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# The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report

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American Institutes for Research

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# **The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report**

Prepared as part of the Evaluation of  
the National Flood Insurance Program

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American Institutes for Research  
1000 Thomas Jefferson St., NW  
Washington, DC 20007

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## REPORTS IN THE EVALUATION OF THE NATIONAL FLOOD INSURANCE PROGRAM

This Evaluation is composed of a series of reports assessing questions identified and prioritized by a steering committee about the National Flood Insurance Program. The reports of the Evaluation will be posted on the FEMA website as they are finalized. The website URL is <http://www.fema.gov/business/nfip/nfipeval.shtm>. The reports in the Evaluation are:

*The Evaluation of the National Flood Insurance Program—Final Report*  
American Institutes for Research and NFIP Evaluation Working Group

*Assessing the Adequacy of the National Flood Insurance Program's 1 Percent Flood Standard.* Galloway, Baecher, Plasencia, Coulton, Louthain, and Bagha, Water Policy Collaborative, University of Maryland.

*Assessing the National Flood Insurance Program's Actuarial Soundness.* Bingham, Charron, Kirschner, Messick, and Sabade, Deloitte Consulting.

*Costs and Consequences of Flooding and the Impact of the National Flood Insurance Program.* Sarmiento and Miller, Pacific Institute of Research and Evaluation.

*Developmental and Environmental Impacts of the National Flood Insurance Program: A Review of Literature.* Rosenbaum, American Institutes for Research.

*The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report.* Rosenbaum and Boulware, American Institutes for Research.

*An Evaluation of Compliance with the National Flood Insurance Program Part A: Achieving Community Compliance.* Monday, Grill, Esformes, Eng, Kinney, and Shapiro, American Institutes for Research.

*An Evaluation of Compliance with the National Flood Insurance Program Part B: Are Minimum Building Requirements Being Met?* Mathis and Nicholson, Dewberry.

*Evaluation of the National Flood Insurance Program's Building Standards.* Jones, Coulbourne, Marshall, and Rogers, Christopher Jones and Associates.

*Managing Future Development Conditions in the National Flood Insurance Program.* Blais, Nguyen, Tate, Dogan, and Petrow, ABSG Consulting; and Mifflin and Jones.

*The National Flood Insurance Program's Mandatory Purchase Requirement: Policies, Processes and Stakeholders.* Tobin and Calfee, American Institutes for Research.

*The National Flood Insurance Program's Market Penetration Rate: Estimates and Policy Implications.* Dixon, Clancy, Seabury, and Overton, RAND Corporation.

*Performance Assessment and Evaluation Measures for Periodic Use by the National Flood Insurance Program.* Miller, Langston, and Nelkin, Pacific Institute of Research and Evaluation.

*State Roles and Responsibilities in the National Flood Insurance Program.* Mittler, Morgan, Shapiro, and Grill, American Institutes for Research.

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## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>vii</b>
An Overview .....	vii
FEMA’s Implementation of NEPA and Executive Order 11988.....	x
Perceptions of Flood Risk, the NFIP and Floodplain Development.....	xi
The Community Rating System and Floodplain Management.....	xii
The NFIP and the Endangered Species Act.....	xii
The NFIP and the Coastal Barrier Resource System.....	xiii
<b>1. INTRODUCTION AND BACKGROUND.....</b>	<b>1</b>
1.1 Does the NFIP Facilitate Floodplain Development or Conservation?.....	2
<b>1.1.1 The NFIP’s Environmental Mandates .....</b>	<b>2</b>
<b>1.1.2 A Contested Impact.....</b>	<b>3</b>
1.2 Study Objectives .....	4
1.3 Organization.....	5
1.4 Methodology .....	7
<b>1.4.1 The NFIP Community Survey .....</b>	<b>7</b>
<b>1.4.2 The National Homeowner Survey.....</b>	<b>7</b>
<b>2. FEMA’S IMPLEMENTATION OF NEPA AND EO 11988 THROUGH THE NFIP .....</b>	<b>9</b>
2.1. Methodology .....	10
2.2 NEPA Requirements .....	10
2.3 EO 11988 Requirements .....	11
2.4 FEMA’s Institutional Implementation of NEPA and EO 11988 .....	12
<b>2.4.1 FEMA’s Rules Implementing NEPA.....</b>	<b>12</b>
<b>2.4.2 FEMA Rules Implementing EO 11988.....</b>	<b>13</b>
<b>2.4.3 FEMA’s Environmental Review Process .....</b>	<b>14</b>
2.5 EO 11988 and NEPA Implementation Through NFIP Regulations .....	15
<b>2.5.1 The NFIP Promotes Floodplain Conservation .....</b>	<b>16</b>
<b>2.5.2 The NFIP Also Removes Some Barriers to Floodplain Development.....</b>	<b>17</b>
<b>2.5.3 Are NFIP Premiums Important to Development? .....</b>	<b>20</b>
<b>2.5.4 Need for Better Data About Natural and Beneficial Floodplain Values .....</b>	<b>21</b>
<b>2.5.5 Floodplain Mapping and Protection of Natural and Beneficial Floodplain Values .....</b>	<b>22</b>
<b>2.5.6 The Letter of Map Change Process Can Discourage Floodplain Conservation.....</b>	<b>27</b>
<b>2.5.7 The LOMR-F Process Creates Floodplain Fill That May Affect Floodplain Values .....</b>	<b>29</b>
<b>2.5.8 LOMR-Fs and Endangered Species .....</b>	<b>30</b>
<b>3. FEMA’S LEADERSHIP IN PREVENTING UNECONOMIC USE AND DEVELOPMENT OF FLOODPLAINS.....</b>	<b>31</b>
<b>4. PERCEPTIONS OF FLOOD RISK AND NFIP AVAILABILITY.....</b>	<b>35</b>
4.1 Objectives.....	35
4.2 Methodology .....	35
<b>4.2.1 Development Interests: State Selection .....</b>	<b>36</b>
<b>4.2.2 Development Interests: Community Selection .....</b>	<b>36</b>
<b>4.2.3 Development Interests: Respondent Selection.....</b>	<b>37</b>
<b>4.2.4 Homeowner Survey .....</b>	<b>38</b>

4.3 Survey Analysis .....	38
<b>4.3.1 Perceptions of Flood Risk Compared</b> .....	39
<b>4.3.2 Perceptions and Behavior About Flood Risk</b> .....	41
<b>4.3.3 The Impact of Flood Insurance Rates on Development in the SFHA.</b> .....	43
<b>4.3.4 The Impact of Seasonal and Annual Residents on SFHA Development</b> .....	46
<b>4.3.5 Development in CBRS Areas</b> .....	46
4.4 Summary and Recommendation .....	47
<b>5. THE COMMUNITY RATING SYSTEM AND FLOODPLAIN CONSERVATION .....</b>	<b>49</b>
5.1 Objectives .....	49
5.2 Methodology .....	50
5.3 Participating CRS Communities Share Several Characteristics .....	50
5.4 Many Credited CRS Activities Intended to Promote Floodplain Conservation .....	51
5.5 CRS Floodplain Conservation Impacts Not Well Documented .....	51
5.6 CRS Participation Not A Priority for Most Communities .....	52
5.7 CRS Standards Should Receive NEPA and EO Programmatic Review .....	54
<b>6. NFIP AND THE ENDANGERED SPECIES ACT .....</b>	<b>55</b>
6.1 Litigation Involving the NFIP and the ESA .....	55
<b>6.1.1 Florida Key Deer v. Stickney (1994)</b> .....	55
<b>6.1.3 National Wildlife Federation and Public Employees for Environmental Responsibility v. FEMA and National Association of Home Builders</b> .....	58
6.2 NFIP May Sometimes Remove Barriers to Development of Endangered Species Habitat .....	59
<b>7. THE COASTAL BARRIER RESOURCE SYSTEM .....</b>	<b>61</b>
7.1 Sale of NFIP Policies on CBRS Lands .....	61
7.2 Why CBRS Units Are Developed .....	62
7.3 Federal Agencies Not Preparing CBRS Compliance Reports .....	63
<b>8. CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>65</b>
8.1 NFIP Insurance Removes Barriers to Floodplain Development .....	67
<b>8.1.1 Perceptions of Community Developers and Homeowners</b> .....	67
<b>8.1.2 NFIP Regulations and Development</b> .....	68
8.2 NFIP Premiums and Development .....	69
8.3 The Community Rating System and Community Development .....	70
8.4 NFIP and Endangered Species .....	71
8.5 NFIP and the Coastal Barrier Resource System .....	71
8.6 Improving the NFIP's Environmental Impact .....	72
<b>8.6.1 Institutional Resources and Challenges</b> .....	72
<b>8.6.2 Promoting Desirable Environmental Impacts</b> .....	73
8.7 Recommendations .....	73
<b>8.7.1 FEMA's Implementation of NEPA and EO 11988 Through the NFIP</b> .....	73
<b>8.7.2 Perceptions of Flood Risk and NFIP Availability</b> .....	75
<b>8.7.3 The Community Rating System and Floodplain Conservation</b> .....	75
<b>8.7.4 NFIP and the Endangered Species Act</b> .....	76
<b>8.7.5 The Coastal Barrier Resource System</b> .....	76
<b>9. APPENDICES .....</b>	<b>79</b>
Appendix 1: Conservation Relevant Interpretations of the National Flood Insurance Act of 1969 .....	79

<b>Appendix 1.1: Senate Committee on Currency and Banking</b> .....	79
<b>Appendix 1.2: House Committee on Currency and Banking</b> .....	80
Appendix 2: The NFIP State Survey .....	83
Appendix 3: Community Survey .....	85
<b>Appendix 3.1: Community Selection</b> .....	85
<b>Appendix 3.2: Statistical Methodology for Stratification and Sample Selection</b> .....	85
<b>Appendix 3.3: Community Interview Protocols</b> .....	87
Appendix 4: Interview Protocol for FEMA Regional Environmental Officers .....	109
Appendix 5: The National Homeowner Survey Methodology .....	111
<b>10. ACRONYMS</b> .....	<b>115</b>
<b>11. REFERENCES</b> .....	<b>117</b>

## LIST OF TABLES

Table 4.1: Pool of Survey Participants by Respondent Group .....	35
Table 4.2: “Please consider the likelihood of some part of your community flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will ‘not happen at all’ and 5 is flooding will ‘definitely happen’, how would you characterize the likelihood of flooding in your community?” .....	39
Table 4.3: “Using the same scale, please tell me how you think the residents of your community would characterize the risk from flooding when considering buying or building on property in your community's floodplain.” .....	39
Table 4.4: “Is this residence in a neighborhood where a flood could happen? .....	40
Table 4.5: “Consider the probability that a flood will cause damage to your home. Using a percentage, please estimate the probability that your home, or the building you live in, will suffer at least moderate damage from a flood within the next 10 years.” .....	40
Table 4.6: “Could you please tell me what factors influence a person's decision to purchase or develop property in your community’s floodplain?” .....	41
Table 4.7: “Using a scale from 1 to 5, where 1 is not important and 5 is very important please tell me how important you think it is for you to have insurance that covers your home in the event of a flood.” .....	42
Table 4.8: “Do you have insurance that would cover losses to your home in the event of a flood?” .....	42
Table 4.9: “If you were not required to have flood insurance as a condition of your mortgage, would you still carry a flood insurance policy on your home?” .....	43
Table 4.10: “Do you think that growth in the number of seasonal residents moving into your community is leading to increased development in the floodplains?” .....	46
Table 4.11: “Do you think that growth in the number of year-round residents moving into your community is leading to increased development in the floodplains?” .....	46
Table 4.12: “Is new development occurring in the Coastal Barrier Resource System?” .....	47

## LIST OF FIGURES

Figure 1.1: Eight Step Decision-Making Process Required by Executive Order 11988 .....	14
Figure 4.1: Suppose that federal flood insurance was not available, but still required for federally backed mortgages, and property owners had to consider purchasing commercial insurance. What percentage of the property owners do you think would be willing to pay 10 percent, 25 percent, 35 percent, 50 percent or 100 percent more for flood insurance? .....	44
Figure 4.2: About how much more would you be willing to pay for a commercial flood insurance policy if federal policies were no longer available? (Response categories offered: 10 percent, 25 percent, 35 percent, 50 percent or 100 percent more for flood insurance).....	45

## EXECUTIVE SUMMARY

The National Flood Insurance Program (NFIP), administered by the Federal Emergency Management Agency (FEMA) is meant to provide individuals with insurance against flood loss, diminish future flood loss through federal, state and local government mitigation, to reduce the loss of life and property due to floods, and federal expenditures for flood disaster assistance and control. The NFIP has also promoted improved property construction standards, better community floodplain management, greater public safety and other national benefits. The NFIP currently underwrites over 5 million policies in about 20,000 communities with a total coverage of approximately over one trillion in 2006.

Since its inception in 1968, a controversy has existed concerning the extent to which the NFIP encourages or accelerates floodplain development and creates adverse environmental consequences inconsistent with the mandates of the National Environmental Policy Act (NEPA) and Executive Order 11988 ('Floodplain Management'). Existing research has produced inconsistent, sometimes contradictory conclusions about the role of the NFIP in floodplain development and its conservation.

FEMA requested the American Institutes for Research to provide, if possible, an objective characterization of the NFIP's developmental and environmental impacts by addressing several related issues:

- The extent of FEMA's implementation of NEPA and EO 11988 through the NFIP and the consequences of this activity;
- How the availability of NFIP policies relates to perceptions of flood risk and decisions to build or buy floodplain property;
- A characterization of communities belonging to the NFIP's Community Rating System and the impact of the CRS standards upon community floodplain protection and quality;
- The credibility of assertions that the NFIP has encouraged floodplain development affecting endangered species, in violation of the Endangered Species Act (1972);
- The characteristics of properties developed on the Coastal Barrier Resource System, where NFIP availability is prohibited, and the extent to which this prohibition has been enforced.

The information to address these issues was gathered from numerous sources: a review of the relevant research literature and public documents, including related litigation; interviews with FEMA and NFIP staff and state floodplain regulators; survey research among NFIP community developers, floodplain administrators, and NFIP policyholders; and discussion with policy advocates, public officials, and others knowledgeable concerning about the NFIP.

### An Overview

The NFIP's developmental and environmental impacts are interdependent. Property development within floodplains is inevitable, but does not necessarily have adverse,

environmental consequences. The NFIP can facilitate both the conservation and development of floodplains with significantly different environmental consequences.

The NFIP can encourage floodplain conservation and the protection of floodplain environmental values. For example, the NFIP requires communities to review development proposals to ensure that all necessary Federal and State environmental permits are obtained, and requires the establishment of a “regulatory floodway” in the most environmentally sensitive riverine floodplains. In addition to higher costs to construct a building in the floodplain to meet the requirements of the community’s floodplain management ordinance, which may deter floodplain development, there are additional costs to purchase flood insurance whether the flood insurance is required by a lender or voluntary. The NFIP regulations encourage communities to adopt an approach to floodplain management that relies more on non-structural floodplain management techniques than on flood control measures

The NFIP also reduces barriers to development by reducing economic risk through building standards and the availability of flood insurance. The NFIP’s requirement of stringent building codes in flood-prone areas, for instance, makes floodplain occupancy safer. The availability of NFIP insurance often makes financing of floodplain properties attractive to financial lenders and a less risky investment for buyers.

Much of the debate concerning the NFIP’s developmental and environmental impacts has focused upon coastal areas. Most NFIP policyholders live in or near coastal communities. These are among the nation’s most rapidly expanding areas in size and population. Coastal land values have sharply increased in recent years, accelerating local economic investment, increasing the pace of urban transformation and placing some of the most ecologically valuable and sensitive at growing risk of degradation. The environmental and developmental impacts are also evident in a great many other, riverine communities across the nation.

Research conducted for this report generally confirms that the NFIP is often perceived to reduce barriers to development by reducing economic and flood risk to property owners. However, the NFIP’s influence is nuanced. The NFIP’s influence on floodplain development appears to be greatest in coastal states and communities. In the states and communities surveyed for this report—primarily rapidly growing coastal areas—the property characteristics, together with the availability of NFIP insurance, appear to be the most significant considerations in decisions to develop, buy or build in flood risk areas. The relative influence of these two factors in the communities surveyed appears to be greater than other considerations in floodplain development. However, in achieving the NFIP’s fundamental objectives, FEMA has also promoted safer, better planned urban development, often epitomized as “wise growth.”

Although the NFIP is widely perceived to encourage safer floodplain construction, it is seldom perceived to inhibit floodplain development, particularly in coastal areas and high-growth communities.<sup>1</sup> The NFIP does comply with the basic requirements of both NEPA and the EO. However, opportunities now exist for FEMA to improve its implementation of both mandates through greater initiative in achieving (a) the mandate of the EO “to minimize the impacts and restore and preserve the floodplain, as appropriate;” (b) the intent of the *Unified National Program* and the EO to protect “natural and beneficial values served by floodplains;” and (c) the legislative intent of the NFIA to “constrict development of land which is exposed to

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<sup>1</sup> See Jones et. al. (2006) and Blais et. al. (2006) for further discussion about how the NFIP protects structures.

flood damage” and “guide the development of future construction, where practicable, away from locations which are threatened by flood hazards.”

Since 1990, FEMA has made significant efforts, particularly through the NFIP’s Community Rating System, to create greater attention to floodplain conservation and environmental protection through the NFIP, as required by NEPA and Executive Article 11988. Additional FEMA actions can significantly improve the floodplain conservation and environmental protection objectives required by NEPA, Executive Order 11988, and related agency regulations. This report recommends that these initiatives merit the highest priority in further promoting FEMA’s environmental conservation responsibilities:

- initiating a new programmatic NEPA and EO 11988 review on aspects of the NFIP’s present floodplain regulations and initiate reviews on any future programmatic changes to these regulations;
- addressing as a priority in these programmatic reviews specific issues identified in the report, including:
  - improvements in the calculation of the 1 percent standard and the “no-rise” regulatory requirement for floodplains;
  - development of quantitative data concerning the natural and beneficial value of floodplains;
  - characterizing the cumulative national and local impact of filling through the LOMC process upon the natural and beneficial value of floodplains;
  - conducting research concerning the NFIP’s impact on endangered species habitat;
  - identifying opportunities for greater use of future-conditions hydrology as a basis for floodplain mapping;
- conducting a nationally-based survey of CRS communities to evaluate the impact of CRS-credited activities intended to promote natural and beneficial floodplain values (CRS categories 330, 420, 430, 450, and 510);
- amending its regulations implementing NEPA and Executive Order 11988 (40 CFR, Parts 9 & 10) to require environmental reviews in the future for new CRS standards and specific community activities for which CRS credit is given;
- creating, or obtaining through the U.S. Fish and Wildlife Service or other federal sources, a geo-coded data base of properties in Coastal Barrier Resource System units sufficient to document development and change in sample units, including any NFIP-insured structures, since CBRS designation.

## **FEMA’s Implementation of NEPA and Executive Order 11988**

FEMA has determined that most NFIP activities are “non-discretionary” and these regulations have received comprehensive “programmatic” NEPA and EO 11988 reviews in 1976 and 1980 respectively. However, subsequent experience with the NFIP’s implementation and continuing environmental research indicate that several components of the NFIP regulations and related activities should receive new EO 11988 programmatic reviews. These include:

- The methodologies used to determine the 1 percent Annual Chance Flood and “no-rise” requirement used in the determination of Special Flood Hazard Areas in NFIP communities;
- The Letter of Map Revision (LOMR) process associated with Special Hazard Flood Area maps;
- The Letter of Map Revision-Fill (LOMR-F) process which permits the use of fill to elevate structures sufficiently to exclude them from the mandatory NFIP purchase requirements;
- Community Rating System standards, particularly those activities for which NFIP communities are given floodplain protection credits.

## **Perceptions of Flood Risk, the NFIP and Floodplain Development**

A significant FEMA concern in understanding floodplain development is to characterize the importance of flood insurance, its availability, and its salience compared to other significant considerations in decisions to build or buy property in areas. In eighteen NFIP communities throughout six states, surveys were conducted among interests important to community development, community floodplain administrators, and homeowners concerning these issues.

Survey responses suggest several conclusions:

- A majority of community developers, floodplain administrators and homeowners considered property characteristics and flood insurance availability to be among the most important factors in decisions about floodplain property ownership;
- Property characteristics and the availability of flood insurance were more important than other factors in decisions about purchasing floodplain property;
- While a majority of individuals living in or near a Special Flood Hazard Area (SFHA) recognized their exposure to flood risk, most of these individuals perceived a much lower risk to their own property;
- A large majority of flood insurance policy holders in and near an SFHA thought it was relatively important to have flood insurance but a majority would still purchase, build or stay in an SFHA without flood insurance;
- Demand for NFIP insurance might be responsive to premium rates under conditions that merit further clarification, including the community setting involved (riverine or coastal), the insured structures (pre- or post-FIRM), and the socioeconomic status of homeowners.

These responses suggest that the availability of NFIP insurance at current premium rates may be an important consideration for some homeowners in their decision to purchase floodplain property. However, the survey responses also imply that an absence of flood insurance does not appear a major deterrent to such property purchases, perhaps because many homeowners perceive a relatively low probability of flood damage to their property.

## **The Community Rating System and Floodplain Management**

The Community Rating System represents an important FEMA effort to promote the protection of natural and beneficial floodplain uses through the NFIP. Five components of the CRS currently create opportunities for communities to receive CRS credit for activities associated with floodplain protection and conservation. The impact of these activities has not been well documented.

The CRS standards have not received NEPA or EO 11988 programmatic reviews. Recent federal litigation involving the NFIP's impact upon endangered species habitat suggests that some CRS credited activities may have environmental impacts requiring FEMA to initiate consultations with appropriate agencies as requirement by the Endangered Species Act. FEMA has revised the CRS standards to address the impact of those activities identified in the litigation. However, other environmental impacts related to CRS standards and involving NEPA or EO 11988 requirements may also occur. Thus, the CRS, or at least its floodplain conservation elements, should now receive both a NEPA and EO 11988 programmatic review.

FEMA can take several measures to increase community participation in the CRS. The present CRS communities represent a majority of NFIP policies, but the majority of NFIP communities do not participate in the CRS and the participants are mostly at the lowest levels of CRS rating. Better coordination and promotion of the CRS among smaller communities and improved education and training of local officials in the advantages of CRS membership are recommended.

## **The NFIP and the Endangered Species Act**

The NFIP's impact on endangered species has been an issue in three federal court lawsuits since 1990. In one case, the court found evidence it considered sufficient to demonstrate that NFIP insurance was associated with adverse impacts on endangered Key Deer in Monroe County, Florida. In the other cases, the court considered that evidence of a *possible* adverse impact upon endangered species sufficient to require that FEMA consult with the appropriate agencies under terms of Section 7(a)(2) of the ESA. There have also been numerous declarations of intent to sue FEMA on issues related to the ESA but few court cases have resulted.

Aside from this litigation, no substantial evidence appears to have evolved about the extent to which NFIP-related development may become an ESA issue. Nor is information available to characterize the extent to which the NFIP enhances the protection of endangered species or their habitat. Given the NFIP's perceived association with floodplain development and the adverse environmental consequences that sometimes arise for endangered species from urban growth, a national investigation concerning the NFIP's potential impact on ESA-protected species would seem desirable

## The NFIP and the Coastal Barrier Resource System

The sale of NFIP insurance is prohibited within the Coastal Barrier Resource System, created in 1984. This restriction of NFIP insurance is often considered to provide evidence concerning whether the absence of flood insurance inhibits coastal development. FEMA is concerned in determining whether NFIP policies have nonetheless been issued to CBRS property, the scale of CBRS development where NFIP insurance is prohibited, and the reasons for such development.

Estimates of NFIP policies issued on CBRS units have been infrequent and major challenges currently exist in creating such estimates. The most recent available data estimates from 2002 show that no more than 4 percent of all CBRS structures—and probably considerably less—was NFIP insured.

A major obstacle to accurate estimates of NFIP-insured properties and rates of property development in the CBRS is lack of a reliable database locating properties, which may be involved. Officials of the FWS report that the USGS topographic quadrangle source maps that currently depict the CBRS are, on average, approximately 30 years old. Congress in 2000 authorized the FWS to conduct a Digital Mapping Pilot Project for approximately 7 percent of the CBRS areas. These maps are not yet completed or available for analysis.

Fragmentary, sometimes anecdotal evidence suggests that the prohibition of NFIP coverage on CBRS property might inhibit development or reduce the developmental rate when compared to comparable non-CBRS properties. CBRS development is more likely to be constrained when state and local governments also collaborate in the process. Available evidence also suggests that many CBRS units have developed, often quite extensively, despite the absence of NFIP insurance. Market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce.

Finally, inferences about the NFIP's possible impact on development based upon experience with development on the CBRS lands appear to be tenuous. The CBRS may not presently be an appropriate basis for such generalizations for several reasons. First, discussions with USFWS staff indicate that maps of CBRS land and related development are frequently outdated, sometimes unrevised since the early 1980s, and conclusions about the rate of development on CBRS lands and its causes are often anecdotal. Second, the motivation for purchase and development of property on CBRS land, and the extent to which this is analogous to property development on non-CBRS lands is not well established. CBRS and non-CBRS lands may constitute different marketplaces with different clientele. As undeveloped coastal barrier lands become scarcer, market forces will overwhelm the present disincentives for development in the CBRS in any case.

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## 1. INTRODUCTION AND BACKGROUND

“In summary, federal policies have sought to make areas at risk from natural hazards safe places for urban development by reducing the degree of hazard and by shielding hazard-area occupants from financial risks of loss. Over time, these policies have facilitated the development of these areas...”

Raymond Burby, “Hurricane Katrina and the Paradoxes of Government Disaster Policies” (2006)

“It is difficult to sort out the variety of co-existing influences on floodplain development to draw clear cause and effect relationships between the NFIP and observed encroachment into flood hazard areas.”

Dixie Shipp Evatt, “Does National Flood Insurance Drive Development?” (1999)

The National Flood Insurance Program (NFIP), created by the National Flood Insurance Act of 1968 (NFIA), was designed to provide individuals with insurance against flood loss, to diminish future flood loss through federal, state and local government mitigation, and to reduce federal expenditures for flood disaster assistance and control.<sup>2</sup> The Federal Emergency Management Agency (FEMA), a component of the Department of Homeland Security (DHS), is currently responsible for implementing the NFIP.

Prior to 2001, the insurance component of the NFIP was administered by the Federal Insurance Administration (FIA) within FEMA. The floodplain management and flood hazard mapping components of the NFIP were located in FIA prior to 1994 and in FEMA’s Mitigation Division from 1994 to 2001. In 2001, the FIA and the Mitigation Division were combined to form the Federal Insurance and Mitigation Administration, which brought all of the components of the NFIP together again and combined them with the other FEMA mitigation programs. In 2003, FEMA was incorporated within the newly created Department of Homeland Security (DHS). Since this transition, all components of the NFIP have been administered through the Office of the Under Secretary for Emergency Preparedness and Response, and located in the Mitigation Division. Within the Mitigation Division, NFIP responsibilities are now divided among three branches.

Americans depend primarily on the NFIP to provide flood insurance and to mitigate against flood risks. The NFIP currently underwrites 4.8 million policies in approximately 20,000 communities with a total coverage of approximately \$770.5 billion in 2005 (Government Accountability Office 2006).<sup>3</sup> The NFIP’s importance continues to grow with the nation’s increasing flood damage costs. Prior to 2005, the NFIP awarded nearly \$16 billion in flood claims. As a result of the disastrous 2005 hurricane season, FEMA estimates that Hurricanes Katrina, Rita, and Wilma alone will generate claims and associated payments of over \$20 billion.

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<sup>2</sup> FEMA estimates that every \$3 in flood insurance claims payments saves about \$1 in disaster assistance payments, and the NFIP’s floodplain management and mitigation efforts save over \$1 billion in flood damage each year.

<sup>3</sup>FEMA markets NFIP policies mostly through contractual agreements with 95 private insurance company partners who sell the policies and process claims.

## 1.1 Does the NFIP Facilitate Floodplain Development or Conservation?

The NFIP was initially created to provide flood insurance, to mitigate future flood risk, to reduce the loss of life and property due to floods and to diminish federal disaster assistance costs. An early concern expressed in Section 1301 of the NFA was that floodplain management should encourage participating communities and states to implement floodplain management practices that “restrict the development of land which is exposed to flood damage” and “guide development of future construction, where practicable, away from locations which are threatened by flood hazards”. (See Appendix 1 for summary of floodplain management objectives in legislation).<sup>4</sup>

Section 1302(c) of the NFIP also required that the goals of the NFIP should be integrally related to a unified national program of floodplain management. In 1979, the Interagency Task Force on Floodplain Management published a revision to *A Unified National Program for Floodplain Management* (FEMA 1979). The report set forth a broad conceptual framework for managing the nation's floodplains and expressed a national policy for managing flood-prone lands and introduced the concept of the natural and beneficial values of floodplains. The 1994 revisions to the Unified National Program for Floodplain Management established two co-equal goals for floodplain management: 1) to reduce the loss of life, the disruption, and the damages caused by floods; and 2) to preserve and restore the natural resources of the Nation’s floodplains. Over the intervening years, the Unified National Program reports to Congress have increasingly emphasized the need to protect the natural resources of floodplains (Conrad 2004).

Since the NFIP’s enactment, additional legislation and other federal actions have clarified and enlarged the scope of the NFIP’s floodplain management goals.<sup>5</sup>

### 1.1.1 The NFIP’s Environmental Mandates

The NFIP’s floodplain management responsibilities were further elaborated through the National Environmental Policy Act (1969) and Executive Order 11988: “Floodplain Management” (1977), discussed in Sections 2.1–2.3, which mandate additional activities meant to promote environmental conservation.

NEPA, which applies to all Federal agencies and actions, requires FEMA to implement the NFIP in a manner to “attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences” and to prepare an Environmental Impact analysis for any NFIP activity “significantly affecting the quality of the human environment.” Executive Order 11988 (EO 11988) requires FEMA “to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modifications of floodplain development wherever there is a practicable

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<sup>4</sup> NFIA, Sec. 1361(c)(1), (2), (4).

<sup>5</sup> The Act limited the definition of ‘natural and beneficial values’ to those functions that reduce flood damages. Other environmentally relevant components include a provision that directs FEMA to provide credits under the NFIP Community Rating System (CRS), and the establishment of the Task Force on the Natural and Beneficial Functions of the Floodplain which was to make recommendations on how to protect natural and beneficial floodplain functions that reduce flood damages

alternative...” and to provide leadership “to restore and preserve the natural and beneficial values served by floodplains” when implementing the NFIP.

### **1.1.2 A Contested Impact**

Since the NFIP’s inception, a major concern has been the extent to which the NFIP may encourage or accelerate floodplain development with adverse environmental consequences. These issues are especially important because these impacts may be inconsistent with the FEMA’s floodplain management responsibilities mandated through the NFIA, NEPA, and EO 11988.

In many communities, the NFIP has often restrained development in high-hazard floodplains and promoted safer construction in flood-prone areas through its community floodplain mapping and management requirements. Many aspects of the NFIP contribute to this impact. For example, the NFIP’s requirement that riverine communities establish a “regulatory floodway” places a significant limitation on development in the most hazardous and most environmentally sensitive area of riverine floodplains. Once a floodway is designated, the community must prohibit development in the floodway, which would cause any increase in flood heights. Another component of the NFIP, the Community Rating System (CRS) encourages communities to exceed the NFIP’s basic floodplain management guidelines by additional actions conserving open space and environmentally sensitive areas.

The NFIP is also frequently perceived to remove economic barriers to floodplain development for several reasons. It is asserted to be a “development stimulus” by reducing the financial risk to property owners and communities from potential flood disasters through relatively low-cost, property insurance, which is backed up by generous federal disaster relief. (Burby 2006, p. 4; John 2005) It is also asserted that the provision of insurance encourages community developers to expand their markets into floodplains and discourages property owners from taking more responsibility, i.e., initiate more aggressive measures, to protect their property from flood risk. The NFIP’s required community floodplain construction standards may make floodplain occupancy less hazardous, and thus more attractive, for property owners.

Environmental advocates often assert that the NFIP has been a major facilitator of the adverse impacts associated particularly with coastal development. In recent years, several national environmental study commissions have advocated major changes in the actuarial structure, rates and availability of NFIP insurance as a means of slowing the environmental degradation of coastal floodplains associated with urban development (H. J. Heinz III Center 2000b, 46; Pew Oceans Commission 2003, 53). Additionally, environmental organizations in Florida, New Mexico and Washington state have initiated federal lawsuits arguing that the NFIP’s required community floodplain regulations encourage destruction of endangered species habitat (See Section 6).

Other studies contest these assertions. For example, a substantial literature concerned with the public’s perceptions about low frequency/high damage events, such as flooding, implies that flood insurance may do little to facilitate floodplain development. This literature often suggests that such events are not important considerations when purchasing property and,

consequently, the availability of flood insurance is unlikely to influence decisions about property purchasing. Other studies, asserting that the NFIP's impact is ambiguous, point to a variety of additional factors, such as rising national affluence and increased coastal zone property values, which may be equal, or more important, drivers of coastal development.<sup>6</sup> The diverse and often contradictory research literature challenges firm or simple conclusions about the NFIP's developmental impact and environmental impacts. (Evatt 1999b, 523).

## 1.2 Study Objectives

FEMA wants to obtain an objective and definitive characterization of NFIP's developmental and environmental impacts because the issue has been a matter of continuing, and inconclusive, controversy. To clarify the NFIP's affect upon floodplain development, FEMA commissioned the American Institutes for Research (AIR), an independent, not-for-profit Corporation, to conduct an evaluation of the NFIP's developmental and environmental impacts as part of a more comprehensive evaluation of the entire NFIP program.

Although it would be highly desirable to apply rigorous quantitative techniques to the assessment of the NFIP's developmental and environmental impacts, the ability to do so is problematic. Much research has confirmed that the asserted linkage between the availability of flood insurance and resulting impacts on development or the environment may be indirect, at best, and confounded by competing explanations not easily separated.<sup>7</sup> Also, the geophysical or community circumstances under which the NFIP does or does not affect development may vary. Some research suggests that the NFIP may inhibit development in riverine settings more than in coastal areas (Burby et. al. 1988). As another example, the definition of a floodway's boundary may affect the extent of development in a floodplain area. Even where the NFIP is a factor in development, the net effect on the environment may be unclear. For instance, NFIP building standards may lessen the environmental impact of development that does occur.

Given these constraints, the evaluation views the program holistically and examines the relation between risk assessment, hazard mitigation, and flood insurance on the one hand and possible environmental and developmental effects on the other hand. Areas of inquiry, discussed below, include the NFIP activities most often associated with developmental and environmental impacts. In broadest perspective, the purpose is to characterize the effectiveness of FEMA's implementation through the NFIP of the floodplain conservation objectives defined by the NFIA, NEPA, and EO 11988. These can be epitomized, in the words of EO 11988, as protecting "the natural and beneficial values served by floodplains" through the NFIP.<sup>8</sup> This research involves several specific goals:

- reviewing FEMA's substantive and procedural responsibilities mandated by NEPA and EO 11988 and the institutional arrangements created to implement these requirements through the NFIP;

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<sup>6</sup> See, for instance, the discussion of this issue in the literature review on this subject prepared as part of the NFIP Evaluation (Rosenbaum 2005).

<sup>7</sup>For example, although the availability of flood insurance may affect a decision to build in a floodplain that is also the habitat of an endangered species, the insurance alone is unlikely to be the sole or primary factor that leads to a decision to build. Indeed, it may not be a factor at all.

<sup>8</sup> Executive Order 11988, Section 1.

- determining whether FEMA’s implementation of NEPA and EO 11988 through the NFIP:
  - is consistent with U.S. Water Resources Council guidelines for implementing the EO;
  - avoids the floodplains whenever practicable;
  - identifies and minimizes adverse impacts to floodplains and preserves floodplain values;
  - prevents modification to the natural floodplain environment or maintains it as closely as possible to its natural state;
  - discourages floodplain development;
  - minimizes impacts to the smallest degree possible.<sup>9</sup>
- characterizing the extent of FEMA’s leadership in preventing the uneconomic use and development of floodplains;
- identifying NFIP activities with significant developmental or environmental effects and characterizing their advantages and deficiencies;
- providing, if possible, a definitive characterization of the NFIP’s developmental and environmental impacts;
- identifying conditions that facilitate or inhibit the NFIP’s floodplain conservation objectives;
- describing how the availability of NFIP insurance is related to public perceptions of flood risk and decision to build or purchase floodplain property;
- evaluating how the NFIP can improve its implementation of mandated floodplain conservation responsibilities;

More detailed discussions of the methodologies adopted for specific substantive segments of the evaluation are discussed in the appropriate section.

### 1.3 Organization

The report examines NFIP activities with potential developmental and environmental impacts upon floodplains. An initial, comprehensive review of the relevant research literature preceded the analysis and, where appropriate, related studies are referenced. The full literature review and analysis is contained in a separate report associated with AIR’s comprehensive NFIP evaluation (Rosenbaum 2005). Each section of this report characterizes a related NFIP program or activity, evaluates its relevance to floodplain development, recommends improvements if appropriate, and describes the related research methodology. The structure of this report follows:

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<sup>9</sup> The different and discreet impacts of the NFIP are often difficult to distinguish in interviews and research literature. Program impacts of concern to NEPA or EO 11988 are often closely related or simultaneous while, on other occasions, they may be distinct. Additionally, researchers and interview respondents often do not, or cannot, distinguish between different program results when discussing whether a FEMA activity meets the objectives of NEPA or EO 11988. Instead, they generalize about impacts with perhaps a few examples. When possible, subsequent discussion of this issue will be framed in terms of these specific impacts. It may be assumed that general characterizations of FEMA’s implementation of NEPA or EO 11988 in interviews or research literature implicitly relate to some, or all, of items. As subsequent analysis illustrates, it is often possible to reach conclusions about the extent to which these objectives are collectively and generally achieved in program implementation.

- Section 3 below reviews the study's methodology and organization in broad outline.
- Section 4 reviews FEMA's implementation of NEPA, EO 11988, and the NFIP's original floodplain management objectives through FEMA's regulations. This includes (a) a description of FEMA's regulations, organizational resources and procedures for implementing these responsibilities; (b) an evaluation of the effectiveness of this implementation at headquarters and regional levels; and (c) recommendations for improvement.
- Section 5 evaluates the extent to which the availability of NFIP policies relates to perceptions of flood risk and decisions to build or buy floodplain property. The analysis is based upon survey research conducted among (a) developmental interests in selected states and NFIP communities; (b) a national sample of homeowners and NFIP policyholders.
- Section 6 characterizes communities joining the CRS and examines the impact of CRS standards intended specifically to improve floodplain protection or quality. The Community Rating System (CRS), created in 1990, is a voluntary program encouraging communities to enact additional measures to reduce flood risk and to protect floodplains beyond the minimum criteria for community enrollment in the NFIP.
- Section 7 discusses the credibility of evidence supporting the contention in several recent federal lawsuits that the availability of NFIP policies and NFIP's regulations have encouraged floodplain development affecting endangered species, in violation of the Endangered Species Act (1972).
- Section 8 examines development in the Coastal Barrier Resource System (CBRS) and its relevance to the NFIP. Legislation creating the CBRS in 1984 prohibits most forms of federal assistance, including flood insurance, to what is now a system of approximately 585 units and almost 1.3 million acres in 23 states. The subsequent history of the CBRS is often cited as a test case for coastal development in the absence of NFIP flood insurance. In light of this assumption, the section discusses (a) the extent of the prohibition's enforcement; (b) the scale and character of CBRS development in the absence of NFIP insurance; and (c) the characteristics of CBRS properties developed in the absence of NFIP availability.
- Section 9 summarizes the findings from individual Sections concerning the character of the NFIP's developmental and environmental impacts and the implications for FEMA's mandated responsibilities from NEPA and EO 11988. A consolidated list of recommendations from individual sections is also provided.

The report is completed with an appendix, a table of acronyms, and a list of references.

## **1.4 Methodology**

Information included in this report is based on a review of the relevant research literature and public documents, including related litigation; interviews with FEMA and NFIP staff and state floodplain regulators; discussion with policy advocates, public officials, and others knowledgeable concerning about the NFIP; and survey research involving NFIP policyholders, other homeowners, NFIP floodplain administrators, and development interests in NFIP communities.

### **1.4.1 The NFIP Community Survey**

A purposive survey of development interests and NFIP floodplain administrators was conducted in selected states and communities to provide missing information strategic to evaluating the current developmental and environmental impacts of the NFIP at the community level. The survey was designed in three stages beginning with state selection, then community identification within selected states, and finally designation of respondent groups. The process of state, community, and respondent selection is fully discussed in Section 4.2 and Appendices 2 and 3.

The NFIP Community Survey included communities in six states: Arizona, Florida, Illinois, North Carolina, South Carolina, and Texas. Four of these states (Florida, North Carolina, South Carolina, and Texas) include primarily high-growth, coastal areas where a large number of NFIP policies are active; two of the states (Arizona and Illinois) include exclusively riverine communities. Three communities were selected from each state for respondent interviews. These communities were chosen based on the total number of NFIP policies in community SFHAs, and then by their rank-order within the state in percent of post-FIRM contracts. The top three communities in each state were then selected for analysis.

Within communities, a random sample was drawn from respondent groups active in promoting community growth: property developers, mortgage lenders and development underwriters, real estate brokers, and insurance agents. Additionally, floodplain administrators were interviewed in each community to provide information on the implementation of the NFIP in that area.

### **1.4.2 The National Homeowner Survey**

The national homeowner survey, discussed in Section 4 of this report and more fully described in Appendix 5, attempts for the first time to account accurately for flood zone status among homeowners, including NFIP policyholders, in describing perceptions about flood risk and flood insurance. Few data sources were available for this critical piece of information. The sample thus is drawn from two sources. The first is a database developed by the RAND Corporation as part of the Evaluation of the NFIP for a report on market penetration rates. This dataset provides crucial information on a respondent's flood zone, which provides an objective measure of risk that would not be available for nonpolicyholders through other means, given the budget available. This dataset was merged with several variables including policyholder status. Because this dataset was developed to estimate market penetration rates, there were insufficient

potential respondents for most policyholder strata where there was a low market penetration rate. This Market Penetration dataset was used for all strata where a sufficient number of potential respondents were found to conduct a survey.

The Market Penetration database was developed in three stages. In the first stage, a stratified cluster sample of 100 communities was created from the approximately 19,200 NFIP communities.<sup>10</sup> Clustering was necessary so that there were a reasonably small number of communities for flood determination agents to visit, draw parcels and make flood zone determinations for the study, as discussed later.<sup>11</sup> From these 100 communities, a random sample of parcels was drawn in the second stage to form a database of 27,667 properties. These parcels were matched with tax identification number of FEMA's BureauNet database of policyholders. They also were assessed by a determination company for their flood zone and distance from any change in NFIP regulatory flood zone, as determined by the determination companies. From this set of properties, a stratified random sample of NFIP nonpolicyholders was drawn for interviews.

The characteristics of properties were selected for stratification based on the results of the literature review and focus groups that suggested the importance of policyholder status, location of the community on a coast versus inland, housing occupancy type, and flood zone as primary determinants of risk perceptions. To simplify the stratification, we restricted each characteristic to two strata. For policyholder status, the two strata are simply policyholders and nonpolicyholders. Similarly, for location of the community, the strata are a coastal community versus an inland community

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<sup>10</sup> At the time of the initial development of the database, Census data was available for only 19,200 of the NFIP's participating communities. Although several hundred more communities have joined the NFIP at the time of writing, most of these are very small communities with few policyholders. About a third of NFIP communities have fewer than ten policyholders, and many of those have none, generally because residential development has not occurred in the SFHAs. The actual number of communities of real interest to this research is much smaller than 19,200.

<sup>11</sup> The clustering contributes to what is called a "design effect," or a difference between the ability to draw inference with this design versus from a random sample drawn across all NFIP communities; although the large number of clusters (100) and stratification helps offset some of the design effect of the sampling approach relative to a random draw from all NFIP communities.

## 2. FEMA'S IMPLEMENTATION OF NEPA AND EO 11988 THROUGH THE NFIP

FEMA's major environmental responsibility associated with the NFIP is floodplain management. While the NFIP's primary purpose is to insure against flood loss and to mitigate flood damage, aspects of floodplain conservation are included in the NFIP's floodplain management goals.

FEMA is directed in Section 1361 of the National Flood Insurance Act (NFIA) to encourage State and local governments to make appropriate land use adjustments "to constrict the development of land which is exposed to flood damage and minimize damage caused by flood losses" and to "guide the development of proposed future construction, where practicable, away from locations which are threatened by flood hazards." The Senate and House Committee reports accompanying the NFIA both emphasize the importance of local land use planning as an instrument to achieve these ends.<sup>12</sup> The subsequent creation of NEPA and EO 11988 substantially increased the scale and scope of FEMA's floodplain management responsibilities through the NFIP.

This section:

- Reviews FEMA's substantive and procedural responsibilities mandated by NEPA and EO 11988 and the institutional arrangements created to implement these requirements through the NFIP;
- Discusses whether FEMA's implementation of NEPA and EO 11988 through the NFIP:
  - is consistent with U.S. Water Resources Council guidelines for implementing the EO;
  - avoids the floodplains whenever practicable;
  - identifies and minimizes adverse impacts to floodplains and preserves floodplain values;
  - prevents modification to the natural floodplain environment or maintains it as closely as possible to its natural state;
  - discourages floodplain development;
  - minimizes impacts to the smallest degree possible.<sup>13</sup>

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<sup>12</sup> "A most important public purpose which the program will serve will be to encourage State and local governments to adopt and enforce appropriate land use provisions to restrict the future development of land which is exposed to flood hazard" (U.S. Congress, Senate, Committee on Banking and Currency 1967, 2).

<sup>13</sup> The different and discreet impacts of the NFIP are often difficult to distinguish in interviews and research literature. Program impacts of concern to NEPA or EO 11988 are often closely related or simultaneous while, on other occasions, they may be distinct. Additionally, researchers and interview respondents often do not, or cannot, distinguish between different program results when discussing whether a FEMA activity meets the objectives of NEPA or EO 11988. Instead, they generalize about impacts with perhaps a few examples. When possible, subsequent discussion of this issue will be framed in terms of these specific impacts. It may be assumed that general characterizations of FEMA's implementation of NEPA or EO 11988 in interviews or research literature implicitly relate to some, or all, of items. As subsequent analysis illustrates, it is often possible to reach conclusions about the extent to which these objectives are collectively and generally achieved in program implementation.

## 2.1. Methodology

In characterizing FEMA’s implementation of NEPA and EO 11988, the legislation, legislative histories, and FEMA regulations relevant to NEPA, the EO and the NFIP were reviewed together with related guidance documents for FEMA’s staff, including materials prepared for state floodplain officials with NFIP responsibilities. Research findings also depend substantially on information from interviews with FEMA staff informed about FEMA’s administration of NEPA and the EO. These respondents include NFIP headquarters and regional staff, and Regional Environmental Officers (REOs) responsible for the oversight of NEPA and the EO implementation. Telephone interviews were conducted with all these respondents using a standard interview protocol with an assurance of confidentiality. A comprehensive search of relevant literature since 1966 was undertaken and additional interviews were conducted with academic, legal, scientific, policy advocacy and governmental informants at all jurisdictional levels when appropriate to the study objectives.<sup>14</sup> Finally, survey research interviews with development interests and floodplain administrators in NFIP communities, and with a national sample of homeowners and NFIP policyholders were utilized (Appendix 1; Appendix 2; Dixon, Clancy, Seabury, and Overton 2006).

## 2.2 NEPA Requirements

NEPA, enacted by Congress in 1970, requires FEMA to create and to evaluate an Environmental Impact Statement (EIS) for “every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment.” An EIS must describe:

- *the environmental impact of the proposed action*—Reviewable actions are new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals;
- *any adverse environmental effects which cannot be avoided should the proposal be implemented*— Adverse effects include the direct and indirect environmental impact of the action(s); possible conflicts between the proposed action(s) and the objectives of federal, regional state and local land use plans; and potential measures that could be taken to mitigate the impact;

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<sup>14</sup>AIR’s literature review did not identify any academic research, journal articles, books or governmental studies concerned with FEMA’s interpretation and application of the EO specifically related to the NFIP (AIR 2005). While FEMA’s implementation of NEPA has created a substantial body of literature, as well as considerable litigation with related documentation, significant issues specifically involving the NFIP and NEPA implementation are absent. Also, federal government monitoring of compliance with EO 11988 throughout executive departments and agencies has been very infrequent. As late as 1994 the Galloway report noted the need for a monitoring and enforcement mechanism for the EO and continuing problems with federal agency compliance among all federal agencies, including possibly FEMA (Interagency Floodplain Management Review Committee 1994, p. 104). Lacking an historic baseline, comparisons between current and past FEMA environmental review activities involving the NFIP is necessarily limited. Thus, the scope of AIR’s review focuses upon FEMA experience primarily within the last decade.

- *alternatives to the proposed action(s)*—All reasonable alternatives should be considered, including a “no action” option and a discussion of the environmental effects of each identified alternative;
- *relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity*—Considerations should include the impact of the proposed action(s) on urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures;
- *any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented*—Among the considerations should be requirements for natural and depletable resources including energy; the conservation potential of various action alternatives; and the requirements of mitigation measures in these respects (42 USC § 4332(C)).

FEMA’s regulations to implement the EIS process were written in 1979.<sup>15</sup>

### 2.3 EO 11988 Requirements

EO 11988 requires all federal agencies to "avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modifications of floodplain development wherever there is a practicable alternative..."<sup>16</sup> The EO directs FEMA to “provide leadership and...take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for:

- acquiring, managing, and disposing of federal lands and facilities;
- providing federally-undertaken, financed, or assisted construction and improvements;
- conducting federal activities and programs affecting land use, including but not limited to water and related land resource planning, regulation, and licensing activities (42 FR 26971, 3 CFR, Sec. 1).

Two components of EO 11988 are important to this report. First, it mandates that FEMA follow a prescribed decision-making procedure for projects with potential impacts to, or within, a floodplain. For this purpose, FEMA regulations incorporate the eight-step process contained in the Water Resources Council Guidelines for Implementing Executive Order 11988. This requires FEMA to:

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<sup>15</sup> The responsibility for creating regulations and guidelines for federal agency implementation of the EIS process is vested in the president's Council on Environmental Quality (CEQ). Following CEQ directives, FEMA's regulations to implement the EIS process for NFIP and other programs under its authority, were codified in 1979 in 44 CFR Part 10.

<sup>16</sup> 42 FR 26971, 3 CFR, 1977 Comp., p. 117.

- "determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year);<sup>17</sup>
- conduct early public review, including public notice;
- identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain;
- identify impacts of the proposed action;
- if impacts cannot be avoided, develop measures to minimize the impacts and restore and preserve the floodplain, as appropriate;
- reevaluate alternatives;
- present the findings and a public explanation;
- implement the action."<sup>18</sup>

Second, FEMA is expected to be a lead federal agency in clarifying and interpreting EO 11988 for other executive agencies who should consult with FEMA in developing their implementation procedures to assure consistency with the Order's purposes.<sup>19</sup>

## 2.4 FEMA's Institutional Implementation of NEPA and EO 11988

FEMA has responded to NEPA and the EO primarily in three ways. First, it has written regulations and created agency offices to implement both mandates. Second, it has also created an Environmental Review process, administered by a headquarters staff and a Regional Environmental Officer (REO) in each of FEMA's ten regions, to carry out these mandates. Finally, FEMA has reviewed its NFIP regulations programmatically to assure compliance with NEPA and the EO.<sup>20</sup>

### 2.4.1 FEMA's Rules Implementing NEPA

FEMA's regulations for NEPA were issued in June 1980.<sup>21</sup> These rules create NEPA implementing procedures for the agency's Regional Administrators, NFIP headquarters and

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<sup>17</sup> The "base floodplain" is also called a "100-Year Floodplain" and a "Special Flood Hazard Area." This is the land area within a community that would be inundated by a flood having a 1% chance of occurring in any given year. It is the area in which the National Flood Insurance floodplain management regulations must be enforced as a condition of community membership in the NFIP. A Flood Insurance Rating Map (FIRM) identifies a Special Flood Hazard Area and delineates the extent of flood hazard within it.

<sup>18</sup> 42 FR 26971, 3 CFR, Sec. 2(a)

<sup>19</sup> In September, 1980 FEMA issued Final Regulations to implement the EO within the agency (44 CFR Part 9). In cooperation with the Water Resources Council, the Interagency Task Force on Floodplain Management, and other collaborators, FEMA has created guidance documents for federal agencies in implementing the EO and procedures for reviewing compliance with the EO (Water Resources Council 1978; FEMA and Interagency Task Force on Floodplain Management 1987). The demise of the Water Resource Council and CEQ's diminished activity subsequent to EO 11988 means that FEMA is the only agency named in the EO with a continuing role in implementing this requirement.

<sup>20</sup> FEMA's environmentally relevant regulations, guidance documents and related actions do not explicitly distinguish between the original floodplain protection goals in the NFIA and later NEPA and EO environmental objectives, presumably because the latter mandates are implicitly assumed to include the NFIA's floodplain management goals. However, the earlier NFIA floodplain goals are relevant to FEMA actions preceding NEPA and EO 11988.

<sup>21</sup> 40 CFR, Part 10.

regional staff and assign responsibility for NEPA enforcement within FEMA. The rules cover in detail the major issues and procedures involved in NEPA's implementation, including such important matters as the arrangements for NEPA's integration early in FEMA's planning processes, determinations necessary for the creation of EISs, and related documents.<sup>22</sup>

These regulations are "supplemental to, and not instead of, the provisions of the FEMA regulations implementing Executive Order 11988..."<sup>23</sup> This creates the possibility that FEMA actions excluded from NEPA may be subject to review through the EO. FEMA's experience has been that the decision-making processes required by the EO and NEPA are usually complimentary. FEMA has combined these dual procedures into its Environmental Review process later described.

#### **2.4.2 FEMA Rules Implementing EO 11988**

FEMA issued its regulations for EO 11988 in September 1980.<sup>24</sup> These final rules, substantially unchanged since their 1980 publication, define the objectives, criteria and procedures FEMA has established when implementing the EO through the NFIP and other programs. The rule incorporates the eight-step decision making process contained in the U.S. Water Resources Council's (WRC) *Floodplain Management Guidelines for Implementing E. O. 11988*. FEMA implements EO 11988 through the NFIP on a programmatic basis. This means that the eight-step process is applied to regulations and other procedures making or amending policy but not to the application of policy in specific instances. For example, the review would be applied to criteria for structures to be insured by the NFIP but not to determinations about the insurability of individual structures.

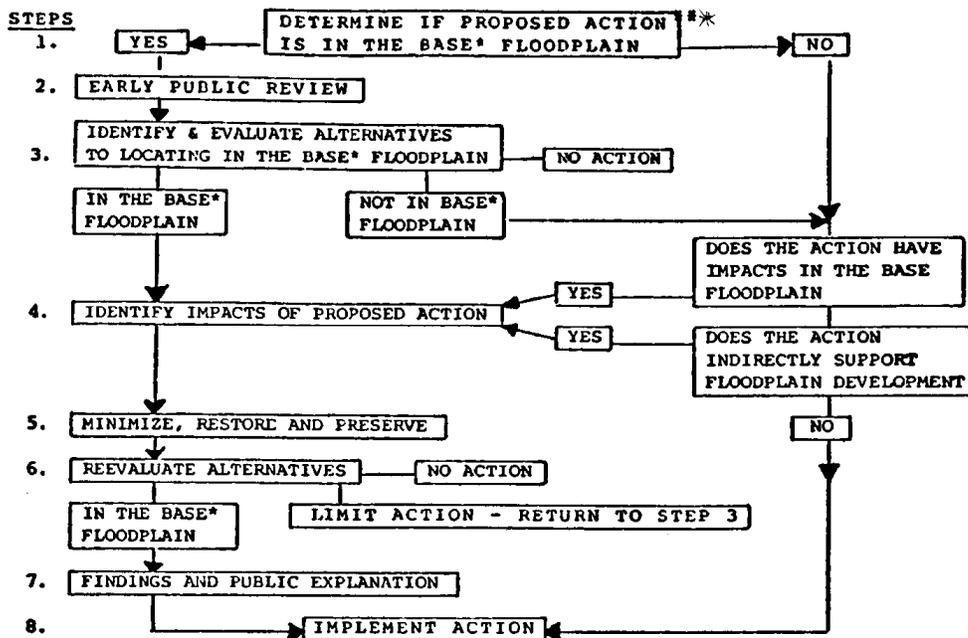
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<sup>22</sup> FEMA prepares several other documents to facilitate decision-making procedures required by NEPA. Before the creation of a complete EIS, an Environmental Assessment (EA) is usually prepared by the responsible officials. The EA analyzes the environmental effects of a proposed activity to determine the significance of potential impacts. Any significant impacts identified in an EA must be analyzed in an EIS. An EA also documents the potential environmental impacts of proposals that do not require an EIS, and identifies as early as possible, mitigation measures that FEMA may require to avoid or to minimize adverse effects of a proposal. An EA may also lead to a determination that the proposed action would not result in any significant environmental effects, in which case a FONSI ("Finding Of No Significant Impact") will be prepared. FEMA has determined that the majority of its recurring actions to which NEPA applies, including most NFIP activities, can be grouped by the type of action or the location and evaluated through preparation of a Programmatic Environmental Assessment (PEA). For example, a PEA has been prepared for FEMA's support of modification of waterways, waterway crossing and coastal features

<sup>23</sup> 40 CFR, Part 10, §10.14

<sup>24</sup> 44 CFR Part 9.

Figure 1.1: Eight Step Decision-Making Process Required by Executive Order 11988



The eight-step decision-making process mandated by EO 11988 for actions affecting floodplains (see Figure 1 above) is fully described in the regulations. These rules create a rigorous and appropriate strategy for implementation based upon compliance with its environmental objectives.<sup>25</sup> This high standard is established by the requirement that FEMA's implementation should be guided by the WRC's *Floodplain Management Guidelines for Implementing E. O. 11988*.

### 2.4.3 FEMA's Environmental Review Process

FEMA combines the required procedures for NEPA and EO 11988 implementation with other environmental and historic preservation requirements into the administrative process called Environmental Review. An environmental review determines, among other things, whether a FEMA action is excluded from the NEPA and/or the EO 11988 process (see Section 2.5 below). The review process is customarily undertaken by program staff with technical assistance from headquarters staff identified as Environmental and Historic Preservation (EHP) unit. This EHP unit reports to FEMA's Deputy Director For Mitigation. In each FEMA regional office, a Regional Environmental Officer (REO) is responsible for this review.

With the exception of the Flood Mitigation Assistance Program funded by NFIP, other NFIP activities, such as adjustments of NFIP premium rates and technical assistance to communities on mitigation activities, are not ordinarily subject to Environmental Reviews.

<sup>25</sup> For example, the rules require that FEMA consider the cumulative effects of FEMA's individual actions on a floodplain, that a presumption against floodplain development should prevail, and that harm to people and property in floodplain should be reduced "to the smallest amount or degree possible" (Final Rules, p. 59523)

## 2.5 EO 11988 and NEPA Implementation Through NFIP Regulations

FEMA has evaluated compliance of its NFIP regulations with NEPA and EO 11988 through a programmatic review of the initial regulations and subsequent revisions. A programmatic review applies to recurring actions defined by regulations but not to their application in particular instances. For example, the eight-step EO process was applied to regulations and other procedures defining the criteria for properties to be insured by the NFIP but not to determinations about the insurability of individual structures. Thus, most routine NFIP activities are currently excluded from EO 11988 review. FEMA believes these programmatic reviews adequately conform to the requirements of NEPA and EO 11988.

NFIP regulations address each of the NFIP's major objectives: (1) indemnifying individuals for flood losses through the provision of federally-supported flood insurance; (2) reducing future flood damages through mitigation and implementation of floodplain management regulations by communities and states; and (3) reducing federal expenditures for disaster assistance and flood control. To the extent that any of these activities involve actions related to NEPA or EO 11988, these actions are subject to programmatic review procedures by NEPA, the EO or both.<sup>26</sup> Additionally, NFIP personnel often provide technical assistance and advice to FEMA staff on the preparation and evaluation of Environmental Reviews associated with FEMA's Pre-Disaster Mitigation Program, Hazard Mitigation Grant Program and Public Assistance Program—three large flood-related programs not funded through the NFIP.

A major FEMA concern is the extent to which the agency's NFIP regulations effectively achieve the floodplain conservation goals associated with NEPA and EO 11988. In particular, FEMA is concerned with how effectively its activities through the NFIP:

- avoid the floodplain whenever practicable;
- identify and minimize adverse impacts to floodplains and preserve floodplain values;
- prevent modification to the natural floodplain environment or maintain it as closely as possible to its natural state;
- discourage floodplain development;
- minimize impacts to the smallest degree possible.

For convenience, these objectives are collectively characterized as “floodplain conservation.” “Conservation,” in this perspective, does not necessarily imply actions incompatible with floodplain development, but does entail obligations to inhibit development, and to reduce its adverse impacts as much as possible.

Many of the specific recommendations for improvement in FEMA's implementation of NEPA and EO 11988, discussed in Section 2.5 below, should be considered as part of updated NEPA and EO 11988 programmatic reviews of NFIP regulations. A newer review is especially

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<sup>26</sup>One NFIP activity for which Environmental Reviews may be prepared on a continuing basis is the Flood Mitigation Grant Assistance Program, funded by the NFIP. This provides assistance to States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable by the NFIP. A major purpose of the program is to address repetitive loss properties and to mitigate repetitive properties

timely as a result of significant research, experience in implementing the NFIP in the last twenty-five plus years, and the consequences of Hurricane Katrina. Thus, the first report recommendation incorporates reference to a number of more specific issues discussed in Section 2.5:

Recommendation DEI-1: *FEMA should initiate new programmatic NEPA and EO 11988 reviews of the NFIP's present floodplain regulations addressing specific issues identified in this report. Among the findings pointing to the desirability of such a comprehensive review are (1) proposals to make improvements in the 1 percent standard and the regulatory floodway requirement for floodplain mapping presented at the 2004 ASFPM Foundation's Gilbert F. White National Flood Policy Forum (ASFPM 2004); (2) the lack quantitative data concerning the natural and beneficial value of floodplains; (3) the need to characterize the cumulative national and local impact of floodplain filling through the LOMC process; (4) the absence of research specifically concerned with the NFIP's impact on endangered species habitat; and (5) the possibility for greater use of future-conditions hydrology as a basis for floodplain mapping.*

### **2.5.1 The NFIP Promotes Floodplain Conservation**

The NFIP's regulations can inhibit, and sometimes prevent, floodplain development while reducing its environmental impacts in many communities. Among the NFIP components intended to accomplish these objectives are provisions for:

- mapping of Special Flood Hazard Areas to direct development away from flood-prone areas;
- requiring communities to review development proposals to ensure that all necessary permits have been obtained, including Federal and State environmental permits;
- establishing building codes and floodplain management ordinances in flood-prone areas;
- limiting development in the most environmentally sensitive areas of riverine floodplains through the designation of a regulatory floodway;
- providing incentives in the Community Rating System (CRS), through flood insurance premium reduction, to exceed NFIP minimum standards for floodplain protection;
- encouraging communities through the CRS to adopt more non-structural techniques for flood control management.

Where the NFIP may not significantly discourage floodplain development, it is often perceived to encourage "wise" or "smart" development that reduces property and environmental destruction that might otherwise occur (Baumann and Emmer 1976; Bollens, Kaiser and Burby 1988). A few empirical studies suggest that the NFIP's floodplain conservation impact may be most evident in riverine, rather than coastal, communities (Kriesel and Landry 2004). The distinction between riverine and coastal zones may be significant in assessing the NFIP's national impact. While budget constraints precluded such an investigation in this report, the issue merits more careful investigation than it has so far received, since much of the ongoing controversy over the NFIP's developmental impact focuses upon coastal settings.

Recommendation DEI-2: FEMA should commission an empirical, national study comparing the developmental and environmental impacts of the NFIP in riverine and coastal areas.

## 2.5.2 The NFIP Also Removes Some Barriers to Floodplain Development

Previous research about the NFIP's floodplain impact suggests several, sometimes inconsistent, generalizations about the NFIP's role in floodplain development. First, the NFIP often removes or reduces barriers to the development and environmental alteration of floodplains.<sup>27</sup> However, these studies frequently note that the NFIP is one among many important developmental facilitators whose relative influence may vary considerably from one geographic setting to another and among different segments of the community.

Second, the literature on risk perception indicates that public perceptions about low frequency/high damage events, such as flooding, imply that flood insurance may do little to facilitate floodplain development because property owners frequently have an “optimistic bias”—a tendency to view themselves as invulnerable, or less likely than others, to experience negative life events such as flood damage (KRC 1996, 1998, 1999). Finally, in high-growth, coastal communities, especially, the NFIP seldom appears to be a major factor in guiding development away from flood prone areas although it is a factor in ensuring that structures are built to minimize damages.

This literature review was supplemented by interviews conducted for this study with individuals instrumental in community development, local floodplain administrators, homeowners and FEMA staff. These generally indicate that the availability of NFIP insurance is (1) perceived important in removing barriers to floodplain development by community interests active in this development; (2) among several factors influential in development whose relative importance is sometimes difficult to characterize; (3) under some circumstances, the most important consideration for community developers and their associated financial institutions in promoting floodplain development; (4) a significant, but not necessarily the most important, concern to homeowners purchasing floodplain property (See Sections 4.3.1 and 4.3.2); and (5) influential primarily through the process of development rather than through perception of risk by purchasers of buildings.

While the NFIP is widely perceived to encourage safer floodplain construction, it is seldom perceived to inhibit floodplain development, particularly in coastal areas and high-growth communities.<sup>28</sup> In these locations, especially, the NFIP is often perceived to remove economic barriers to development. Nationally, the NFIP does comply with the basic requirements of both NEPA and the EO. However, opportunities now exist for FEMA to improve its implementation of both mandates through greater initiative in achieving (a) the mandate of the EO “to minimize the impacts and restore and preserve the floodplain, as appropriate;” (b) the intent of the *Unified National Program* and the EO to protect “natural and

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<sup>27</sup>The most well-designed, empirical studies do suggest the NFIP encourages, to varying extent, floodplain development, or may have done so in the past (Bollens; Burby, Bollens, Holway, Kaiser, Mullan and Sheaffer). See Rosenbaum. “The Developmental and Environmental Impacts of the National Flood Insurance Program: A Review of Literature”, 2005, for more information on specific studies.

<sup>28</sup> See Jones et. al. (2006) and Blais et. al. (2006) for further discussion about how the NFIP protects structures.

beneficial values served by floodplains;” and (c) the legislative intent of the NFIA to “constrict development of land which is exposed to flood damage” and “guide the development of future construction, where practicable, away from locations which are threatened by flood hazards.”

### **Community Development Interests: Flood Insurance Essential**

AIR interviewed randomly selected individuals from five different groups—property developers, insurers, lenders, realtors, and floodplain administrators—in eighteen communities from six states. These groups represent occupations commonly instrumental in promoting, financing and directing community growth. The states and communities, representing both riverine and coastal settings, were characterized by high population growth and significant NFIP enrollments. While most of the 20,000 NFIP communities are smaller and often may not experience the strong growth pressures in our sample communities, the sample communities are typical of those where the majority of flood insurance policies are marketed and sold, and where the NFIP’s environmental and developmental impacts are currently most contested. Although the random sample from development interests in the eighteen NFIP communities studied is insufficient for national generalizations, the methodology was intended so that the results would be as representative as possible of results were greater resources available. The methodology is more fully described in Appendix 3.

The importance of flood insurance in community development was illustrated by the total group response to several survey questions:

- Flood insurance was identified among the most important factors affecting decisions to either purchase or develop property in the community;
- More than three-quarters of the respondents identified flood insurance as “very important” to decisions regarding where they would develop or purchase property in their community;
- Almost eighty percent of the respondents with potential investments in community property development stated that they would not finance or develop floodplain property if federal flood insurance were unavailable.

These findings are generally consistent with the vigorous support for maintaining the availability of NFIP insurance among local, state and national community development interests reported in other research and the media (Drew and Treaster 2006).

### **Homeowners: Flood Insurance Important But Not Essential**

The random national sample of homeowners living in and outside a floodplain also indicates that flood insurance is important to the extent that most believe they should have such insurance and would carry a policy even if it were not required as a condition for obtaining a mortgage:

- More than two-thirds (68.2 percent) of homeowners considered it “very important” to have flood insurance in the event of a flood” (Table 4.5);

- More than two-thirds (67 percent) of homeowners stated they would carry flood insurance on their homes if they “were not required to have flood insurance as a condition of your mortgage”. (Table 4.7)

However, 70 percent of homeowners stated that they would still purchase, build, or remain in their property even if flood insurance were unavailable or they could not purchase the insurance. Also, a study of NFIP market penetration conducted for FEMA by the RAND Corporation indicates that only 22 percent of homeowners living in SFHAs did purchase flood insurance when they were not required to do so. These findings may explain why many properties do not carry policies when insurance is not required.

### **NFIP Regional Personnel: Flood Insurance Encourages Prudent Development**

NFIP staff in each of FEMA’s ten regional offices was interviewed concerning their perception of the NFIP’s impact upon floodplains within their region (See Appendix 4 for interview protocol). In response to a specific question concerning whether the NFIP encouraged or discouraged floodplain development, staff in the majority of regions described the NFIP as encouraging “responsible,” “wise,” or “smart” development rather than discouraging development. These characterizations associated the NFIP with such desirable impacts as improved building safety, reduced flood risk, better building design and desirable local growth planning. Some respondents observed that it was difficult to distinguish between the influence of the NFIP and many other factors promoting floodplain development.

### **Floodplain Administrators: Flood Insurance Sometimes Encourages Development**

Floodplain administrators in each of the eighteen communities included in the survey were divided in their opinion about the NFIP’s role in community development:

- More than half the administrators believed the availability of NFIP insurance “enabled” or “encouraged” floodplain development;
- Administrators were evenly divided concerning whether NFIP insurance increased the rate of floodplain development.

The administrators perceived the importance of flood insurance to homeowners in a perspective similar to that reported by homeowners themselves:

- Two-thirds of the administrators considered the availability of flood insurance to be “very important” in a community homeowner’s decision to purchase floodplain property;
- However, availability of flood insurance was mentioned less frequently than property characteristics, financial considerations, and proximity to amenities among the factors perceived to be important in decisions to purchase property on a community floodplain.

The perception of the respondents, individuals actively involved in community development, are generally consistent with those earlier research studies characterizing the NFIP as removing barriers to development. The responses also confirm that the availability of NFIP insurance is not always the most influential or the primary explanation for such development.

However, the survey responses, although drawn from a limited number of NFIP communities, characterize NFIP insurance so frequently among the major considerations in floodplain property growth that its importance in community development appears notable.

### **2.5.3 Are NFIP Premiums Important to Development?**

An important continuing issue is the influence of NFIP insurance rates on the market for flood insurance. Descriptions of NFIP insurance that characterize its premiums as low-cost or “cheap” have often implied that a significant increase in NFIP premium might diminish the market for NFIP policies and thereby reduce the pace of floodplain development, particularly in coastal areas. Environmental advocacy organizations, for example, frequently asserted that inexpensive NFIP premiums encourage development in high risk flood zones, particularly in coastal areas, that might not otherwise occur. Commonly suggested remedies include an increase NFIP premiums until they “reflect the true risk of coastal hazards,” (Pew Oceans Commission 2003, 58), and denial of insurance or a significant premiums increase, for structures in coastal 30-year erosion zones. (Heinz Center 2000a, Chapter 3; National Research Council 1990). This section reviews the possible impacts of higher flood insurance rates on development, but does not address the issue of whether current premiums reflect the true risk of coastal and other flood hazards.

Section 4.3 presents survey data concerning NFIP premiums taken from the NFIP community developer and the national homeowner questionnaires. Some of the survey questions were intended to analyze the impact of higher insurance rates on development in the SFHA (Section 4.3.3). The survey results raise significant issues but are inconclusive and at times—for example, concerning homeowner perceptions flood of risk and behavior (Section 4.3.2)—are inconsistent and perhaps contradictory.

All respondent groups generally perceived that if the price for flood insurance were to increase, the willingness to purchase flood insurance would decrease. Previous research also indicates a decrease in insurance demand for pre-FIRM structures if higher rates were to prevail (Price Waterhouse Coopers 1999, p. 1). The national survey of homeowners conducted by the Rand Corporation estimates that demand for NFIP insurance may be responsive to changes in NFIP’s premiums only if existing rates were increased beyond 25 percent (Dixon et. al. 2006, p. xxi).

The survey questions, however, lack important nuances, such as distinctions between the base premiums to be increased—a 20 percent increase in a \$400 and a \$4000 premium may elicit different responses. The survey data also does not distinguish between individuals with income sufficient to absorb a given increase comfortably and those lacking such income. Finally, the survey information may not accurately predict behavior. For example, in the survey data shown in Section 4.3, “The Characteristics of the Property” is typically as important as the “Availability of Flood Insurance” in a SFHA for many homeowners. Thus, individuals might indicate a reluctance to pay higher flood insurance premiums yet pay the premium.<sup>29</sup>

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<sup>29</sup> This possibility is supported by a recent research among coastal NFIP policyholders. For property owners living within 1,000 feet of coastal waters, neither an increase nor decrease in NFIP premiums would significantly alter the propensity of property owners purchase NFIP policies (Kriesel and Landry 2004). In coastal areas, NFIP enrollment

A plausible assumption is that the impact of increased or decreased NFIP premiums would be closely associated with the perception of flood risk and the importance of flood insurance to the property owner. As discussed later in Section 4.3.2, the survey of individuals active in NFIP community development and the more comprehensive study of national homeowners included in this report suggest that relatively few owners or prospective owners perceive a significant flood risk to their own property, even if (in the case of homeowners) they be aware their property is located in a flood prone area. A substantial majority of the surveyed NFIP community developers and homeowners identified flood insurance as an important consideration in property ownership or development. Further, a majority of homeowners also indicated they would purchase flood insurance even if it were not required for the financing of their property. But the survey results also indicate a substantial majority of homeowners would still purchase their property if they were unable to obtain flood insurance. Additionally, 28.2 percent of current policy holders in a SFHA homeowners indicated that they would drop their flood insurance if flood insurance were not required as a condition of their mortgage.

Recent research among coastal NFIP policyholders also suggests that neither an increase nor decrease in NFIP premiums would significantly alter the propensity of property owners to purchase NFIP policies (Kriesel and Landry 2004). In coastal areas, NFIP enrollment appears to be most responsive to perceptions of flood risk and experience with coastal flood hazards, or to mortgage requirements. AIR's national survey of residential NFIP policyholders indicates that almost three quarters of the respondents would have purchased, built, or remained in their present location even if flood insurance were unavailable or they could not purchase it (Shapiro et. al. 2006).

The potential impact of a change in premium rates on the NFIP market merits further investigation. One fundamental problem in generalizing from existing surveys is that no appropriate alternative to the existing flood insurance market is available for comparison. Survey residents also are geographically variable. Surveys of coastal NFIP policyholders may not reflect perceptions about flood insurance rates among all national property owners, or all NFIP policyholders. Riverine area residents may respond differently than coastal residents to potential changes in NFIP premium rates. Moreover, potential rate changes may vary across locations and affect survey respondents differentially, but are not evident in survey data, which typically are weak indicators of elasticity of demand for a product. For example, the survey of community development interests discussed previously indicates that individuals involved in local development perceive that willingness to pay for flood insurance is significantly responsive to premium rates.

#### **2.5.4 Need for Better Data About Natural and Beneficial Floodplain Values**

Section 1 of EO 11988 requires that FEMA take action through the NFIP and its other programs to “restore and preserve the natural and beneficial values served by floodplains in

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appears to be most responsive to perceptions of flood risk and experience with coastal flood hazards, or to mortgage requirements. AIR's national survey of residential NFIP policyholders indicates that almost three quarters of the respondents would have purchased, built, or remained in their present location even if flood insurance were unavailable or they could not purchase it (Shapiro et. al 2006).

carrying out its activities.” These values are described generically in the WRC’s *Guidelines for the Implementation of E. O. 11988*, and more definitively characterized in *A Unified Program for Floodplain Management* (FEMA, Interagency Task Force on Floodplain Management 1984, V.1 to V.4).

Quantitative techniques for characterizing these floodplain values, however, are not well developed or utilized by the NFIP in analyzing and modeling hydrologic, hydraulic and geomorphological properties of floodplains or in assessing the socioeconomic costs and benefits associated with floodplain uses (Task Force On The Natural and Beneficial Functions of the Floodplain 2002, 5-4). These methodologies, and their associated data, could be useful to state and local government officials when assessing the impact of existing or prospective NFIP activities on natural and beneficial floodplain values. For example, improved valuation of floodplain natural and beneficial values can be applied to:

- guiding local governments in regulating fill and other obstructions to floodway areas;
- determining the adequacy of existing or alternative regulatory floodway designations;
- assessing the impact of the 1-foot rise and alternatives in floodplain mapping; and
- identifying the most desirable flood mitigation techniques for protecting floodplain values.

Recommendation DEI-3: *FEMA should utilize, or develop, quantitative methodologies for assessing the natural and beneficial function of floodplains, which can be provided to state and local officials as a tool for assessing the impact of flood mapping and floodplain regulatory decisions.*

### **2.5.5 Floodplain Mapping and Protection of Natural and Beneficial Floodplain Values**

The 1 percent standard for defining a Special Flood Hazard Area (SFHA) and analysis used to designate a floodway are basic components of the NFIP’s flood mapping program. At the NFIP’s inception, these provisions were meant primarily to facilitate community implementation of the NFIP’s floodplain management standards, to reduce future flood damage and to define in communities where the mandatory purchase requirement would be enforced.

#### **Improving the Implementation of the 1 Percent Standard**

Since the NFIP’s creation, the 1 percent standard has also been considered one method for protecting floodplains, or significant portions of them, while fulfilling the NFIP’s mission to decrease flood damage. Important floodplain conservation goals have often been achieved. For example, mapping SFHAs may direct development away from floodplain areas or reduce the pace at which such development might otherwise occur. However, recent studies of the 1 percent standard presented in a report by the Association of State Floodplain Managers (ASFPM) suggest that the way the standard is currently implemented may be insufficient to assure protection of the natural and beneficial values of floodplains as required by EO 11988 (ASFPM Foundation 2004; Galloway, et. al. 2006)

The 1 percent standard has slowed the pace of development in the NFIP mapped floodplains and improved their management. However, the floodplain defined by the 1 percent standard has no scientific connection to the natural, biological, physical, or geomorphologic floodplain (ASFPM Foundation 2005). It defines a spatial “footprint” where a theoretical flood can occur. Usually, this does encompass the areas over which most of the natural and beneficial functions of floodplains may occur on a seasonal basis.

However, the 1 percent mapping process may also exclude natural and beneficial floodplain values within its boundary. This applies, as well, to the SFHA’s “regulatory floodway”—the channel of a stream and any adjacent floodplain area that must be kept free from encroachment so that the 1 percent annual chance flood can be carried without substantial increases in flood heights.<sup>30</sup> This uniform national standard for SFHAs and regulatory floodways, as currently implemented, may be insufficient to protect natural and beneficial floodplain values for several reasons:

- Significant regional variations exist in the spatial and temporal characteristics of both riverine and coastal floodplain ecosystems and their associated physical, biological and ecological processes;
- The most beneficial natural functions of riverine floodplains are often closer to the portion of a stream where overbank flooding is more common and where frequent and complex habitat exist along the aquatic-terrestrial boundary;
- The 1 percent standard and many supporting NFIP regulations do not take account of the short- and long-term economic value of the natural and beneficial floodplain functions as a basis for mapping decisions;
- There is a consensus at the scientific and policy levels that wetlands best characterize the diverse and important natural and beneficial functions provided by floodplains, and wetland loss can exacerbate flood hazards. Yet, there has been little study of the implementation of actions to prevent such losses.

In the light of recent research and experience with Hurricane Katrina, the implementation of the 1 percent standard can be improved to achieve better the NFIP’s environmental conservation mandates. From this perspective, several aspects of this calculation of the 1 percent chance flood merit consideration (Galloway et. al 2006).

First, the present methodology used for implementing the 1 percent standard and for defining community SFHAs does not usually take in consideration the hydrological impact of developmental changes already planned, or already underway, in communities. The implementation of the 1 percent standard should, when practicable, take into account future conditions hydrology. Essentially, future conditions hydrology involves cooperative agreements between FEMA and communities through which NFIP flood hazard maps are based upon flood discharges that would occur a community if land-use conditions shown on current zoning maps or comprehensive land-use plans were implemented (FEMA, Federal Insurance and Mitigation Administration 2001, p. 2-3). This approach encourages more restrictive watershed management standards than would occur with more traditional mapping procedures and appeals particularly to

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<sup>30</sup> Minimum FEMA standards limit such an increase to 1.0 foot although communities can enforce a more stringent standard.

urban communities experiencing rapid growth. In addition to improving protection of floodplain environmental values, future conditions hydrology can promote better, more proactive flood mitigation measures and enable progressive communities to implement stricter land-use regulations.

Second, use could be made of confidence intervals when computing the 1 percent annual flood. For example, the flood could be based on the upper limit of the 90 or 95 percent confidence interval to ensure that the 1 percent chance protection is provided to most properties. In many communities, the result of this approach would be to raise estimated SFHA flood heights above those calculated with current procedures, thereby taking better account of future community growth. This approach could promote better spatial definition of regulatory floodways in riverine settings, particularly, and more adequately protect the most environmentally sensitive floodplain areas that are usually included the regulatory floodway (Galloway et. al 2006).

The elevation specified by the 1 percent standard for a given location is in fact only one of many elevations that are represented in the statistical distribution of possible elevations for the 1 percent recurrence interval.<sup>31</sup> At a 90 percent confidence interval on a large river, the “real” 1 percent elevation could be several feet above or below the elevation. There have been significant advances in technology and in model development over the past three decades. The power of modern computers to carry out sophisticated calculations and to model real world situations as well as the capability of remote sensors to rapidly gather highly accurate data offer opportunities to more easily determine a range of flows. While there are opportunities to gather high quality data, the data are not being collected.<sup>32</sup>

Third, the current basis for determining the spatial area of the regulatory floodway in riverine communities, based upon modeling the 1 percent floodway, may not adequately protect the most natural and beneficial stream functions where overbank flooding is most common. Studies presented at the ASFPM Gilbert White Forum (2004) suggest that a more restrictive floodway, based upon a more restrictive standard, may sometimes be more desirable to protect these values.

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<sup>31</sup> One can indicate that the flow producing a 1 percent flood will lie somewhere between two flow values. If the confidence limits are low, the spread can be low; if the confidence limits are high the spread will be large. For example, it might be possible to compute that, with a 5% confidence interval (little confidence), the 1 percent flow of a given river would fall between 150,000 cfs and 170,000 cfs. If you used the mean (160,000) as the measure of the 1 percent flood, you could indicate that the elevation of the 1 percent flood would be at 30 feet but would know that it could be as low as 28 or as high as 32 feet, but you have little confidence in computations. If you seek to have a high level of confidence (95%) that you have bracketed the 1 percent flood, the flow values spread to 100,000 to 220,000 and the height above and below the mean of 160,000 could be 6 feet. Typically, in identifying the 1 percent flood, the mean is used, yet this leaves the possibility that the protection is 6 feet too low or 6 feet too high

<sup>32</sup> Computation of the 1 percent flood for a coastal zone is more complex than for riverine environments since coastal flooding is a function of tides, storm surge heights, and waves, with the latter two being the most critical during storm periods. These computations are based on available data from tide gages and other coastal monitoring and use of available data on storms that have affected the area under study such as maximum winds, barometric pressure, forward storm speed, shoreline crossing point and crossing angle. The computations are subject to the same challenges in data collection and modeling that face riverine computations.

Recommendation DEI-4: *Evaluate the methodology used to calculate and map the 1 percent standard to determine if there are ways to provide increased protection to the natural and beneficial functions of floodplains based on recent research suggesting that the biological functions and natural boundary of floodplains may not be adequately addressed in the current methodology.*

Recommendation DEI-5: *When assessing the methodology used to calculate the 1 percent standard, priorities should include: (a) revising relevant FEMA regulations and CRS standards to encourage use of future conditions hydrology, when practicable, as a methodology; and (b) using the upper limit of a 95-5 or 90-10 confidence interval in calculating the BFE.*

Recommendation DEI-6: *Replace the present regulatory floodway standard with one based on either a 10-year floodplain or the regulatory floodway, whichever is greater.<sup>33</sup>*

### **The 1 Percent Standard Can Affect Species Habitat**

Providing flood insurance through the NFIP to entities wishing to develop within the 1 percent floodplain may be inconsistent with the conservation of endangered and threatened species of fish, wildlife and plants in aquatic and riparian ecosystems.

Section 7 of the ESA requires federal agencies consult on activities that may constitute a taking of an endangered species or impact its habitat. This requirement is a main point of contention in a lawsuit against FEMA in Washington State. The Court recently ruled that FEMA has violated Section 7(a) (2) of the ESA by failing to consult with NMFS to ensure that the minimum standards of the NFIP and the mapping of (1 percent) floodplains are not likely to jeopardize the continued existence of the Puget Sound Chinook salmon.<sup>34</sup> A key issue of the Plaintiffs is that FEMA designates the boundaries of floodplains on flood maps and these actions affect the location and patterns of development.

An updated, comprehensive NEPA and EO 11988 review of NFIP regulations—a strategy suggested in the Executive Summary and Concluding Recommendations for improving the NFIP’s environmental impact in light of recent research and disaster experience—would provide an opportunity to examine the NFIP’s impact on endangered species more thoroughly than litigation may provide.

### **The Regulatory Floodway and the “No-Rise” Analysis**

Some of the most direct impacts to floodplain natural and beneficial functions may come from the ability of communities to perform “no-rise” analyses to permit development within the regulatory floodway. The regulatory floodway is defined as the stream channel plus a designated

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<sup>33</sup> See Galloway, “Assessing the Adequacy of the National Flood Insurance Program’s 1 Percent Standard”, page 115.

<sup>34</sup> *National Wildlife Federation and Public Employees for Environmental Responsibility v. Federal Emergency Management Agency and National Association of Home Builders*. U.S. District Court for the Western District of Washington at Seattle (2005).

portion of the floodplain that must be kept free from encroachment in order to discharge the 1 percent annual chance flood without increasing flood levels by more than 1.0 foot; this is the minimum NFIP standard and some states specify a smaller allowable rise. The intention of the floodway concept is not to preclude development, but to assist communities in managing and developing floodplain lands so as to prevent additional damages to other property owners.

Approximately 9,000 square miles of floodway have been established along 40,000 miles of stream and rivers in the nation (FEMA 2002a) and the use of floodways as a land use management tool has protected the natural and beneficial functions of tens of thousands of acres of riparian floodplain lands (Association of State Floodplain Managers 2005).

However, the minimum NFIP standards [44 CFR 60.3(d) (3)] allow “fill, new construction, substantial improvements and other development within the regulatory floodway” if it can be demonstrated through engineering analyses that an encroachment will not result in any increase in the base flood elevation. These analyses constitute the “no-rise” analyses that are required by FEMA to demonstrate that any loss of flood flow conveyance and associated potential rise in water level is adequately mitigated by actions to restore the lost conveyance. This mitigation is often accomplished by excavating land and removing vegetation within the floodway to compensate for the obstruction caused by the proposed encroachment, such that the conveyance capacity of the stream remains unchanged. FEMA discouraged development of the floodway, but provided guidance for performing “no-rise” analyses to standardize the methods (Schauerte 1990).

Disruption of natural floodplain terrain and vegetation within a floodway adjacent to the stream channel can affect some of the highest quality habitat and represents a significant impact to the natural and beneficial functions of floodplains. Recent recommendations were made at the Gilbert F. White National Flood Policy Forum (Association of State Floodplain Managers 2005) to enhance the existing 1 percent standard by eliminating the allowable 1-foot rise used to designate the floodway and delineating a “resource-based” floodway, with consideration for ecological and geomorphic process, to better protect floodplain functions (see also Coulton 2004 and Berginnis 2004).

Recommendation DEI-7: *Eliminate the 1-foot rise allowed in determination of an SFHA floodway and delineate a “resource-based” floodway, with consideration for ecological and geomorphic process, to better protect floodplain functions.*

### **The Economic Value of Floodplains**

The 1 percent standard and many supporting NFIP regulations were designed to strike a balance between promoting economic growth and preventing flood damages in the development of floodplains; however, this perceived balance may be significantly different if the economic value of the natural and beneficial functions of floodplains are to be accounted for. For its mitigation projects, FEMA employs a benefit-cost analysis method to determine the future benefits of a mitigation project versus its cost; however, it does not take into account the short- or long-term economic value of ecosystem services provided by floodplain mitigation activities.

Although the economic valuation of ecosystem services is still in its infancy, studies are showing that the economic value derived from the sustainable management of ecosystems is often greater than the value obtained from converting the complex natural ecosystem to more simplified systems for human uses. Documentation of the value of ecosystem services protected by sound floodplain management practices may better justify the protection of floodplain natural and beneficial functions to NFIP communities and the public in general. It is recommended that FEMA initiate pilot studies to test the feasibility of incorporating the economic value of floodplains into current benefit-cost analyses to better reflect the benefit of mitigation projects that serve to protect or restore beneficial floodplain functions.

*Recommendation DEI-8: Modify FEMA cost-benefit procedures used in mitigation projects to include consideration of the long-term environmental and economic services created or preserved in floodplains through non-structural mitigation techniques. Documenting the value of ecosystem services protected by sound floodplain management practices may better justify the protection of floodplain natural and beneficial functions to NFIP communities and the public in general.*

## **2.5.6 The Letter of Map Change Process Can Discourage Floodplain Conservation**

FEMA regulations permit revisions of existing community FIRMs through a process called Letter of Map Change (LOMC). This process can be initiated by local governments, property owners or lessees through several methods. Even though the physical changes to the floodplain that result in LOMCs are allowed under NFIP floodplain management regulations, aspects of the LOMC process appear to be detrimental to the goal of protecting the natural and beneficial functions of floodplains. The current LOMC process likely results in more fill in the floodplain and more levees, channels and other physical changes to the floodplain than would otherwise occur. A detailed discussion of the impact of the LOMC process on natural and beneficial floodplain values is contained in a related NFIP evaluation document commissioned by FEMA. (Galloway et. al. 2006).

Two types of LOMCs have potential environmental affects relevant to this report. Letters of Map Revision (LOMR), or physical map revisions, reflect physical changes to the floodplain caused by levees, channels, dams, bridges, and similar construction. LOMRs also correct errors on an effective FIRM or revise a FIRM using better topographical data. Letters of Map Revisions Based on Fill (LOMR-F) are issued to remove areas that are filled to above the base flood elevation from the floodplain.

This review indicates that the LOMC process generally affects the natural and beneficial functions of floodplains in several ways:

- Existing LOMR and LOMR-F procedures generally result in a smaller floodplain as opposed to revisions that attempt to map larger floodplains, which protect floodplain natural and beneficial functions and reduce future flood damages. LOMRs are often times granted to reflect construction of a channel or levee that in many cases can adversely impact the channel, adjacent riparian and wetland areas, and impact the geomorphic stability of the natural system.

- The existing LOMR review process is based on uniform national standards and does not incorporate a local environmental impact assessment that should ultimately guide map changes while protecting the natural and beneficial functions of floodplains;
- The existing LOMR-F provisions provide an indirect incentive for filling in the floodway fringe with minimal consideration for environmental impacts since there is no requirement for a local environmental impact assessment;
- The requirements to track LOMC actions are not adequate to ensure there are no cumulative effects nor are LOMC data readily available to determine these effects.

There is a general awareness at the local level that the current LOMR process facilitates floodplain development by providing a mechanism to remove a property from the floodplain. Developers prefer to build properties, which can be characterized as outside the floodplain and homebuyers frequently want to avoid purchasing flood insurance. Property-by-property decisions to change effective maps are reviewed and approved without proper considerations for their cumulative effects.

The regulatory floodway concept is intended to account for the cumulative effects of development in the floodway fringe. Based on commentary from invited participants at the 2004 National Flood Policy Forum, however, there are two significant shortcomings to the established approach in determining a floodway to accommodate cumulative effects of future floodplain development: 1) the inconsistent use of a 1 percent discharge rate based on existing land use conditions, to guide future land use decisions; and, 2) the traditional use of steady flow modeling to establish floodway boundaries associated with a highly unsteady, dynamic event such as flooding. These shortcomings should be evaluated in detail to determine the appropriateness of the floodway concept for long-term land use management.

One potentially useful approach to better account for the cumulative impact of the LOMC procedures is to promote in NFIP communities the use of “No Adverse Impact” (NAI) as the default floodplain management criteria. The principle underlying NAI is that the action of one property owner does not adversely affect the property rights of others, as measured by increased flood peaks, flood stage, flood velocity and erosion of sedimentation (ASFPM 2004). NAI could become the default management criteria unless a community has developed and adopted a comprehensive plan to manage development that identifies acceptable levels of impact, appropriate measures to mitigate those adverse impacts and a plan for implementation. This approach encourages communities to make future developmental actions affecting the floodplain a component of local planning.

Recommendation DEI-9: *Given the nationwide trend in urbanization and higher peak flows, a true 1 percent floodplain is likely larger than a mapped effective floodplain. The LOMC standards and guidance should acknowledge this condition and at least give encouragement to map revision requests that raise, rather than lower BFEs, or scrutinize in more detail requests that lower floodplains in the face of continued development, loss of floodplain habitat and increasing flood damages.*

*Recommendation DEI-10: Examine the feasibility of adding to the Community Rating System standards, additional credit for No Adverse Impact as community floodplain management strategy.*

*Recommendation DEI-11: Restructure the LOMC review process to encourage more local involvement and interagency input, especially from resource management agencies familiar with the unique local and beneficial functions of floodplains.*

## **2.5.7 The LOMR-F Process Creates Floodplain Fill That May Affect Floodplain Values**

Floodplain managers usually consider fill the safest way to protect buildings from flooding. NFIP floodplain management regulations permit floodplain property to be elevated by the use of fill outside the regulatory floodway. This use of fill continues to be controversial, in good part because of its possibly adverse impact on natural and beneficial floodplain values.

Fill can also damage wetlands, floodplain forest and riparian habitat, or alter hydrologic flows, particularly when it is used extensively within a floodplain. It may also reduce flood storage in riparian systems. Much depends upon the volume and location of fill. The cumulative environmental impact of floodplain fill has not been well documented and merits further evaluation by FEMA in light of the NEPA and EO mandates. At least, communities should be encouraged to minimize floodplain fill as much as possible.

One aspect of the LOMC process, the Letter of Map Revision-Fill (LOMR-F) appears to be a particularly important facilitator of floodplain development with minimal consideration for environmental impacts. In some communities, it may have the most direct impact to the natural and beneficial functions of floodplains and deserves greater attention.

The LOMR-F process provides an incentive for an owner or lessee of property in the floodway fringe to raise the lot or structure above the 1 percent flood elevation with fill.<sup>35</sup> LOMR-Fs are documents issued by FEMA that officially remove a property and/or structure from the SFHA. To obtain a LOMR-F, the applicant must submit mapping and survey data for the property, much of which is available from the municipality in which the property is located (e.g., the City Hall, County Courthouse, etc.). In most cases, the applicant will need to hire a land surveyor to prepare a property survey. Upon receiving a complete application, FEMA normally completes its review in 4 to 6 weeks.

Once a LOMR-F is granted, a property is removed from the floodplain, exempted from the mandatory NFIP purchase requirement, and excluded from most community floodplain management regulations that may otherwise be required by the NFIP. In many communities, this has become a perverse incentive for developers to fill property and market it as free from the mandatory NFIP purchase requirement.

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<sup>35</sup>This ability to fill in the floodway fringe is predicated on the methods and assumptions used to define the regulatory floodway at the time of the effective flood insurance study; i.e., under minimum FEMA standards, the fringe area can be entirely filled because the floodway has been reserved to convey the 1 percent discharge without raising flood elevations more than one-foot. Many NFIP communities have adopted higher standards limiting the floodway rise, with a zero-rise standard effectively prohibiting fill placement in the floodway fringe.

### 2.5.8 LOMR-Fs and Endangered Species

The impact of LOMR-Fs is an issue in recent litigation in Washington State where the Federal District Court held that LOMR-Fs created a possible incentive for developers to use fill, rather than other elevation techniques, to the point where the increased use of fill might have an adverse impact upon salmon habitat and thus violate the ESA. Although LOMR-Fs are not frequently issued in the State of Washington, they are widely used for development in other parts of the nation.

FEMA does require a Community Acknowledgement Form to accompany floodplain fill requests and this might provide at least a partial assessment of fill impacts on endangered species habitat. Before FEMA will process a LOMR-F the community must determine that the development complies with all local floodplain management regulations and that the applicant has obtained or will obtain before beginning construction all necessary Federal, state and local permits (including ESA and Section 404). Currently, the form requires the signature of one community official but not necessarily an individual familiar with natural resource issues or the relevance of fill to endangered species habitat.

Recommendation DEI-12: *Initiate a nationwide evaluation of the impact of the LOMC process on the natural and beneficial values of floodplains with a priority component focused on the floodplain impact of the LOMR-F process.*

Recommendation DEI-13: *The signatory requirement for a Community Acknowledgment Form should be broadened to include the signature of someone familiar with the environmental effects of the floodplain fill request, such as a community natural resource manager, in order to more directly address the effects of floodplain fill on floodplain functions.*

### 3. FEMA'S LEADERSHIP IN PREVENTING UNECONOMIC USE AND DEVELOPMENT OF FLOODPLAINS

Executive Order 11988 requires that each federal agency “shall provide leadership ... to preserve the natural and beneficial values served by floodplains.”<sup>36</sup> This section concerns the extent to which FEMA through the NFIP provides this leadership.

FEMA's leadership responsibility under EO 11988 is consultation with other federal agencies, involving largely guidance and assistance. FEMA has no oversight or regulatory authority over other Federal agencies implementing EO 11988. Both FEMA HQ and FEMA Regional staff provide consultation and guidance to other Federal agencies as requested, including HQ review of other agency procedures when an agency is updating its EO 11988 procedures. Sometimes FEMA staff contact Federal agencies when a notice of a proposed action appears in the *Federal Register* or a concern is raised by a community or individuals over a proposed Federal action.

Three issues complicate the task of characterizing FEMA's leadership in implementing the EO 11988. First, stakeholders in NFIP programs often evaluate FEMA's leadership according to whether the NFIP achieves a preferred policy outcome. Second, judgment about leadership also depends upon how the substantive elements of EO 11988 are interpreted. For example, the EO 11988 mandates agency leadership in “conducting Federal activities and programs affecting land use, including ... water and related land resources planning, regulating, and licensing activities.” This could be interpreted to imply that FEMA should take major initiatives in regulating how NFIP communities interpret and enforce NFIP eligibility requirements. Finally, FEMA's regulations, activities and documents do not clearly define its concept of “leadership.”<sup>37</sup>

A useful criterion for “leadership” responsibilities is provided in the Water Resources Council *Floodplain Management Guidelines for Implementing E.O. 11988*, which notes that “this role requires the agencies to lead other public and private entities [emphasis added] in achieving the goals of the Order by setting a good example” (WRC 1978, 9). This implies that FEMA should transcend a diligent discharge of specific duties required of the agency itself and should, individually or in combination: (1) communicate to the public and other governmental entities the importance of promoting the economic and environmentally beneficial uses of floodplains; (2) influence other federal agencies in interpreting and implementing EO 11988; or (3) influence other public and private entities to initiate activities that advance the environmentally beneficial use of floodplains.

FEMA has initiated or assisted activities that involve communication with the public and other agencies to promote environmentally beneficial floodplain use. FEMA has also

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<sup>36</sup> The leadership and action is supposed to be taken in carrying out “responsibilities for (1) acquiring, managing and disposing of Federal lands, and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.”

<sup>37</sup> FEMA regulations note only that “It is the policy of the Agency to provide leadership in floodplain management and the protection of wetlands” (44 CFR, §9.2).

collaborated with other agencies in creating guidance to public and private entities concerning the economic and beneficial use of floodplains. These activities include:

- Membership in the U.S. Water Resources Council during its existence between 1960 and 1984, including particularly collaboration in writing the WRC *Floodplain Management Guidelines for Implementing E. O. 11988*;
- Membership on the Interagency Task Force on Floodplain Management and collaboration in preparation of its report, *Further Advice on Executive Order 11988, Floodplain Management* (1987);
- Membership on the Interagency Task Force on Floodplain Management and collaboration in preparation of its report *Floodplain Management in the United States: An Assessment Report* (1992);
- Membership on the Interagency Floodplain Management Review Committee and collaboration in its report, *Sharing the Challenge: Floodplain Management into the 21<sup>st</sup> Century* (1994);
- Membership on Federal Interagency Floodplain Management Task Force and collaboration in its reports, *A Unified National Program for Floodplain Management* (1994) and *Protecting Floodplain Resources: A Guidebook for Communities* (1996);
- Sponsorship with the American Planning Association in the publication of Marya Morris's, *Subdivision Design in Flood Hazard Areas* (1997);
- Chairing the Task Force on the Natural and Beneficial Functions of Floodplains and collaboration in preparation of its report *The Natural and Beneficial Functions of Floodplains: Reducing Flood Losses By Protecting And Restoring the Floodplain Environment* (2002);
- Development of numerous publications that promote best practices, particularly those that protect the environment;
- Adoption of a requirements at 44 CFR 60.3(b)(2) that communities assure that permit applicants have obtained all necessary Federal, State and local permits including wetlands permits required under the Clean Water Act and incidental take permits required under ESA;
- Maintenance at FEMA's website ([www.fema.gov/library/prepandprev.shtm#mit](http://www.fema.gov/library/prepandprev.shtm#mit)) of links to numerous FEMA publications for relevant audiences concerning protection and conservation of floodplains.

Since the creation of EO 11988, FEMA's Headquarters floodplain management staff have reviewed a number of proposed revisions to Federal agency environmental regulations or guidance that included procedures for implementing E.O. 11988. Floodplain management staff in both Headquarters and the Regions provide ongoing technical assistance to other Federal agencies on implementing EO 11988. In some cases, FEMA has heavily encouraged other federal agency actions supporting the objectives of EO 11988 when such assistance seemed appropriate. FEMA's Headquarters management staff was active in the OMB Task Force effort to update and reissue EO 11988 as recommended in the 1994 Galloway Report.

FEMA's involvement in the review of other federal agencies' EO 11988 procedures is dependent upon those agencies making a determination that their environmental procedures must be updated. In more recent years, FEMA has been less involved in these consultation and

guidance activities due to a loss of experienced EO 11988 training staff, agency reorganization, and a redirection of greater resources for disaster assistance in the aftermath of Hurricanes Hugo and Andrew. The higher level FEMA activities earlier associated with its implementation of EO 11988 are more consistent with the requirements EO 11988 and their restatement in the WRC's *Guidelines for Implementing E.O. 11988*.

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## 4. PERCEPTIONS OF FLOOD RISK AND NFIP AVAILABILITY

The National Flood Insurance Act (1969), the NFIP’s authorizing legislation, mandates that the NFIP encourage communities “to constrict the development of land which is exposed to flood damage and [to] minimize damage caused by flood losses” and to “guide the development of proposed future construction, where practicable, away from locations which are threatened by flood hazards.” FEMA is concerned to understand how perceptions about flood hazard and the availability flood insurance may relate to these goals.

### 4.1 Objectives

FEMA believes that an important aspect in evaluating the NFIP’s impact on floodplain development is knowledge about the extent to which flood hazards, and flood insurance, are important when individuals consider floodplain occupancy. The NFIP is often criticized as an incentive for floodplain development on the assumption that people would not build or buy in floodplains without flood insurance. However, research on the relationship between perceptions of flood hazard and concern for flood insurance is very limited. FEMA has requested survey research among appropriate communities to better characterize this relationship between perceptions of flood risk, concern with flood insurance, and floodplain development.

### 4.2 Methodology

The survey responses reported in Section 4 are drawn from two databases: individuals important in the development of specific NFIP communities and a national sample of homeowners. The survey of individuals important in community development was limited to eighteen NFIP communities in six purposively chosen states and was not intended to be representative of all NFIP communities. Community respondents involved with development include those who design, build, finance, sell floodplain development and manage floodplain regulations. This group specifically includes insurance agents, realtors, financial lenders, property developers and floodplain managers. The homeowner category includes NFIP policyholders and non-policyholders as well as those living in a SFHA and those who live near a community SFHA

Table 4.1 identifies the respondent groups and the total number of respondents for each group:

**TABLE 4.1: Pool of Survey Participants by Respondent Group**

Administrators* <sup>1</sup>	Developers <sup>1</sup>	Insurers <sup>1</sup>	Lenders <sup>1</sup>	Realtors <sup>1</sup>	Homeowners <sup>2</sup>
17	25	31	78	37	738

<sup>1</sup> These five respondent groups are also referred to as “community respondents involved with development.”

<sup>2</sup> Homeowners will be further broken down by “policyholders” and “non-policyholders” as well as “in SFHA” or “outside SFHA.”

NOTE: Due to the sequencing of questions in the survey, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions thus, not all respondents had the opportunity to respond to all questions.

#### 4.2.1 Development Interests: State Selection

States selected in the community survey were chosen by criteria which prior research suggests may be related, singly or in combination, to variability in the onset and magnitude of development and the environmental consequences of development in flood hazard areas.<sup>38</sup> These criteria were:

- regionally distributed among the Northwest, Southeast, Southwest, Midwest and Mid-Atlantic areas;
- inclusive of coastal and riverine states;
- among the highest third of states in total population growth between 1990-2000; and
- within the highest third of states in total number of NFIP policy holders.

States ranked nationally among the upper third in population growth between 1990–2000 were selected (with the exception of Illinois) because the development of floodplains appears to be most intensive within these states and, consequently, the magnitude and character of such environmental transformation most apparent. Illinois is added to assure at least one Midwestern state is included in the survey. All states are among the top third nationally in the total number of policyholders to assure the survey is conducted where large numbers of policyholders exist. The six states selected by these criteria were Arizona, Florida, Illinois, North Carolina, South Carolina, and Texas.

#### 4.2.2 Development Interests: Community Selection

The selection of communities was based on those communities with the most developmental pressure during the 1990-2000 time period. In general, the selected communities met the following criteria: 1) communities that were among the top 5 percent of total policy holders in their respective states; 2) communities with the highest percentage of post firm policies.

Three communities were selected for study within each state. Within each state, communities were ranked according to the total number of NFIP policies in community SFHAs, then rank-ordered by the percent of post-FIRM contracts. The highest-scoring three communities in each state were then designated for interviews. These communities were surveyed:

- Arizona: Scottsdale, Mohave County, Maricopa County
- Florida: Pembroke Pines, Davie, Palm Beach County
- Illinois: St. Clair, Fox Lake, Round Lake

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<sup>38</sup> Regions differ, for example, in the extent to which their political cultures encourage aggressive local governmental planning for floodplain conservation. Also, significant regional differences exist in the rate of population growth and the increase of NFIP policyholders between 1990–2000 that may, in turn, imply important variability in regional economic, political or geographic contexts for floodplain management. All Midwestern states in this survey, for instance, are among the lowest third of all states in population growth during this decade. The Southeastern and Northwestern states are in the upper third of national population growth during 1990–2000, and the Mid-Atlantic states generally rank in the middle-third among state growth rates during this period. Since research also suggests that coastal and riverine states may differ significantly in developmental impacts upon floodplains, the six-state survey includes two riverine states (Arizona and Illinois) and four coastal states (South Carolina, Texas, Florida, and North Carolina).

- North Carolina: Sunset Beach, Ocean Isle Beach, Kill Devil Hills
- Texas: Corpus Christi, League City, Hidalgo County
- South Carolina: Beaufort City, Mt. Pleasant, Hilton Head Island

These communities are generally high growth and high policy communities and are representative of that type of community. The results may or may not reflect attitudes and perceptions in other NFIP communities, which do not have as much floodplain development and have far fewer NFIP policies.

#### **4.2.3 Development Interests: Respondent Selection**

Survey research was conducted among respondents strategic in understanding the relationship between perceptions of flood hazard, flood insurance availability and development in NFIP communities (See Section 4.2).

The survey was conducted among individuals likely to have a significant influence on community floodplain development, or to be well informed about floodplain management in the communities to be studied. These individuals were identified as developers, mortgage lenders and development underwriters, real estate brokers, insurance agents and floodplain administrators. The sampling frame was composed of various businesses in the research communities or, in the case of floodplain administrators, from local government officials.

Budget constraints precluded a large, statistically valid random sample of these respondents, but interviews with a smaller number of randomly selected individuals in each group provided valuable interpretations of factors affecting floodplain development in specific communities that could not be obtained from policyholders themselves. Individuals chosen for these interviews were selected randomly from appropriate community professional and business association rosters.

Individual respondents in the communities, such as realtors, developer, insurers, and lenders were randomly selected from phone listings. Floodplain administrators were not randomly selected. The survey protocols address specific issues identified by FEMA:<sup>39</sup>

1. What kind(s) of risk, or other factors, are considered when decisions are made to buy/build in a floodplain?
2. To what extent, and in what manner, do individuals in or near SFHAs consider flood hazard an important consideration when making decisions about buying/building within a SFHA?
3. Do individuals contemplating buying/building in or near a SFHA consider flood insurance necessary for floodplain occupancy?

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<sup>39</sup> Questionnaire protocols are found in Appendix 3.2.

4. How important is the availability of flood insurance relative to the other factors in the decision to develop an area?
5. What is the relation between people's perceptions about development in flood-prone areas and their actions and behaviors?
6. In what way(s) does the availability of flood insurance influence decisions about buying, building, or financing development in a SFHA? Would the lack of insurance serve as a deterrent to buy, build, or develop in a SFHA?
7. To what extent is development on community floodplains attributable to a growth in seasonal residents or to year-round residents moving into the community to provide services and infrastructure for an expanding population?
8. Is there development in the CBRS and if there is, what is causing the development?

The Florida Research Center (FSRS) was contracted by AIR to assist in the development of survey instruments and to conduct surveys in selected communities throughout the United States. The surveys were conducted telephonically. All surveys were conducted by FSRS with the exception of the community floodplain administrators. The community floodplain administrators were interviewed telephonically by the report study director.

#### **4.2.4 Homeowner Survey**

The national homeowner survey, more fully described in Section 1.4.2 of this report, attempts for the first time to account accurately for flood zone status among homeowners, including NFIP policyholders, in describing perceptions about flood risk and flood insurance. Few data sources were available for this critical piece of information. The sample thus is drawn from two sources. The first is a database developed by the RAND Corporation as part of the Evaluation of the NFIP for a report on market penetration rates. This dataset provides crucial information on a respondent's flood zone, which provides an objective measure of risk that would not be available for nonpolicyholders through other means, given the budget available. This dataset was merged with several variables including policyholder status. Because this dataset was developed to estimate market penetration rates, there were insufficient potential respondents for most policyholder strata where there was a low market penetration rate. This Market Penetration dataset was used for all strata where a sufficient number of potential respondents were found to conduct a survey.

### **4.3 Survey Analysis**

FEMA's eight issues were linked to survey questions across all respondent groups. The resulting categories of this linkage are shown below:

- Issues 1-4 were associated with survey questions evaluating perceptions of flood risk by respondent groups and the importance the respondents attributed to flood insurance in

making decision to buy, build, develop, finance or insure a property in or near a SFHA. Section 4.3.1 below presents the data analysis;

- Issue 5 was related to survey questions evaluating the relation between individual perceptions about development in flood-prone areas and actions or behaviors. Section 4.3.2 below presents this data;
- Issues in 6 were associated with survey questions concerning the impact of flood insurance on decisions about buying, building, or financing development in a SFHA. Specifically, these questions focus on the potential impact that an absence of flood insurance or higher insurance rates might have on property decisions within an SFHA. Section 4.3.3 below presents this analysis;
- Issue 7 relates to survey questions addressing the role of seasonal and year-round residents in SFHA development. Section 4.3.4 below presents this data analysis;
- Issue 8 involves to survey questions about potential development in CBRs areas. Section 4.3.5 below presents the analysis.

### 4.3.1 Perceptions of Flood Risk Compared

Issues 1 to 4 concern perceptions of risk associated with buying or building near a floodplain and the role that flood insurance plays in mitigating that perceived risk. The surveys asked several questions related to these perceptions. Tables 4.2 and 4.3 compare how community development interests and floodplain administrators perceived these risks with how they believed residents of their community would perceive the same risks. Table 4.2 reports the community developers and floodplain administrators own perceptions of their community flood risks.

**TABLE 4.2: “Please consider the likelihood of some part of your community flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will ‘not happen at all’ and 5 is flooding will ‘definitely happen’, how would you characterize the likelihood of flooding in your community?”**

Response (%)	Administrators	Developers	Insurers	Lenders	Realtors	Aggregated by Group
Rating: 1 or 2	35.3%	20.0%	35.5%	24.4%	29.7%	27.7%
Rating: 3	29.4%	20.0%	16.1%	21.8%	21.6%	21.3%
Rating: 4 or 5	35.3%	56.0%	48.4%	53.9%	46.0%	50.0%
Don't Know	0.0%	4.0%	0.0%	0.0%	2.7%	1.1%

Table 4.3 reports the respondent’s perception of how residents of their communities would also perceive local flood risk.

**TABLE 4.3: “Using the same scale, please tell me how you think the residents of your community would characterize the risk from flooding when considering buying or building on property in your community's floodplain.”**

Response (%)	Administrators	Developers	Insurers	Lenders	Realtors	Aggregated by Group
Rating: 1 or 2	70.6	28.0	54.8	46.2	18.9	42.0
Rating: 3	23.5	40.0	16.1	28.2	46.0	30.9
Rating: 4 or 5	5.9	20.0	25.8	23.1	29.7	22.9
Don't Know	0.0	12.0	3.2	2.6	5.4	4.3

While 50 percent of the aggregated community group thought a flood to be relatively likely in the next 10 years, they speculate that only 22.9 percent of residents would perceive the same likelihood of flood risk. These responses suggest that the community developers and administrators shared a greater sensitivity to flood risk than they believed would be found

generally within their communities, and that community concern with flood risk to property in the floodplain is low.

Table 4.4 summarizes perceptions about flood risk from a survey of homeowners living in or near an SFHA in NFIP communities. In general, a majority of homeowners living in an SFHA recognized a potential flood risk in their neighborhood, although a substantial minority—about 41 percent of the homeowners—seemed unaware of this exposure. Table 4.5 indicates that a majority of the homeowners living in an identified floodplain, however, did not perceive that their own property was exposed to significant flood damage. As might be expected, those lacking flood insurance and living outside of the SFHA perceived the least amount of flood risk. Tables 4.4 and 4.5 are consistent with the “optimistic bias,” noted in Section 2.5.2, often reported about individuals when considering the likelihood that they are at risk from a recognized flood hazard. Table 4.5 also suggests that personal flood risk is a not a salient concern for most homeowners regardless of whether they are NFIP policyholders.

**Table 4.4: “Is this residence in a neighborhood where a flood could happen?”**

Response	Policyholders in SFHA		Policyholders Outside SFHA		Non-policyholders in SFHA		Non-policyholders Outside SFHA	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	239	66.6	115	53.7	57	50.9	15	28.3
No	102	28.4	86	40.2	50	44.6	34	64.2
Don't Know	1	5.0	13	6.1	5	4.5	4	7.6
Refused	0	0.0	0	0.0	0	0.0	0	0.0

Note: Due to the sequencing of questions, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

**TABLE 4.5: “Consider the probability that a flood will cause damage to your home. Using a percentage, please estimate the probability that your home, or the building you live in, will suffer at least moderate damage from a flood within the next 10 years.”**

Response	Policyholders in SFHA		Policyholders Outside SFHA		Non-policyholders in SFHA		Non-policyholders Outside SFHA	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
0-25	100	54.1%	52	56.5%	34	54.8%	9	64.3%
26-50	42	22.7%	25	27.2%	14	22.6%	2	14.3%
51-75	8	4.3%	3	3.3%	5	8.1%	1	7.1%
76-100	25	15.0%	10	10.9%	6	9.7%	2	14.3%
Don't Know	10	5.4%	2	2.2%	3	4.8%	0	0.0%
Refused	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

Table 4.6 considers homeowner concerns about flood risk from a different perspective. This table indicates that the surveyed community developers and floodplain administrators reported that “characteristics of a property” was one of the two most significant factors in decisions to purchase floodplain property, virtually equal to “the availability of flood insurance” as the most important influence on decisions to purchase or develop in a floodplain.

**TABLE 4.6: “Could you please tell me what factors influence a person's decision to purchase or develop property in your community's floodplain?”**

Response (%)	Administrators	Developers	Insurers	Lenders	Realtors	Aggregated by Group
Availability of flood Insurance	41.1%	64.0%	22.6%	46.2%	73.0%	49.5%
Characteristics of the property	100.0%	16.0%	58.1%	41.0%	62.2%	50.0%
Financial considerations	70.6%	48.0%	22.6%	33.3%	27.0%	35.6%
Flood risk	23.5%	24.0%	9.7%	26.9%	5.4%	21.3%
Proximity to shopping, schools, employment	47.0%	4.0%	0.0%	17.9%	8.1%	15.4%
Proximity to friends/relatives	35.3%	0.0%	0.0%	9.0%	N/A	8.6%
The surrounding area	52.9%	8.0%	22.6%	20.5%	27.0%	23.4%
Availability of homes or land*	N/A	8.0%	22.6%	6.4%	5.4%	10.6%
Cost of flood insurance*	N/A	0.0%	3.2%	10.3%	0.0%	3.4%
Other	5.9%	32.0%	12.9%	46.2%	37.8%	34.0%
Don't Know	5.9%	8.0%	6.5%	3.8%	0.0%	3.7%
Refused	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

\* Categories created from “Other” responses.

Note: Percentages may add up to be more than 100 percent since respondents were allowed to choose more than one response.

The data in Tables 4.2 to 4.6 suggest a significant difference in perceptions of flood risk between homeowners or prospective homeowners as compared with community development interests interviewed for this study. The community developers and their collaborators are generally more aware of local flood risk and more likely to anticipate the likelihood of actual community flooding. In contrast, the community developers perceive that relatively few local homeowners consider themselves vulnerable to significant flood damage—a conclusion supported by the homeowner survey as well. Additionally, the tables suggest inconsistent conclusions concerning the role of flood risk in property selection: (a) most homeowners recognize the existence of neighborhood flood risk but consider themselves unlikely to be significantly affected; and (b) community developers perceive that the availability flood insurance is very important to individuals purchasing floodplain property despite evidence of weak homeowner concern about significant flood damage to their property.

### 4.3.2 Perceptions and Behavior About Flood Risk

Homeowner perceptions and behaviors about the importance of flood insurance are not consistent, as Table 4.7 illustrates. This table displays the response of homeowners to a question concerning the importance of flood insurance to them. As might be expected, for example, a substantial majority of NFIP policyholders (those in response categories 4 and 5) considered flood insurance important but more than half the homeowners living in an SFHA and more than one-third of homeowners living outside an SFHA also considered flood insurance important but did not own NFIP policies.

**TABLE 4.7: “Using a scale from 1 to 5, where 1 is not important and 5 is very important please tell me how important you think it is for you to have insurance that covers your home in the event of a flood.”**

Response	Policyholders in SFHA		Policyholders Outside SFHA		Non-policyholders in SFHA		Non-policyholders Outside SFHA	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Rating: 1 or 2	104	21.5%	22	10.3%	38	27.6%	26	50.0%
Rating: 3	38	7.9	19	8.9%	19	13.1%	5	9.6%
Rating: 4 or 5	333	68.9	172	80.4%	85	58.6	19	36.5%
Don't Know	6	1.2	1	0.5%	1	0.7	2	3.8%
Refused	2	0.4	0	0.0%	0	0.0%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

When community development interests were asked why homeowners would choose to purchase, build, or stay in a location in or near a SFHA—even if flood insurance were not available to the homeowner—the most commonly identified responses were “Proximity to shopping, schools, employment, and relatives/friends” (24 percent); “Characteristics of the property” (50 percent); “The surrounding area (business, community, reputation, etc.)” (23.4 percent) and “Financial Considerations” (35.6 percent). It would appear from these responses that areas in or near SFHA have a variety of attractions to potential homeowners, increasing their value and perhaps offsetting somewhat the flood-related costs and risks. (Table 4.6)

Table 4.8 suggests that a significant number of homeowners may also be confused about their flood insurance. For example, about 5 percent of policyholders in or near an SFHA indicated that they did not have flood insurance while FEMA data indicated that they had policies. Another 2 percent were unsure if they had flood insurance. Additionally, about 17 percent of residents living in a SFHA did not have flood insurance. Federal law requires any person with a federally backed mortgage to have flood insurance if their home resides in a SFHA, although it is unclear from the data that 15.6 percent of respondents have federally backed mortgages.

**TABLE 4.8: “Do you have insurance that would cover losses to your home in the event of a flood?”**

Response	Policyholders in SFHA		Policyholders outside SFHA		Non-policyholders in SFHA		Non-policyholders outside SFHA	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	387	80.1%	202	94.4%	83	57.2%	21	40.4%
No	81	16.8%	11	5.2%	52	35.9%	26	50.0%
Don't Know	15	3.1%	1	0.5%	9	6.2%	5	9.6%
Refused	0	0.0%	0	0.0%	1	0.7%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

Another indicator of inconsistency between homeowner risk perceptions and behavior about flood risk is presented in Table 4.9, reporting responses to a question concerning willingness to retain flood insurance. A striking aspect from Table 4.9 is that 27.2 percent of current policy holders in a SFHA indicated that they would drop their flood insurance if flood insurance were not required as a condition of their mortgage.

**TABLE 4.9: “If you were not required to have flood insurance as a condition of your mortgage, would you still carry a flood insurance policy on your home?”**

Response	Policyholders in SFHA		Policyholders outside SFHA		Non-policyholders in SFHA		Non-policyholders outside SFHA	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Yes	119	67.6%	16	64.0%	25	64.1%	1	50.0%
No	49	27.2%	8	32.0%	9	23.1%	1	50.0%
Don't Know	8	4.6%	1	4.0%	5	12.8%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

Consistent with these findings, other studies (Dixon et. al. 2006, p. 25; Kriesel, Warren and Landry 2004, p. 413) found that only 18-22 percent of homeowners in SFHAs who were currently not subject to mandatory flood insurance purchase requirements have an active NFIP policy. A variety of reasons are plausible—for example, some owners without mortgages may feel they have sufficient resources to “self-insure” against flood damage.

Overall, these data reveal that while most homeowners are likely to believe in the importance of flood insurance (including homeowners who may not be living in a floodplain) a significant minority of the homeowners—at least 25 percent—would probably discontinue their flood insurance if they were not required to have it.

### 4.3.3 The Impact of Flood Insurance Rates on Development in the SFHA.

The cost of NFIP insurance is sometimes controversial. Some experts have studied the NFIP and concluded that NFIP premiums are not actuarially sound for a variety of empirical reasons and, consequently, premiums may be too low.<sup>40</sup> This reduced premium cost, in turn, is sometimes asserted to encourage floodplain development that might not otherwise occur if NFIP premiums were actuarially sound and therefore higher.

Congress, however, has mandated multiple goals for the NFIP that do not assure universal mandatory purchase of flood insurance at actuarial rates and, as a result, some categories of NFIP premium will not be actually sound. For example, in a study conducted as part of the NFIP Evaluation, *The Role of Actuarial Soundness in the National Flood Insurance Program*, Deloitte Consulting noted that the majority of NFIP policyholders are charged actuarially-based premiums but approximately 25 percent of policyholders are assessed significantly discounted (subsidized) premiums by law and this constraint prevents the NFIP as a whole from achieving actuarial soundness (Bingham, Charron, Messick and Kirschner 2005).

The scope of this study does not include evaluating the actuarial soundness of NFIP premiums. However, the influence that NFIP premium costs may have on the willingness of individuals to buy or build floodplain properties is relevant to consideration of the NFIP’s impact upon floodplain development. Several questions in the community and policyholder surveys

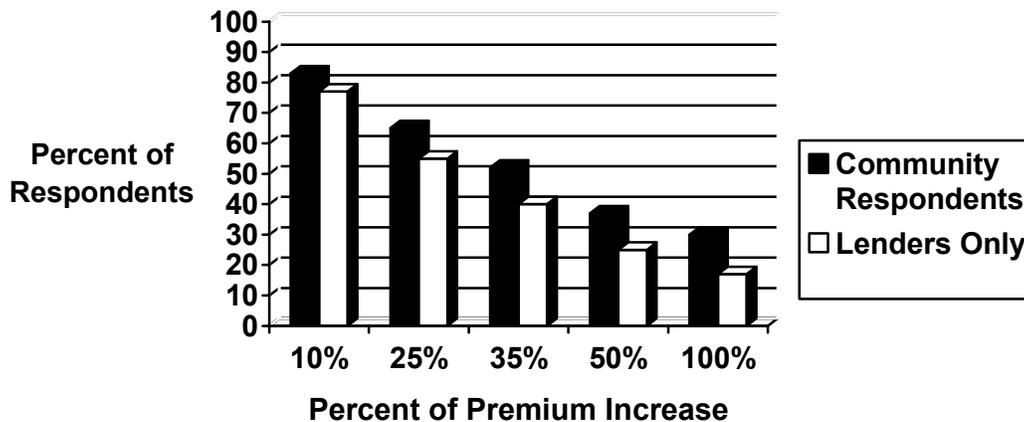
<sup>40</sup> See French Wetmore (2005); Raymond J. Burby (2006) and David R. Conrad (2006) as examples. Reasons commonly cited to this support their position: NFIP rates do not fully account for: (1) repetitive loss properties; (2) subsidized pre-firm structures; (3) failure to use the more realistic 500-year floodplain for actuarial calculations; (3) the absence of re-insurance costs calculated into premiums.

concerned the possible influence of increases in flood insurance premium rates on homeowners. While the response to these questions suggests that the price of flood insurance may influence demand, the constraints inherent to the questions are sufficient to indicate only that the impact of differences in geographic setting (riverine or coastal), status of structures (pre- or post-FIRM) and base premium rates upon demand for NFIP insurance merits continued investigation.

### Community Developers and Premium Rates

Community development interests interviewed for this study generally perceived that demand for flood insurance would decrease as premium rates increased. Figure 4.1 graphically displays their response to a question concerning the possible impact of prospective increases in flood insurance premiums in their community.

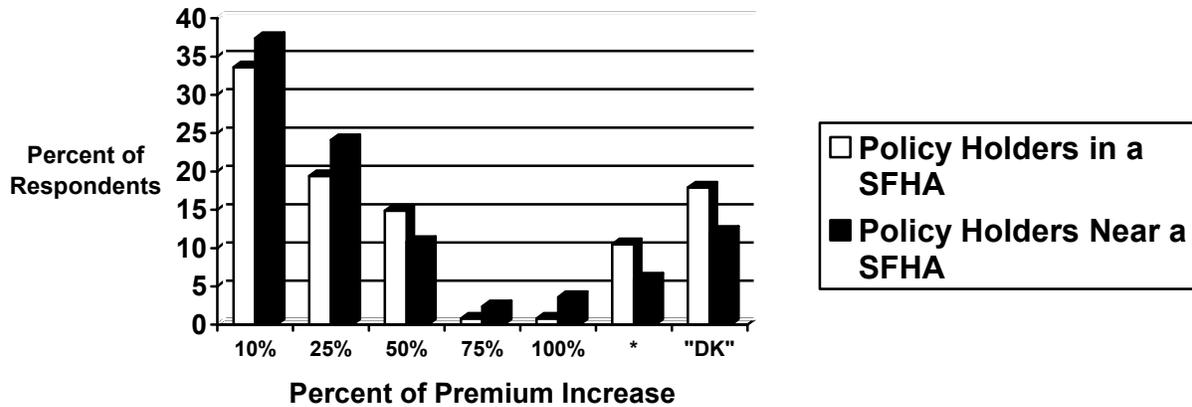
**FIGURE 4.1:** Suppose that federal flood insurance was not available, but still required for federally backed mortgages, and property owners had to consider purchasing commercial insurance. What percentage of the property owners do you think would be willing to pay 10 percent, 25 percent, 35 percent, 50 percent or 100 percent more for flood insurance?



### Homeowners and Premium Rates

When NFIP policyholders were asked a similar set of questions in the national homeowner survey, 54.3 percent of policyholders in a SFHA responded that they would be willing to pay higher premiums for commercial insurance if federal insurance were not available. Among this group: 35.3 percent were willing to pay up to 10 percent higher premiums; 18.5 percent were willing to pay up to 25 percent higher premiums; and 16 percent were willing to pay up to 50 percent higher premiums. Only 10.1 percent were willing to pay “whatever it cost” to have flood insurance. These responses are graphically summarized in Figure 4.2.

Figure 4.2: About how much more would you be willing to pay for a commercial flood insurance policy if federal policies were no longer available? (Response categories offered: 10 percent, 25 percent, 35 percent, 50 percent or 100 percent more for flood insurance)



Note: \* = "Whatever it Costs" and DK = "Don't Know"

The data in Section 4.3.3 suggest that there may be some price elasticity in demand for NFIP insurance but the influence of prospective premium increases is problematic and the constraints inherent to these data suggest that the circumstances under which this elasticity may exist should be clarified in several respects.

### Issues Meriting Further Investigation

The data in Section 4.3.3 do not compare demand for NFIP insurance between riverine and coastal communities. This may be an important distinction since property values, the availability of buyers, and the proportion of pre- and post-FIRM structures may vary significantly between the different settings and consequently influence the impact of NFIP premium changes in each case. There may also be an important difference in the willingness of individuals to pay higher NFIP premiums on new, more expensive post-FIRM properties and older, and perhaps less expensive pre-FIRM structures. The elasticity for more expensive post-FIRM construction is likely to be lower (more inelastic) than that for less expensive, existing pre-FIRM houses, which receive flood insurance price subsidies, reports (GAO 2003; PricewaterhouseCoopers 1999), given the existence of the mandatory purchase requirement. Finally, differences in the value of base NFIP premiums to be raised may influence the propensity of individuals to pay higher premiums: a 20 percent increase in a \$400 annual premium, for example, may be more acceptable to a homeowner than the same increase in a \$4000 premium.

**Recommendation DEI-14:** *FEMA should initiate a comparative study of cost and demand elasticity for NFIP insurance in riverine and coastal communities, between pre- and post-FIRM structures, and among different premium bases to determine the extent to which NFIP premium increases are sensitive to these specific social and geographic settings.*

#### 4.3.4 The Impact of Seasonal and Annual Residents on SFHA Development

The survey responses regarding the role of seasonal versus year-round residents driving development in the floodplain was highly dependent on the specific community surveyed. Table 4.10 indicates that the survey group was almost evenly split (45.2 percent versus 47.3 percent) about the contribution of seasonal residents to SFHA development.

**TABLE 4.10: “Do you think that growth in the number of seasonal residents moving into your community is leading to increased development in the floodplains?”**

Response (%)	Administrators	Developers	Insurers	Lenders	Realtors	Aggregated by Group
Yes	35.3%	16.0%	36.7%	53.9%	56.8%	45.2%
No	58.8%	72.0%	54.8%	41.0%	32.4%	47.3%
Don't Know	5.9%	12.0%	6.5%	5.1%	10.8%	7.5%

Table 4.11 illustrates that a much higher proportion of developers and administrators attributed SFHA growth to year-round residents. However, if lenders and realtors, who are closer to the actual purchasers, are correct, seasonal residents are indeed helping drive development. In most cases, these are second homebuyers who would be expected to have an even lower elasticity of demand than average. Thus, they would be even less price sensitive to increases in flood insurance premiums, particularly for the subset purchasing much higher than average priced properties or those in condominiums, which often are higher than ground level. One inference from Tables 4.10 and 4.11 is that development pressures come from both seasonal and year-round residents and that the additional pressures from seasonal residents make it even less likely that increases in flood insurance premiums are likely to decrease developmental pressure.

**TABLE 4.11: “Do you think that growth in the number of year-round residents moving into your community is leading to increased development in the floodplains?”**

Response (%)	Administrators	Developers	Insurers	Lenders	Realtors	Aggregated by Group
Yes	88.2%	56.0%	61.3%	74.4%	73.0%	70.7%
No	11.8%	28.0%	35.5%	23.1%	18.9%	23.9%
Don't Know	0.0%	16.0%	3.2%	2.6%	8.1%	5.3%

#### 4.3.5 Development in CBRS Areas

Legislation creating the Coastal Barrier Resource System (CBRS) in 1984 prohibits most forms of federal assistance, including flood insurance, to what is now a system of approximately 585 units and almost 1.3 million acres in 23 states. The subsequent history of the CBRS is often cited as a test case for coastal development in the absence of NFIP flood insurance. In light of this assumption, the section discusses (a) the extent of the prohibition’s enforcement; (b) the scale and character of CBRS development in the absence of NFIP insurance; and (c) the characteristics of CBRS properties developed in the absence of NFIP availability.

The survey data seems to indicate development occurring in CBRS, which is difficult to estimate by other means. Survey questions in communities including or adjacent to CBRS units indicate that the reasons for developing in CBRS areas and floodplains elsewhere are similar: characteristics of the property and financial considerations. It is perhaps significant that many community decision makers stated that they “Don’t Know” if new development is occurring in

CBRS areas. During another phase of this study involving community floodplain managers, zoning administrators, and other local land use regulators, the term “Coastal Barrier Resource System” (CBRS) was often unfamiliar, possibly because their community contained no CBRS areas. If development (or discouraging development) of CBRS areas is considered a priority by the government, then further study is required.

**TABLE 4.12: “Is new development occurring in the Coastal Barrier Resource System?”**

Response (%)	Administrators	Developers	Insurers	Lenders	Realtors	Aggregated by Group
Yes	N/A	33.3%	25.0%	30.8%	33.3%	30.7%
No	N/A	16.7%	41.7%	16.4%	5.6%	17.7%
Don't Know	N/A	50.0%	33.3%	53.9%	61.1%	51.6%

#### 4.4 Summary and Recommendation

The surveys document the developmental pressures in and around SFHAs in the rapidly developing areas included in the eighteen community study. Residents and community decision makers are aware of the flood risk and the majority of those surveyed find the availability of flood insurance desirable. However, most residents currently living in SFHA indicate that, even if flood insurance was not available, they would still live in communities close to the water with the associated flood risk. Therefore, the mandatory purchase requirement for federally backed mortgages in SFHAs seems a reasonable measure to help insure against the probability of uncompensated losses due to flooding.

**Recommendation DEI-15:** *Evaluate the familiarity of community floodplain managers, zoning administrators, and other local land use regulators with local CBRS areas and determine if local administrators are enforcing federal restrictions on aid to development in these CBRS units.*

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## 5. THE COMMUNITY RATING SYSTEM AND FLOODPLAIN CONSERVATION

The Community Rating System (CRS), created in 1990, is a voluntary program encouraging communities to enact additional measures to reduce flood risk and to protect floodplains beyond the minimum criteria for community enrollment in the NFIP. Floodplain conservation is among the CRS objectives. In 1994, the CRS was modified by an additional goal “to encourage adoption of more effective measures that protect natural and beneficial floodplain functions” (Pub. L. 103-325, Sec. 541 (b)). To achieve this goal, FEMA is allowed to credit communities for activities that protect natural and beneficial floodplain functions.<sup>41</sup>

Any NFIP community may join the CRS, provided the community is in full compliance with NFIP eligibility requirements and makes a commitment to perform a minimum amount of additional floodplain management activities. NFIP premiums in a CRS community are discounted according to the number and type of additional CRS floodplain regulations the community adopts.<sup>42</sup> CRS communities account for more than two-thirds of NFIP policies in force and CRS communities can be found in virtually all the nation’s major urban areas, making the CRS an important consideration when assessing the environmental impact of the NFIP. However, CRS communities are also geographically concentrated in a few areas. These incentives might create the critical mass in communities to adopt floodplain protection and management practices that protect natural and beneficial functions far more than would have been the case were there no NFIP.

### 5.1 Objectives

FEMA is concerned with three aspects of the CRS that may directly relate to the NFIP’s developmental and environmental impacts upon floodplains:

- the type of communities participating in the CRS and their reasons for participation;
- strategies that may encourage more NFIP communities to join the CRS;
- the effectiveness of specific CRS components intended to promote natural and beneficial floodplain functions, including:
  - outreach projects that include descriptions of the natural and beneficial floodplain functions of the community’s floodplains (component 330);
  - open space preservation (component 420);
  - higher regulatory standards that protect natural areas during development or that protect water quality (component 430);
  - erosion and sediment control and water quality requirements for projects that affect runoff of stormwater (component 450);

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<sup>41</sup>The *CRS Coordinator’s Manual* providing guidance for FEMA officials administering the CRS also emphasizes that a major CRS objective is “protect natural and beneficial floodplain functions (FEMA 2002, 110-5).”

<sup>42</sup> FEMA partners with the NFIP Community Rating System Task Force made up of representatives of stakeholder groups to develop a catalog of specific activities that communities in the CRS can undertake to improve floodplain management. Insurance Services Office, Inc (ISO), as a contractor, provides support for the Task Force and is the interface with CRS communities.

- planning for floodplain management that considers natural resources in floodplains (component 510).<sup>43</sup>

## 5.2 Methodology

Interviews were conducted with FEMA headquarters staff administering the CRS; with officials at Insurance Services Office, (ISO) Inc., the contractor providing support for FEMA's Community Rating Service Task Force and the primary FEMA liaison with CRS communities; with NFIP staff familiar with the CRS program in FEMA regional offices; and with floodplain administrators in the eighteen communities included in AIR's community developers survey discussed in Section 4.5.1 Additionally, relevant literature was reviewed, including FEMA's biannual *CRS Report to Congress* and the Inspector General's *Community Rating System: Effectiveness and Other Issues* (FEMA Office of the Inspector General 2002).

## 5.3 Participating CRS Communities Share Several Characteristics

CRS communities are present in all states, except West Virginia. Although participation is spread across the country, over half of the communities are concentrated in California, Colorado, Florida, Louisiana, New Jersey, North Carolina, and Texas. Florida is the largest participating state with 206, or 22 percent, of CRS communities. CRS communities also account for 68 percent of flood insurance policies.

Discussions with FEMA's CRS administrators and research conducted by FEMA's Office of Inspector General (FEMA Office of the Inspector General 2002) indicate that CRS communities have common characteristics. These include:

- Awareness of vulnerability to flooding. Experience with flooding and its potential for reduced revenue from the community's tax base also factor into participation;
- Strong local leadership and public support for floodplain conservation programs of many kinds. In communities with better CRS ratings, the backing and interest of elected officials is more prevalent and the program is viewed as an incentive for marketing the community to investors, stakeholders, citizens, and potential residents;
- A large NFIP policy base. In these communities, the economic advantages of CRS participation are most apparent;
- Strong state support. States can assume a role directly contributing to participation by adopting community floodplain management requirements exceeding minimum NFIP requirements and resulting in additional credits to participating CRS communities.<sup>44</sup> Communities benefit because they receive points towards their CRS rating, and all CRS communities must meet the same minimum state standards;
- A full time floodplain management staff already committed to implementing CRS creditable activities and able to share resources with neighboring communities to reduce the staff time required.

<sup>43</sup> The *CRS Coordinator's Manual* identifies these components as ones that promote natural and beneficial uses.

<sup>44</sup>These standards are identified in the *CRS Coordinator's Manual* refers as State Mandatory Regulatory Standards and Uniform Minimum Credit.

## 5.4 Many Credited CRS Activities Intended to Promote Floodplain Conservation

Floodplain conservation is a CRS objective. Since the CRS was codified in 1994, one goal has been “to encourage adoption of more effective measures that protect natural and beneficial floodplain functions” (Public Law 103-325, Sec. 541 (b)). The CRS contains credit for many activities meant to promote the protection of floodplain natural and beneficial functions. FEMA uses these CRS credits as a major means of encouraging NFIP communities to adopt “best practices” for floodplain management. Examples of important CRS floodplain conservation credits include:

- 420: Open Space
  - Keeping floodplain lands open through public ownership, private reserve, or through regulation; (Up to 725 points)
  - Preservation of the above land as open space is assured through deed restrictions; (Up to 75 points)
  - A bonus of up to 100 points if the parcels are in a natural state, are restored to a natural state or protect natural and beneficial floodplain functions (specifically mentioned are Critical Habitat Designations and areas included in Habitat Conservation Plans); (Up to 100 points)
- 430: Higher Regulatory Standards
  - Protection of floodplain storage capacity through prohibition of fill or requiring compensatory storage; (Up to 80 points)
  - Natural and beneficial functions regulations that prohibit all activities in the floodplain that may harm public health or water quality or protect shorelines, stream channels or banks with a bonus if it is done in accordance with a Habitat Conservation Plan or that protect aquatic or riparian habitat; (Up to 40 points)
  - Other Higher Standards that prevent flood losses or protect natural and beneficial functions that are not otherwise credited; (Currently up to 50 points, but being increased to 100 points)
  - Land Development Criteria that require or encourage appropriate uses of floodplains and avoid or discourage development of floodplains such as planned unit developments, clustering, transfer of development rights, etc; (Up to 100 points with additional points obtained as land is set aside for open space)
  - Low density zoning with minimum lot sizes of 1 acre with maximum points for lot sizes at 10 acres or more. (Up to 600 points)

Because FEMA has considerable discretion in creating such credits, the CRS provides an important opportunity for FEMA to define and improve incentives for desirable community floodplain conservation.

## 5.5 CRS Floodplain Conservation Impacts Not Well Documented

The CRS provides community credit for several classes of activities related to floodplain conservation. These include publicizing the benefits of the natural and beneficial uses of

floodplains (Activity 330-Outreach Projects); preserving open space in the floodplain that also encourages the natural and beneficial uses of floodplains (Activity 420 -Open Space Preservation); encouraging the natural and beneficial uses of floodplains (Activity 430–Higher Regulatory Standards); providing credit under floodplain management planning (Activity 510-Floodplain Management Planning) for implementing measures that contain natural resource protection elements.

FEMA has given greater emphasis in recent year to promoting the CRS floodplain conservation goals. NFIP officials interviewed for this evaluation in all FEMA regions reported that they, often in cooperation with state floodplain officials, encourage NFIP communities to exceed the minimum NFIP eligibility requirements by adopting CRS standards including those concerned with floodplain conservation. However, the community impact of CRS activities has never been comprehensively evaluated. In particular, no data base exists to characterize the regional or national impact of those activities intended specifically to promote floodplain natural and beneficial values.

The NFIP’s floodplain conservation impact, including the specific contribution of CRS contribution toward that goal, should be clarified. Interviews conducted with community floodplain administrators in association with this study (Section 3 above) suggest that NFIP activities intended to protect beneficial floodplain values and functions have been only moderately successful in many rapidly growing NFIP coastal communities. For example, in the eighteen communities examined, only 28% of the floodplain administrators perceived the NFIP to be moderately or very successful in preserving open space and 24% gave a similar rating to the NFIP’s water quality protection. This finding is consistent with other research indicating that local political and economic interests, particularly in coastal communities, often give development priority over environmental protection in local land use planning (Norton 2005). It would be useful to characterize with greater clarity the relative contribution of CRS standards toward achieving the floodplain management goals mandated by NEPA and EO 11988—particularly since some FEMA officials surveyed for this report have suggested adding to NFIP community eligibility requirements those CRS activities identified in the *CRS Coordinator’s Manual* as promoting the natural and beneficial value of floodplains.

**Recommendation DEI-16:** *Initiate a nationally-based survey of CRS communities to evaluate the impact of CRS-credited activities intended to promote natural and beneficial floodplain values: CRS categories 330, 420, 430, 450, and 510.*

## **5.6 CRS Participation Not A Priority for Most Communities**

FEMA wants to increase community participation in the CRS. While the 1038 communities currently participating in the CRS represent more than two-thirds of all NFIP policyholders, this represents less than six percent of all NFIP communities. Additionally, the two lowest classes of CRS rating (Classes Eight and Nine) represent seventy percent of all participating communities (FEMA 2005a).

Several reasons are cited in FEMA’s Inspector General’s report to explain this low priority for CRS participation.

- Divided responsibilities for coordinators. Most CRS coordinators are responsible for other duties ranging from building inspector to emergency management official. Varied job duties often leave the coordinators with competing priorities, commitments, and limited opportunities to maintain and/or move the CRS program forward.
- Limited staff. Many communities have small floodplain management staff who lack experience in FEMA or state training programs that might alert them to the advantages of CRS participation.
- No team approach. A team approach is often needed. Communication between local agencies responsible for various facets of the CRS program is often ineffective. The CRS program depends upon coordination among planning and zoning entities, stormwater management, emergency management agencies and local officials.
- Lack of institutional knowledge. In many cases, one person coordinates the CRS program and maintains the documentation. This presents a problem should that individual choose to leave. CRS Coordinators may leave without instructions for a successor. CRS documentation might be taken by the departing official and the new CRS Coordinator must start from scratch.
- Limited claim information. Communities do not have routine access to flood insurance claims data. Access to accurate and timely claims data and policies in force by flood zone would provide communities with a more realistic picture of their floodplain management challenges and assist in administering CRS programs more effectively.

Several suggestions were made by FEMA and local government officials for improving community CRS participation:

Recommendation DEI-17: *Encourage communities with limited staff resources to work together with adjacent communities that may already be in the CRS or are willing to share resources. For example, sharing the same CRS Coordinator has been successful in the past.*

Recommendation DEI-18: *Promote more collaboration between small communities and counties to use existing resources to create credible CRS activities. For example, counties may already send outreach materials to all citizens in the county, including those in incorporated NFIP communities within the county. This outreach project could be creditable under CRS for the county and for all communities within the county*

Recommendation DEI-19: *Update solicitation lists used to recruit local professionals to attend CRS regional training sessions. Updating these lists and making them available to the communities would be beneficial for all concerned.*

Recommendation DEI-20: *Focus more attention on CRS education and training for local political officials whose support is needed for an effective program.*

Recommendation DEI-21: *Improve coordination with FEMA's Flood Mitigation Assistance Program, Hazard Mitigation Grant Program, and Pre-disaster Mitigation, which can all*

*be used to further CRS efforts. The CRS and those programs should be seen as complimentary to improve floodplain management activities and issues*

## **5.7 CRS Standards Should Receive NEPA and EO Programmatic Review**

Recent federal litigation involving the NFIP’s impact upon endangered species habitat suggests that some CRS credited activities may have a significant environmental effect requiring FEMA’s consultation with FWS as required by the ESA.<sup>45</sup> As a result of this litigation, FEMA has included a clarification in the CRS Coordinator’s Manual to ensure that CRS does not credit activities that could affect species.

FEMA also recently revised its *CRS Coordinator’s Manual* to require that a community “demonstrate compliance [with federal law] when it is an issue” and “lay groundwork to allow [FEMA] to withhold credit for any activity undertaken by a community that is inconsistent with these laws and regulations.” This does not clarify whether FEMA expects to apply NEPA and EO 11988 environmental reviews to discretionary decisions concerning CRS standards and to specific community activities qualifying for CRS credit.<sup>46</sup> This action may also imply that FEMA intends that its discretionary decisions concerning which community activities will receive CRS credit in the future will be subject to EO 11988 and NEPA review.

FEMA should review its process for setting and applying community CRS standards to determine the circumstances under which NEPA and the EO may now apply to the CRS.

Recommendation DEI-22: *FEMA should require environmental reviews in the future for new CRS standards and specific community activities for which CRS credit is given.*

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<sup>45</sup> *National Wildlife Federation and Public Employees for Environmental Responsibility v. Federal Emergency Management Agency and National Association of Home Builders*. For example, the CRS at the time of the lawsuit recognized parking lots and paved roads as “open space” eligible for community credit under the CRS accounting system. These open spaces have minimal flood damage but may create stormwater runoff and habitat loss detrimental to the protection of endangered species or other environmental flora and fauna.

<sup>46</sup> For example, as a result of the federal district court decision in *NWF and PEER v FEMA and NAHB*, FEMA determined that communities may not in the future receive CRS “open space” credit for paved parking lots because this may involve a potential conflict with the ESA. FEMA revised its *CRS Coordinator’s Manual* accordingly.

## 6. NFIP AND THE ENDANGERED SPECIES ACT

Several organizations have filed lawsuits claiming that the NFIP encourages the development of habitat protected by the Endangered Species Act (ESA). As a result, this section is concerned with three related issues:

- Identifying litigation in which the NFIP is alleged to have caused development of endangered species habitat;
- Evaluating the extent to which this litigation and related documents demonstrate that the NFIP facilitates development harmful to endangered species;
- Identifying instances in which the NFIP's implementation provides protection for endangered species by keeping development out of floodways or by deterring development in floodplains.

### 6.1 Litigation Involving the NFIP and the ESA

Section 7(a)(2) of the ESA requires that all federal agencies consult with the U.S. Fish and Wildlife Service (FWS) to assure that agency actions “are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species.” Three lawsuits have been initiated in federal courts asserting that the NFIP has caused or facilitated development threatening endangered species or their habitat and that FEMA is required by Section 7(a)(2) of the ESA to consult with the FWS in these situations. In addition to the three lawsuits, environmental organizations have sent FEMA other Notices of Intent to Sue (NOIs) under ESA that have not resulted in litigation or preparation of a Biological Assessment by FEMA. FEMA has determined that there is no effect and either responded as such or not respond to the NOI. In response to one NOI, FEMA entered into informal consultation with FWS and set up a permit referral system similar to that described below for Monroe County, Florida. Compliance with ESA remains an on-going issue for the NFIP and is yet to be resolved.

#### 6.1.1 Florida Key Deer v. Stickney (1994)

Monroe County, Florida, includes the Florida Keys. Monroe County and the incorporated communities in the county have participated in the NFIP since the early 1970's. Big Pine Key and adjacent No-Name Key in Monroe County, the principal habitat of the endangered Florida Key Deer, are inhabited by approximately two-thirds of the remaining Key Deer population. At that time, federal land holdings in these areas were insufficient to assure the continued survival of the Key Deer. The USFWS was competing with private developers to acquire additional land judged essential to Key Deer recovery. The USFWS had determined that the greater the scale and pace of private development on these lands, the less likely the Key Deer population would recover.

The federal District Court opinion asserted that the NFIP was related to development of the remaining unprotected Key Deer habitat in several ways. First, FEMA had broad discretion to issue regulations implementing the NFIP and was therefore subject to the consultation requirements of the ESA. Additionally, the court cited evidence it believed was sufficient to

demonstrate that the NFIP could affect the rate of development on unprotected Key Deer habitat. This evidence included:

- An August 24, 1984, statement by the Associate Solicitor of the United States Department of Interior noting that the implicit approval of construction or acquisition and the issuance of flood insurance to make available needed financing for such projects clearly involve actions subject to the consultation requirements of ESA Section 7(a)(2) and “but for” the all pervasive activities of FEMA, development in floodplains would probably not take place;”
- Correspondence to FEMA from the USFWS in August, 1989, stating its belief that FEMA’s insurance in Monroe County encouraged development that would have been “much less attractive” with such insurance;
- Testimony by USFWS staff in August 1989 to a Congressional subcommittee on the effects of the availability of federal flood insurance in promoting new development. The USFWS cited its survey of 186 units of the Coastal Barrier Resource System, where NFIP insurance may not be issued, to demonstrate that in the absence of NFIP insurance no substantial new development had occurred;<sup>47</sup>
- A letter from USFWS Director John Turner to FIA Administrator C. M. Schauerte in December 1990 reaffirming the USFWS beliefs that “experience with the Coastal Barrier Resources System (System) shows the importance of flood insurance for development.”

The federal District Court issued in 1994 an opinion that the NFIP encouraged the development of endangered species habitat and ordered that FEMA work with the USFWS to address the issue.

In 1997, FWS issued a Biological Opinion on Key Deer and other listed species in Monroe County. This opinion concluded that the administration of the NFIP in Monroe County would affect protected species in the County and issued a Reasonable and Prudent Alternative (RPA) to avoid the likelihood of the NFIP jeopardizing the continued existence of species. The RPA specified that FEMA would require Monroe County to refer all development proposals that could impact listed species to FWS for review under the ESA. This was done under 44 CFR 60.3(a)(2) of the NFIP Regulations that requires communities to assure that floodplain permit applicants obtain other necessary Federal and State permits prior to issuing a floodplain permit. If the proposed development will not adversely affect species, the County can issue the building permit. If it could adversely affect species, FWS works with the applicant to ensure that the development complies with the ESA

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<sup>47</sup>USFWS staff testified that, based on a USFWS review of 186 units in the CBRA system, no substantial new development occurred in 176 of those units after federal flood insurance was prohibited. Moreover, the USFWS testimony continued, the USFWS was "confident" that in the 10 CBRA units where substantial development did occur, the "vast bulk of that development occurred in these 10 units occurred during the one-year grace period . . . when landowners could still receive new federal flood insurance." See *Coastal Barrier Improvement Act of 1989*: Hearing on H.R. 2840 Before the Subcommittee on Fisheries and Wildlife Conservation and the Environment and the Subcommittee on Oceanography and the Great Lakes of the House Committee on Merchant Marine and Fisheries, 101st Cong., 1st Sess. 30 (1989) (Statement of USFWS Coastal Barrier Coordinator), Plaintiffs’ Exhibit 8.

On November 27, 2002, FWS issued a letter reopening formal Section 7 consultation and indicating that FWS would proceed to update the 1997 opinion due to new information on the status and distribution of species and non-completion of a habitat conservation plan by Monroe County. The Opinion was updated with FEMA input and finalized in April 2003. The 2003 opinion placed no additional requirements on FEMA other than to continue to implement the RPA.

On Dec. 16, 2002, a hearing was held on a motion previously filed by environmental groups to challenge the sufficiency of the 1997 biological opinion in Monroe County. This was later followed by a second amended complaint under the ESA filed by the National Wildlife Federation, et al. challenging the sufficiency of the 2003 amended Biological Opinion and the RPA. On March 29, 2005, the Court issued an Order ruling the Service and FEMA violated the Act and the Administrative Procedure Act (APA) (79 Stat. 404; 5 U.S.C. 500 et seq.). The Court's March 2005 Order criticized the 2003 RPAs for (1) relying on voluntary measures and (2) not protecting against habitat loss and fragmentation or otherwise accounting for the cumulative effects of the permitted projects.

On September 9, 2005, the Court also granted the plaintiff's motion for an injunction against FEMA issuing flood insurance on any new residential or commercial developments in suitable habitats of federally listed species in Monroe County, Florida. The Court also ordered the Service to submit a new BO within nine months from the September 9, 2005 date. FEMA closely coordinated with the FWS in completing a new Biological Opinion (BO) on FEMA's implementation of the NFIP in Monroe County, FL and its effects on federally listed endangered species. After getting a 60-day extension of the deadline, the FWS submitted the BO on FEMA's implementation of the NFIP in Monroe County, Florida and its effects on eighteen federally listed threatened or endangered species on August 9, 2006.

According to the BO "the only direct effect identified because of the action under consultation is the availability of flood insurance that facilitates development. Flood insurance is purchased because lending institutions require it for a government-backed loan or individual property owners purchase on a voluntary basis because they are concerned about their flood risk."

The primary indirect effects were from traffic and free roaming cats related to development. The BO concluded that nine of the species were not likely to be affected by the NFIP, largely because they are on protected lands where development will not occur. For five of the remaining species, including the Key Deer, the BO concluded that the continuing administration of the NFIP in the Florida Keys is likely to result in incidental take of the species, but will not jeopardize the continued existence of the species. For the remaining four species (Key Largo cotton mouse, Key Largo woodrat, Key tree-cactus, and Lower keys rabbit) the BO concluded that the continuing administration of the NFIP in the Florida Keys will jeopardize the continued existence of the species. The jeopardy was due to habitat loss and, for the rodents, indirect effects, primarily free roaming cat predation.

The issues raised by the Court in March of 2005 were addressed as follows: First, FEMA has more clearly described the steps that will be taken if the RPA is not followed. The

Reasonable and Prudent Alternative to avoid jeopardy is a modification of the permit referral system put in place after the 1997 BO to address the concerns of the Court. Second, the revised RPA will result in a review process that will allow the Service to consider the cumulative impacts of a series of permit proposals at clear points in time, rather than on a piecemeal basis. In addition, a brochure is to be distributed to permit applicants addressing the issue of predation of species by domestic and feral cats.

FEMA is in the process of working with the Service in implementing the August 9, 2006 BO.

### **6.1.2 Forest Guardians, Southwest Environmental Center, and Sierra Club v. FEMA (2001)**

In 2001, New Mexico environmental organizations sued FEMA in federal District Court, alleging that FEMA was jeopardizing thirteen listed endangered species by providing flood insurance for communities developing within the Rio Grande and San Juan River floodplains. The plaintiffs requested the court to order FEMA to prepare both an environmental impact statement and an assessment as required by NEPA and to consult with the USFWS under ESA Section 7(a)(2). In February 2002 FEMA agreed to consult with the USFWS on the effects of the NFIP by submitting a Biological Assessment to the USFWS in April.

In May 2002, FEMA provided the USFWS with its Biological Assessment of the NFIP impact on the Rio Grande and San Juan River floodplains. The Assessment determined that “the implementation of the NFIP in New Mexico has not adversely affected the 13 listed species and that the Program is not likely to affect listed species and their habitat”<sup>48</sup>

No further litigation has been initiated in response to FEMA’s environmental assessment. Discussion with staff of the Southwest Environmental Center, one of the two plaintiffs in the initial suit, indicates no further litigation concerning the biological assessment is currently anticipated.

### **6.1.3 National Wildlife Federation and Public Employees for Environmental Responsibility v. FEMA and National Association of Home Builders**

In 2003 the National Wildlife Federation and Public Employees for Environmental Responsibility, initiated a lawsuit against FEMA, alleging that FEMA had violated Section 7(a)(2) of the ESA by not consulting with the National Marine Fisheries Service (NMFS) on the impact of the NFIP on the Puget Sound Chinook salmon, listed as a threatened species by the NMFS since 1999. Every community within the range of the salmon is enrolled in the NFIP and is required to adopt floodplain development standards consistent with FEMA’s regulatory minimums. Since that time, FEMA had provided over 2,600 flood insurance policies for new floodplain structures in these communities.

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<sup>48</sup> FEMA, *Biological Assessment of the National Flood Insurance Program in New Mexico Under the Endangered Species Act of 1973*. Washington, DC: FEMA Federal Insurance and Mitigation Administration, May 14, 2002.

The plaintiffs contended that FEMA’s implementation of NFIP regulations constituted a “discretionary” agency action requiring ESA consultation because some regulations encouraged development in the floodplain habitat of the salmon. At issue were elements of NFIP mapping regulations, its community floodplain management requirements and the CRS.

The federal District Court ruled in November 2004 that FEMA’s implementation of the regulations at issue constituted a discretionary and continuing action subject to ESA review. Additionally, the court held that “FEMA’s passage of minimum eligibility criteria, the mapping of floodplains, and the implementation of the CRS have ongoing effects extended beyond their mere approval” that could affect Chinook salmon habitat. The court ordered FEMA to consult with the NMFS on aspects of the mapping program, the criteria for community eligibility, and the CRS

In support of its opinion that NFIP regulations may have a negative impact upon floodplain ecology and, specifically, upon Chinook salmon habitat, the presiding judge cited evidence which he considered sufficient to indicate that such an impact might exist:

- The U.S. Department of the Interior’s “official policy determination” in 1984 that floodplain development “would probably not take place” were it not for the activities of FEMA (See Section 7.1.1 above);
- The expert opinion of Alan Wald, a floodplain manager from the Washington Department of Fish and Wildlife, that filling of floodplains, such as that conditionally permitted by NFIP regulations (see Section 4.5.6 above), can result in destruction of wetland with a negative impact on species habitat;
- Another opinion by Alan Wald that the CRS encourages some activities that are harmful to salmon, such as the removal of large woody debris from rivers;
- Letters to FEMA from the NMFS and the Washington Department of Ecology stating that implementation of the NFIP may be affecting salmon listed under the ESA;
- Sworn statements by defendant-intervenors, experts in the construction and real estate business, indicating that the restriction of flood insurance would “effectively shut down” development and real estate transactions in Puget Sound;
- A biological opinion between FEMA and the U.S. Fish and Wildlife Service over implementation of the NFIP in Monroe County, Florida, finding that FEMA’s activities were “jeopardizing” several listed species.

FEMA has contested these assertions. However, FEMA has initiated consultation with NMFS on those NFIP regulations at issue, in accordance with the judge’s order. This order did not affect the sale of insurance itself, which the court ruled was non-discretionary. FEMA also agreed to expand the consultation to include all of the 16 salmonids within the state of Washington. That Biological Assessment is not yet available.

## **6.2 NFIP May Sometimes Remove Barriers to Development of Endangered Species Habitat**

In one of the three case reviewed, the court found evidence it considered sufficient to demonstrate that NFIP insurance was associated with adverse impacts on endangered Key Deer

in Monroe County, Florida. In other litigation, FEMA's Biological Assessment indicated no adverse impact upon endangered species on New Mexico's Rio Grande and San Juan River floodplains and no Biological Assessment has yet been completed concerning NFIP impact on endangered Chinook habitat in Washington State. In each case, the court considered that evidence of a *possible* adverse impact upon endangered species sufficient to require that FEMA consult with the appropriate agencies under terms of Section 7(a)(2) of the ESA.<sup>49</sup>

No research evidence is available to characterize the extent to which the NFIP enhances the protection of endangered species or their habitat. Nor does substantial evidence exist about the extent to which development in floodplains may become an ESA issue. Given the NFIP's association with reducing barriers to floodplain development and the adverse environmental consequences that sometimes arise for endangered species from urban growth, a national investigation concerning the NFIP's potential impact on ESA-protected species would seem desirable.

Several other conclusions are relevant to this litigation. First, whether the NFIP significantly drives development and whether that development may adversely affect endangered species habit are two distinct, if related, issues. It has been suggested that the NFIP can encourage development but that development may not necessarily affect endangered species. Moreover, in cases where such development does affect endangered species and can be associated with the availability of NFIP insurance, action might be taken through FEMA's NFIP regulations, or its CRS standards, to mitigate that impact.

Recommendation DEI-23: *FEMA should use a NEPA and/or EO 11988 review of its NFIP regulations and CRS standards as an opportunity to initiate a national study of the NFIP's impact on endangered species and its relevance to the ESA.*

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<sup>49</sup> There have been other Notices of Intent to Sue under ESA where FEMA has determined that there is no impact and either responded as such or did not respond (San Pedro River, AZ, Verde River, AZ, and Santa Clara River, CA) where no litigation has resulted. There is also one situation where FEMA is in informal consultation with FWS and has set up a permit referral system similar to Monroe County, FL. The issue is still very much unresolved.

## 7. THE COASTAL BARRIER RESOURCE SYSTEM

Legislation creating the CBRS in 1984 prohibits most forms of federal assistance, including flood insurance, to what is now a system of approximately 585 units and almost 1.3 million acres in 23 states. FEMA is interested in examining these CBRS areas because the CBRS experience may suggest what development might occur elsewhere if the NFIP did not exist.

FEMA is concerned with several CBRS issues:

- Whether flood insurance is being sold to property owners in the units;
- The scope of development on sample units of the CBRS, including the reasons for such development in the absence of available NFIP insurance;
- Whether federal agencies, including FEMA are complying with the Coastal Barrier Improvement Act (1990) requirement to report and to certify annually to the Secretary of the Interior and to the Congress that the agency is in compliance with the provisions of the Act.

### 7.1 Sale of NFIP Policies on CBRS Lands

Estimates of NFIP policies issued on CBRS units have been infrequent and major challenges currently exist in creating such estimates.

One of the few empirical studies of NFIP sales on CBRS units was conducted by the U.S. General Accounting Office in 1992. On the basis of a sample of residences in five CBRS units, the GAO estimated that FEMA underwrote flood insurance coverage for 9 percent of the homeowners in these units. FEMA attributed this noncompliance with CBRA's prohibitions to its inadequate resources for overseeing private insurers who write the flood insurance policies. (GAO 1992, 4).<sup>50</sup>

In 2001 FEMA's Inspector General (IG) addressed the issue of NFIP policy sales on CBRS lands in *Coastal Barrier Resources System: FEMA's Management Controls Governing the Prohibition of Flood Insurance* (2001). The IG report focused on information about NFIP-insured structures provided to the WYO and Direct Serving Agents who write individual NFIP policies. The IG requested FEMA to process all NFIP policies in four sample states through FEMA's policy database and found that 4 percent (210 of 5,692 policies) may have been issued for structures in the CBRS.

Technical problems with obtaining geo-referenced locations of buildings in the CBRS, however, prevented an accurate determination of the proportion among the 210 NFIP policies that were actually issued within a CBRS. Also, the accuracy of the 4 percent estimate was itself uncertain. The IG recommended that FEMA modify its data base to process all policies in states with CBRS units through its Geographic Policy Edit System created in 1998 and modify its administrative procedures for providing WYO and Direct Servicing Agents with geo-coded policy information.

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<sup>50</sup> The GAO initiated a replication of this study, currently underway, in 2005.

A major obstacle to accurate estimates of NFIP-insured properties in the CBRS continues to be a lack of a reliable database locating properties, which may be involved. Officials of the FWS report that the USGS topographic quadrangle source maps that currently depict the CBRS are, on average, approximately 30 years old. Dynamic natural features (such as shorelines and wetland boundaries) and development features (such as structures and roads) shown on the quadrangles were often outdated at the time the maps were used to delineate the CBRS in 1982 and again in 1990. Development that has occurred over the past 30 years is, in many cases, not depicted on the existing CBRS maps. Since dynamic natural CBRS features may also shift significantly over time, properties may be included within the CBRS at one time, and excluded at another—in effect, a property might appropriately be issued an NFIP policy at one time, and not another.<sup>51</sup>

Finally, FEMA’s computer database of structures insured by the NFIP, the Geographic Policy Edit System, does not accurately locate structures which may be in CBRS units and does not accurately identify these structures for WYO or Direct Servicing agents writing policies for such structures (FEMA Office of the Inspector General. 2001).

Congress in 2000 authorized the FWS to conduct a Digital Mapping Pilot Project for approximately 7 percent of the CBRS areas. These maps are not yet completed. As these and other digitized CBRS maps become available, it may be possible to use GIS technology to integrate CBRS digital maps with geo-coded FEMA data to identify more readily the appropriate properties and land parcels necessary to document reliably the extent of NFIP sales on CBRS units included in the IG report or elsewhere.

## 7.2 Why CBRS Units Are Developed

The communities included in the IG report were revisited by telephone to determine from local floodplain management officials the extent to which the report recommendations were being implemented. However, awareness of these recommendations, their implementation, and the appropriate officials to be contacted is not well institutionalized locally. In many instance, local floodplain managers were unaware of their community’s proximity to CBRS land and unfamiliar with the issues raised in the Inspector General’s report.

Fragmentary, sometimes anecdotal evidence suggests that the prohibition of NFIP coverage on CBRS property often inhibits development or reduces the developmental rate when compared to comparable non-CBRS properties. For example, a survey of structures completed for a 2000 Heinz Foundation erosion hazards study quantitatively evaluated the effect of CBRA designation on development density. The study found that during the period from 1982 -1990, CBRA decreased development density by about 40 percent, and that the CBIA of 1990 decreased density by about 60 percent (Cordes, Yezer and Asadurian 2000).

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<sup>51</sup>See: Testimony of Benjamin Toggle, Acting Special Assistant to the Director, FWS: “The existing series of more than 600 maps that depict the System, including OPAs, were created more than 15 years ago and are in need of modernization. They are outdated technologically, and therefore difficult to use. In addition, because of the mapping technology used to create the existing series of maps, boundaries are sometimes imprecise or inaccurate. System unit and OPA boundaries may not align precisely with the geomorphic features, cultural features, or property boundaries they were intended to follow.” (Tuggle 2005).

Another study commissioned by the U.S. Fish and Wildlife Service in 2002, *The Coastal Barrier Resources Act: Harnessing the Power of Market Forces to Conserve America's Coasts and Save Taxpayers' Money*, reported that “system units with significant development appear to be exceptions to the rule (USFWS 2002, 4). The report emphasized that restraints on CBRS development are likely to be most effective when state and local governmental policies also support such restriction (Salvesen and Godschalk 1998, 34).

Available evidence also suggests that many CBRS units have developed, often quite extensively, despite the absence of NFIP insurance. This development appeared to result from a combination of state and local government incentives and market forces. For example, units in Bethany Beach, Delaware, North Topsail Beach, North Carolina, and Cape San Blas, Florida, studied in 1997 developed very much like nearby non-System areas (Salvesen and Godschalk 1998, xx). Market forces appear to be an increasingly potent source of developmental pressure on CBRS units as undeveloped coastal barrier land becomes increasingly scarce.

Finally, inferences about the NFIP's possible impact on reducing barriers to development based upon experience with development on the CBRS lands appear to be tenuous. The CBRS may not presently be an appropriate basis for such generalizations for several reasons. First, discussions with USFWS staff indicate that maps of CBRS land and related developments are frequently outdated, sometimes unrevised since the early 1980s, and conclusions about the rate of development on CBRS lands and its causes are often anecdotal. Second, the motivation for purchase and development of property on CBRS land, and the extent to which this is analogous to property development on non-CBRS lands is not well established. These may constitute different marketplaces with different clientele. As undeveloped coastal barrier lands become scarce, market forces will overwhelm the present disincentives for development in the CBRS in any case.

Recommendation DEI-24: *At the time appropriate data is available from the USFWS Digital Mapping Pilot Project, FEMA should initiate a study of development rates, the reasons for such development, and the incidence of NFIP policies in the sample of CBRS units included in the Project. If possible, these units should be those in the GAO's "Coastal Barriers: Development Occurring Despite Prohibitions Against Federal Assistance" (1992).*

### **7.3 Federal Agencies Not Preparing CBRS Compliance Reports**

Discussion with staff in the FWS Division of Habitat and Resource Conservation indicate that they have no federal agency reports submitted in compliance with the CBRA as required by that legislation.

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## 8. CONCLUSIONS AND RECOMMENDATIONS

The NFIP's developmental and environmental impacts are interdependent and property development within floodplains has inevitable, but not necessarily adverse, environmental consequences. The NFIP can have varying direct and indirect impacts on the amount of development that occurs in floodplains. Some components of the NFIP have the affect of discouraging development while other components of the program act to remove barriers to that development. For example, the NFIP's community floodplain management requirements can protect ecologically valuable riverine and coastal land through the 'regulatory floodway' and requirements related to siting or site alterations in V Zones. However, those requirements may also indirectly encourage construction in floodplains by reducing the flood risk to buildings. Flood insurance availability can also have varying impacts on development. In riverine areas, the cost of the flood insurance required as a condition of obtaining a mortgage loan may act to discourage some floodplain development. In high-growth riverine and coastal areas, cost of insurance may not be an issue and the availability of flood insurance may instead act to reduce barriers to floodplain development by reducing financial risk from flooding although this factor is often secondary to the demand for property near water and access to recreation.

Much of the debate concerning the NFIP's developmental and environmental impacts has understandably focused upon coastal areas. Most NFIP policyholders live in or near coastal communities. These are among the nation's most rapidly expanding areas in size and population. Coastal land values have sharply increased in recent years, accelerating local economic investment, increasing the pace of urban transformation and placing some of the most ecologically valuable and sensitive areas at growing risk of degradation. However, more than 20,000 communities participate in the NFIP. The NFIP's environmental and developmental impacts may also be evident in many other, riverine communities across the nation.

In many communities, the NFIP has often restrained development in high-hazard floodplains and promoted safer construction in flood-prone areas through its community floodplain mapping and management requirements. Many aspects of the NFIP contribute to this impact. For example, the NFIP's requirement that riverine communities establish a 'regulatory floodway' places a significant limitation on development in the most hazardous and most environmentally sensitive area of riverine floodplains. Once a floodway is designated, the community must prohibit development in the floodway, which would cause any increase in flood heights. Another component of the NFIP, the Community Rating System (CRS) encourages communities to exceed the NFIP's basic floodplain management guidelines by additional actions conserving open space and environmentally sensitive areas.

The NFIP is also frequently asserted to be a facilitator, or enabler, of floodplain development for several reasons. It is asserted to be a "development stimulus" by reducing the financial risk to property owners and communities from potential flood disasters through relatively low-cost, property insurance along with generous federal disaster relief (Burby 2006, 4; John 2005). The provision of insurance is assumed to encourage community developers to expand their markets into floodplains, discourage property owners from taking more responsibility, by initiating more aggressive measures, to protect their property from flood risk.

The NFIP's required community floodplain construction standards may make floodplain occupancy less hazardous, and thus more attractive, for property owners.<sup>52</sup>

Research conducted for this report generally confirms that the NFIP removes barriers to development by reducing economic risk through building standards and making flood insurance available. This is an important factor for coastal floodplains and some riverine floodplains in rapidly developing areas. In achieving the fundamental NFIP's objectives—providing individuals with insurance against flood loss, diminishing flood loss through federal, state and local government mitigation, and reducing federal expenditures for flood disaster—FEMA has also promoted safer, better planned urban development, often epitomized as “wise growth.” In communities with riverine floodplains, not subject to intensive development pressure, the NFIP appears often to inhibit floodplain development that might otherwise occur.

Apart from riverine settings, the NFIP is seldom perceived to inhibit floodplain development, particularly in coastal, high-growth areas. The NFIP does comply with the basic requirements of both NEPA and the EO. However, opportunities now exist for FEMA to improve its implementation of both mandates through greater initiative in achieving (a) the mandate of the EO “to minimize the impacts and restore and preserve the floodplain, as appropriate;” (b) the intent of the *Unified National Program* and the EO to protect “natural and beneficial values served by floodplains;” and (c) the legislative intent of the NFIA to “constrict development of land which is exposed to flood damage” and “guide the development of future construction, where practicable, away from locations which are threatened by flood hazards.”

Since 1990, FEMA has made a substantial effort to improve floodplain conservation components of the NFIP, especially by improving Community Rating System standards conducive to floodplain conservation. FEMA has also made constructive efforts to identify NFIP elements with potentially negative environmental effects and to mitigate them. However, new research and continuing experience with the NFIP's implementation indicate additional actions are necessary to improve the NFIP's floodplain conservation and environmental protection objectives consistent with NEPA and EO 11988.

All recommendations in this report are directed to FEMA. The findings suggest a range of concerns sufficiently broad that FEMA could most effectively address them by initiating new programmatic NEPA and EO 11988 reviews of the NFIP's present floodplain regulations within which specific issues identified in the report could be incorporated. Among the findings pointing to the desirability of such a comprehensive review are (1) the papers proposing improvements in the 1 percent standard and the regulatory floodway requirement for floodplain mapping presented at the 2004 ASFPF Foundation's Gilbert F. White National Flood Policy Forum (ASFPF 2004); (2) the lack quantitative data concerning the natural and beneficial value of floodplains; (3) the need to characterize the cumulative national and local impact of floodplain filling through the LOMC process; (4) the absence of research specifically concerned with the NFIP's impact on endangered species habitat; and (5) the possibility for greater use of future-conditions hydrology as a basis for floodplain mapping.

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<sup>52</sup> See Jones et. al. (2006) and Blais et. al. (2006) for further discussion about how the NFIP protects structures.

## 8.1 NFIP Insurance Removes Barriers to Floodplain Development

The NFIP removes barriers to development by reducing economic risk through building standards and making flood insurance available. The impact of the NFIP on such development is also nuanced. The magnitude of this impact varies between different aspects of the NFIP, among other drivers of floodplain development, and perhaps between coastal and riverine communities. Development pressures associated with local political and economic interests, especially in rapidly growing coastal and urban communities often diminish the NFIP's ability to constrict development or direct it away from land subject to flood hazard.

### 8.1.1 Perceptions of Community Developers and Homeowners

NFIP insurance is a significant consideration in property purchases in the opinion of community developers, those who underwrite and facilitate development and homeowners who purchase floodplain properties. However, NFIP insurance is often not the most important of these incentives and the NFIP insurance priority differs among different community interests concerned with floodplain properties.

Among the eighteen NFIP communities surveyed in this study, floodplain developers and those who finance or market floodplain properties generally considered property characteristics and NFIP insurance the two most important factors in decisions concerning floodplain property construction and purchase. The national homeowner survey also used in this report indicated that a majority of homeowners living inside and outside community SFHAs considered flood insurance important, own such policies and would purchase flood insurance even if it were not required to do so. However, a large majority of homeowners report that they would still purchase their property even if flood insurance were unavailable. An important reason for this willingness to own floodplain property in the absence of flood insurance may be that most homeowners do not appear to perceive their own property at risk of significant flood damage although they may be living in a floodplain.

Although most homeowners surveyed were willing to purchase floodplain property in the absence of flood insurance, the availability of NFIP insurance may still be relevant to these decisions for several reasons. First, the willingness of floodplain property developers, their financial underwriters, and home mortgage lenders to invest in property development may be influenced significantly by knowledge that NFIP insurance is available to mitigate the flood risks and associated financial losses that may be involved. Without this NFIP assurance, prospective homeowners might confront a less attractive capital market for home purchases in flood-prone areas. Second, in the absence of NFIP insurance, prospective home buyers would have to rely upon commercial providers for flood insurance if they wanted it. Commercial flood insurance premiums would be higher, perhaps significantly higher, than NFIP premiums if the insurance were available in an area. It is difficult to infer how this altered insurance market might affect perceptions about floodplain properties among homeowners or purchasers but one consequence might be to render flood-prone properties less attractive.

Some research studies and discussions with floodplain administrators surveyed for this report suggest that the mandatory purchase requirement for NFIP insurance may inhibit

floodplain development more effectively in riverine settings when compared to coastal areas. The existence of this differential impact on riverine and coastal communities has not been well documented nor have the reasons for this difference, if it exists, been identified. Most important developmental and environmental impacts of the NFIP discussed in this report are related primarily to FEMA's regulations implementing the NFIP and to both riverine and coastal communities.

### **8.1.2 NFIP Regulations and Development**

The NFIP was initially intended to provide individuals with insurance against flood loss, to diminish future flood loss through federal, state and local government mitigation, and to reduce federal expenditures for flood disaster assistance and control. Floodplain conservation may also have been an objective implied by the NFIA's requirement that the NFIP encourage state and local governments to constrict development in land vulnerable to flood hazard. However, the NFIP's primary environmental objectives have been defined by the NEPA (1969) requirement for environmental impact assessment of relevant NFIP activities and by the EO 11988 (1977) mandate that all federal agencies protect floodplain "natural and beneficial values."

The NFIP's environmental impact is considerably influenced by FEMA's rules defining how NEPA and EO 11988 will be applied to NFIP activities and by FEMA regulations specifically implementing the substantive and procedural requirements of the NFIP itself. FEMA last conducted a comprehensive, or "programmatic" NEPA and EO 11988 review of its NFIP regulations in 1976 and 1980, respectively. A programmatic review applies to recurring actions defined by regulations but not to their application in particular instances. For example, the eight-step EO review procedure is applied to regulations and other arrangements defining the criteria for properties to be insured by the NFIP but not to determinations about the insurability of individual structures.

These comprehensive reviews are now more than twenty-five years old. In light of newer research and growing experience with the NFIP, FEMA should again initiate NEPA and EO 11988 programmatic reviews for several basic components of its community eligibility requirements and CRS standards. Such reviews would also be desirable to stimulate more awareness of the NFIP's environmental implications within FEMA. NFIP staff does not generally perceive the NFIP to be an environmentally significant program. FEMA believes most NFIP programs are "non-discretionary" and implements them on the basis of regulations previously reviewed programmatically. Thus, with the exception of the Flood Mitigation Assistance Program funded directly by NFIP, other NFIP activities are subject to NEPA and EO 11988 review when a change in the NFIP Regulations is proposed.

FEMA's regulations implementing the 1 percent annual chance flood ( the 100-year flood) as the standard for mapping community Special Flood Hazard Areas could be improved to better promote the purposes of NEPA and EO 11988. While the 1 percent standard has slowed the pace of development in the NFIP mapped floodplains and improved their management, the area defined has no necessary scientific connection to the natural, biological, physical, or geomorphological floodplain. It defines a spatial "footprint" where a theoretical flood can occur.

Usually this does encompass the areas over which most of the natural and beneficial functions of floodplains occur on a seasonal basis. This uniform national standard for SFHAs, and related standards for defining a regulatory floodway within an SFHA, may be insufficient to protect natural and beneficial floodplain values and may allow encroachment on endangered species habitat protected by federal law.

A second mapping regulation with potentially significant adverse impact on floodplain conservation appears to be the Letter of Map Change (LOMC) process and, especially, the Letter of Map Revision-Fill (LOMR-F) component of this process. The LOMR-F process appears to be a particularly important facilitator of floodplain development with minimal consideration of the environmental impacts. In some communities, it may have the most direct impact upon floodway natural and beneficial values among all NFIP mapping regulations. The LOMR-F process may indirectly encourage placement of more fill in the floodplain than would otherwise occur. Essentially, the LOMR-F procedure permits a property owner or lessee in the floodway fringe to raise with fill a lot or structure above the 1 percent annual flood elevation and thereby remove it from the mandatory NFIP insurance requirement when specified engineering and local regulatory procedures are followed. In many communities, the LOMR-F may have become a way for developers to avoid the mandatory NFIP purchase requirement for structures they create.

## **8.2 NFIP Premiums and Development**

The NFIP premiums have often been controversial. It is often asserted that these premiums encourage floodplain development because they are not actuarially sound and too inexpensive, thus reducing the perceived risks that buyers might associate with ownership of floodplain property. Among the important aspects at issue are the extent to which demand for NFIP insurance is responsive to increases in existing NFIP premiums, and whether an inability to purchase flood insurance might be a significant disincentive for homeowners to purchase floodplain property.

Surveys of community developers, local floodplain administrators, and NFIP policyholders conducted for this report imply that demand for NFIP insurance might be responsive to increases in insurance rates, particularly if they exceed 25 percent. For example, among the community developers and floodplain administrators interviewed, more than 80 percent believed homebuyers would be willing to pay 10 percent more for their flood insurance but less than 50 percent would pay as much as 35 percent more. When policyholders were asked a similar question, 54.3 percent responded that they would be willing to pay higher premiums for commercial insurance if federal insurance were not available. However, the majority of current homeowners in a SFHA (67.4 percent) reported that they would still purchase, build or stay in a SFHA without flood insurance.

This data is problematic concerning how much influence a prospective premium increase would exert on demand for floodplain property. These surveys, for instance, did not investigate possible differences between riverine and coastal communities in the elasticity of demand for NFIP or commercial insurance—a potentially significant issue since property values and other economic factors influencing insurance demand may vary significantly between these community settings. Nonetheless, these data imply that the pace of floodplain property

development may be to a significant extent responsive to increases in NFIP premiums so long as the mandatory purchase requirement exists.

### **8.3 The Community Rating System and Community Development**

The CRS is a voluntary program encouraging communities to enact additional measures to reduce flood risk and to protect floodplains beyond the minimum criteria for community enrollment in the NFIP. Floodplain conservation is among the CRS objectives. A specific CRS goal is “to encourage adoption of more effective measures that protect natural and beneficial floodplain functions.” To achieve this objective, FEMA allows communities to receive credit for activities that protect natural and beneficial floodplain functions—actions such as preservation of open space and public education concerning the ecological value of floodplains.

Any NFIP community may join the CRS, provided the community is in full compliance with NFIP eligibility requirements and makes a commitment to perform a minimum amount of additional floodplain management activities. NFIP premiums in a CRS community are discounted according to the number and type of additional CRS floodplain regulations the community adopts

FEMA considers the CRS among its most important and successful NFIP activities concerned with floodplain protection and preservation. In recent years, FEMA has invested increasing resources in promoting the CRS because, among other reasons, it involves numerous large communities with a majority of NFIP insured properties. The 1,038 communities currently participating in the CRS represent more than two-thirds of all NFIP policyholders.

Discussions with NFIP regional officials suggest that the CRS has been generally successful in promoting floodplain conservation in many communities through its conservation credits. However, the CRS could be improved in several ways relevant to the environmental goals of NEPA and, particularly, EO 11988.

First, the community impact of CRS activities credited for floodplain conservation should be evaluated. No data base of this kind currently exists. This is a matter of concern because interviews conducted with community floodplain administrators in association with this study suggest that NFIP activities intended to protect beneficial floodplain values and functions have been only moderately successful in many rapidly growing NFIP coastal communities.

Second, FEMA is concerned to increase community CRS participation. Currently, less than six percent of all NFIP communities belong to the CRS and 70 percent of these communities represent the two lowest classes of CRS rating. CRS participation has not been a high priority in most communities. FEMA believes this is due lack of local information about the CRS, limited staff to implement the program locally, and lack of collaboration in promoting CRS activities among smaller communities. Additionally, most communities have too few policies in force to make the current CRS premium discounts significant to local government.

Finally, CRS standards should be reviewed programmatically for NEPA or EO 11988 compliance. The CRS program has never received these reviews. A review is merited because

recent federal litigation suggests that some CRS credited activities may have had a negative impact on endangered species habitat although the activities mentioned in the litigation have since been revised to address this issue. Some of these activities may require FEMA's consultation with the U.S. Fish and Wildlife Service or the U.S. Bureau of Marine Fisheries as mandated by the Endangered Species Act. Other standards, especially those concerned with floodplain conservation, may also have environmental consequences inconsistent with the objectives of EO 11988 especially.

## 8.4 NFIP and Endangered Species

Evidence relating to the NFIP's impact on endangered species has evolved almost entirely from three lawsuits initiated against FEMA involving claims that the NFIP adversely affects endangered species habitat. However, FEMA has received Notices of Intent to Sue on this issue and additional litigation may occur.

One of these actions, *Florida Key Deer v. Stickney* (1994), produced evidence, primarily by the U.S. Department of the Interior, convincing the court that the NFIP was a major stimulant for land development in the Florida Keys threatening the endangered Key Deer habitat.<sup>53</sup> The cases established that the NFIP had sufficient influence on urban development in New Mexico and Washington State to require that FEMA comply with the Endangered Species Act by consulting the appropriate federal agencies concerning the NFIP's role in this development and the consequences for endangered species habitat.

This litigation has identified specific NFIP components that may potentially affect endangered species habitat: NFIP mapping rules, its community eligibility requirements, and CRS standards. More recently, additional evidence has been presented suggesting that the methods used to establish 1 percent annual flood standard may not be sufficient to protect the natural and beneficial value of floodplains, or wetlands, as habitat for endangered species.

The evidence presented in these cases constitutes virtually all the research currently available relating NFIP programs to endangered species habitat. This data does suggest a *possible* relationship between specific elements of the NFIP, urban development, and adverse impacts on endangered species habitat. This relationship is sufficiently plausible to justify continued awareness, and additional investigation of the NFIP's impact on endangered species and the relevance of this information for FEMA's implementation of both the ESA and EO 11988.

## 8.5 NFIP and the Coastal Barrier Resource System

NFIP insurance on new construction and substantial improvements is restricted within the Coastal Barrier Resource System (CBRS), created in 1984. Because of this restriction, CBRS units are often considered to exemplify how coastal floodplain development would occur elsewhere if NFIP insurance were prohibited to CBRS residents.

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<sup>53</sup> FEMA continues to dispute this finding.

Inferences about the NFIP's developmental impact drawn from current information about the status of CBRS properties are problematic. The current data bases, which identify properties within the CBRS or indicate changes in CBRS development over time are outdated, thus making difficult an accurate determination of the scale and rate of CBRS development since CBRS creation. Also, FEMA's current data does not permit accurate determination of which CBRS properties may now have NFIP insurance despite its prohibition within the CBRS. The fragmentary available evidence indicates that a small proportion of CBRS structures—no more than 5 percent and probably much less—may currently be insured by the NFIP. This suggests that erroneous sale of NFIP policies within the CBRS is an unlikely contributor to CBRS development.

Fragmentary studies suggest that development within CBRS lands in the past has been significantly less than might have been expected if prohibitions of federal subsidies in the CBRS did not exist. However, the specific impact of restricted NFIP coverage is not evident. Many of the CBRS units in past developmental studies have been relatively small, inaccessible, or clearly hazardous, thus unlikely to be developed. A more useful test of the NFIP's impact would be to study developable land where significant development has occurred.

The inhibition of CBRS development is more likely to occur when state and local governments are also actively encouraging CBRS conservation. Some studies suggest that market forces may increasingly overcome the present disincentives for CBRS development and that, consequently, the developmental rate of CBRS lands may increase significantly in the future. The most important economic incentives for increasing CBRS development may be growing affluence among prospective property owners, attractive investment and tax advantages at many CBRS locations, and growing scarcity of less expensive coastal properties elsewhere.

## **8.6 Improving the NFIP's Environmental Impact**

The NFIP was intended primarily to mitigate public and private risks associated with floodplain development while reducing the cost of flood disasters. These programs have also reduced barriers to floodplain transformation sometimes inconsistent with the environmental goals of NEPA and EO 11988 to which FEMA is also committed. FEMA's concern with improving the NFIP's implementation of NEPA and EO 11988 create opportunity for constructive NFIP innovations in NFIP's existing floodplain conservation activities.

### **8.6.1 Institutional Resources and Challenges**

A major challenge to FEMA's improvement of the NFIP's environmental impact is an institutional history and culture that encouraged a belief that the NFIP "isn't environmental." Until recently, this perception appears to have marginalized environmental concerns within FEMA and, especially, the NFIP.

This heritage appears to be changing, as evident in FEMA's current interest in better NEPA and EO 11988 implementation. Moreover, FEMA now has resources upon which to build further improvements in the NFIP's environmental impact:

- The advancement of FEMA’s Environmental and Historic Preservation Unit (EHP) from a relatively subordinate location in the Risk Reduction Branch of FEMA’s Mitigation Division to a separate unit reporting directly to FEMA’s Deputy Director of Mitigation;
- An increasing emphasis upon the value of floodplain conservation in CRS training for FEMA and state personnel responsible for implementing the CRS;
- An expansion in the floodplain conservation activities for which NFIP communities can receive CRS credit and more vigorous promotion of these standards to local governments;
- The comprehensive evaluation of the NFIP, which includes assessments of the associated environmental impacts.

### **8.6.2 Promoting Desirable Environmental Impacts**

The recommendations integrated into this report provide an extensive, detailed agenda of actions—many grounded in current FEMA environmental activities—that appear to further enhance NFIP’s implementation of NEPA and EO 11988. Priorities are essential. In broad perspective, the actions, which appear most strategic in shaping the NFIP’s continuing environmental impact, include:

- initiating new programmatic NEPA and EO 11988 reviews of the NFIP’s present floodplain mapping and management regulations during which specific issues identified in the report could be addressed;
- evaluating methodologies for implementing the NFIP’s current 1 percent annual flood standard;
- examining the cumulative impact of the NFIP’s LOMR and LOMR-F regulations on floodplain natural and beneficial functions;
- applying an EO 11988 programmatic review of CRS standards together with an increase in the activities for which NFIP communities can receive floodplain conservation credit;
- investigating the extent to which the NFIP’s present methods for mapping SFHAs may adversely effect endangered species habitat and a consideration of the implications for the NFIP’s implementation of EO 11988;
- developing and apply quantitative techniques for characterizing the natural and beneficial value of floodplains.

## **8.7 Recommendations**

### **8.7.1 FEMA’s Implementation of NEPA and EO 11988 Through the NFIP**

#### **Highest Priority**

Recommendation DEI-1: *FEMA should initiate a new programmatic NEPA and EO 11988 reviews of the NFIP’s present floodplain regulations within which specific issues identified in the report could be incorporated. Among the findings pointing to the desirability of such a comprehensive review are (1) papers proposing improvements in the 1 percent standard and the regulatory floodway requirement for floodplain mapping presented at the 2004 ASFPM Foundation’s Gilbert F. White National Flood Policy*

*Forum (ASPFM 2004); (2) the lack quantitative data concerning the natural and beneficial value of floodplains; (3) the need to characterize the cumulative national and local impact of floodplain filling through the LOMC process; (4) the absence of research specifically concerned with the NFIP's impact on endangered species habitat; (5) the possibility for greater use of future-conditions hydrology as a basis for floodplain mapping; and (6) continuing professional discourse concerning the actuarial soundness of NFIP premiums.*

Recommendation DEI-3: *FEMA should utilize, or develop, quantitative methodologies for assessing the natural and beneficial function of floodplains, which can be provided to state and local officials as a tool for assessing the impact of flood mapping and floodplain regulatory decisions.*

Recommendation DEI-4: *Evaluate the methodology used to calculate and map the 1 percent standard to determine if there are ways to provide increased protection to the natural and beneficial functions of floodplains based on recent research suggesting that the biological functions and natural boundary of floodplains may not be adequately addressed in the current methodology.*

Recommendation DEI-5: *When assessing the methodology used to calculate the 1 percent standard, priorities should include: (a) revising relevant FEMA regulations and CRS standards to encourage use of future conditions hydrology, when practicable, as a methodology; and (b) using the upper limit of a 95-5 or 90-10 confidence interval in calculating the BFF.*

Recommendation DEI-6: *Replace the present regulatory floodway standard with one based on either a 10-year floodplain or the regulatory floodway, whichever is greater.*

Recommendation DEI-7: *Eliminate the 1-foot rise allowed in determination of an SFHA floodway and delineate a "resource-based" floodway, with consideration for ecological and geomorphic process, to better protect floodplain functions.*

Recommendation DEI-11: *Restructure the LOMC review process to encourage more local involvement and interagency input, especially from resource management agencies familiar with the unique local and beneficial functions of floodplains.*

Recommendation DEI-12: *Initiate a nationwide evaluation of the impact of the LOMC process on the natural and beneficial values of floodplains with a priority component focused on the floodplain impact of the LOMR-C process.*

## **Highly Desirable**

Recommendation DEI-2: *FEMA should commission an empirical, national study comparing the developmental and environmental impacts of the NFIP in riverine and coastal areas.*

Recommendation DEI-8: *Modify FEMA cost-benefit procedures used in mitigation projects to include consideration of the long-term environmental and economic services created or preserved in floodplains through non-structural mitigation techniques. Documentation the value of ecosystem services protected by sound floodplain management practices may better justify the protection of floodplain natural and beneficial functions to NFIP communities and the public in general.*

Recommendation DEI-9: *Given the nationwide trend in urbanization and higher peak flows, a true 1 percent floodplain is likely larger than a mapped effective floodplain. The LOMC standards and guidance should acknowledge this condition and at least give encouragement to map revision requests that raise, rather than lower BFEs, or scrutinize in more detail requests that lower floodplains in the face of continued development, loss of floodplain habitat and increasing flood damages*

Recommendation DEI-13: *The signatory requirement for a Community Acknowledgment Form should be broadened to include the signature of someone familiar with the environmental effects of the floodplain fill request, such as a community natural resource manager, in order to more directly address the effects of floodplain fill on floodplain functions.*

## **8.7.2 Perceptions of Flood Risk and NFIP Availability**

### **Highest Priority**

Recommendation DEI-14: *FEMA should initiate a comparative study of cost and demand elasticity for NFIP insurance in riverine and coastal communities, between pre- and post-FIRM structures, and among different premium bases to determine the extent to which NFIP premium increases are sensitive to these specific social and geographic settings*

### **Highly Desirable**

Recommendation DEI-15: *Evaluate the familiarity of community floodplain managers, zoning administrators, and other local land use regulators with local CBRS areas and determine if federal regulations are being enforced regarding development in these CBRS units.*

## **8.7.3 The Community Rating System and Floodplain Conservation**

### **High Priority**

Recommendation DEI-10: *Examine the feasibility of adding to the Community Rating System standards, additional credit for No Adverse Impact as community floodplain management strategy.*

Recommendation DEI-16: *Initiate a nationally-based survey of CRS communities to evaluate the impact of CRS-credited activities intended to promote natural and beneficial floodplain values: CRS categories 330, 420, 430, 450, and 510.*

Recommendation DEI-20: *Focus more attention on CRS education and training for local political officials whose support is needed for an effective program.*

Recommendation DEI-22: *FEMA should amend its regulations implementing NEPA and EO 11988 (40 CFR, Parts 9 and 10) to require environmental reviews in the future for new CRS standards and specific community activities for which CRS credit is given.*

### **Highly Desirable**

Recommendation DIE-17: *Encourage communities with limited staff resources to work together with adjacent communities that may already be in the CRS or are willing to share resources. For example, sharing the same CRS Coordinator has been successful in the past.*

Recommendation DEI-18: *Promote more collaboration between small communities and counties to use existing resources to create credible CRS activities. For example, counties may already send outreach materials to all citizens in the county, including those in incorporated NFIP communities within the county. This outreach project could be creditable under CRS for the county and for all communities within the county*

Recommendation DEI-19: *Update solicitation lists used to recruit local professionals to attend CRS regional training sessions. Updating these lists and making them available to the communities would be beneficial for all concerned.*

Recommendation DEI-21: *Improve coordination with FEMA's Flood Mitigation Assistance Program, Hazard Mitigation Grant Program, and Pre-disaster Mitigation which can all be used to further CRS efforts. The CRS and those programs should be seen as complimentary to improve floodplain management activities and issues*

### **8.7.4 NFIP and the Endangered Species Act**

#### **High Priority**

Recommendation DEI-23: *FEMA should use a NEPA and/or EO 11988 review of its NFIP regulations and CRS standards as an opportunity to initiate a national study of the NFIP's impact on endangered species and its relevance to the ESA.*

### **8.7.5 The Coastal Barrier Resource System**

#### **High Priority**

Recommendation DEI-24: *At the time appropriate data is available from the USFWS Digital Mapping Pilot Project, FEMA should initiate a study of development rates, the reasons for such development, and the incidence of NFIP policies in the sample of CBRS units included in the Project. If possible, these units should be those in the GAO's "Coastal Barriers: Development Occurring Despite Prohibitions Against Federal Assistance" (1992).*

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## 9. APPENDICES

### Appendix 1: Conservation Relevant Interpretations of the National Flood Insurance Act of 1969

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#### Appendix 1.1: Senate Committee on Currency and Banking

[Parenthetical numbers reference pages in U.S. Congress, Senate, Committee on Banking and Currency, *National Flood Insurance Act of 1967: Report of the Committee on Banking and Currency to Accompany S. 1985*. 90<sup>th</sup> Congress, 1<sup>st</sup> Session, Report No. 549. August 29, 1967.]

“The Secretary should develop criteria which will be flexible while at the same time accomplishing the regulation of the development and use of floodplains where it is needed.” (p. 6)

General Purposes:

1. “A most important public purpose which the program will serve will be to encourage state and local governments to adopt and enforce appropriate land use provisions to restrict the future development of land which is exposed to flood hazard.” (p. 2)
2. “Flood insurance is viewed both as a means of helping the individual bear more easily the risks of flood damage to which his location often exposes him, and equally, as a means of discouraging unwise occupancy of flood-prone areas.” (p. 2). Also: “Subsidies to some present occupants of flood-prone areas should be viewed as part of a program of land use adjustment, aimed at ultimate reduction in the exposure to flood hazard...” (p. 3)
3. “Achieving a sensible use of flood-prone land is equally as important as indemnification of loss. This requires far-sighted land use planning and control. Zoning of land against occupancy, or against certain kinds of uses is one mechanism for achieving this aim...But any federal subsidy which will accrue under the program is justifiable only as part of an interim solution to long-range readjustments in land use. Such assistance should not prejudice these needed long-range adjustments, or the program would be self-defeating.” (p. 6)

Statutory Language:

Section 2: “...a critical ingredient of such a program will be the encouragement of state and local government to adopt land use regulations to govern the development of land exposed to flood damage.” (p. 15)

## Appendix 1: Conservation Relevant Interpretations of the National Flood Insurance Act of 1969, continued

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### Appendix 1.2: House Committee on Currency and Banking

[Parenthetical numbers reference pages in U.S. Congress, House of Representatives, Committee on Banking and Currency, *National Flood Insurance Act of 1967: Report of the Committee on Banking and Currency*. 90<sup>th</sup> Congress, 1<sup>st</sup> Session, Report No. 786. October 16, 1967.]

1. Encourage state/local governments to encourage land use planning to restrict development on land exposed to flood hazards:  
 “A most important feature of the program that would be authorized under the bill would be to encourage state and local governments to adopt and enforce appropriate land use provisions to restrict the future development of land which is exposed to flood hazards.” (p. 2)
2. Encourage state/local governments to adopt various forms of land use planning and zoning:  
 “High among the considerations of any insurance program, in the committee’s view, is an assessment of its effect upon the national effort to abate damages, and upon state and local governments’ efforts to achieve good planning in the use of flood-prone lands.” (p. 10).
3. “Coordination of Flood Insurance With Land Management Programs in Flood-Prone Areas:”  
 “...based upon studies and investigations, the Secretary will develop comprehensive criteria designed to encourage, where necessary, the adoption of permanent state or local measure which will lessen the exposure of land to flood losses, improve the long range land management, and use of flood-prone areas, and inhibit, the maximum extent feasible, unplanned and economically unjustifiable future development in such areas.” (p. 20).
4. Section 114 directs the Secretary of ... to consult with other federal agencies and interstate, state and local agencies with responsibility for flood control to assure maximum possible consistency between agencies and flood insurance program.
5. Subsections (a) and (b) of Section 302 authorize the Secretary to carry out studies and investigations “with regard to the adequacy of state and local measures in flood prone areas as to land management and use, flood control, flood zoning, and flood damage prevention.” (p. 42)
6. Subsection (c) of Section 302 directs the Secretary on the basis of studies and investigations to “develop comprehensive criteria designed to encourage, where necessary, the adoption of permanent state or local measures which will lessen the exposure of property and facilities to flood losses, improve the long-range land management and use of flood-

## **Appendix 1: Conservation Relevant Interpretations of the National Flood Insurance Act of 1969, continued**

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prone areas, and inhibit to the maximum extent feasible, unplanned and economically unjustifiable future development in such areas.” (p. 42-43)

The general purpose of the NFIA relates is to control flood-prone area development.

7. The purpose of the flood insurance program in general is “a means of discouraging unwise occupancy of flood prone areas.” (p. 3)
8. “Land use planning for flood-prone areas, to keep development out of areas where risks are higher than probable gains, must be an adjunct to flood insurance.”
9. Section 112 provides that after June 30, 1970, no new flood insurance coverage to any area unless an appropriate public body has adopted permanent land use and control measures, with effective enforcement provisions, which the Secretary finds consistent with criteria for land use management as prescribed in Section 302 of the bill.
10. Section 113 of the NFIA prohibits, after June 30, 1970, new flood insurance or renewals for property in violation of state/local laws intended to discourage or otherwise restrict land development or occupancy in flood-prone areas.

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## **Appendix 2: The NFIP State Survey**

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A survey of development interests and NFIP floodplain administrators was conducted in selected states and communities to provide missing information strategic to evaluating the NFIP's current developmental and environmental effects at the community level. The survey was designed in three stages, beginning with state selection, then community identification within selected states, and finally designation of respondent groups. The process of state, community, and respondent selection is fully discussed in Section 4.2.

Communities in six states were surveyed: Arizona, Florida, Illinois, North Carolina, South Carolina, and Texas. Four of these states (Florida, North Carolina, South Carolina, and Texas) include primarily high-growth, coastal areas with a large number of active NFIP policies; two of the states (Arizona and Illinois) consist of exclusively riverine communities. Three communities were selected from each state for respondent interviews. These three communities ranked at the top in each state in the total number of NFIP policies in community SFHAs, as well as percentage of post-FIRM contracts.

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## **Appendix 3: Community Survey**

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### **Appendix 3.1: Community Selection**

The survey addressed two closely related concerns in AIR's report on the NFIP's developmental and environmental impacts: (a) the extent to which the NFIP encourages or accelerates the development of floodplains; and (b) the environmental consequences of such development.

Program budget and time constraints precluded a comprehensive fifty-state strategy. It was practical, however, to survey states and communities deliberately identified on the basis of variables which provided important, missing, information essential for evaluating the NFIP's current developmental and environmental impact at the community level.

### **Appendix 3.2: Statistical Methodology for Stratification and Sample Selection**

The survey design consists of is three stages, beginning with state selection, then community identification within selected states, and finally designation of respondent groups.

#### Stage 1: States Selection

States included in the survey were:

- regionally distributed among the northwest, southeast, southwest, Midwest, and mid-Atlantic areas;
- inclusive of coastal and riverine states;
- among the highest third of states in total population growth between 1990-2000; and
- among the highest third of states in total number of NFIP policy holders.

These criteria were selected because prior research suggests that they may be related, singly or in combination, to variability in the onset and magnitude of development and the environmental consequences of development in flood hazard areas. Regions differ, for example, in the extent to which their political cultures encourage aggressive local governmental planning for floodplain conservation. Also, significant regional differences exist in the rate of population growth and the increase of NFIP policyholders between 1990–2000 that may, in turn, imply important variability in regional economic, political or geographic contexts for floodplain management. All Midwestern states in this survey, for instance, are among the lowest third of all states in population growth during 1990–2000. The southeastern and northwestern states are in the upper third of national population growth during 1990–2000, and the mid-Atlantic states generally rank in the middle-third among state growth rates during this period. Since research also suggests that coastal and riverine states may differ significantly in developmental effects on floodplains, the six-state survey includes two riverine states (Arizona and Illinois) and four coastal states (South Carolina, Texas, Florida, and North Carolina).

## **Appendix 3: Community Survey, continued**

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States ranked nationally among the upper third in population growth between 1990–2000 were selected (with the exception of Illinois) because the development of floodplains appears to be most intensive within these states and, consequently, the magnitude and character of such environmental transformation is most apparent. Illinois was added to ensure that at least one Midwestern state was included in the survey. All states are among the top third nationally in the total number of policyholders, ensuring that the surveyed areas contained large numbers of policyholders.

### Stage 2: Community Selection

Three communities were selected for study within each state. Within each state, communities were ranked according to the total number of NFIP policies in community SFHAs, then rank-ordered by the percent of post-FIRM contracts. The three highest-scoring communities in each state were then designated for interviews.

### Stage 3: Respondent Selection

The survey was conducted among individuals likely to have a significant influence on community floodplain development, or to be well informed about floodplain management in the studied communities. These individuals were identified as developers, mortgage lenders and development underwriters, real estate brokers, insurance agents, and floodplain administrators. The sampling frame was composed of various businesses in the research communities with the exception of the floodplain administrators, who were local government officials.

Budget constraints precluded a large, statistically valid random sample of the respondents, but interviews of a smaller number of randomly selected individuals in each group did yield valuable interpretations of factors affecting floodplain development in specific communities, that could not be obtained from policyholders themselves. Individuals chosen for these interviews were randomly selected from appropriate community, professional, and business association rosters.

### Stage 4: Protocol Pretest and Administration

All survey instruments were designed, pre-tested, and administered by the Florida Survey Research Center, University of Florida, in collaboration with the study authors.

The field testing was conducted by a supervisor or an interviewer with several years of experience conducting surveys. The pretest was designed to test the following aspects of a survey instrument:

- spelling, grammar, branches (go-to questions);
- clarity of the introductory statement;
- question wording and flow from one question to another;
- interviewer's ease in reading the questions;

## Appendix 3: Community Survey, continued

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- respondent’s ability to understand and answer the questions;
- ease of transition from one survey section to another; and
- other problems or issues observed during the pretest.

A maximum of nine pretest interviews will be conducted of the following target groups:

1. mortgage lenders;
2. real estate brokers;
3. insurance agents;
4. developers; and
5. floodplain administrators.

An appropriate geographic location was selected that had not been subject to a recent flood or natural disaster such as a hurricane.

Responses:

	<u>Number</u>
Administrators:	17
Developers:	25
Insurers:	31
Lenders:	78
Realtors:	37
TOTAL :	188

### Appendix 3.3: Community Interview Protocols

#### Residential Mortgage Lenders

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with lenders who finance development and housing, so that we can learn more about your concerns about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of flooding in [community]:

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is

### Appendix 3: Community Survey, continued

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flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]

2. “Using the same scale” [INTERVIEWER: repeat if needed], “please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] floodplain.” [1-5, DR]
3. “Now, please think about people considering whether to purchase property or build on property in [community’s] floodplain. What percentage of these individuals do you think are AWARE that the property they’re considering for purchase is located in a floodplain?” [%, DR]
4. “How often does your company evaluate the likelihood of flooding for property that you consider financing BEFORE that purchase takes place? Would you say you (or your company) always, most of the time, sometimes, rarely, or never evaluate the likelihood of flooding for property before a purchase takes place?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] floodplain.

5. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] floodplain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]  
[CHECKBOX: mention
  - i. “Availability of Flood Insurance
  - ii. “Characteristics of the property (size, aesthetics, resources, etc.)
  - iii. “Financial considerations (price, loan provisions, down payment, etc.)
  - iv. “Flood Risk
  - v. “Proximity to shopping, schools, employment
  - vi. “Proximity to friends / relatives
  - vii. “The surrounding area (businesses, community reputation, etc.
  - viii. “Other
  - ix. “Don’t know
  - x. “Refuse”]

For each response:

“Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think [factor] is in a person’s decision to purchase or build on property in the [community] floodplain.” [1-5, DR]

### **Appendix 3: Community Survey, continued**

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For each response, except “Availability of Flood Insurance”:

“And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person’s decision to purchase or build on property in the [community] floodplain?” [More, Equal, Less, DR]

“Now, we have some more specific questions about flood insurance.”

6. “How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is “not familiar at all” and 5 is “very familiar?”
7. “Suppose that federal flood insurance is NOT available for a property located in the floodplain that you or your company is considering for purchase or development. Would you still purchase or develop the property if federal flood insurance were not available?” [Y, N, DR]  
If Yes:
  - a. “Why?” [Do NOT read list; Mark ALL mentioned] [checkbox]
 If No:
  - b. “Why not?” [Do NOT read list; Mark ALL mentioned] [checkbox]
8. “Again, suppose that flood insurance was not available, but was still required for federally backed mortgages in [community], and property owners in [community] had to consider purchasing commercial insurance, not guaranteed by the federal government. What percentage of property owners in [community] do you think would be willing to:
  - a. “Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - b. “Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - c. “Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - d. “Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - e. “Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
9. “Would you please estimate what percentage of your clients who bought or built on property in the floodplain of [community] applied for documents to revise the mapping of the property to remove it from the floodplain?” [INTERVIEWER: Prompt if asked—“a Letter of Map Change” or a “Letter of Map Revision.”] [%, DR]

“Now, I have a few questions about development in [community].”

### **Appendix 3: Community Survey, continued**

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10. “Using a scale from 1 to 5, where 1 is “very little” and 5 is “very much,” please estimate how much new development has occurred in the [community] floodplain in the past three years.” [1-5, DR]

11. “Do you think that growth in the number of seasonal residents, as opposed to year-round residents, moving into [community] is leading to increased development in the floodplains?” [Y,N,DR]

If Yes:

“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of seasonal residents buying or building on property there.” [%, DR]

12. Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the floodplains? [Y, N, DR]

If Yes:

“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of year-round residents buying or building on property there.” [%, DR]

[CBRS communities only]

“Part of your community is located in, or near, what is called the Coastal Barrier Resource System.”

13. “Is new development occurring in the Coastal Barrier Resource System?” [Y, N, DR]

If Yes:

“Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?” [Do NOT Read List, Mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don’t know; Refuse]

“Finally, I just have a few demographic questions for statistical purposes.

14. “How long have you held your present position? [# years]

15. “Do you live in [community]?” [Y, N, DR]

If Yes:

“How long have you lived in [community]?” [# years]

### **Appendix 3: Community Survey, continued**

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16. “Do you have any other comments about the National Flood Insurance Program or flooding in [community]?” [Y, N, DR]

If Yes:

[text from response]

17. “Do you have any questions regarding this study or your rights as a participant?” [Y, N, DR]

If Yes:

“For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433.”

“That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).”

#### **Real Estate Brokers**

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with real estate brokers, so that we can learn more about your concerns, and your clients’ concerns, about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of the risks from flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] floodplain.” [1-5, DR]
3. “How often do you discuss the likelihood of flooding for a property with clients BEFORE a purchase takes place? Would you say you (or your company) always, most of the time, sometimes, rarely, or never discuss the likelihood of flooding for property with

clients before a purchase takes place?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

“Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] floodplain.

4. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] floodplain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]  
[Checkbox: mention
- i. “Availability of Flood Insurance
  - ii. “Characteristics of the property (size, aesthetics, resources, etc.)
  - iii. “Financial considerations (price, loan provisions, down payment, etc.)
  - iv. “Flood Risk
  - v. “Proximity to shopping, schools, employment
  - vi. “Proximity to friends / relatives
  - vii. “The surrounding area (businesses, community reputation, etc.)
  - viii. “Other (text)
  - ix. “Don’t know
  - x. “Refuse”]
- For each mentioned:
- a. “Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think [factor] is in a person’s decision to purchase or build on property in the [community] floodplain.” [1-5, DR]  
[All responses except “Availability of Flood Insurance:”]
  - b. “And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person’s decision to purchase or build on property in the [community] floodplain?” [More, Equal, Less, DR]

“Now, we have some more specific questions about flood insurance.

5. “How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is “not familiar at all” and 5 is “very familiar?”
6. “Suppose that federal flood insurance is NOT available for a property located in the floodplain that a client is considering for purchase through you or your agency. Would you still recommend that a client purchase the property if federal flood insurance were not available?” [Y, N, DR]  
If Yes:
  - a. “Why?” [Do NOT read list; Mark ALL mentioned] [checkbox]
 If No:
  - b. “Why not?” [Do NOT read list; Mark ALL mentioned] [checkbox]

### **Appendix 3: Community Survey, continued**

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7. “Again, suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loans and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:
- “Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - “Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - “Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - “Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - “Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

8. “Would you please estimate what percentage of your clients who bought or built on property in the floodplain of [community] applied for documents to revise the mapping of the property to remove it from the floodplain?” [INTERVIEWER: Prompt if asked—“a Letter of Map Change” or a “Letter of Map Revision.”] [%, DR]

“Now, we have a few basic questions about development in [community].

9. “Using a scale from 1 to 5, where 1 is “very little” and 5 is “very much,” please estimate how much new development has occurred in the [community] floodplain in the past three years.” [1-5, DR]
10. “Do you think that growth in the number of seasonal residents moving into [community] is leading to increased development in the floodplains?” [Y, N, DR]  
If Yes:  
“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of seasonal residents buying or building on property there.” [%, DR]
11. “Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the floodplains?” [Y, N, DR]  
If Yes:  
“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of year-round residents buying or building on property there.” [%, DR]

[CBRS communities only]

“Part of your community is located in, or near, what is called the Coastal Barrier Resource System.

### **Appendix 3: Community Survey, continued**

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12. “Is new development occurring in the Coastal Barrier Resource System?” [Y, N, DR]  
If Yes:

- a. “Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?” [Do NOT Read List, Mark all that apply.]  
[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don’t know; Refuse]

“Finally, I just have a few demographic questions for statistical purposes.

13. “How long have you held your position?” [# years]

14. “Do you live in [community]?” [Y, N, DR]

- a. If Yes:  
b. “How long have you lived in [community]?” [# years]

15. “Do you have any other comments about the National Flood Insurance Program or flooding in [community]?” [Y, N, DR]  
If Yes: [text from response]

16. “Do you have any questions regarding this study or your rights as a participant?” [Y, N, DR]  
a. If Yes: “For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433.

“That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).”

#### **Insurance Agents or Brokers**

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with insurers, so that we can learn more about your concerns, and your clients’ concerns, about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

### **Appendix 3: Community Survey, continued**

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“First, we’d like to ask you some general questions about your perceptions of the risks from flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] floodplain.” [1-5, DR]
3. “How often do you discuss the likelihood of significant flooding for a property with clients BEFORE a policy is issued? Would you say you (or your company) always, most of the time, sometimes, rarely, or never discuss the likelihood of flooding for property with clients before a policy is issued?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

“Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] floodplain.

4. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] floodplain? [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]  
[Checkbox: mention
  - i. “Availability of Flood Insurance
  - ii. “Characteristics of the property (size, aesthetics, resources, etc.)
  - iii. “Financial considerations (price, loan provisions, down payment, etc.)
  - iv. “Flood Risk
  - v. “Proximity to shopping, schools, employment
  - vi. “Proximity to friends / relatives
  - vii. “The surrounding area (businesses, community reputation, etc.)
  - viii. “Other (text)
  - ix. “Don’t know
  - x. “Refuse”]
 For each mentioned:
  - a. “Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think [factor] is in a person’s decision to purchase or build on property in the [community] floodplain. [1-5, DR]  
[All responses except “Availability of Flood Insurance”]
  - b. “And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person’s decision to purchase or build on property in the [community] floodplain? [More, Equal, Less, DR]

### **Appendix 3: Community Survey, continued**

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“Now, we have some more specific questions about flood insurance.

11. “How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is “not familiar at all” and 5 is “very familiar?”
12. “If the federal government discontinues government backed flood insurance but still requires flood insurance for federally backed loans on floodplain property, do you think private insurance companies will assume all policies currently in place?” [Y, N, DR]
13. “Are you an independent insurance agent or do you work for a company?” [independent, company, other, DR]

“Now, suppose that federal flood insurance were NOT available for property located in the floodplain of [community].”

If the response to question #13 is INDEPENDENT:

14. “Do you presently have a policy or policies available that you could offer as a substitute for federal flood insurance?” [Y, N, DR]

If No:

“Would you develop a policy to substitute for federal flood insurance if it were necessary?” [Y, N, DR]

If the response to question #13 is COMPANY:

15. “Does your company presently have a policy or policies available that you could offer as a substitute for federal flood insurance?” [Y, N, DR]

If No:

“Would your company develop a policy to substitute for federal flood insurance if it were necessary?” [Y, N, DR]

16. “Suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loan and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:
  - a. “Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - b. “Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - c. “Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - d. “Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - e. “Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

### **Appendix 3: Community Survey, continued**

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17. “Would you please estimate what percentage of your clients who bought or built on property in the floodplain of [community] applied for documents to revise the mapping of the property to remove it from the floodplain?” [INTERVIEWER: Prompt if asked—“a Letter of Map Change” or a “Letter of Map Revision.”] [%, DR]

“Now, I have a few questions about development in [community].

18. “Using a scale from 1 to 5, where 1 is “very little” and 5 is “very much,” please estimate how much new development has occurred in the [community] floodplain in the past three years.” [1-5, DR]

19. “Do you think that growth in the number of seasonal residents, as opposed to year-round residents, moving into [community] is leading to increased development in the floodplains?” [Y, N, DR]

If Yes:

“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of seasonal residents buying or building on property there.” [%, DR]

20. “Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the floodplains?” [Y, N, DR]

If Yes:

“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of year-round residents buying or building on property there.” [%, DR]

[CBRS communities only]

“Part of your community is located in, or near, what is called the Coastal Barrier Resource System.”

21. “Is new development occurring in the Coastal Barrier Resource System?” [Y, N, DR]

If Yes:

“Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?” [Do NOT read list; mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don’t know; Refuse]

“Finally, I just have a few demographic questions for statistical purposes.

22. “How long have you sold flood insurance in [community]?” [# years]

### **Appendix 3: Community Survey, continued**

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23. “Do you live in [community]?” [Y, N, DR]

If Yes:

“How long have you lived in [community]? [# years]

24. “Do you have any other comments about the National Flood Insurance Program or flooding in [community]?” [Y, N, DR]

If Yes:

[text from response]

25. “Do you have any questions regarding this study or your rights as a participant?” [Y, N, DR]

If Yes:

“For questions regarding this study you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Internal Review Board at 352-392-0433.

“That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).”

#### **Residential Developers**

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with developers and builders, so that we can learn more about your concerns about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of the risks from flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] floodplain.” [1-5, DR]

### Appendix 3: Community Survey, continued

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3. “How often do you, or does your company, evaluate the likelihood of flooding for property that you consider purchasing or developing BEFORE that purchase or development takes place? Would you say you (or your company) always, most of the time, sometimes, rarely, or never evaluate the likelihood of flooding for property before a purchase or development takes place?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

“Next, please consider the factors that might influence a decision to purchase or build on property in the [community] floodplain.

4. “Could you please tell me what factors influence your company’s decision to purchase or develop property in the [community] floodplain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]

[Checkbox: mention

- i. “Availability of Flood Insurance
- ii. “Characteristics of the property (size, aesthetics, resources, etc.)
- iii. “Financial considerations (price, loan provisions, down payment, etc.)
- iv. “Flood Risk
- v. “Proximity to shopping, schools, employment
- vi. “The surrounding area (businesses, community reputation, etc.)
- vii. “Other
- viii. “Don’t know
- ix. “Refuse”]

For each response:

- a. “Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think [factor] is in your decision to purchase or develop property in the [community] floodplain.” [1-5, DR]

[All responses except “Availability of Flood Insurance”]

- b. “And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in your decision to purchase or develop property in the [community] floodplain?” [More, Equal, Less, DR]

5. “Could you please tell me what factors you think might influence a person’s decision to purchase or build on property in the [community] floodplain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]

[Checkbox: mention

- i. “Availability of Flood Insurance
- ii. “Characteristics of the property (size, aesthetics, resources, etc.)
- iii. “Financial considerations (price, loan provisions, down payment, etc.)
- iv. “Flood Risk
- v. “Proximity to shopping, schools, employment
- vi. “Proximity to friends / relatives
- vii. “The surrounding area (businesses, community reputation, etc.)
- viii. “Other

### Appendix 3: Community Survey, continued

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ix. “Don’t know

x. “Refuse”]

For each response:

a. “Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think [factor] is in a person’s decision to purchase or build on property in the [community] floodplain.” [1-5, DR]

[All responses except “Availability of Flood Insurance”]

b. “And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person’s decision to purchase or build on property in the [community] floodplain?” [More, Equal, Less, DR]

Next, we have some more specific questions about flood insurance.

5. “How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency? Would you say that you’re very familiar, somewhat familiar, or not at all familiar with the National Flood Insurance Program?” [VF, SF, NF, DK, R]

6. “Suppose that federal flood insurance is NOT available for a property located in the floodplain that you or your company is considering for purchase or development. Would you still purchase or develop the property if federal flood insurance were not available?” [Y, N, DR]

If Yes:

a. “Why?” [Do NOT read list; Mark ALL mentioned] [checkbox]

If No:

b. “Why not?” [Do NOT read list; Mark ALL mentioned] [checkbox]

“Now, consider residents of [community].

7. “Again, suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loans and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:

a. “Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

b. “Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

c. “Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

d. “Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

e. “Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

### **Appendix 3: Community Survey, continued**

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8. “Would you please estimate what percentage of your clients who bought or built on property in the floodplain of [community] applied for documents to revise the mapping of the property to remove it from the floodplain?” [INTERVIEWER: Prompt if asked—“a Letter of Map Change” or a “Letter of Map Revision.”] [%, DR]

“Now, we have a few basic questions about development in [community].

9. “Do you think that there are particular advantages to developing property **inside** a floodplain where flood insurance is required?” [Y, N, DR]  
 If Yes:  
 “What are those advantages?” [text from response]
10. “Do you think that there are particular **disadvantages** to developing property **inside** a floodplain where flood insurance is required?” [Y, N, DR]  
 If Yes:  
 “What are those disadvantages?” [text from response]
11. “Do you think that there are particular advantages to developing property **outside** of a floodplain where federal flood insurance is not required?” [Y, N, DR]  
 If Yes:  
 “What are those advantages?” [text from response]
12. “Do you think that there are particular **disadvantages** to developing property **outside** of a floodplain where federal flood insurance is not required?” [Y, N, DR]  
 If Yes:  
 “What are those disadvantages?” [text from response]
13. “Using a scale from 1 to 5, where 1 is “very little” and 5 is “very much,” please estimate how much new development has occurred in the [community] floodplain in the past three years. “ [1-5, DR]
14. “Do you think that growth in the number of seasonal residents, as compared to year-round residents, moving into [community] is leading to increased development in the floodplains?” [Y, N, DR]  
 If Yes:  
 “Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of seasonal residents buying or building on property there.” [%, DR]

### **Appendix 3: Community Survey, continued**

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15. “Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the floodplains?” [Y, N, DR]

If Yes:

“Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of year-round residents buying or building on property there.” [%, DR]

16. “Using a scale from 1 to 5, where 1 is “very unsuccessful” and 5 is “very successful,” please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following:
- “Preserving open spaces in [community]?” [1-5, DR]
  - “Protecting water quality in [community]?” [1-5, DR]
  - “Controlling soil erosion and sedimentation in [community]?” [1-5, DR]
  - “Guiding residential development away from locations that are threatened by flood hazards?” [1-5, DR]
  - “Guiding business development away from locations that are threatened by flood hazards?” [1-5, DR]

[CBRS communities only]

“Part of your community is located in, or near, what is called the Coastal Barrier Resource System.

6. “Is new development occurring in the Coastal Barrier Resource System?” [Y, N, DR]  
If Yes:

“Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?” [Do NOT Read List, Mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don’t know; Refuse]

Finally, I just have a few demographic questions for statistical purposes.

7. “How long have you held your present position with your company?” [# years]
8. “How many residential units has your company built in the past 12 months?” [#]
9. “Does your company engage in only building, only land development, or a combination of both?” [Building, Land Development, Both, DK, R]

### **Appendix 3: Community Survey, continued**

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10. “Do you live in [community]?” [Y, N, DR]

If Yes:

“How long have you lived in [community]?” [# years]

11. Do you have any other comments about the National Flood Insurance Program or flooding in [community]?” [Y, N, DR]

If Yes:

[text from response]

12. “Do you have any questions regarding this study or your rights as a participant?” [Y, N, DR]

If Yes:

“For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433.

“That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).”

#### Floodplain Administrators

“May I please speak with [name] (or the Floodplain Administrator)?

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re conducting short interviews with administrators associated with the NFIP, so that we can learn more about participation in the program and how the program might be improved. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 15 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of significant flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] floodplain.” [1-5, DR]

### **Appendix 3: Community Survey, continued**

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3. “Now, please think about people considering whether to purchase property or build on property in [community’s] floodplain. What percentage of these individuals do you think are AWARE that the property they’re considering for purchase is located in a floodplain?” [%, DR]

If the response to question #3 is not “100 percent”:

4. “Consider those prospective buyers in [community] who do NOT know that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how do you think these prospective buyers would characterize the likelihood of significant flooding on the property?” [1-5, DR]

If the response to question #3 is not “100 percent”:

5. “Again, consider those prospective buyers in [community] who do NOT know that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think the availability of flood insurance is to prospective buyers who are NOT aware the property is in a floodplain?” [1-5, DR]

If the response to question #3 is between 1 percent and 100 percent:

6. “Now consider those prospective buyers in [community] who ARE aware that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how do you think these prospective buyers would characterize the likelihood of significant flooding on the property?” [1-5, DR]

If the response to question #3 is between 1 percent and 100 percent:

7. “Again, consider those prospective buyers in [community] who ARE aware that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think the availability of flood insurance is to prospective buyers who ARE aware the property is in a floodplain?” [1-5, DR]

“Now, I’d like to ask you some more specific questions about flood insurance.

8. “How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is “not familiar at all” and 5 is “very familiar?”
9. “Suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loan and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:

### Appendix 3: Community Survey, continued

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- a. “Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
- b. “Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
- c. “Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
- d. “Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
- e. “Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]

10. “Would you please estimate what percentage of residents who bought or built on property in the floodplain of [community] applied for documents to revise the mapping of the property to remove it from the floodplain?” [INTERVIEWER: Prompt if asked—“a Letter of Map Change” or a “Letter of Map Revision.”] [%, DR]

“Next, I have some general questions about property purchases in [community].

11. “Is there a legal requirement in [community] that a buyer must be informed if property is located in a floodplain before he/she purchases the property?” [Y, N, DR]

If Yes:

“Is that legal requirement:

- a. “at the state level?” [Y, N, DR]
- b. “at the county level?” [Y, N, DR]
- c. “at the city level?” [Y, N, DR]

12. “Can you please estimate what percentage of developers evaluates the likelihood of flooding for property they consider purchasing for development BEFORE that purchase takes place?” [%, DR]

“Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] floodplain.

13. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] floodplain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]

[Checkbox: mention

- i. “Availability of Flood Insurance
- ii. “Characteristics of the property (size, aesthetics, resources, etc.)
- iii. “Financial considerations (price, loan provisions, down payment, etc.)
- iv. “Flood Risk
- v. “Proximity to shopping, schools, employment
- vi. “Proximity to friends / relatives
- vii. “The surrounding area (businesses, community reputation, etc.)

### Appendix 3: Community Survey, continued

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- viii.
- ix. "Other
- x. "Don't know
- xi. "Refuse"]

For each mentioned:

- a. "Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in a person's decision to purchase or build on property in the [community] floodplain." [1-5, DR]  
[All responses except "Availability of Flood Insurance"]
- b. "And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person's decision to purchase or build on property in the [community] floodplain?" [More, Equal, Less, DR]

"Now, I have a few questions about development in [community].

- 14. "Using a scale from 1 to 5, where 1 is "very unsuccessful" and 5 is "very successful," please tell me how successful you think your community floodplain management program has been in accomplishing the following:
  - a. "Preserving open spaces in [community]?" [1-5, DR]
  - b. "Protecting water quality in [community]?" [1-5, DR]
  - c. "Controlling soil erosion and sedimentation in [community]?" [1-5, DR]
  - d. "Guiding residential development away from locations that are threatened by flood hazards?" [1-5, DR]
  - e. "Guiding business development away from locations that are threatened by flood hazards?" [1-5, DR]
- 15. "Using a scale from 1 to 5, where 1 is "very little" and 5 is "very much," please estimate how much new development has occurred in the [community] floodplain in the past three years. " [1-5, DR]
- 16. "Do you think that growth in the number of seasonal residents, as opposed to year-round residents, moving into [community] is leading to increased development in the floodplains?" [Y, N, DR]  
If Yes:  
"Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of seasonal residents buying or building on property there." [%, DR]
- 17. "Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the floodplains?" [Y, N, DR]  
If Yes:  
"Please estimate as best you can, what percentage of new construction on the floodplains of [community] in the last three years is the result of year-round residents buying or building on property there." [%, DR]

### **Appendix 3: Community Survey, continued**

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[CBRS communities only]

“Part of your community is located in, or near, what is called the Coastal Barrier Resource System.

18. “Is new development occurring in the Coastal Barrier Resource System?” [Y, N, DR]

If Yes:

“Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?” [Do NOT Read List, Mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don’t know; Refuse]

“Finally, I just have a few demographic questions for statistical purposes.

14. “How long have you been professionally involved in floodplain management?” [# years]

15. “How long have you held your present position in [community]?” [# years]

16. “Is there floodplain manager on the staff that administers your program who is certified by a national or state organization?” [Alternatives?]

17. “Do you live in [community]?” [Y, N, DR]

If Yes:

How long have you lived in [community]?” [# years]

18. “Do you have any other comments about the National Flood Insurance Program or flooding in [community]?” [Y, N, DR]

If Yes:

[text from response]

19. “Do you have any questions regarding this study or your rights as a participant?” [Y, N, DR]

If Yes:

“For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433.”

“That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).”

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## **Appendix 4: Interview Protocol for FEMA Regional Environmental Officers**

Official:

Regional Office:

Interview Date:

1. “Are you responsible for implementing both NEPA and EO 11988?”
2. “What staff and other resources do you have available for these tasks?”
3. “Are the resources adequate?”
4. “Do you think FEMA in your Region gives NEPA and the EO sufficient attention and priority?”
5. “Do you work with other agencies during the NEPA and EO process? If so, with which of these agencies do you work with most often?”
6. “Are there occasions when you might work with the NFIP office in the Region during the process of implementing NEPA and EO 11988? Can you describe a typical situation when you would work with the NFIP office? What is NFIP staff expected to do when you work with them?”
7. “EO 11988 requires that FEMA take action through the NFIP, among other programs, to identify and/or minimize adverse impacts and to restore and preserve floodplain values? Do you feel FEMA is able to accomplish this objective with the NFIP? Can you suggest specific actions FEMA has initiated, through the NFIP, to identify and/or minimize adverse impacts and to restore and preserve floodplain values?”
8. “Thinking about NEPA and the NFIP in the Region, do you think that FEMA generally is able to consider the environmental impacts of NFIP?
  - a. “If so, how (and how often) does FEMA do so?”
  - b. “If not, why not?”
9. “Do you think the NFIP in the Region has taken action, in the words of the Water Resources Council, to “reduce to the smallest amount or degree,” potential harm to floodplains?”
10. “Thinking about your experience in the Region again: EO 11988 requires that FEMA's activities should “avoid the floodplain, wherever practicable” and “prevent modification to the natural floodplain environment, or to maintain it as closely as possible to its natural state?” Do you feel this is accomplished during the activities of the NFIP program? If not, why?”
11. “Do you think the NFIP in your Region takes action to discourage development in floodplains)? With what consequences?”

**Appendix 4: Interview Protocol for FEMA Regional Environmental Officers,  
continued**

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12. “Do you think NFIP in your Region provides sufficient support and resources for implementing NEPA and EO when you collaborate with them?”
13. “Do you think headquarters gives sufficient attention and support for the implementation of NEPA and EO?”
14. “Other”:

## **Appendix 5: The National Homeowner Survey Methodology**

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Since the goal of the study is to draw inferences regarding attitudes, beliefs, and risk perceptions regarding floods and flood insurance where it is available, the sample frame is developed to generalize across NFIP communities rather than nationally including areas not within the NFIP. The sample frame therefore is limited to communities participating in the NFIP.

Because the study attempts for the first time to account accurately flood zone status, a critical piece of information in understanding risk perceptions, few data sources were available. The sample thus is drawn from two sources. The first is a database developed by the RAND Corporation as part of the Evaluation of the NFIP for a report on market penetration rates. This dataset provides crucial information on respondent flood zone, which provides an objective measure of risk that would not be available for nonpolicyholders through other means given the budget available. This dataset was merged with several variables including policyholder status. Because this dataset was developed to estimate market penetration rates, for most policyholder strata where there was a low market penetration rate, there were insufficient potential respondents for a survey. This Market Penetration dataset was used for all strata where a sufficient number of potential respondents were found to conduct a survey.

The Market Penetration database was developed in three stages. In the first stage, a stratified cluster sample of 100 communities was created from the approximately 19,200 NFIP communities.<sup>54</sup> Clustering was necessary so that there was a reasonably small number of communities for flood determination agents to visit drawn parcels and make flood zone determinations for the study, as discussed later.<sup>55</sup> From these 100 communities, a random sample of parcels was drawn in the second stage to form a database of 27,667 properties. These parcels were matched with tax identification number of FEMA's BureauNet database of policyholders. They also were assessed by a determination company for their flood zone and distance from any change in NFIP regulatory flood zone, as determined by the determination companies. From this set of properties, a stratified random sample of NFIP nonpolicyholders was drawn for interviews. More details about the development of this sample, can be found in Appendix B.

The characteristics of properties were selected for stratification based on the results of the literature review and focus groups that suggested the importance of policyholder status, location of the community on a coast versus inland, housing occupancy type, and flood zone as primary determinants of risk perceptions. To simplify the stratification, we restricted each characteristic to two strata. For policyholder status, the two strata are simply policyholders and

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<sup>54</sup> At the time of the initial development of the database, only 19,200 communities were in the NFIP. Although several hundred more communities have joined the NFIP at the time of writing, most of these are very small communities with few policyholders. About a third of NFIP communities have fewer than ten policyholders, and many of those have none, generally because residential development has not occurred in the SFHAs. The actual number of communities of real interest to this research is smaller than 19,200.

<sup>55</sup> The clustering contributes to what is called a "design effect," or a difference between the ability to draw inference with this design versus from a random sample drawn across all NFIP communities; although the large number of clusters (100) and stratification helps offset some of the design effect of the sampling approach relative to a random draw from all NFIP communities.

nonpolicyholders. Similarly, for location of the community, the strata are a coastal community versus an inland community.<sup>56</sup>

For flood zones, the V zones, or wave velocity zones, were too small on their own to include as a separate stratum, and so they are combined with A zones as the zone that represents all residences within SFHAs.<sup>57</sup> To simplify the stratification into two strata, we aggregate B, C, X, or D zones since they all represent people outside of a SFHA, or, in the case of the very few D zones found, an unmapped region. For nonpolicyholders, where more addresses were in the sample frame, we were able to limit addresses selected to those within 1,000 feet of the change in flood zone in order to represent those most likely to share similar perceptions of risk to those within SFHAs.

For residential housing occupancy type, we focused on single family-types of structures versus condominium-type residences. This is intended to explore differences in perceptions between condominium and single family houses, since little is found about this issue in the literature and because market penetration rates for condominiums is expected to be lower than for other housing types. Occupancy type is a difficult characteristic for stratification since condominiums technically are a method of financing rather than a unique occupancy type. Condominium financing commonly is associated, however, with multi-unit structures lacking significant land, including apartment-style buildings. The common connotation of condominiums also is apartment-style buildings. We included in the category of condominiums cooperatives and multi-unit buildings with more than three units, and we excluded condominiums above the first floor through a survey question based on the assumption that owners of units on the second floor or higher are unlikely to see flooding as a direct threat. Single family-type structures included single family residences, townhouses or rowhouses, duplexes, and triplexes. Mobile home units and lots were excluded from the analysis. To the extent to which our groupings do not accurately represent residences with different characteristics relative to flood risks, any differences in perceptions and beliefs should be attenuated.

Because the stratification already was very complicated, the team did not further stratify by other characteristics including whether respondents resided at the location. Owners may not reside at the location either because they are absentee landlords, have other family members living there, or use it as a vacation home. The reason for choosing non-residential owners as a group not to stratify was based on the lack of reason from the literature to believe that the attitudes, beliefs, and perceptions of non-residential owners are expected to differ substantively from residential owners. The literature found reason to expect possible differences for all other characteristics on which the sample is stratified.

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<sup>56</sup> Not all residences in coastal communities are immediately on the coast nor are all in V zones. Although there is some reason to believe that people who do not live directly the coast do foresee flooding differently than people in inland riverine communities, we do not have the data to test whether people who live directly on the coast or in V zones have different perceptions. Further, although the expectation is that there would be a difference, there are sufficiently few houses in V zones in general, and without flood insurance specifically, that this does not represent a big new potential market for flood insurance.

<sup>57</sup> The floodzones also do not distinguish among types of zones within a lettered zone (e.g., AO, AH, A1-A50, A99, etc.).

Because the Market Penetration dataset was developed for the purpose of assessing the market penetration of flood insurance, there were insufficient policyholders in most strata to reach targets. A sample of policyholders was drawn from this database for single-family residences in either A or V flood zones. For these other policyholder strata, we use the 100 communities selected into the first stage of the Market Penetration dataset and sample directly from the total population of policyholders available from FEMA's BureauNet Database of flood insurance policyholders. FEMA's BureauNet Database includes flood zone status as well, although if there was a conflict between the flood zone determination made for the Market Penetration dataset and the BureauNet database, we used that found in the Market Penetration dataset.<sup>58</sup>

The initial sample size was chosen to determine a level of difference between groups that suggest substantive differences in preferences or policy states. An initial sample size was chosen to detect differences of about 8 to 10 percent in proportions (conservatively assuming equal proportions) after accounting for the estimated design effect for cross-cutting strata such as all policyholders versus all nonpolicyholders. The initial sample size was chosen in order to try to get 1,600 responses.

Strata were created that represent the most important remaining questions to be answered by the study. The primary characteristics on which strata are formed are policyholder status, flood zone, and housing type. Each of these characteristics were treated so that only two strata would be created. Thus, there are policyholders and nonpolicyholders, people within SFHAs (A or V flood zones from the flood insurance rate maps) or outside of them (B, C, X, or D flood zones), and single family houses and similar detached or semi-detached structures or condominiums or other multi-family units with at least four units.<sup>59</sup> Additional stratification was made when possible within each of those eight strata based on whether the community was located on the coast or inland. Thus, there are 16 individual strata, although they generally are each sufficiently small that the expectation was that they would be aggregated with other strata

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<sup>58</sup> One difficulty in assessing floodzone accurately is that FEMA has grandfathered the rates of some residences that obtain flood insurance when the flood maps indicate they are outside of the SFHA after a map revision indicates they are inside an SFHA. No records are kept when rates are grandfathered. Thus, some residences may have obtained insurance before they were actually mapped as being in a flood zone. When data from the flood determination company indicates a different floodzone from what FEMA records indicate, we rely on the flood determination company's assessment on the assumption that our interest testing the hypothesis that location relative to the floodzone rather than insurance rate price signals for determining beliefs and risk perceptions.

<sup>59</sup> In a few counties, the county did not include information in the occupancy type field. In these cases, we sampled from these counties based only on the other stratifying variables. The actual occupancy type is determined by the respondents' answers.

across a characteristic, such as all policyholders versus all nonpolicyholders, to have sufficient power.

Because some of these strata are small nationally as well as in the actual population of the 100 NFIP communities in the sample, the survey over-samples those strata. The over-sampled strata include all strata with condominium-type structures as well as policyholders in single-family style housing outside of the SFHA and nonpolicyholders in single-family style housing inside the SFHA.

## 10. ACRONYMS

AIR	American Institutes of Research
ASFPM	Association of State Floodplain Managers
BFE	Base Flood Elevation
CATEX	Categorical Exclusion (from environmental review)
CAC	Community Assistance Communication
CAV	Community Assistance Visit
CBIA	Coastal Barrier Improvement Act
CBRA	Costal Barrier Resource Act
CEQ	Council on Environmental Quality
CLOMR-F	Conditional Letter of Map Revision-Fill
CRS	Community Rating System
DHS	U.S. Department of Homeland Security
EIS	Environmental Impact Statement
EA	Environmental Assessment
EHP	Environmental and Historic Procedure
EIS	Environmental Impact Statement
EO	Executive Order 11988
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
FIA	Federal Insurance Administration
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
HUD	U.S. Department of Housing and Urban Development
ISO	Independent Services Office
LOMR-F	Letter of Map Revision-Fill
NEPA	National Environmental Policy Act of 1970
NFIA	National Flood Insurance Act of 1968
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act of 1994
NMFS	National Marine Fisheries Service
PEA	Programmatic Environmental Assessment
REO	Regional Environmental Officer
RPA	Reasonable and Prudent Alternative
SFHA	Special Flood Hazard Area
USFWS	United States Fish and Wildlife Service
USMFS	United States Marine Fisheries Service
WRC	U.S. Water Resources Council
WYO	“[W]rite [Y]our [O]wn” NFIP policies

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## 11. REFERENCES

ASFPM Foundation, Gilbert F. White National Flood Policy Forum. 2004. *Reducing Flood Losses: Is the 1% Chance (100-year) Flood Standard Sufficient?* Washington, DC: Association of Floodplain Managers.

Association of State Floodplain Managers. 2003a. *Floodplain Management 2003: State and Local Programs*. Madison, WI: Association of State Floodplain Managers.

\_\_\_\_\_. 2003b. *Floodplain Management 2003: State and Local Program, Appendix*. Madison, WI: Association of State Floodplain Managers.

\_\_\_\_\_. 2004. *No Adverse Impact Floodplain Management*. Available at [www.floods.org/NoAdverseImpact/whitepaper.asp](http://www.floods.org/NoAdverseImpact/whitepaper.asp).

Baumann, Nancy and Rod Emmer. 1976. "Flood Insurance Community Planning." Working Paper No. 29. Boulder, CO: Institute of Behavioral Science, University of Colorado.

Bingham, Kevin, Mark Charron, Gerald Kirschner, Richard Messick, and Shama Sabade. 2006. *Assessing the National Flood Insurance Program's Actuarial Soundness*. Washington, D.C.: American Institutes for Research.

Berginnis, Chad. 2004. "How the 1% Standard Relates to Protection of Natural and Beneficial Functions of Floodplains," *Gilbert F. White National Flood Policy Forum, 2004 Assembly*. Washington, DC: ASFPM Foundation, 90-92.

Blais, N.C., Nguyen, Y., Tate, E., Dogan, F., Petrow, A., ABSG Consulting Inc. and Mifflin, E., and Jones, C. 2006. *Managing Future Development Conditions in the National Flood Insurance Program*. Washington DC: American Institutes for Research.

Bollens, Scott A., Edward J. Kaiser, and Raymond J. Burby. "Evaluating the Effects of Local Floodplain Management Policies on Property Owner Behavior." *Environmental Management* 12:311-25.

Burby, Raymond J. 2002. "Flood Insurance and Floodplain Management: Issues for Evaluation." *Journal of Environmental Hazards* 3:102-107.

\_\_\_\_\_. March 2006. "Hurricane Katrina and the Paradoxes of Government Disaster Policy," *Annals of the American Academy of Political and Social Science*, 604:171-191.

\_\_\_\_\_, Scott A. Bollens, James Holway, Edward J.Kaiser, David Mullan, and John R. Sheaffer. 1988. *Cities Under Water*. Program on Environment, Technology & Man Monograph #47. Boulder, CO: Institute of Behavioral Science, University of Colorado

Coulton, Kevin G. 2004. "Definition of a Natural—Versus Regulatory—Floodway to Protect Beneficial Floodplain Functions," in *Reducing Flood Losses: Is the 1% Chance (100-year) Flood Standard Sufficient?* Washington, DC: National Academies Keck Center, 93-94.

Conrad, David. 2004. "Are Natural and Beneficial Functions of Floodplains Being Affected By the 1 percent Chance Annual Flood Standard?" in *Reducing Flood Losses: Is the 1 percent Chance (100-year) Flood Standard Sufficient?* Washington, DC: National Academies Keck Center, 87-89.

\_\_\_\_\_. February 2, 2006. *Statement of David R. Conrad: Recommendations for Strengthening the Financial Solvency of the National Flood Insurance Program*. Statement Before the Committee on Banking, Housing, and Urban Affairs, United States Senate. Washington, DC: National Wildlife Federation.

\_\_\_\_\_, Ben McNitt and Martha Stout. 1998. *Higher Ground: A Report on Voluntary Property Buyouts in the Nation's Floodplains*. Vienna, VA: National Wildlife Federation.

Dixon, Lloyd, and Noreen Clancy, Seth A. Seabury, and Adrian Overton. 2006. *The National Flood Insurance Program's Market Penetration Rate: Estimates and Policy Implications*. Santa Barbara, CA: RAND Corporation.

Drew, Christopher and Joseph B. Treaster. May 15, 2005. "Politics Stalls Plan To Bolster Flood Coverage." *New York Times*, A1.

Esformes, Paul. 2005. "Unpublished Evaluation Research on LOMR-F." Washington, DC: American Institutes for Research.

Evatt, Dixie Shipp. 1999a. "Does National Flood Insurance Drive Development?" *Journal of Insurance Regulation*. 17: 497-526.

\_\_\_\_\_. 1999b. *National Flood Insurance Program: Issues Assessment*. Washington, DC: FEMA.

FEMA. No Date. *Integrating Environmental Considerations Into Disaster Mitigation, Planning and Recovery*. Washington, DC.

\_\_\_\_\_. 1983. *The 100-Year Base Flood Standard and the Floodplain Management Executive Order: A Review Prepared for the Office of Management and Budget by the Federal Emergency Management Agency*. Washington, DC.

\_\_\_\_\_. 1986. *NFIP Community Compliance Program Guidance*. Washington, DC.

\_\_\_\_\_. 2002a. *CRS Coordinator's Manual*. Washington, DC.

\_\_\_\_\_. 2002b. *National Flood Insurance Program: Program Description*. Washington, DC.

- \_\_\_\_\_. 2005a. *Flood Insurance Agent's Manual*. Washington, DC.
- \_\_\_\_\_. 2005b. *National Flood Insurance Program Community Rating System: CRS Coordinator's Manual*. Washington, DC.
- \_\_\_\_\_. June 1, 2005c. *Flood Insurance Policy and Claim Statistics*. Washington, DC. Available at [www.fema.gov/nfip/pcstat.shtml](http://www.fema.gov/nfip/pcstat.shtml)
- \_\_\_\_\_. 2005d. *Integrating Environmental Considerations into Disaster Mitigation, Planning and Recovery*. Washington, DC.
- \_\_\_\_\_. June 1, 2005e. *Policy Statistics by State as of 9/30/2004*. Washington, DC. Available at <http://www.fema.gov/nfip/10110409.shtm>
- \_\_\_\_\_, Federal Insurance and Mitigation Administration, Hazards Study Branch. 2001. *Modernizing FEMA's Flood Hazard Mapping Program: Recommendations for Using Future-Conditions Hydrology for the National Flood Insurance Program*. Washington, DC.
- \_\_\_\_\_, National Flood Insurance Program. 2004. *Flood Insurance: Total Coverage By Calendar Year: 2003*. Washington, DC. Available at <http://www.fema.gov/nfip/fy03cov.shtm>
- \_\_\_\_\_, Office of the Inspector General. 2001. *Coastal Barrier Resources System: FEMA's Management Controls Governing the Prohibition of Flood Insurance*. Washington, DC: FEMA.
- \_\_\_\_\_, Office of the Inspector General, Inspections Division. 2002. *Community Rating System: Effectiveness and Other Issues*. Washington, DC: FEMA.
- \_\_\_\_\_, Region Five. 2005f. *Environmental and Historic Preservation Review Process*. Available at [http://www.fema.gov/regions/v/env/env6\\_1.shtm](http://www.fema.gov/regions/v/env/env6_1.shtm)
- Florida Insurance Council. June 1, 2005. "2004 Hurricane Season: Key Facts From Florida's 2004 Nightmare Hurricane Season." Available at [www.flains.org/public/hc\\_keyfacts930.html-ssi](http://www.flains.org/public/hc_keyfacts930.html-ssi)
- Friends of the Earth. 1998. *Flood Funding Fiasco: National Flood Insurance Program*. Washington, DC.
- Galloway, Gerald E., Jr. 1994. "Floodplain Management: A Present and a 21<sup>st</sup> Century Imperative," in Universities Council on Water Resources, Water Resources Update, *Sharing the Challenge: The Next Step*, 97: 4-8.
- \_\_\_\_\_; Gregory B. Baecher, Douglas Plasencia, Kevin Coulton, Jerry Louthain, Mohamed Bagda, and Antonio R. Levy. 2006. *Assessing the Adequacy of the National Flood Insurance Program's 1 percent Flood Standard*. College Park, MD: Water Policy Collaborative, University of Maryland.

H. John Heinz III Center for Science, Economics, and the Environment. 2000a. *Evaluation of Erosion Hazards*. Washington, DC: FEMA.

\_\_\_\_\_. 2000b. *The Hidden Costs of Coastal Hazards: Implications for Risk Assessment and Mitigation*. Washington, DC: Island Press.

Interagency Floodplain Management Review Committee. 1994. *Sharing the Challenge: Floodplain Management in the 21<sup>st</sup> Century*. Washington DC: Government Printing Office.

Interagency Task Force on Floodplain Management. 1979. *A Unified National Program for Floodplain Management*. Washington, DC: FEMA.

John, David C. December 13, 2005. "Fix the National Flood Insurance Program to Reduce Future Losses." *Heritage Foundation Web Memo #936*, at [www.heritage.org/Research/Regulation/wm936.cfm](http://www.heritage.org/Research/Regulation/wm936.cfm)

Jones, Christopher P., Coulbourne, William L., Marshall, Jamie and Rogers, Spencer M. Christopher Jones and Associates. 2006. *Evaluation of the National Flood Insurance Program's Building Standards*. Washington, DC: American Institutes for Research.

KRC Research and Consulting. 1995. Qualitative Research Report: In-depth Interview with Community Officials, Lenders, Realtors, and Advisory Board Committee Members.

KRC Research and Consulting. 1996. Qualitative Report Focus Groups: Apathetics And Proactives.

KRC Research and Consulting. 1998. Agent quantitative survey results.

KRC Research and Consulting. 1999. Quantitative Evaluative Report IX.

Kriesel, Warren, and Craig Landry. 2000. *Modeling the Decision to Buy Flood Insurance: Results From 62 Coastal Communities*. Paper Presented at the American Agricultural Economics Association Annual Meeting, Tampa, Florida.

\_\_\_\_\_. 2004. "Participation in the National Flood Insurance Program: An Empirical Analysis of Coastal Properties." *Journal of Risk and Insurance*. 71(May): 405-420.

\_\_\_\_\_, and Andy Keeler. Undated. *Coastal Erosion Hazards: The University of Georgia's Results*. Working paper. Athens, GA: College of Agricultural and Environmental Science, University of Georgia.

National Research Council, Committee on Coastal Erosion Zone Management. 1990. *Managing Coastal Erosion*. Washington, DC: National Academy Press.

- Norton, Richard K. March, 2005. "Striking the Balance between Environment and Economy in Coastal North Carolina." *Journal of Environmental Planning and Management*. 48: 177-207.
- Pasterick, Edward T. 1998. "The National Flood Insurance Program," *Paying the Price: The Status and Role of Insurance Against Natural Disasters in the United States*, ed. Howard Kunreuther and Richard J. Roth. Washington, DC: John Henry Press.
- Pew Oceans Commission. 2003. *America's Living Oceans: Charting a Course for Change*. Arlington, VA.
- Pielke, Jr., R.A., M.W. Downton, and J.Z. Barnard Miller. 2002. *Flood Damage in the United States, 1926-2000: A Reanalysis of National Weather Service Estimates*. Boulder, CO: University Center for Atmospheric Research. Available at [www.flooddamkagedata.org/data/national.cgi](http://www.flooddamkagedata.org/data/national.cgi)
- Plasencia, Douglas. 1994. "Sharing the Challenge: Future Impacts and Next Steps," in Universities Council on Water Resources, Water Resources Update. *Sharing the Challenge: The Next Step*. Issue No. 97: 14-16
- PricewaterhouseCoopers. May 14, 1999. *Study of the Economic Effects of Charging Actuarially Based Premium Rates for Pre-Firm Structures*. Executive Summary. Washington, DC.
- Randall, Martin M. Spring 2003. "Coastal Development Run Amuck: A Policy of Retreat May Be the Only Hope." *Journal of Environmental Law and Litigation*. 18: 145-185.
- Rosenbaum, Walter A. 2005. *A Review of Literature Relevant to Identifying, Describing, and Explaining the Developmental and Environmental Impacts of the National Flood Insurance Program*. Washington, DC: American Institutes for Research.
- Ross, Tom and Lott, Neal. 2003. *A Climatology of 1980-2003 Extreme Weather and Climate vents*. Technical Report 2003-01. Washington, DC: National Climatic Data Center.
- Schauerte, C.M. 1990. Certification Requirements for Simple Floodway Encroachments. Memorandum for FEMA Regional Directors from the FIA Administrator, Washington, DC, October 31, 1990.
- Shapiro, Marc, Chris Evensen, Nina Aggarwal, Michael Burke, and Marion Chastain, November 2006. *Flood Risk Perceptions and Flood Insurance*." Washington, DC: American Institutes for Research.
- Task Force on the Natural and Beneficial Functions of the Floodplain. 2002. *The Natural and Beneficial Functions of Floodplains*. Washington, DC: FEMA.
- Tuggle, Benjamin. July 28, 2005. *Written testimony of Dr. Benjamin Tuggle, Acting Special Assistant to the Director, U.S. Fish and Wildlife Service, Department of the Interior, before the House Resources Subcommittee on Fisheries and Oceans regarding H.R. 3522 to reauthorize the*

*Coastal Barrier Resource Act*. Available at <http://resourcescommittee.house.gov/archives/109/testimony/2005/benjamintuggle.htm>

University Corporation for Atmospheric Research. 2003. *Flood Damage in the United States, 1926-2003: A Reanalysis of National Weather Service Estimates*. Available at <http://www.flooddamagedata.org/index.html>.

U. S. Commission on Ocean Policy. June 7, 2004. *An Ocean Blueprint for the 21<sup>st</sup> Century*. Washington, DC. Available at [www.oceancommission.gov/documents/full\\_color\\_rpt/welcome.html](http://www.oceancommission.gov/documents/full_color_rpt/welcome.html)

U.S. Congress, House of Representatives, Committee on Banking and Currency. October 15, 1967. *National Flood Insurance Act of 1967: Report of the Committee on Banking and Currency on S. 1985*. Document No. 85-242, 90<sup>th</sup> Congress, First Session.

\_\_\_\_\_, Senate, Committee on Banking and Currency. August 29, 1967. *National Flood Insurance Act of 1967: Report of the Committee on Banking and Currency to Accompany S. 1985*. Document No. 85-010, 90<sup>th</sup> Congress, First Session.

\_\_\_\_\_, Task Force on Federal Flood Control Policy. 1966. *A Unified National Program for Managing Flood Losses*. House Document 465, 89<sup>th</sup> Congress, 2<sup>nd</sup> Session.

U.S. National Oceanic and Atmospheric Administration, National Climatic Data Center. 2003. *A Chronology of 1980-2003 Extreme Weather and Climate Events: Billion Dollar Climate and Weather Disasters*. Technical Report 2003-01. Asheville, NC: National Climatic Data Center.

\_\_\_\_\_, National Environmental Satellite Data Information Service, National Climatic Data Center. 2004. *Flood/Flash Flood, Lightning, Tornado, Hurricane: 2003 Annual Summaries*. Asheville, NC: National Climatic Data Center.

\_\_\_\_\_, National Weather Service, Office of Climate, Water, and Weather Services. 2004. *Natural Hazard Statistics: Weather Fatalities*. Available at <http://www.nws.noaa.gov/om/hazstats.shtml>

U.S. Department of the Interior, Fish and Wildlife Service. 2002. *The Coastal Barrier Resources Act: Harnessing the Power of Market Forces to Conserve America's Costs and Save Taxpayers' Money*. Washington, DC: Fish and Wildlife Service.

U.S. General Accounting Office. 1992. *Coastal Barriers: Development Occurring Despite Prohibitions Against Federal Assistance*. Report No. GAO/RCED-92-115. Washington, DC: GAO.

\_\_\_\_\_. January 25, 2006. *Federal Emergency Management Agency: Challenges for the National Flood Insurance Program*. Report No. GAO-06-335T

U.S. Water Resources Council. 1978. *Floodplain Management Guidelines for Implementing EO 11988*. Washington, DC: FEMA.

Wetmore, French. September 11, 2006. *A Recipe for Rebuilding and Mitigation in New Orleans: Summary*. Available at [www.floods.org/PDF/FrenchWetmore\\_Recipe\\_for\\_Rebuilding\\_090705.pdf](http://www.floods.org/PDF/FrenchWetmore_Recipe_for_Rebuilding_090705.pdf)

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