obstructions (ice or debris dams, sediment, and vegetation) and human-made
1093 obstructions (structures and facilities). Some areas flood either from tributary stream overflow,
1094 backwater from a major stream, or from both simultaneously.

1095 Riverine 1-percent-annual-chance floodplains (or base floodplains) are designated as A
1096 Zones (A, AE, A1-30) on the Flood Insurance Rate Maps (FIRMs) (Figure 2) and Flood Hazard
1097 Boundary Maps (FHBM) (Figure 3) issued by FEMA. A detailed FEMA Flood Insurance Study
1098 (FIS) also may contain flood profiles for these areas of riverine hazard. Flood profiles (Figure 4)
1099 are graphs that usually include elevations for the 10-percent, 2-percent, 1-percent, and 0.2-
1100 percent-annual-chance flood. Elevations depicted on the FIRM or FHBM are for informational
1101 purposes only; therefore, agencies should refer to the profile in the FIS to obtain a more precise
1102 Base Flood Elevation.

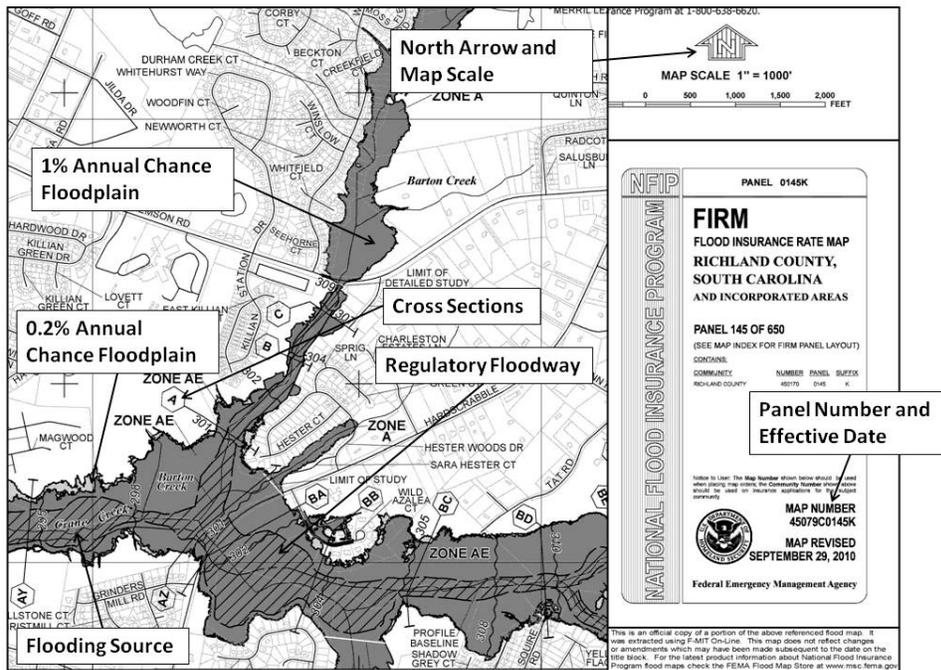
1103 The three figures below (Figures 2, 3 and 4) are examples of FEMA products that assist
1104 agencies in visualizing floodplains of various exceedances. Not shown is an example of a Flood
1105 Map Panel from a Flood Insurance Rate Map showing the upstream limits of a Flood Insurance
1106 Study. It is FEMA's policy not to map flood hazard areas that have less than one square mile of
1107 drainage or less than one foot of flooding during the 1-percent-annual-chance flood. However,
1108 flooding conditions could exist. Therefore, consideration should be given to seeking information

1109 from a Federal, State, or other source or seeking the services of a professional engineer with the
 1110 ability to develop information about the floodplain.

1111 For most of the Flood Maps produced since January 1985, flood insurance risk zones,
 1112 base flood elevations, and the regulatory floodway are presented on the Flood Map panels. These
 1113 Flood Maps present simplified flood insurance risk zone designations for the 1-percent-annual
 1114 chance floodplain. (That is, Zone AE is used in place of Zones A1 to A30 in riverine areas, and
 1115 Zone VE is used in place of Zones V1 to V30 in coastal areas.) Before January 1985, the
 1116 regulatory floodway was shown on separate Flood Maps, called Flood Boundary and Floodway
 1117 Maps. Also since 1985, a number of the Flood Maps depict areas for the 0.2-percent-annual-
 1118 chance floodplain as Zone X (the shaded Zone X is comparable to Zone B on older Flood Maps)
 1119 and areas outside the 0.2-percent-annual-chance floodplain as Zone X (unshaded Zone X is
 1120 comparable to Zone C on older Flood Maps).

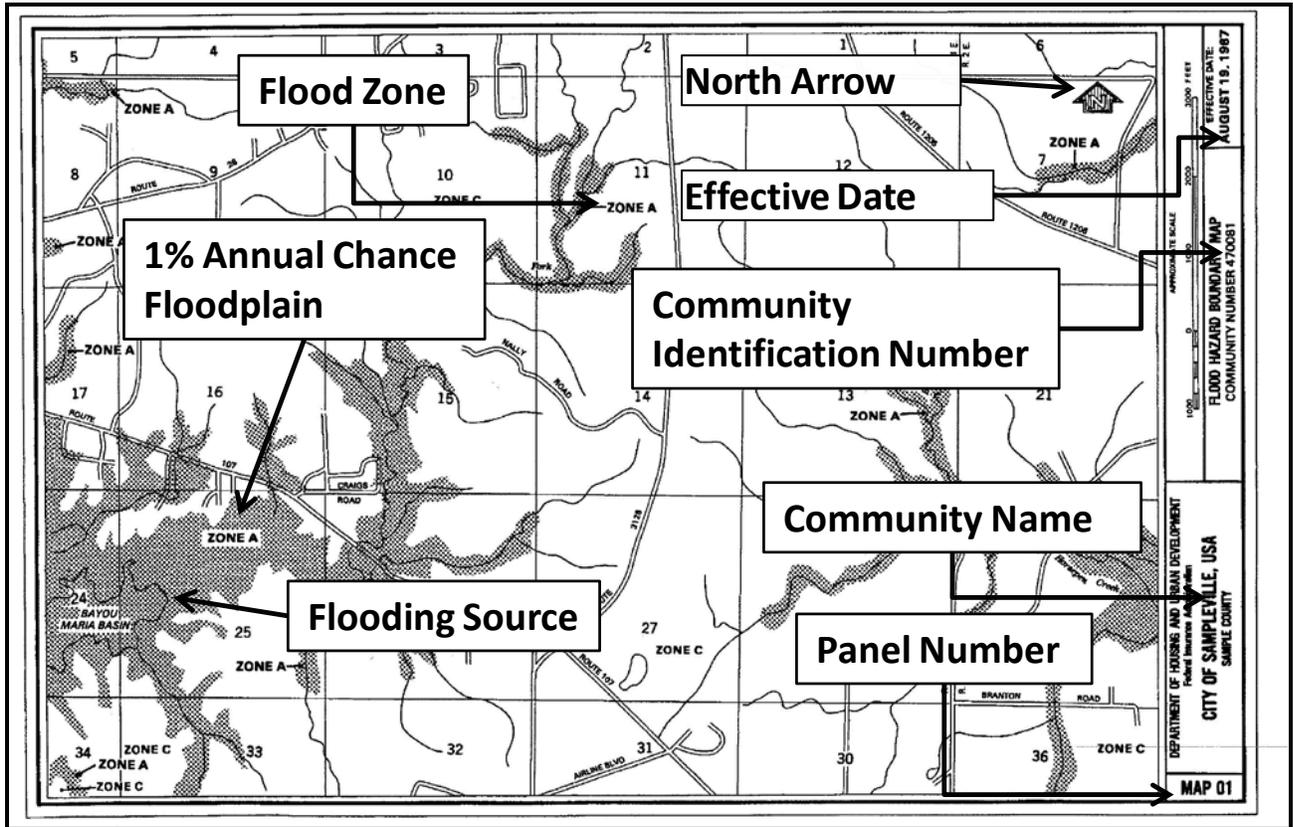
1121 In this section, the key elements common to Flood Maps are described and illustrated. As
 1122 a result of variations in format and content, all elements described here do not appear on every
 1123 Flood Map.

1124 **Figure 2. Flood Map Panel Elements for a Riverine Flood Hazard Area**



1125 Figure 2 shows an excerpt of a sample FIRM for a riverine flood hazard area. In addition to the base map
 1126 features (e.g., major highways, roads, railroads, and community boundaries), this map depicts a
 1127 regulatory floodway, cross sections, flood zones and flood zone boundaries, 1-percent-annual-chance
 1128 and 0.2-percent-annual-chance floodplains, a north arrow, panel number, effective date, community
 1129 name, and NFIP community identification number.
 1130

1131 **Figure 3. Sample Flood Hazard Boundary Map (FHBM)**

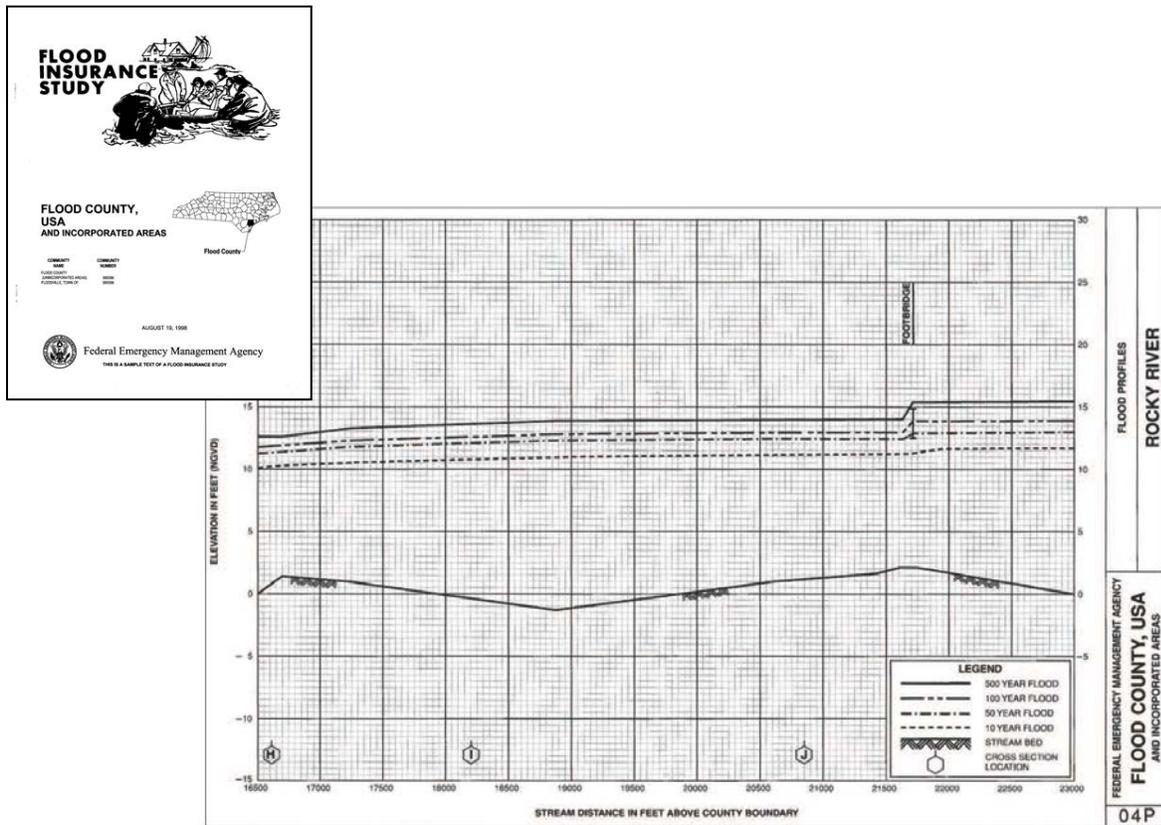


1132
1133

1134 *Figure 3 shows a sample FHBM for a riverine flood hazard area. In addition to the base map features*
1135 *(e.g., major highways, roads, and community boundaries), this map depicts riverine flooding sources,*
1136 *flood zones and flood zone boundaries, 1-percent-annual-chance floodplain (Zone A with no Base Flood*
1137 *Elevations (BFEs) shown) and areas outside the 0.2-percent-annual-chance floodplains (Zone C), a north*
1138 *arrow, panel number, effective date, community name, and community identification number.*

1139

1140 **Figure 4. Sample Flood Insurance Study (FIS) and Flood Profile**



1141
 1142 *Figure 4 shows the cover of a sample FIS, which is a compilation and presentation of flood risk data for*
 1143 *specific watercourses, lakes, and coastal flood hazard areas within a community. It also includes a*
 1144 *sample flood profile from an FIS, which shows the stream distance in feet on the horizontal axis (or x-*
 1145 *axis), flood elevations in feet on the vertical axis (or y-axis), cross section locations, the stream bed, and a*
 1146 *footbridge location.*

1.A.3. Coastal Floodplains

1147
 1148 Coastal floodplains border oceans, estuaries, some lakes, or similar large bodies of
 1149 standing water (Figure 5). Flooding in these areas is due to landward flows caused by unusually
 1150 high tides, waves from high winds, storm surges, tsunamis (large waves in the sea associated
 1151 with very strong earthquakes or other impulsive disturbances), or by a combination of these
 1152 causes.

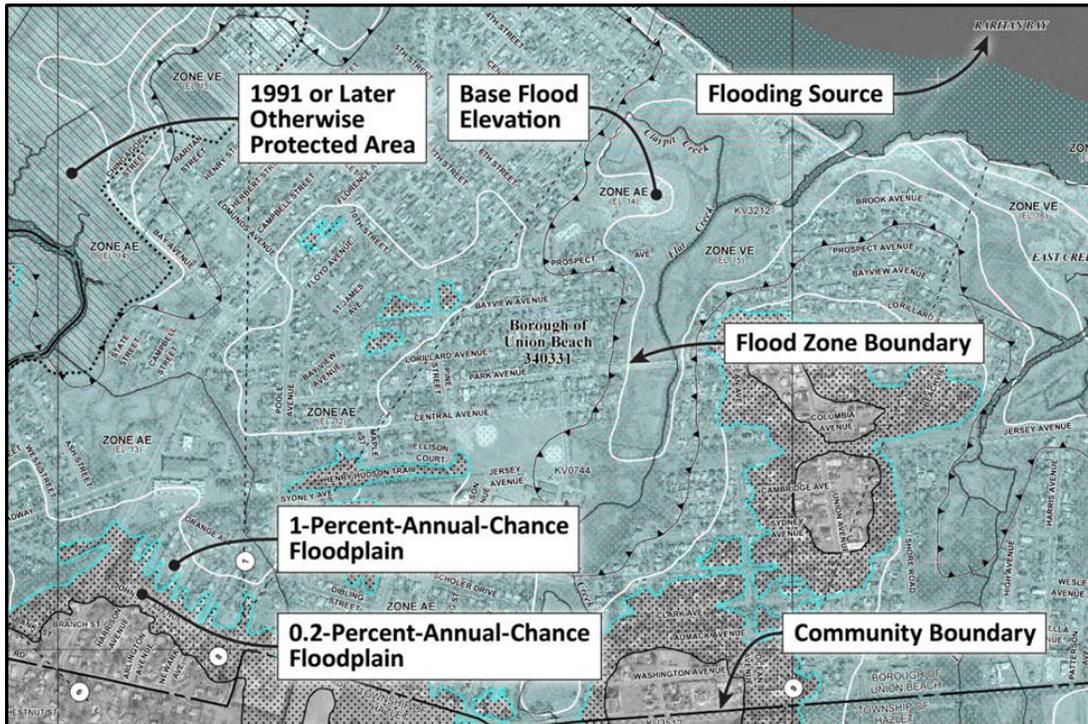
1153 Coastal 1-percent-annual-chance floodplains are designated as V Zones (V, VE, V1-30),
 1154 where the “V” stands for velocity wave action on the FIRMs and FHBMs issued by FEMA.
 1155 Where a detailed FIS is produced by FEMA, a coastal hydraulic analysis may include transects
 1156 instead of cross sections or profiles. A transect (not exhibited) shows the elevation of the ground
 1157 both onshore and offshore and the expected height of the wave crests and run-up above the storm
 1158 surge.

1159 V Zones are the more hazardous coastal flood zones because they are subject to high-
1160 velocity wave action. FEMA applies the V-Zone designation to those areas along the coast where
1161 water depth and other conditions would support at least a 3-foot wave height. FEMA usually
1162 designates A Zones in coastal areas landward of the V Zone. Coastal flood hazards areas mapped
1163 as A Zones can be subject to storm surge and damaging waves; however, the waves are less than
1164 3 feet in height.

1165 Post-storm field visits and laboratory tests have confirmed that wave heights as low as
1166 1.5 feet can cause significant damage to structures when constructed without consideration to the
1167 coastal hazards. Additional flood hazards associated with coastal waves, include floating debris,
1168 high velocity flow, erosion, and scour, can cause damage to Zone AE-type construction in these
1169 coastal areas.

1170 To help community officials and property owners recognize this increased potential for
1171 damage due to wave action in Zone AE, FEMA issued guidance in December 2008 that
1172 identified and mapped the 1.5-foot wave height line, referred to as the Limit of Moderate Wave
1173 Action (LiMWA). The LiMWA alerts property owners on the coastal side of the line that
1174 although their property is in a Zone AE, their property may be adversely affected by waves as
1175 low as 1.5 feet high. Consequently, property owners and community officials need to be aware of
1176 the high flood risk in the area between this inland limit and the Zone VE boundary, although the
1177 risk is not as high as in Zone VE (see Figures 6 and 7).

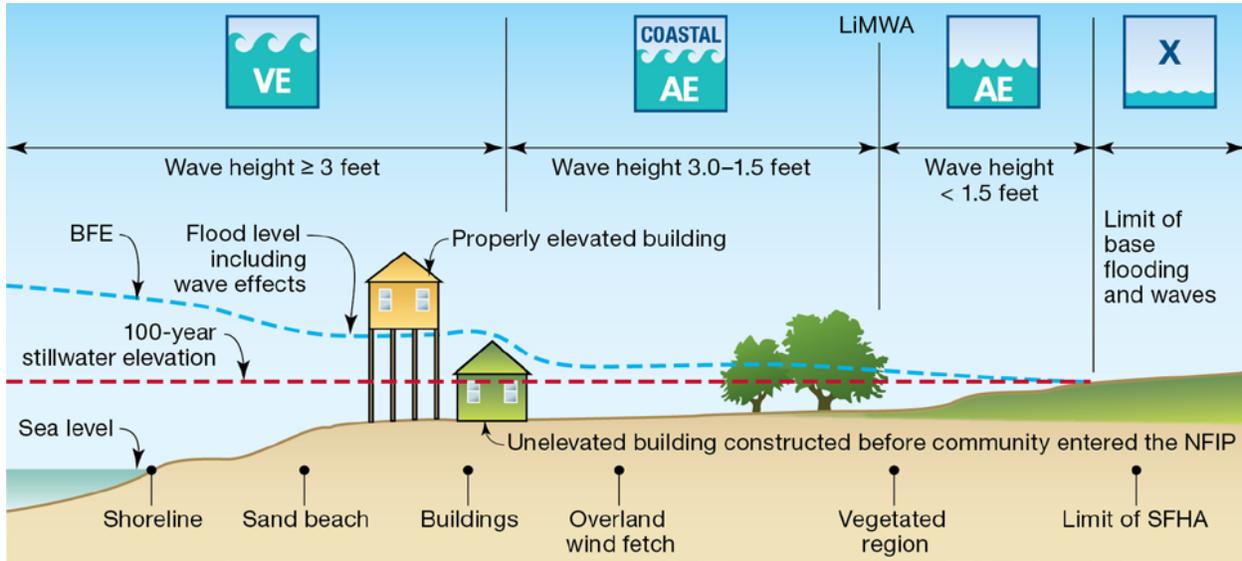
1178 **Figure 5. Flood Map Panel Elements for a Coastal Hazard Area Map**



1179

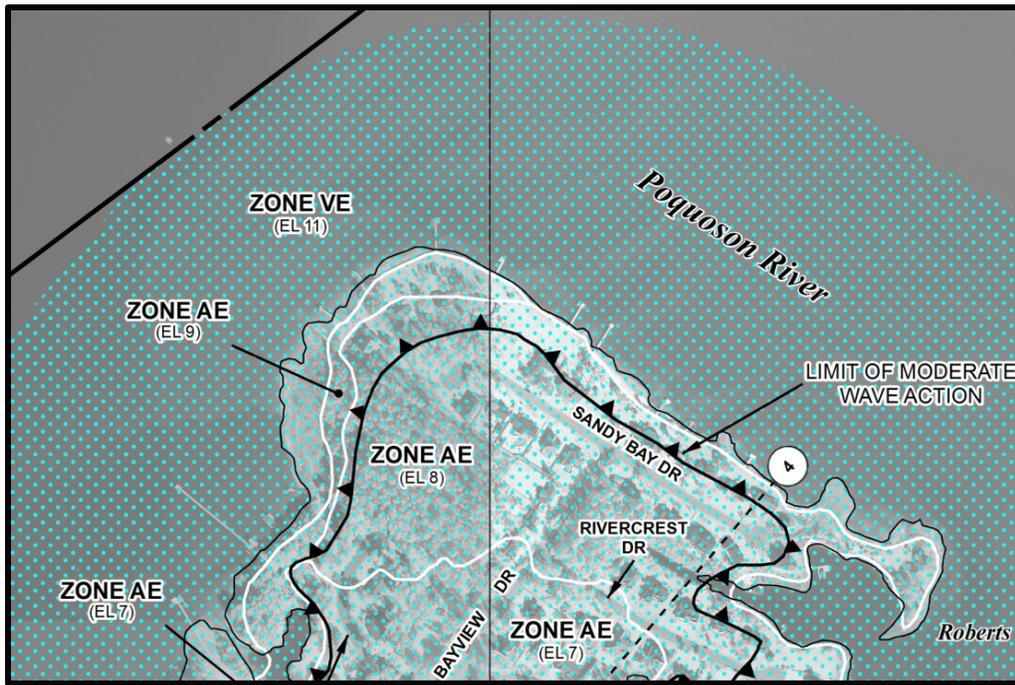
1180 Figure 5 shows a portion of a sample FIRM for a coastal flood hazard area. In addition to the base map
 1181 features (e.g., major highways, roads, and community boundaries), this map depicts coastal flooding
 1182 sources, flood zones, 1-percent-annual-chance floodplains (Zone VE with BFEs rounded to the nearest
 1183 whole foot and Zone V with no BFEs), 0.2-percent-annual-chance floodplains (Zone X (shaded)), areas
 1184 outside the 0.2 percent-annual-chance floodplains (Zone X (unshaded)), and Otherwise Protected Areas
 1185 (OPAs).

1186 **Figure 6. Depiction of the Limit of Moderate Wave Action (LiMWA)**



1187

1188 **Figure 7. Excerpt of FIRM with Limit of Moderate Wave Action (LiMWA)**



1189

1190
1191
1192
1193
1194
1195
1196
1197
1198
1199
1200
1201

1.A.4. High-Hazard Areas

Within the base floodplain, extreme hazard is associated with those portions of riverine and coastal floodplains nearest to flood sources, where depths and velocities of floodwaters are greatest. These areas are usually referred to as a “floodway” and “coastal high-hazard area,” and with few exceptions, are locations to avoid. Locating buildings, facilities, and other development, including fill, can obstruct flood flows and cause the water to slow down and back up, resulting in higher flood elevations. A floodway is included in most riverine Flood Insurance Studies. Actions proposed in the floodway should undergo an encroachment review to determine if the action has any effect on flood flow or may cause any other problem. The coastal high-hazard area is the most hazardous part of the coastal floodplain, due to its exposure to wave effects. These are the floodplain areas where flooding is not only most frequent and damaging, but where natural and beneficial values of the land and water interface are at their maximum.

1202
1203
1204
1205
1206
1207
1208
1209
1210
1211

1.A.5. Special Floodplain Areas

Special floodplain areas encompass sheet flow or shallow flooding areas, wetlands, mudflows, and ground failures, such as sinkholes, subsidence, and liquefaction. When a clearly defined channel does not exist, the path of flooding is unpredictable. In some cases, high velocity flow may occur with sheet flow, as it does commonly on, for example, alluvial fans, which are shown as Zone AO with depth and velocity on the FIRMs. Areas of shallow flooding are designated on the FIRMS as either AO, AH, AR/AO, or AR/AH on a FIRM with a 1-percent annual-chance or greater flooding to an average depth of one (1) to three (3) feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident.

1212
1213
1214
1215
1216
1217
1218
1219
1220

Areas of approximate study, designated Zone A on a FIRM or FHBM with no BFEs shown, are determined by FEMA in areas where there is little or no development and it is not expected in the future. In order to determine the boundary of the 1-percent-annual-chance flood, agencies must draw information from a variety of sources – soils mapping, actual high water marks, aerial photographs of previous floods, and topographic maps. These data are used to populate automated flood engineering models to generate the approximate boundary of the 1-percent-annual-chance flood. For assistance in determining 1-percent-annual-chance flood elevations or in obtaining flood study data in areas of approximate study, contact the agencies listed in Table 1 and Appendix A.

1221
1222
1223
1224

Other flood problems are caused when development occurs in areas drained by sinkholes, which often become plugged. Subsidence and liquefaction of soil may cause flooding of areas in the immediate vicinity of the ground failure, while mudflows may cause damages downstream of the location where the initial ground failure occurred.

1225 **1.A.6. Potential Sources of Floodplain Information and Technical Assistance**
 1226 **Services**

1227 FEMA has published maps for approximately 21,000 of the over 22,000 NFIP
 1228 participating communities, and more maps continue to be published. Many of the communities
 1229 that have a FIRM also have an FIS report containing detailed flood information. Less than 5,000
 1230 NFIP communities have FEMA maps showing the approximate areas of the base (Zone A)
 1231 floodplain that do not have base flood elevations or other detailed data as indicated in Figure 3.
 1232 There are currently 190 unmapped NFIP participating communities.

1233 If a decision involves an area or location within extensive Federal or State holdings, it is
 1234 unlikely that FIS reports and FIRM or FHBM maps would be available. In this event,
 1235 information should be sought from the land administering agency before information and/or
 1236 assistance is sought from the agencies listed in Table 1. If none of these agencies has information
 1237 or can provide assistance, the services of an experienced consulting engineer should be obtained.

1238 **Table 1: Resources for Floodplain Information and Technical Assistance**

1239 *The agencies listed in the table below may be able to provide information that can assist decision-makers*
 1240 *in determining whether a potential action will be located in or impact a floodplain. The information types*
 1241 *and levels of technical assistance vary greatly. Appendix A provides additional detail on resources that*
 1242 *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 (NRCS)	✓	✓	✓
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 (FWS)	✓	✓	✓
United States Geological Survey (USGS)	-	-	✓
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.		

1243 **1.B. DETERMINATION OF THE FLOODPLAIN**

1244 For purposes of the Order, all agency heads will determine if the proposed action is
1245 located in the floodplain. The intent of the new definition of floodplain as amended by E.O.
1246 XXXXX is to ensure that uncertainties associated with climate change and other future changes
1247 are more adequately accounted for in the agency decision-making process. Agencies may use
1248 any of the approaches included in the definition to determine the flood elevation and flood
1249 hazard area for a given action. Agencies should use an approach that takes advantage of best-
1250 available information and data. When actionable climate science is available, the Climate-
1251 informed Science Approach is preferred. Regardless of which approach is selected, there are
1252 distinctions within the approach for critical versus non-critical actions and actions proposed for
1253 locations vulnerable to flooding from riverine versus coastal flood hazards.

1254 There are several important concepts that agencies should keep in mind as they develop
1255 procedures for determining the flood elevation and flood hazard area. These include the
1256 importance of considering the best-available data and information and use of State, Tribal,
1257 Territorial, or Local Government standards.

1258 ***Use of best-available, actionable hydrologic and hydraulic data and methods that integrate***
1259 ***current and future changes in flooding based on climate and related science***

1260 Climate change can affect property, human health and welfare in various ways – one of
1261 which is through increased risk of flooding. The Order anticipates increases in both climate
1262 change impacts and the intensity of those impacts over time. As a result, these Guidelines
1263 encourage agencies to use best-available and actionable science, including engineering methods,
1264 to develop innovative solutions that reflect the evolving nature of flood hazards in relation to
1265 physical and socioeconomic vulnerability. The Climate-informed Science Approach utilizes the
1266 best-available, actionable hydrologic and hydraulic methods and data that integrate current and
1267 future changes in flooding based on climate and related science to determine the flood elevation
1268 and flood hazard area. Using scientific information to prepare for climate change can help
1269 agencies evaluate alternatives to locating in the floodplain and to better manage the flood risk
1270 and minimize impacts and costs over time if there are no alternatives to locating in the
1271 floodplain. Climate-related science information continues to grow and evolve, and it is the intent
1272 of this standard that agencies will use the latest science, in consideration of policies, procedures,
1273 criticality and consequences, to make their determinations of the flood elevation and flood
1274 hazard area. (In some cases, this flood elevation could correspond to the projected 1-percent-
1275 annual-chance flood.)

1276 ***Use of best-available information***

1277 Agencies should consider using the best-available information in determining whether a
1278 proposed action will be located in a floodplain if the agency uses either the Freeboard Value
1279 Approach or the “500-year” Elevation Approach. FEMA’s FIRMs and FISs are established as
1280 the starting point for making this determination. When a FIRM or FIS is revised, a FEMA draft
1281 or preliminary flood insurance study would be developed. The information from this study may

1282 serve as best available information if the information shows that a site previously located outside
1283 the floodplain is now in the floodplain or that the Base Flood Elevation at the site has increased.

1284 If the information from the study shows that the Base Flood Elevation or 0.2-percent-
1285 annual-chance flood elevation has increased, the agency should use the higher base flood
1286 elevation and apply the freeboard to that elevation or use the higher 0.2-percent-annual-chance
1287 flood elevation for the decision-making process. For example, if FEMA’s preliminary flood
1288 insurance study indicates that the Base Flood Elevation at a site has increased by two feet, then
1289 the two-foot freeboard or three-foot freeboard for critical actions would be added to the two foot
1290 increase in the Base Flood Elevation.

1291 To find information on whether an FIS is underway in a community and whether
1292 preliminary flood insurance information is available, agencies can check FEMA’s Flood Map
1293 Service Center (MSC) on their website. Agencies may also contact the FEMA Regional Offices
1294 listed in Appendix A regarding draft FIS information or other information about the flood
1295 hazards in a particular community.

1296 Advisory Base Flood Elevations (ABFEs) are developed under certain situations. FEMA
1297 may develop ABFEs after a major disaster in order to assist communities and property owners in
1298 making rebuilding decisions. Agencies should consider using the ABFEs where available.
1299 Agencies can contact the FEMA Regional Offices to find out if ABFEs have been developed
1300 after a disaster.

1301 If a FIRM, FIS, or FHBM are not available from FEMA for the proposed location and the
1302 agency is using the Freeboard Value Approach or the “500-year” Elevation Approach, the
1303 agency may seek information about the base floodplain, 1-percent-annual-chance flood, and 0.2-
1304 percent-annual-chance flood from other Federal, State, or Local agencies. The agency also may
1305 seek the services of a professional engineer with the ability to develop information about the
1306 floodplain. As an alternative, agencies could also consider using the Climate-informed Science
1307 Approach if there is available actionable science to determine the flood elevation and flood
1308 hazard area.

1309 ***Use of State, Tribal, Territorial, or Local Government Standards***

1310 The elevation standards of the Federal Flood Risk Management Standard are not intended
1311 to supplant applicable State, Tribal, Territorial, or Local floodplain protection standards. A
1312 Federal agency will consider State, Tribal, Territorial, and Local laws and regulations to
1313 determine whether their floodplain management standards exceed the Federal Flood Risk
1314 Management Standard. If such standards exceed the Federal Flood Risk Management Standard,
1315 the Federal agency should apply such standards if the agency determines the application of the
1316 standards is reasonable in light of the goals of E.O. 11988 and any amending Executive Orders.
1317 A modification of Federal action to meet such State, Tribal, Territorial, or Local standards does

1318 not necessarily mandate an increase of the Federal financial investment in the action, particularly
1319 where state, tribal, territorial, or local entities have non-Federal cost-sharing requirements.

1320 **1.B.1. Climate-Informed Science Approach**

1321 *Non-critical Actions*

1322 The Climate-informed Science Approach utilizes the best-available, actionable
1323 hydrologic and hydraulic data and methods that integrate current and future changes in flooding
1324 based on climate and related science to determine the flood elevation and flood hazard area in a
1325 manner appropriate to policies, practices, criticality and consequences. (In some cases, this flood
1326 elevation could correspond to the projected 1-percent-annual-chance flood.) This approach
1327 ensures that expected future changes, including changes in climate, land use, or other watershed
1328 characteristics, are incorporated into calculations of expected flood levels. Calculations are
1329 different for areas that may experience riverine or coastal flood hazards.

1330 *Coastal Flood Hazards*

1331 The Climate-informed Science Approach for areas vulnerable to coastal flood hazards
1332 incorporates scenarios of time-dependent regional sea-level change into the best-available
1333 hazard information that takes into consideration the anticipated life of the action and risk
1334 associated with that action. An example approach may be to use NOAA (Parris et al.
1335 2012) or similarly developed global mean sea-level-rise (GMSLR) scenarios, adjusted to
1336 local relative sea-level (LRSL) conditions to determine possible future conditions. The
1337 LRSL conditions should be combined with surge, tide, and wave data to determine the
1338 flood elevation and flood hazard area using state-of-the-art science in a manner
1339 appropriate to policies, practices, criticality, and consequences. (In some cases, this flood
1340 elevation could correspond to the projected 1-percent-annual-chance flood.) As another
1341 example, an agency could start with the best-available coastal flood hazard information,
1342 which in many cases could be FEMA-mapped stillwater elevations, and add the plausible
1343 changes in sea level using scenarios from such sources as NOAA or the LRSL to
1344 determine a future 1-percent-annual-chance elevation. The agency would project this
1345 future elevation inland to determine the floodplain. This second example is a simplified
1346 approach that may address agency needs to identify the floodplain quickly and with
1347 relatively low up-front cost. It should be noted that in cases where local relative sea level
1348 is expected to fall rather than rise, the anticipated flood elevations to which the action
1349 may be expected to be exposed over the entire life of the action should be considered.

1350 In following this methodology, the agency must consider a number of factors about the
1351 action, including an assessment of the risk to which the action will be exposed, the
1352 anticipated level of investment, the anticipated life of the action, and the consequences of
1353 exposure of the action to flood hazards. These factors should help inform choices the
1354 agency makes in determining the flood elevation, such as which GMSLR scenario to use,
1355 the time horizon to consider, and level of rigor to apply in the analyses.

1356 Riverine Flood Hazards

1357 The Climate-informed Science Approach for areas vulnerable to riverine flood hazards
1358 combines an agency’s actionable hydrological and hydraulic methodologies with the
1359 additional consideration of incorporating plausible future conditions resulting from
1360 changes in climate, land use, or other watershed characteristics. Specifically, the agency
1361 should conduct a hydrology study that is informed by expected changes in climate and
1362 land-use factors. This future-oriented hydrologic analysis should be incorporated into the
1363 current process used by the agency to calculate flood elevation and flood hazard area of
1364 the floodplain.

1365 In using this approach, the agency should again consider numerous factors about the
1366 action, including anticipated level of investment, anticipated life of the action, and the
1367 consequences of exposure of the action to flood hazards. These factors should assist the
1368 agency in making appropriate decisions about data sources to use in their analyses,
1369 methodologies, level of rigor to apply in analyses, and the time horizon to consider.

1370 ***Critical Actions***

1371 For critical actions affected by coastal or riverine flood hazards, the flood elevations
1372 informed by the Climate-informed Science Approach can be adjusted to be higher to account for
1373 the increased consequences associated with flood damage. The Climate-informed Science
1374 Approach for critical actions will use the same methodology as used for other actions, but with
1375 emphasis on criticality as one of the factors for agencies to consider. For example, for coastal
1376 systems, agencies can take a more conservative approach for critical actions by choosing a
1377 higher sea-level rise scenario that will result in a higher flood elevation. For riverine systems,
1378 agencies could assume a larger impervious surface that would increase the potential runoff to the
1379 river and result in a higher potential flood elevation.

1380 **1.B.2. Freeboard Value Approach**

1381 ***Determination of Elevation***

1382 The Freeboard Value Approach is based upon the current Base Flood Elevation, with the
1383 addition of freeboard to account for uncertainties in future conditions. For non-critical actions in
1384 areas prone to either riverine or coastal flood hazards, a freeboard of two (2) feet should be
1385 added to the Base Flood Elevation. For critical actions, a freeboard of three (3) feet should be
1386 added to the Base Flood Elevation to determine the flood elevation for actions.

1387 ***Determination of Flood Hazard Area***

1388 There are several methods that can be used to approximate the floodplain without first
1389 calculating the elevation using one of the approaches described in section 6(c) of the Order. Two
1390 examples are listed below.

- 1391 1) The first such approach would be to review existing FEMA FIRMs and FIS reports to
1392 determine whether the proposed action is located within the existing base floodplain, or

1393 based on the best available information (See Step 1). If the proposed action is located
1394 within the existing base floodplain or based on best available information, then the
1395 proposed action will be located within the floodplain. The agency should then add the
1396 appropriate freeboard to the Base Flood Elevation to determine the floodplain elevation.

1397 2) If the proposed location is not within the existing base floodplain but is close to the
1398 existing floodplain boundary, the agency may consult a topographic map or seek the
1399 services of a professional surveyor to determine the ground elevation of the location. The
1400 agency should then add the appropriate freeboard to the Base Flood Elevation to
1401 determine the floodplain elevation. If the ground elevation is lower than the floodplain
1402 elevation, the action should be considered to be in the floodplain and the requirements of
1403 the Order apply to the proposed action.

1404 **1.B.3. “500-year” Elevation Approach**

1405 The “500-year” Elevation approach allows an agency to use the 0.2-percent-annual-
1406 chance flood elevation to determine the elevation and flood hazard area. In some areas, FEMA
1407 has already calculated the 0.2-percent-annual-chance flood elevation and mapped the
1408 corresponding floodplain on a FIRM and FIS. If such data do not exist, an agency may obtain
1409 such calculations of the 0.2-percent-annual-chance flood elevation and floodplain from another
1410 existing source or by making their own calculations. While this approach may be used for both
1411 riverine and coastal floodplains, it is important to evaluate the 0.2-percent-annual-chance flood
1412 data you are using in coastal areas, and conduct an analysis of coastal flood hazards at the site
1413 that incorporates the local effects of wave action, scour and erosion, wave run-up, and
1414 overtopping. Thus, agencies are encouraged to ensure that this approach will achieve an
1415 appropriate level of flood resilience for the proposed action. This approach may be used for
1416 either non-critical or critical actions.

1417 **1.B.4. Additional Guidance for Selecting Among the Three FFRMS Approaches**

1418 When an agency is not using the Climate-informed Science Approach in areas subject to
1419 coastal flood hazards, the agency must use, at a minimum, the applicable freeboard elevation. In
1420 some instances, the FEMA 0.2-percent-annual-chance (“500-year”) flood elevation, which does
1421 not consider wave action, will be lower than the current base flood elevation or the base flood
1422 elevation plus the applicable freeboard; the 0.2-percent-annual-chance (“500-year”) flood
1423 elevation should not be used in these cases. When an agency is not using the Climate-informed
1424 Science Approach in riverine flood hazard areas, the agency may select either the Freeboard
1425 Value Approach or the 0.2-percent-annual-chance (“500-year”) elevation, as appropriate, and is
1426 not required to use the higher of the two.

1427 Actions that may be vulnerable to flooding from lakes present special challenges for
1428 agencies when selecting an approach to determine the elevation and flood hazard area for a
1429 floodplain. The Great Lakes shorelines are modeled for flood risk similar to other U.S. coastal
1430 regions in that they account for surge (seiche) and waves; therefore, there is current flood risk

1431 information for the Great Lakes shorelines from the National Flood Insurance Program. Future
1432 flood risk in the Great Lakes will be determined by future fluctuations in lake levels. Currently,
1433 there is significant uncertainty as to trends in future lake levels, because water level projections
1434 for the individual lakes vary by several feet among the available climate models. As a result,
1435 there is not currently a recommend approach for determining the elevation or flood hazard area
1436 for the Great Lakes shoreline. Generally speaking, the applicability of an approach to other lakes,
1437 including whether they should be considered as riverine or coastal, should be handled on a case-
1438 by-case basis. If considering lakes as coastal floodplains, sea-level-rise scenarios do not apply.

1439 **1.B.5. Procedures if Site is Out of the Floodplain**

1440 Actions above the elevations established in the approaches described in the FFRMS and
1441 outside determined flood hazard area would meet the minimum requirements, and no further
1442 action is required for compliance with the Order unless the action impacts the floodplain (Step 4)
1443 or indirectly supports floodplain development (Step 4.A.) In the absence of a finding to the
1444 contrary, agencies may want to consider structures or facilities that have been flooded as being
1445 located in a floodplain and, if so, apply the eight-step decision-making process.

1446 If a ground elevation for a proposed site is higher than the determined elevation, agencies
1447 should consider reviewing surrounding sites and their ground elevation relative to that elevation
1448 and evaluate such factors as whether the proposed action will be surrounded by flood water,
1449 whether it is a critical action, proposed use (if it is not a critical action), flood characteristics,
1450 access roads, and flood warning to determine whether the site is still appropriate.

1451 If the action is a critical action or other factors are relevant, agencies should undertake the
1452 eight-step decision-making process.

1453 **1.B.6. Procedures if Site is in the Floodplain**

1454 If the location of the proposed action is within the floodplain, both alternative sites
1455 outside the floodplain and alternative actions are to be identified and evaluated (Step 3), in an
1456 initial attempt to avoid the floodplain.

1457 **1.C. FEDERAL ACTIONS INVOLVING WATERWAYS ALONG OR**
1458 **CROSSING AN INTERNATIONAL BOUNDARY**

1459 When a Federal action involves waterways along or crossing an International boundary
1460 and has the potential to affect the waterways or floodplains of a foreign Nation, the agency
1461 should ensure that consultations with responsible authorities in the affected foreign Nation take
1462 place regarding the means to apply this standard in a manner consistent with International
1463 obligations.

1464

1465

STEP 2 – EARLY PUBLIC REVIEW

1466
1467
1468

Early public review is one of several requirements of the Order directed at the objective of public involvement. It should be considered in the context of the whole public involvement process.

1469
1470
1471
1472
1473
1474

The objective of public involvement is to provide sufficient information early enough in the process of making decisions affecting floodplains so that the public can have impact on the decision outcome. The Order 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. These requirements are stated in Section 2 of the Order, which:

1475
1476
1477
1478
1479

- Requires agencies to provide opportunity for early public review of any plans or proposals for actions in floodplains;
- Requires agencies to provide notice explaining a proposed action; and
- Requires preparation and circulation of a notice of findings and explanation prior to taking an action.

1480
1481
1482
1483
1484

An overview of these sections suggests that agency procedure should provide an integrated procedure for involvement of the public in the floodplain management decision-making process. Thus, to ensure that adequate information and opportunities are provided for the public to effectively participate in floodplain decisions, and to meet the requirements of the Order, the following elements should be incorporated in agency public involvement procedures:

1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499

- A description of the overall audience, including specific segments to whom public 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 possible;
- A description of the vehicles or public information mechanism which will be utilized to reach the target audience (e.g., public hearings, newsletters, workshops, advisory groups, etc.). The responsibility is to provide continuous interaction and involvement opportunities for the public during the floodplain decision-making process;
- A description of the purpose for which various public notice actions will be undertaken and assurance that public 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; and

- 1500 • A statement explaining the timing of public notice actions to promote public
1501 understanding and provide opportunities for the public to affect a proposed action
1502 or plan before alternative actions have been precluded.

1503 It is recognized that the public involvement process must be tailored to specific program
1504 types (permits, direct in Federally assisted projects, etc.) and will vary. Nevertheless, agency
1505 procedures must be compatible with section 2(b) of Executive Order 11514 (Appendix E), and
1506 must apply to actions which require preparation of an EIS, EA, or documented CE under NEPA.

1507 If there is a reasonable likelihood that a plan or proposed action or its alternatives will
1508 impact a floodplain, then it should be announced as early as that is known and not delayed until
1509 much more detailed information is developed.

1510 It is recognized that variations in program types will determine the earliest time in the
1511 floodplain decision-making process when the public can be notified. For example, in the case of
1512 a private developer applying for a permit to construct a housing complex with floodplain impact,
1513 the earliest public notice may not come until a point very late in the decision-making process. At
1514 that point, the only options maybe no project, or the project as designed and proposed. In another
1515 example, a major facility such as a proposed regional wastewater treatment facility requires
1516 considerable expenditure for site evaluation, engineering, and design. Public notice must precede
1517 major site identification and analysis so the public can have an input early in the decision-
1518 making process of preliminary site screening and selection. If not, public choice options may be
1519 foreclosed, or decisions will not be based on similarly detailed information bases.

1520 Early public notice is the first in a series of public information and involvement activities.
1521 This would logically be followed by continuing public communication at Step 4, in identifying
1522 impacts, Step 6, reevaluating alternatives through the environmental review process, and at Step
1523 7, in the issuance of findings and explanation of why the proposed plan or action must impact the
1524 floodplain.

1525 **STEP 3 – IDENTIFY AND EVALUATE PRACTICABLE ALTERNATIVES**
1526 **TO LOCATING IN THE FLOODPLAIN**

1527 Having determined that a proposed action is located in the floodplain, the agency is
1528 required by the Order to identify and evaluate practicable alternatives to locating in the
1529 floodplain. Alternatives to be evaluated include: (1) carrying out the proposed action at a
1530 location outside the floodplain (alternative sites); (2) other means which accomplish the same
1531 purpose as the proposed action (alternative actions); and (3) no action.

1532 **3.A. ALTERNATIVE SITES**

1533 Alternative sites must be identified and the practicability of such sites evaluated. If a
1534 practicable site exists outside the floodplain, the proposed action must not be located in the

1535 floodplain. Whenever a floodplain site is the only practicable alternative, the agency analysis
1536 leading to this conclusion should be fully documented. In determining the practicability of a non-
1537 floodplain site, the general concepts of site feasibility apply. At a minimum, site practicability
1538 shall be addressed in the light of the following:

- 1539 • Natural (topography, habitat, hazards, etc.);
- 1540 • Social (aesthetics, historic and cultural values, land use patterns, etc.);
- 1541 • Economic (cost of space, construction, services, relocation); and
- 1542 • Legal (deeds, leases, etc.).

1543 **3.B. ALTERNATIVE ACTIONS**

1544 Alternative actions must be considered before a decision is made to carry out an action in
1545 the floodplain. These are actions which substitute for the proposed action in that they comprise
1546 new solutions or approaches which serve the same function or purpose as that proposed, but
1547 which have less potential for harm. For example, where an agency has proposed the construction
1548 of a document storage facility within the floodplain to handle expanding record keeping needs,
1549 the alternative of storing documents offsite electronically could allay the need for a new
1550 structure. Similarly, rather than providing expanded waste treatment capacity for an area by
1551 constructing a new or larger facility in the floodplain, the alternative of using surplus capacity in
1552 a neighboring locale could serve the need for a new or expanded facility.

1553 When considering alternative actions that can serve the same function or purpose as the
1554 proposed action but that would result in less potential harm, an action that completely avoids the
1555 floodplain, as illustrated in the above examples, should be the preferred alternative. However,
1556 when considering alternative actions, agencies may want to consider whether existing natural
1557 features/ecosystem processes, or the restoration of natural features/ecosystem processes could be
1558 an appropriate alternative action. Specifically, agencies may want to consider the use of nature-
1559 based or nonstructural alternatives where these actions could appropriately be used in lieu of
1560 actions proposed in the floodplain. For example, an alternative to construction of a sea wall for
1561 shoreline stabilization could be the creation of a “living shoreline” using strategic placement of
1562 habitat components to accomplish the same purpose. When a nature-based approach is
1563 implemented in lieu of or to complement a proposed action in the floodplain, there may be
1564 reduced flood risk as well as less potential for degradation to the natural and beneficial
1565 floodplain values. In addition, there will likely be improvements over time to the natural and
1566 beneficial values of floodplains when preserving or restoring natural features or using nature-
1567 based approaches. If a nature-based approach is the preferred alternative action, this would still
1568 be an action in the floodplain subject to the remaining eight steps of the decision-making process
1569 in of E.O. 11988.

1570 **3.C. NO ACTION**

1571 No action is also an alternative, and assessment of this course is required. The alternative
1572 of no action probably cannot be fully evaluated until a determination has been made in Step 4 of
1573 the harm to or within the floodplain resulting from the proposed action.

1574 **STEP 4 – IDENTIFY IMPACTS OF THE PROPOSED ACTION**

1575 If the agency has determined that the only practicable alternative is locating in the
1576 floodplain, the impacts of the proposed action must be identified. Similarly, where actions
1577 proposed to be located out of the floodplain will affect the floodplain, impacts resulting from
1578 these actions must be identified. Agencies are required to identify impacts of their proposed
1579 actions on lives, property, and the natural and beneficial values of floodplains. The potential
1580 impacts of any nature-based approaches or restoration activities being considered should still be
1581 evaluated as part of the action and in consideration of the types of impacts outlined in these
1582 Guidelines.

1583 Since the Order is based primarily on NEPA, the agencies can draw upon the impact
1584 identification and assessment experience and guidance which they have developed in their
1585 implementation of NEPA. The concepts of impact assessment applicable to both NEPA and the
1586 Order are identical, with the Order's focus being narrower. The following discussion addresses
1587 general concepts of impact identification and assessment (Step 4.A.), and the two areas of
1588 concern which are impacted as a result of the occupancy and modification of floodplains; lives
1589 and property (Step 4B.), and floodplain values (Step 4.C.).

1590 **4.A. GENERAL CONCEPTS**

1591 In their regulations and procedures, the agencies must identify the means by which they
1592 will address the following impact-related issues:

- 1593 • All agency actions can have impacts associated with the modification of
1594 floodplains. Although the modification of floodplains and ensuing impacts most
1595 clearly result from actions located in the floodplain or at its periphery, it can also
1596 result from actions out of the floodplain.
- 1597 • Certain types of agency actions may support subsequent actions which have
1598 additional impacts of their own;
- 1599 • The Order focuses on the adverse impacts of proposed actions on lives and
1600 property, and on natural and beneficial floodplain values.
- 1601 • The three basic types of impacts are: (a) positive and negative; (b) concentrated
1602 and dispersed; and (c) short- and long-term.

1603 **4.A.1 Direct and Indirect Support of Floodplain Development**

1604 The Order requires the agencies to avoid the direct and indirect support of floodplain
1605 development whenever there is a practicable alternative. For the purposes of these Guidelines, an

1606 action supports floodplain development if it encourages, allows, serves or otherwise facilitates
1607 additional floodplain development. The agencies may also reflect in their regulations and
1608 procedures, the manner in which agency actions similarly accommodate-the maintenance of
1609 existing uses in the floodplain. That is, a proposed action can reinforce existing land use patterns
1610 which generally have developed without reflecting the concepts of hazard and risk minimization
1611 and restoration and preservation of natural floodplain values which form the basis of the Order.

1612 Direct support results from actions located on the floodplain, while indirect support
1613 results from those outside the floodplain. For example, the location of a major public service
1614 structure or facility (a post office, library or office building), in the floodplain, requires new or
1615 additional investment in or construction of support facilities for food service, parking, etc.
1616 Further, simply through their location, such actions would foster additional developments in the
1617 floodplain. Floodplain development could be indirectly supported by the provision of
1618 infrastructure (water and waste water systems, power supplies, highway and secondary road
1619 networks, mass transit systems and airports) outside the floodplain.

1620 It is the intent of the Order that the impacts of Federal actions and the impacts of actions
1621 supported by Federal actions be evaluated. However, the identification and evaluation of these
1622 positive and negative changes to the systems of flood losses, threats to life and health, and
1623 environmental values are often both difficult and even speculative. Moreover, the process by
1624 which an agency tries to describe the actions supported by their actions is both complex and
1625 often not well addressed in accepted methodologies, without a clear conceptualization of the
1626 supported action, there is little chance that the imports can be identified. On the other hand, when
1627 the supported actions are describable in terms of growth experience in the area or from
1628 experience with similar actions elsewhere, the impacts of the supported actions can be identified
1629 as they are for the proposed action.

1630 **4.A.2. Types of Impacts**

1631 The three basic types of impacts which must be addressed are: (a) positive and negative;
1632 (b) concentrated and dispersed; and (c) short and long term.

1633 *Positive and negative impacts:* both must be identified, even though the focus of impact
1634 identification and assessment is on negative or adverse impacts. This is necessary in order to
1635 identify the full range of impacts against which to weigh the practicability of a proposed action.
1636 In addition, it must be recognized that impacts which are beneficial to some, may be harmful to
1637 others. For example, draining wetlands establishes an environment which is suitable for certain
1638 uses, but at the expense of the beneficial values of the wetland.

1639 *Concentrated and dispersed impacts:* both may result from any action. The impact is
1640 concentrated if it occurs at or near the site of the action and is dispersed if it occurs at a site
1641 remote from the action. For example, a concentrated impact of constructing a building on a

1642 wooded area is the loss of vegetation at the site. A dispersed impact of the same action could be
1643 sedimentation downstream caused by erosion at the site.

1644 *Regional impacts:* watersheds and floodplains are interconnected systems that do not
1645 follow political boundaries and are part of larger regions that encompass multiple jurisdictions.
1646 To help limit the transfer of impacts, risks, or costs onto others, agencies should also consider
1647 actions that increase *regional* resilience to reduce unacceptable risks to structures, facilities, and
1648 communities. Such regional approaches to actions foster long-term resilience.

1649 *Short- and long-term impacts:* both must be analyzed in order to evaluate the total impact
1650 of an action. Short-term impacts are temporary changes occurring during or immediately
1651 following an action and usually persist for a short while. Long-term impacts occur during or after
1652 an action and may take the form of delayed changes or changes resulting from the cumulative
1653 effects of many individual actions. Long-term impacts may persist for a considerable time and
1654 may continue indefinitely. An example of a short-term impact could be sedimentation at or
1655 below a construction site. A long-term impact could be the loss of valley floodwater storage
1656 resulting from the cumulative effect of floodplain development.

1657 **4.A.3. Sources of Impacts**

1658 Regardless of the source of impacts, the agencies are required to identify the types of
1659 impacts discussed above which arise from their actions when these impacts affect the floodplain.
1660 This requirement applies to actions proposed both in and out of the floodplain. The location of
1661 the action causing the impact determines which of the requirements of the Order must be met by
1662 the agencies. For actions proposed in the floodplain, all of the requirements of the Order must be
1663 met as outlined (Figure 1). For actions proposed out of the floodplain, however, the Order does
1664 not require that the public notice and findings discussed in Steps 2 and 7 be prepared. Similarly,
1665 since in these cases the action causing the impacts in the floodplain is located outside of it, the
1666 practicability test (Step 3) is not required. As a minimum, however, the agencies must identify
1667 these impacts and minimize ensuing harm to or within the floodplain which would result if the
1668 action is taken as proposed. Because there is no requirement for public notice or the
1669 practicability test, the minimization responsibility (Step 5) takes on added significance. This
1670 should be reflected in agency procedures.

1671 The agencies are strongly encouraged to apply the public notice procedures and alternate
1672 sites and action evaluations to actions proposed out of the floodplain which will result in impacts
1673 to the floodplain. It has been recognized that public input in agency decision-making processes
1674 through NEPA has improved the environmental soundness of these decisions. It is even more
1675 reasonable to apply the alternate site and action evaluation to actions taking place outside the
1676 floodplain. The evaluation of alternatives to the proposed action, as discussed in Step 3, provides
1677 a better opportunity to explore the range of possibilities for avoiding adverse impacts to or within
1678 the floodplain than the more narrowly focused concepts of minimization, restoration and
1679 preservation discussed in Step 5. For example, the overall costs involved in locating a highway

1680 interchange, sewer interceptor line, airport facility, etc., at a location less directly affecting the
1681 floodplain could be less than the costs incurred in attempting to minimize the impact of the
1682 proposed action and to restore and preserve floodplain values.

1683 **4.B. LIVES AND PROPERTY**

1684 After determining that a proposed action is in the floodplain, the risk to lives and property
1685 involved in using that site must be determined. This requires an understanding of the magnitude
1686 and consequences of flooding that can be expected.

1687 **4.B.1. Nature of Hazard and Risk**

1688 Two basic types of floods are used in determining flood hazards: observed or historic
1689 floods and probability floods.

1690 *Historic Floods:* Often these can be the basis for deciding whether a proposed site is in a
1691 hazardous area. However, the fact that a certain level of flooding has been observed indicates
1692 little about how floods are likely to occur in the future. Even where records extend over a long
1693 period of time, the highest observed flood must not be used as the only guide for decision-
1694 making. With very few exceptions, flooding at any site can be expected to reach higher levels
1695 than those previously recorded because larger storms, urbanization, floodplain encroachment, or
1696 other factors affect flooding.

1697 *Probability Floods:* These are statistically derived floods. The one percent chance (100-
1698 year or base) flood is the term which describes the magnitude of flooding used by FEMA as the
1699 minimum acceptable level to which a community must regulate the floodplain in order to qualify
1700 for the National Flood Insurance Program. As stated previously, this magnitude flood has a one
1701 percent chance of being equaled or exceeded in any one-year period. The likelihood of exceeding
1702 the one percent chance flood magnitude increases with time periods longer than one-year period.
1703 For example the probability is about one in four that the one percent chance flood will be
1704 exceeded during the life of a 30-year mortgage.

1705 Large floods occur each year in many parts of the United States. No part of the country is
1706 immune from large floods. Consequently, it has become standard practice for agencies dealing
1707 with flood problems to calculate elevations of a greater flood to indicate the range of flooding
1708 which can and will occur.

1709 **4.B.2. High-Hazard Areas**

1710 High-hazard areas are those portions of riverine and coastal floodplains nearest the source
1711 of flooding. These are the frequently flooded areas that become arenas of major flood dynamics
1712 during large floods. Here, floodwaters exert their maximum pressures, erosion is greatly
1713 accelerated, and loss potential is increased. Additionally, these are the areas of coastal and
1714 riverine floodplains within which many of the most critical floodplain values are concentrated. In
1715 riverine situations, the high-hazard area is that portion of the floodplain where impedance to

1716 flood flow resulting from human activity can increase flood heights and consequently the area
1717 subject to flooding. In coastal floodplains, the high-hazard area is usually confined to the beach
1718 area in front of high bluffs or the crest of primary or foredunes, where wave impact is the most
1719 significant inducing factor. In light of the high loss potential and the likelihood of significant
1720 adverse effects to floodplain values associated with the conduct, support or allowance of actions
1721 in these portions of the floodplain, the agencies must rigorously apply the Order’s charge to
1722 avoid these areas.

1723 **4.B.3. Evaluation of Flood Hazard**

1724 Evaluation procedures must be established in writing by all agencies. This evaluation
1725 serves to express clearly the hazard involved and provides the basis for carrying out the
1726 succeeding phases of the analysis. Key questions which must be addressed by the agencies in
1727 establishing their regulations/and procedures for the evaluation of flood hazard include the
1728 following:

- 1729 • Is the proposed action to be located in the floodway portion of the riverine
1730 floodplain, or the coastal high-hazard area?
- 1731 • Is the proposed action in a flood fringe area such as a flood fringe portion of the
1732 riverine floodplain or the backwater areas of a coastal floodplain?
- 1733 • Is the flood hazard aggravated by the presence of, or potential for, destructive
1734 velocity flows, flood related erosion, or other special problems?
- 1735 • Is there a combination of flood sources present, which may flood simultaneously
1736 in the area (e.g., river and ocean, or shallow overland runoff and river, etc.)?

1737 **4.C. NATURAL AND BENEFICIAL FLOODPLAIN VALUES**

1738 Water and the adjacent floodplain exist in nature in a state of dynamic equilibrium; when
1739 coastal or riverine systems are disturbed, the environmental effects may affect areas far from the
1740 original site of the disturbance and can last for decades. Thus, floodplain actions must be viewed
1741 with caution and a careful assessment made of their impact on natural and beneficial floodplain
1742 values. Floodplains in their natural or relatively undisturbed state serve water resources values
1743 (natural moderation of floods, water quality maintenance, and groundwater recharge), living
1744 resource values (fish, wildlife, and plant resources), cultural resource values (open space, natural
1745 beauty, scientific study, outdoor education, and recreation), and cultivated resource values
1746 (agriculture, aquaculture, and forestry).

1747 **4.C.1. Water Resources**

1748 Floodplains provide for the natural storage of surface and ground waters and the natural
1749 improvement of water quality.

1750 *Natural Moderation of Floods:* The characteristics of the floodplain and of flooding are
1751 closely interdependent. Floods shape floodplain topography and soils and influence the ecology
1752 of the aquatic and floodplain systems. In turn, the physical characteristics of the floodplain shape

1753 flood flows. Except for some steep valley and coastal bluff landscapes, naturally vegetated
1754 floodplains can provide a broad area to spread and slow floodwaters, thereby reducing velocities
1755 and flood peaks. Stream meander, dune formation in coastal areas, and other natural processes
1756 which reduce the force of floodwaters are also accommodated in undisturbed floodplains.

1757 Floodplain encroachment modifies these processes. The effects of such modification are
1758 complex and not fully understood. Although in some cases encroachments may interact with
1759 natural processes to aid in the reduction of flood forces, their predominant effect has been to
1760 aggravate the flood hazard.

1761 In coastal floodplains, natural barriers exist in the form of sand dunes and certain
1762 vegetation, e.g., mangrove stands, which reduce the impact of high tides and storm surges.
1763 Alteration or removal of the barriers themselves, or the vegetative and drainage systems which
1764 support them, reduces or eliminates their role in the reduction of flood forces. In addition,
1765 excessive withdrawal of groundwater may result in land subsidence thereby increasing flood
1766 depths and exposing greater areas to flooding.

1767 *Water Quality Maintenance:* Floodplain vegetation and soils maintain the physical and
1768 chemical integrity of the water that ultimately supports biological communities. Runoff is slowed
1769 by vegetation, allowing the water to deposit not only sediments originating on land but also those
1770 scoured from the channel bank and bed. Sediment deposition may add rich nutrients to the
1771 floodplain soil and also keep sediment-associated pathogens from the water.

1772 However, siltation can destroy or degrade biological communities within floodplains
1773 because it contributes to eutrophication (nutrient overloading), decreased dissolved oxygen,
1774 increased water temperature, and serious impairment of photosynthetic productivity. Vegetation
1775 shades stream banks and decreases daily water temperature fluctuations thereby alleviating
1776 temperature stress to the biota. Vegetation slows the flow of water and provides slack waters that
1777 give the aquatic biota a greater chance to survive flooding. In addition, floodplain storage and
1778 vegetation reduces siltation in downstream reservoirs.

1779 *Groundwater Recharge:* An additional value of floodplain vegetation's role in slowing
1780 runoff is in groundwater recharge. Slowing the floodwater allows it to infiltrate through the
1781 generally porous floodplain soil. Base streamflow and the level of standing water bodies are
1782 regulated naturally by groundwater. During periods of excessive precipitation, runoff enters the
1783 groundwater system as well as stream channels and standing water bodies, thereby reducing peak
1784 flows; during the dry season, water generally flows from the groundwater system into surface
1785 waters, augmenting low flows.

1786 **4.C.2. Living Resources**

1787 The Nation's coastal and riverine floodplains support large and diverse populations of
1788 flora and fauna which represent valuable resources of great importance to society.

1826 However, certain agricultural uses and practices in the floodplain may adversely affect
1827 natural floodplain values. They may be incompatible with wildlife production; may induce
1828 aggravated erosion and sedimentation; or may result in the drainage of inland and tidal wetlands
1829 to increase the amount of arable land. Excessive fertilization and poor feedlot practices can result
1830 in nutrient pollution in local water bodies. Thus, proper management practices are essential
1831 where agriculture is proposed in sensitive floodplain areas.

1832 The use of floodplain areas for aquacultural operations has grown into a viable industry
1833 producing a wide variety of aquatic crops. Aquaculture is subject to similar limitations to those
1834 noted for agriculture, but if properly managed, can be compatible with the natural values of
1835 floodplains and may offer opportunities for the restoration of damaged floodplain values.

1836 Many of the Nation's valuable forest resources are found within floodplains. Bottomland
1837 hardwoods and other riparian species (those which can only flourish in close proximity to water)
1838 are important to the timber industry and the overall economy of the country. Thus, sound
1839 management of forest resources in the floodplain is also essential.

1840 **STEP 5 – MINIMIZE, RESTORE, PRESERVE**

1841 The requirements of the Order to minimize, restore, and preserve apply if a proposed
1842 action will result in harm to or within the floodplain. The term "harm," as used in the context of
1843 the Order, applies to both lives and property (Step 4.B.), and natural and beneficial floodplain
1844 values (Step 4.C.). The concept of minimization (Step 5.A.), applies to harm. The concept of
1845 restoration and preservation (Step 5.A.) applies only to floodplain values. Step 5.C. discusses
1846 some mechanisms which may be applied to achieve these three requirements.

1847 **5.A. MINIMIZE**

1848 Minimize is a demanding standard and requires the agency to reduce harm to the smallest
1849 possible degree, thus establishing a far more rigorous standard than other terms which often are
1850 used in similar contexts, e.g., alleviate (to lessen), mitigate (to moderate the severity of),
1851 ameliorate (to improve), etc. From the standpoint of lives and property, potential harm to or
1852 within the floodplain must be reduced to the smallest possible amount or degree. Where a critical
1853 action is proposed (see Step 2.C.) the goal is associated with higher levels of flooding. Similarly,
1854 from the standpoint of floodplain values, minimization requires that harm to such values be
1855 reduced to the smallest possible amount or degree. The Order's requirement to minimize
1856 potential harm applies to (1) the investment at risk, or the flood loss potential of the action itself,
1857 (2) the impact the action may have on others, and (3) the impact the action may have on
1858 floodplain values. The agencies must specify in their regulations and procedures, how actions
1859 will be designed and modified to minimize harm to or within the floodplain. (Also see page 1-4
1860 on the requirements to minimize harm.)

1861
1862
1863

1864
1865
1866
1867
1868

1869
1870
1871
1872
1873

1874
1875
1876
1877
1878
1879
1880
1881
1882
1883

1884
1885
1886
1887
1888
1889
1890
1891
1892

1893
1894
1895
1896

5.B. RESTORE AND PRESERVE

In the context of this Order, “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 floodplain values can again operate. 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 the Order, 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 minimize harm and restore and preserve the natural values of 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 actions may assist in moderating flood flows, thereby minimizing the harm caused by the action.

Although the Order emphasizes avoidance of the floodplain as the preferred manner 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 these examples. Additionally, agencies should note that the activities described in these examples

1897 would provide multiple benefits including the reduction of flood risks and the preservation and
1898 restoration of natural systems and ecosystem processes.

1899 **5.C.1. Natural Moderation of Floods**

- 1900 • Minimize floodplain fills and actions that require fills such as construction of dwellings,
1901 factories, highways, etc.
- 1902 • Require that structures and facilities on wetlands provide for adequate flow circulation.
- 1903 • Use minimum grading requirements and save as much of the site from compaction as
1904 possible.
- 1905 • Relocate nonconforming structures and facilities out of the floodplain.
- 1906 • Return site to natural contours.
- 1907 • Preserve free natural drainage-when designing and constructing bridges, roads, fills, and
1908 large built-up centers.
- 1909 • Prevent intrusion on and destruction of beach and estuarine ecosystems and restore
1910 damaged dunes and vegetation.
- 1911 • Preserve watershed functions of riverine or coastal systems when designing and
1912 constructing bridges, roads, fills, and large built-up centers.
- 1913 • Prevent intrusion on and destruction of beach and riverine ecosystems and restore
1914 ecological features such as damaged dunes, vegetation, and wetlands.
- 1915 • Preserve or restore natural features such as barrier islands, dunes, wetlands, and native
1916 vegetation to attenuate waves, stabilize sediment, and store floodwaters.

1917 **5.C.2. Water Quality**

- 1918 • Maintain wetland and floodplain vegetation buffers to reduce sedimentation and delivery
1919 of chemical pollutants to the water body.
- 1920 • Control agricultural activities to minimize nutrient inflow.
- 1921 • Control urban runoff, other storm water, and point and nonpoint discharges.
- 1922 • Control methods used for grading, filling, soil removal and replacement, etc., to minimize
1923 erosion and sedimentation during construction.
- 1924 • Prohibit the location of potential pathogenic and toxic sources on the floodplain, such as
1925 sanitary landfills and septic tanks, etc.
- 1926 • Use green infrastructure for stormwater management to improve water quality and reduce
1927 flood flows.
- 1928 • Preserve and restore wetland functions and riparian areas to facilitate groundwater
1929 recharge, improve water quality, and protect fish and wildlife habitats.
- 1930 • Modify or remove a structure to reconnect rivers to their floodplain.

1931 **5.C.3. Groundwater Recharge**

- 1932 • Require the use of pervious surfaces where practicable.
- 1933 • Design construction projects for runoff detention.

- 1934 • Dispose of spoils and waste materials so as not to contaminate ground or surface water or
1935 change land contours.

1936 **5.C.4. Living Resources**

- 1937 • Identify and protect wildlife habitat and other vital ecologically sensitive areas from
1938 disruption.
- 1939 • Require topsoil protection programs during construction.
- 1940 • Control wetland drainage, channelization, and water withdrawal.
- 1941 • Reestablish degraded floodplain ecosystems.
- 1942 • Minimize tree cutting and other vegetation removal.
- 1943 • Design floodgates and seawalls to allow natural tidal activity and estuarine flow.

1944 **5.C.5. Cultural Resources**

- 1945 • Provide public access to and along the waterfront for recreation, scientific study,
1946 educational instruction, etc.
- 1947 • Locate and preserve from harm historical cultural resources; consult with appropriate
1948 governmental agency or private groups.

1949 **5.C.6. Agricultural Resources**

- 1950 • Minimize soil erosion on cropped areas within floodplains.
- 1951 • Control use of pesticides, herbicides, and fertilizer.
- 1952 • Limit the size of fields.
- 1953 • Promote fence rows, shelter belts, and strip cropping.
- 1954 • Strengthen water bank and soil bank type programs to be consistent with alternate
1955 demands for the use of agricultural land.
- 1956 • Minimize irrigation return flows and excessive applications of water.

1957 **5.C.7. Aquacultural Resources**

- 1958 • Construct impoundments to minimize any alteration in natural drainage and flood flow.
1959 Existing natural impoundments such as oxbow lakes and sloughs could be utilized under
1960 proper management.
- 1961 • Limit the use of exotic species, both plant and animal, to those organisms already
1962 common to the area or those known not to compete unfavorably with existing natural
1963 populations.
- 1964 • Discourage mechanized operations.
- 1965 • Machinery such as dredges, weeders, and large-scale harvesting equipment may lead to
1966 environmental problems such as sediment loading to adjacent watercourses.

1967 **5.C.8. Forestry Resources**

- 1968 • Control the practice of clear-cutting, depending upon the species harvested, topography,
1969 and location.

- 1970 • Complement State law governing other aspects of harvest operations: proximity to
- 1971 watercourses, limits on roadbuilding, equipment intrusions, etc.
- 1972 • Include fire management in any overall management plans. Selective fire use may reduce
- 1973 the probability of major destructive fires.
- 1974 • Require erosion control plans on all timber allotments, roads, and skidways.

1975 These may be achieved through many types of administrative measures, depending in
1976 part upon the agency programs and authority.

1977 Some examples are:

- 1978 • Engineering and realty section standards and procedures.
- 1979 • Contract, grant, loan, permit, and license stipulations.
- 1980 • Application of appropriate encumbrances during land conveyance.
- 1981 • Information transfer and education of employees and public.
- 1982 • Delegation of responsibility for floodplain activities to a specific office with sufficient
- 1983 authority to play an active leadership role both within and outside of the agency.
- 1984 • Systematic review of existing agency programs to identify opportunities for floodplain
- 1985 value preservation and restoration.
- 1986 • Site surveys to identify opportunities for floodplain preservation and restoration; and
- 1987 • Provision of coordination methods within and outside of agency to enable the
- 1988 implementation of unified floodplain management measures.

1989 **STEP 6 – RE-EVALUATE ALTERNATIVES**

1990 Having identified the impacts the proposed action would have on the floodplain (Step 4),
1991 methods to minimize these impacts, and opportunities to restore and preserve floodplain values
1992 (Step 5); the proposed action should now be reevaluated. For proposed actions in the floodplain,
1993 the reevaluation should consider if the action is still feasible at this site. If not, consider limiting
1994 the action to make non-floodplain sites practicable. If neither is acceptable, the alternative is no
1995 action. If the proposed action is outside the base floodplain but has impacts which cannot be
1996 minimized (Step 5), consider whether the action can be modified or relocated to eliminate or
1997 reduce the identified impacts, or if the no action alternative should be chosen.

1998 The reevaluation should also include a provision for comparison of the relative adverse
1999 impacts associated with the proposed action located in and out of the floodplain. The comparison
2000 should emphasize floodplain values. However, a site out of the floodplain should not be chosen
2001 if the overall harm is significantly greater than that associated with the floodplain site.

2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036

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 of the Order 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. 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 the Order (section 2(a)(2)(ii)) through such mechanisms as OMB A-95 and NEPA procedures, or other public involvement programs. However, agency procedures must incorporate the development and issuance of a written statement of findings and public explanation which includes:

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:

- 2037 4. A statement indicating why the NFIP criteria are demonstrably inappropriate for the
2038 proposed action;
- 2039 5. A provision for publication in the Federal Register or other appropriate vehicle;
- 2040 6. A provision for a brief comment period prior to agency action (15 to 30 days);
- 2041 7. A description of how the activity will be designed or modified to minimize harm to or
2042 within the floodplain;
- 2043 8. A statement indicating how the action affects natural or beneficial floodplain values; and
- 2044 9. A statement listing other involved agencies and individuals.

2045 **7.A. INTERAGENCY NOTICE**

2046 Certain public review procedures already exist with which the Order’s review
2047 requirements are to be integrated.

2048 **7.A.1 Programs Subject to E.O. 12372**

2049 For programs subject to E.O. 12372, the agency shall follow its agency-specific
2050 procedures when sending a notice in compliance with E.O. 11988. The notice shall include (as a
2051 minimum) 1, 2, and 3 from above. It would also be helpful to the reviewer, and consistent with
2052 the intent of the Order, to include items 4 through 9.

2053 **7.A.2. Other Programs**

2054 For programs not subject to E.O. 12372 requirements, agencies must develop or ensure
2055 other existing procedures provide for similar notice and explanation of why a proposed action is
2056 to be located in a floodplain. This notice must be circulated among agencies and also made
2057 available to the public for review.

2058 **7.B. ACTIONS SUBJECT TO NEPA**

2059 For agency actions subject to NEPA which take place in the floodplain, the public review
2060 requirements discussed above as set out in Section 2(b) of Executive Order 11514, as amended,
2061 should include the nine items listed in the introduction to the step. Section 2(a)(4) of the Order
2062 requires the same public notice procedures for actions in the floodplain even though impacts are
2063 not significant enough to require the public review required for preparation of an environmental
2064 impact statement (EIS) under Section 102(2)(C) of NEPA (Public Law 91-190).

2065 Under NEPA procedures, a final EIS is circulated for public and interagency review and
2066 comment. A minimum of 30 days is required to allow a review and to receive responses from the
2067 public and governmental agencies. These comments must then be considered. The findings must
2068 be made in conjunction with a final agency decision and the formal statement of findings
2069 required by the Order must be issued prior to initiating the proposed action. A final EIS should
2070 explain, if appropriate, why the responsible official has recommended or why the agency might
2071 support an action located in a floodplain.

2072

7.C. ALL ACTIONS LOCATED IN THE FLOODPLAIN

2073

A statement of findings (including the explanatory information discussed in 7.A.) must be issued by the agency head in compliance with Section 2(a)(2) of the Order. This applies to all proposed actions located within or impacting the floodplain, including proposed actions whose impacts are not significant enough or are not otherwise required to complete an EIS.

2074

2075

2076

2077

STEP 8 – IMPLEMENT ACTION

2078

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 the Order. This is especially important for projects with long-term operation, maintenance and repair programs such as reservoirs or waste treatment facilities.

2079

2080

2081

2082