AMERICAN INSTITUTES FOR RESEARCH®

An Evaluation of Compliance with the National Flood Insurance Program Part B:

Are Minimum Building Requirements Being Met?

Margaret L. Mathis and Suzanne Nicholson

Dewberry

October 2006

Prepared under subcontract to the American Institutes for Research
as part of the 2001–2006 Evaluation of the National Flood Insurance Program

This page left intentionally blank

An Evaluation of Compliance with the National Flood Insurance Program Part B:

Are Minimum Building Requirements Being Met?

Prepared as part of the 2001-2006 Evaluation of the National Flood Insurance Program

Margaret L. Mathis and Suzanne Nicholson

Dewberry

October 2006

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.

The research described in this report was funded with Federal funds from the Federal Emergency Management Agency under contract # 282-98-0029 and under subcontract to the American Institutes for Research. The content of this publication does not necessarily reflect the views or policies of the Federal Emergency Management Agency, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

In designing and executing this study, Dewberry tapped its extensive floodplain management, flood hazard analysis and mapping, flood mitigation, and disaster response and recovery experience gained through 30 years supporting FEMA and its partners. This experience has provided Dewberry with an uncommon understanding of the programs, practices, and policies governing the National Flood Insurance Program (NFIP) and how they interrelate to activities conducted by state and local governments.

This study contributes to the overall NFIP evaluation by developing estimates of the level of compliance with the NFIP minimum building requirements and increases our understanding of what are the most common violations and what factors explain the differences in levels of compliance between communities, flood zones, building types, and similar factors.

For additional information about this study or Dewberry's NFIP experience, contact:

Margaret L. Mathis, CFM
Dewberry
8401 Arlington Boulevard
Fairfax, Virginia 22031-4666
Phone: (703) 849-0330
E-mail: mmathis@dewberry.com

BIOGRAPHICAL INFORMATION ON REPORT AUTHORS

Margaret L. Mathis is the Department Manager at Dewberry responsible for program support activities within Dewberry's Hazard Engineering Resources Department. She has in-depth knowledge of floodplain management regulations and procedures, gained through working on FEMA's flood hazard mapping program for over 20 years. Her experience has included a broad spectrum of assignments including flood study development; interpretation and implementation of NFIP floodplain regulations, policies, and procedures; and development of outreach strategies to improve dissemination of information to NFIP communities and property owners. She has also supported FEMA and its state partners in developing processes to improve map adoption and community compliance. Ms. Mathis also provides consulting services to clients on the Community Rating System and adoption of higher NFIP regulatory standards. She is a graduate of the University of Maryland, with a B.S. in Geography.

Suzanne Nicholson is a Senior Technical Writer at Dewberry. She has over 11 years experience researching, writing, and editing reports in support of FEMA and the NFIP, including the *Mitigation Assessment Team Report: Hurricane Ivan in Alabama and Florida* (FEMA 489), FEMA's "Project Impact Tool Kit," and many documents in support of FEMA's Map Modernization Plan. Prior to joining Dewberry, Ms. Nicholson was Rhetoric professor at Southern Methodist University and a professor of composition and developmental studies at Brookhaven College. She is a graduate of the University of Texas at Dallas with an M.A. in Humanities.

TABLE OF CONTENTS

ACKNOWLEDGMENTS

Appreciation is extended to the many professionals who took their time to review and provide insights and observations on earlier drafts of this report. Thanks are due in particular to Michael Robinson formerly of FEMA for his help in developing the compliance categories used in this report and for his review and comments on the findings. His thoughtful comments on the noncompliance with the NFIP building requirements found in this study and how it contributes to damages during the base flood formed the basis of much of the discussion included in the *Results by Compliance Classification Categories* section of this report.

An immense amount of data was collected for this study, and the study would not have been successful without the hard work of the Dewberry project team including David Burkholder, Kelly Clemmensen, Lisa Turcios, John Graves, Scott Weber, Richard Nash, and Kaveh Zomorodi.

A sincere thank you also goes out to Claudia Murphy of FEMA and Marc Shapiro, the current project director for the NFIP evaluation at AIR for their detailed comments on the report and for their help moving the study to completion.

EXECUTIVE SUMMARY

Background

In 2000, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) contracted with the American Institutes for Research (AIR) to perform a comprehensive evaluation of the National Flood Insurance Program (NFIP). As part of the evaluation, FEMA tasked AIR with conducting a comprehensive nationwide assessment of compliance with the NFIP minimum floodplain management regulations as set forth in Title 44, Section 60.3, of the *Code of Federal Regulations* (44 CFR §60.3). That assessment has been completed through two coordinated studies.

Study Part A, prepared by AIR, assesses the processes for ensuring community compliance with NFIP regulations. The areas of inquiry include the NFIP's approach to training and technical assistance; the effectiveness of tools for monitoring community compliance, and defining and remedying violations; the roles of FEMA's headquarters and regional offices, and state floodplain management agencies in supporting the NFIP; the capabilities of communities to identify and address violations; and the appropriateness of sanctions for noncompliance.

Study Part B, prepared by Dewberry under subcontract to AIR, quantitatively addresses the percentage of buildings located in FEMA designated Special Flood Hazard Areas (SFHAs)[1] – that are in compliance with the NFIP's floodplain management regulations, especially those regulations related to construction standards. Specifically, this study examined a subset of the buildings in SFHAs; notably recent[2] construction that has occurred after the date FEMA had produced a Flood Insurance Rate Map (FIRM) for the area in which the building is located[3]. Study Part B seeks to identify those floodplain management regulations that have the highest and lowest rates of compliance and what factors explain the differences in levels of compliance between communities, flood zones, building types, and similar factors.

Floodplain management regulations that meet minimum NFIP standards have been adopted by over 20,000 communities nationwide. These regulations are designed to prevent new development from increasing the flood threat and to protect new and existing buildings from anticipated flooding. In exchange for adoption and continued enforcement of the regulations, flood insurance is made available to communities, their property owners and renters.

---

[1] The SFHA is the area that is predicted to be inundated by the flood events having a 1-percent or greater chance of being equaled or exceeded in any given year. The SFHA, which is shown as either an A Zone or V Zone, is identified on a Flood Hazard Boundary Map or Flood Insurance Rate Map prepared by FEMA.

[2] In this context, recent construction is defined as construction that has occurred since January 1, 1990.

[3] Buildings constructed or substantially improved after the effective date of the initial FIRM for the area in which the building is located, or after December 31, 1974, whichever is later are referred to as Post-FIRM buildings.

In general, communities participating in the NFIP must require permits for all new development in the SFHA; elevate the lowest floor of all residential buildings[4] in the SFHA to or above the Base Flood Elevation (BFE); restrict development in the regulatory floodway[5]; ensure that construction materials and methods used will minimize future flood damage; and treat substantially improved structures[6] as new buildings that must meet the minimum NFIP standards.

The success of the NFIP depends on communities' ensuring that buildings and other development within their jurisdictions are constructed and maintained according to these standards so that flood losses will be minimized. If communities do not elect to participate in the program or if they do so but fail to adequately enforce the standards, then lives and property are placed in harm's way; buildings will suffer unnecessary flood damage; the NFIP's actuarial soundness will be jeopardized; and the costs to society from future floods will be increased unnecessarily. The NFIP has an added dimension that encourages the thoughtful placement of new development and compliance with the NFIP regulations. Notably, flood insurance premiums are based on the flood zone in which the building is located and the elevation of the building in relation to the BFE. The effect of this differential rate structure is to provide an incentive to increase the level of safety of buildings beyond the minimum standards by giving significant financial benefits to building at higher elevations and in less hazardous flood zones.

As discussed in Study Part A, there has never been a comprehensive nationwide assessment of compliance with the NFIP regulations. Although participating communities are monitored individually on a regular, though fairly infrequent basis, the question of how well the NFIP is being administered across the United States, and what proportion of flood prone buildings are built to the program's standards has been unanswered. The data collected through this study allow observations to be drawn about the level of compliance among a subset of NFIP communities, notably those located in areas where current and future floodplain development and flood risk is greatest and where success in achieving compliance with the NFIP regulations is most important.

The summary that follows describes the research methods used in this evaluation, presents selected results and conclusions, and lists the recommendations growing out of this study.

---

[4] In meeting the NFIP regulations, residential buildings are required to be elevated to or above the BFE, while non-residential buildings have the option of being either elevated or floodproofed to the same level.

[5] The regulatory floodway is the area identified on a FIRM or a Flood Boundary Floodway Map that represents the portion of the floodplain that carries the majority of the flood flow and often is associated with high velocity flows and debris impact. The floodway represents the channel of a river or watercourse and the adjacent land areas that must be reserved to discharge the one-percent annual chance flood without cumulatively increasing the water surface elevation more than a designated height, generally one foot.

[6] "Substantial improvement" is defined in 44 CFR §59.1 as "any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the 'start of construction' of the improvement.

Method

The first stage of the sampling process used in this study included the purposive identification of geographic areas made up of either a metropolitan area or a group of closely located counties or communities (referred to herein as "clusters") with large concentrations of post-FIRM buildings. This non-random approach to selection of the clusters was necessary to fit the available budget and ensure that the sample was representative of areas of the country where a preponderance of NFIP post-FIRM policies are found. Large, fast-growing communities as well as smaller tourist destinations along the coasts are represented in the sample frame because a high percentage of the post-FIRM construction is occurring in these areas. From an original sample frame that included eighteen cluster areas, ten clusters were chosen. These clusters represent the predominant types of flooding experienced by NFIP communities; in addition, they are geographically and economically diverse and include areas with high growth rates both in terms of population and the number of post-FIRM policies. A community selection process was used to develop a viable list of communities within each cluster, and from this list the communities to be studied were selected randomly. Fifty communities ultimately were included in Study Part B.

All or most of the post-FIRM buildings constructed after January 1, 1990[7] (both insured and uninsured) located within SFHAs studied by detailed methods (i.e., for which FEMA had established BFEs or flood depths) of each candidate community were identified. From the comprehensive list of buildings, 35 to 45 candidate buildings suitable for survey in each community were selected randomly; ultimately, approximately 25 buildings in each community were physically surveyed.

The data collection approach included an administrative survey – an inspection of the community's permit files – and an elevation and building inspection survey. The objective of the administrative survey was to review community record keeping and retention as it relates to the construction of buildings in SFHAs, and the objective of the elevation and building inspection survey was to determine if buildings built within the surveyed communities had been built to minimum NFIP standards.

The results should be considered suggestive of results that would be found among communities and buildings that fit the study criteria[8]. The presentation of results breaks down the compliance problems encountered to distinguish between different types of factors that may or may not put a building's structure substantially at risk of damage in a 1-percent annual chance flood.

---

[7] The January 1, 1990 date was set to ensure an adequate sample of buildings in most communities and allow comparison of changes in floodplain management practices over a 14-year time period.

[8] The communities selected are predominantly rapidly-growing coastal communities on the Atlantic, Gulf, and West coasts and inland communities in the Southwest and along the Mississippi River. Buildings included in the study are post-FIRM buildings constructed after January 1, 1990 in detailed SFHAs. Buildings both insured and uninsured by a flood insurance policy are included.

Results and Conclusions

This study addressed a series of research questions aimed at identifying the most common violations of the floodplain management regulations, where they were most common, and possible explanations for the differences in levels of compliance between communities, flood zones, building types, and similar factors. The results of those most salient questions follow.

Overall rate of floodplain development compliance:

Of the 1,253 buildings physically surveyed, 63 percent were found to be in full compliance with all of the building requirements of the NFIP. Generalizing up to what would be expected if all buildings in the clusters of communities meeting the selection criteria were surveyed, we estimate at a 95 percent confidence interval that between 58 and 70 percent of the buildings would be found to be in full compliance. These percentages, however, must be put into context. Of the buildings surveyed, few are at risk of suffering significant damage during base flood conditions; notably, because communities are generally successfully meeting the elevation requirements of the program. This success is illustrated by the fact that 89 percent of all buildings surveyed have their lowest floor at or above the BFE or within 6 inches of that elevation. In terms of damage reduction, ensuring that the lowest floor is elevated to or above the BFE is significant and results in minimizing flood insurance claims and federal disaster assistance. Again, generalizing up to what would be expected if all buildings meeting the selection criteria were surveyed across these clusters of communities, we estimate at a 95 percent confidence interval that between 86 and 94 percent of the buildings would have their lowest floor at or above the BFE or within 6 inches of that elevation. The 89 percent is comprised of the following:

- 63.1 percent of the buildings found to be in full compliance with all of the regulatory building requirements of the program
- 9.3 percent of the buildings with mechanical and utility equipment located below BFE but are fully compliant with the lowest floor elevation requirement
- 9.3 percent of buildings with openings that do not meet the openings requirement at 44 CFR §60.3(c)(5) but are otherwise fully compliant
- 3.8 percent with multiple noncompliance issues but are compliant with the elevation requirement
- 1.4 percent with their lowest floor within 6 inches of the BFE
- 1.9 percent with their lowest floor within 6 inches of the BFE and other instances of noncompliance

Of further note, in addition to the 89 percent of buildings found to have been built to the BFE or within 6 inches of that elevation, an additional 4.3 percent have their main working\living floors above BFE but have finished enclosures or basements below the BFE. The buildings with noncompliant finished enclosures typically had the majority of the area

under the elevated floor reserved for parking but in each case had an enclosed finished room with non-flood resistant materials and furnishings. The noncompliant basements found were one to three feet below BFE and not likely to experience damages due to hydrostatic pressure[9] during base flood conditions. For these reasons, as well as, limitations on flood insurance coverage for basements and noncompliant finished enclosures, the claims on these buildings would be much lower than for buildings with lowest floor violations at the same elevation.

Most common violations found:

The most common violations found were mechanical and utility equipment located below the BFE and openings that do not meet the openings requirement at 44 CFR §60.3(c)(5). Between them, these two types of violations account for 50.6 percent of the violations found within our sample. The regulations governing mechanical and utility equipment and openings are technically the most difficult to apply and enforce. Further, although these items can be compliant when a building is built, they can be modified later by the property owner without the community's knowledge. For these reasons, it is difficult to determine if the violations found are the result of misunderstandings concerning the requirements by local officials, willful disregard, less importance or focus placed on ensuring that the requirements are met, or lack of enforcement.

Variation in compliance by geographic region:

The results show that geography affects level of compliance only modestly. The analysis suggests that rates of compliance are better in the Southwest and lower on the West Coast of the US. It is speculated that some differences in rates of compliance are attributable to the prevailing building construction method found within the region. Generally higher rates of compliance were observed in communities with primarily slab-on-grade construction and lower rates in communities that use various types of elevated foundations.

Effect of community size and economic resources on compliance:

At the start of this study, it was anticipated that better levels of compliance would be found in larger communities with large areas of their community located within flood hazard areas and more economic resources. This assumption was based on the premise that more economic resources would be available within the community to support full-time floodplain management staff and more resources would be devoted to outreach and public education. It was further surmised that because FEMA and its state partners put the vast majority of their resources and effort into promotion of compliance within communities with the greatest number of flood insurance policies in an effort to protect the financial stability of the Flood Insurance Fund, better levels of compliance would be found in the larger communities within the sample. This study found little evidence of a strong relationship between the size or economic resources of the community and the number of compliant buildings.

[9] Solid walls can collapse if floodwaters get too deep. To prevent collapse the enclosure must have openings to allow floodwaters to enter and exist, thus automatically equalizing hydrostatic flood forces on the walls.

Compliance variation by the source of flooding—coastal or riverine:

Generally, the analysis showed that no significant difference exists in the rate of compliance between buildings affected by coastal versus inland flooding[10].

Compliance in Community Rating System (CRS)[11] and non-CRS communities:

Although one would expect to find better rates of compliance among communities participating in the CRS which is a voluntary incentive program that encourages communities to perform floodplain management activities that exceed the NFIP's minimum requirements in exchange for reduced flood insurance premiums, there is no evidence to support this expectation. The exception is that fewer lowest floor (Zone AE) and Lowest Horizontal Structural Member (Zone VE) violations are found in the CRS than non-CRS communities.

Issuance of building permits, ensuring lowest floor and "as-built" elevations are at or above BFE, and document retention:

In general, this study found problems with record keeping and retention by communities. As a result, it is unclear to what degree communities are meeting the 44 CFR §60.3 requirement[12] to issue building permits for all development in the SFHA, if they are commonly ensuring that the proposed lowest floor and "as-built" elevations (after construction has been completed) are at or above BFE, and if they obtain and retain documentation of design and construction methods. Although Elevation Certificates or equivalent data are available more widely among the CRS communities than NFIP communities not in the CRS, they nonetheless do not reach rates expected for CRS communities.

Compliance variation by flood zone:

Generally our analysis showed a significantly better rate of compliance in Zone AO than in other flood zones. Elevations associated with Zone AO are represented on the FIRM as whole foot elevations. It is theorized that the existence of a whole foot flood depth or elevation that is clearly identified on the FIRM may increase the accuracy of the flood elevation determined and placement of fill or the lowest floor. While on a whole there is no evidence of significant differences in rates of compliance other than in AO Zones, there is mild evidence to suggest that

---

[10] Coastal flooding includes flooding from any body of water subject to tidal fluctuations. Coastal communities may or may not include "V" flood zones. V Zones are areas that are inundated by tidal floods with velocity waters and breaking waves.

[11] Any community participating in the NFIP may join the CRS provided that the community is in full compliance with the NFIP's minimum requirements and that it makes a commitment to perform a minimum number of additional floodplain management activities. As a basic requirement, CRS communities must keep permit files that include Elevation Certificates for all structures built, substantially damaged, or substantially improved in the SFHA since the community entered the CRS.

[12] Communities participating in the NFIP must require permits for all new development in the SFHA. Further they must ensure the lowest floor of residential buildings be at or above BFE and that the building be constructed to withstand flood damage. Standard documentation including a development permit, FEMA Elevation Certificate or equivalent "as-built" elevation data, and information regarding the construction methods are to be retained by the community indefinitely.

VE Zone has a higher fraction of buildings where the elevation requirements of the program have not been met than found in the other flood zones.

Variation in compliance between buildings uninsured and insured by the NFIP:

Buildings carrying and not carrying NFIP flood insurance (insured and uninsured buildings) were included in this study to help ascertain if flood insurance may have been dropped for structures where serious violations may have resulted in high flood insurance premiums. Marginally significant evidence was found of a relationship between lower compliance and uninsured buildings.

Compliance over time:

Study B compares results by compliance category for three segments of time: 1990 to 1995, 1996 to 2000, and 2001 to 2004. The analysis shows a significant increase in the percentage of fully compliant buildings from the earliest to the most recent time period.

Method of construction of buildings and compliance:

In general, there are higher rates of compliance in communities with primarily slab-on-grade construction (construction on a concrete slab that is installed on compacted or natural soil) and lower rates in communities that use various types of elevated foundations.

Building type (commercial, manufactured homes, or other residential structures) and compliance:

Higher levels of compliance were observed in townhomes/rowhouses and in public buildings. Poor compliance was found in manufactured homes. Within the manufactured buildings, there was a high occurrence of electrical and mechanical below the BFE. These were primarily air conditioning condensers found at grade.

In conclusion, as discussed in Part A of this study, *Achieving Community Compliance,* (Monday *et al*., 2006) and in latter sections of this report , the NFIP's success is based on two conditions. The first is that communities will choose to participate in the program and, therefore, will adopt and agree to enforce floodplain management ordinances established under authority of the National Flood Insurance Act, as amended. The incentive for such participation, and all that it entails, is the availability of flood insurance for the community and its property owners.

Second, once a community begins participating in the NFIP, it is assumed that it administers and enforces its ordinance in such a way that development in its floodprone areas meets the local (and NFIP) standards and, thus, is protected from future flood damage. If either condition is not met—if communities do not elect to participate in the program or if they do so but fail to adequately enforce the standards – lives and property are placed in harm's way; buildings will suffer unnecessary flood damage; the NFIP's actuarial soundness is jeopardized; public policies and regulations in floodplains may be based on unreliable data; and the costs to society from future floods will be increased unnecessarily. In short, a high level of continuous compliance with the NFIP standards is crucial to the program's success. Thus, the question of the extent and nature of compliance and noncompliance is an important element of any assessment of the NFIP and must be continually monitored.

Recommendations

The $1.1 billion in estimated flood damages prevented annually due to reduced frequency and severity of losses[13] resulting from enforcement of floodplain management regulations provides testament to the successful implementation of many of the NFIP's floodplain management measures. However, the data gathered through this study point to the need for greater focus on enforcement and additional training and technical guidance in several areas. In addition, this study identified widespread problems with community record keeping and retention related to construction of buildings in the nation's SFHAs.

Recommendations for improving the specific deficiencies identified through Part B of the Evaluation of Community Compliance follow. These recommendations include specific actions that communities can take to improve compliance as well as actions FEMA and its state partners can take to promote improved compliance.

Community Compliance Part B Recommendation #1 (CCB1): Adoption of freeboard should be strongly promoted

The prevalence of lowest floor (Zone AE) and LHSM (Zone VE) violations, and noncompliant buildings found to be within 6 inches of the BFE, reinforces the advisability of communities or states adding a requirement for freeboard rather than meeting the minimum requirement that the top of the floor be built at BFE. Freeboard is the additional height requirement above the BFE that provides a factor of safety against flooding and wave run-up. The benefits of adopting freeboard should be widely promoted through training, FEMA and community websites, and in technical publications. Communities should be strongly encouraged to codify the requirement in their local ordinances.

CCB#2: Promote frequent verification inspections during construction

One of the most effective ways to ensure compliance with the NFIP building standards, as well as higher standards such as freeboard requirements that a community may have adopted, is to inspect the site frequently during construction. Errors in the elevation of the lowest floor are most easily found and corrected in earlier phases of construction, while detection of errors in the placement of electrical and mechanical equipment is not possible until later in the construction process. An inspection program also puts builders, developers, and property owners on notice that the community will insist that projects are completed in compliance with the regulations.

CCB#3: Perform periodic checks to ensure that the property continues to remain in compliance

Communities should periodically check to ensure that the property continues to remain in compliance over time. Later inspections are particularly important when a building has an enclosure below the lowest floor. Such areas can be easily modified into habitable fully furnished space in violation of the NFIP regulations creating safety hazards. This study

[13] Source: FEMA website http://www.fema.gov/plan/prevent/floodplain/How_the_NFIP_works.shtm.

identified 30 noncompliant finished enclosures. Many are surmised to have been converted to habitable fully finished living space without community consent.

CCB#4: A concerted effort is needed to focus greater attention on community permit file record keeping and retention

Strong adherence to a floodplain management program that requires permits for all floodplain development, monitors construction as it takes place as well as periodically over time to ensure continued compliance with the NFIP requirements or the community's own higher standards, and ensures adequate documentation of those activities, benefits the NFIP compliance program in two ways. First, it allows FEMA and its state partners involved in community monitoring activities to quickly assess the adequacy of the community's program and direct limited resources towards communities with the greatest needs. Second, good records show what was approved, forming a "paper trail" needed for administrative or legal proceedings when buildings are found to be in violation of the community's ordinance. Improvements in this area may be brought about by having FEMA regional offices, FEMA state partners, and Insurance Services Office, Inc. (ISO)[14]/CRS personnel focus greater attention on the record keeping requirements of the program during contacts with communities.

CCB#5: FEMA should consider revising the opening requirements found in 44 CFR 60.3 (c)(5) for buildings in coastal AE zones with non supporting breakaway walls.

The FEMA 2000 *Coastal Construction Manual* recommends that buildings in Coastal AE zones[15] be constructed to be more resistant to coastal flood forces. Further, the nation's private sector building code organizations and consensus standards groups (i.e., IBC, IRC, NFPA 5000, ASCE 7, ASCE 24) recognize the Coastal AE zone hazard and require appropriate design and construction requirements similar to those established for VE zones under the NFIP. Nonetheless, the Coastal AE zone, has yet to be included in the NFIP regulations. At present, buildings in Coastal AE zones constructed to Zone VE standards that include non supporting breakaway walls below the lowest floor and do not also have openings that meet the openings requirements of 44 CFR 60.3(c)(5) are considered noncompliant. Thirteen of the noncompliant buildings identified by this study as having insufficient openings are pile and column buildings that appear to be built to Zone VE standards in Zone AE. It is recognized that a regulatory change does not happen without great deliberation. Until such time as a regulatory change might be implemented, FEMA should issue clear guidance regarding the opening requirement in breakaway walls in coastal AE zones.

---

[14] The CRS is administered jointly by FEMA and ISO personnel. On behalf of FEMA, ISO reviews and scores community applications and conducts regular visits with communities to verify activities are being implemented as described in their application.

[15] The Coastal Construction Manual identifies a new hazard zone called a Coastal A zone, that is not included in the NFIP regulations. Coastal A zones are those areas located landward of an open coast with or without mapped V Zones where the principal sources of flooding are tides, storm surges, seiches or tsunamis instead of riverine sources. Coastal A Zones are subject to wave effects, velocity flows, erosion, scour, and all combinations of the above. These areas are expected to receive 1½ - 3 foot breaking waves during a 100-year event.

CCB#6: FEMA should continue its support of training for local staff, state training requirements, and certification of local floodplain managers.

It is impossible to know if the instances of noncompliance found in this study are the result of misunderstandings concerning NFIP requirements by local officials, willful disregard, less importance or focus placed on ensuring that certain requirements are met, or lack of enforcement once violations are found. Nonetheless, it is widely believed that most communities and individuals are willing to abide by technical standards set for the program and that public servants are interested in protecting people and their property. With the latter premise in mind, it is surmised that community compliance could be improved by making more resources available for both FEMA and the states to increase staff levels and travel support, and to produce and deliver more workshop and training materials. This recommendation is also found in Part A of the evaluation of community compliance.

CCB#7: FEMA and ISO/CRS personnel should monitor compliance in communities participating in CRS more closely and take decisive action to bring communities into compliance or retrograde their CRS class.

Part A of the evaluation of community compliance found monitoring and enforcement in CRS communities to be deficient. Shortcomings are perceived to be the result of poor recordkeeping and retention, confusion about roles and responsibilities and communication gaps between FEMA, FEMA's state partners, and ISO/CRS personnel. Study B found further evidence of noncompliant programs in CRS communities in the areas of both recordkeeping and retention and noncompliant buildings.

CRS communities typically have large amounts of development in the floodplain and serious flooding problems and, hence it is not surprising that they are faced with serious challenges in ensuring compliance. However, FEMA recognizes and rewards CRS communities for having "better" floodplain management programs by reducing the cost of flood insurance premiums within the community; the effect is to reduce the community's contribution to the National Flood Insurance Fund. Thus, noncompliance in CRS communities increases the overall costs of the NFIP and affects the viability of the flood insurance fund even more than noncompliance in other communities. A concerted effort is needed to remedy the deficiencies in this program.

1. INTRODUCTION

1.1. Background and Purpose of Report

In 2000, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) initiated a comprehensive evaluation of the National Flood Insurance Program (NFIP)—the first since Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The purpose of the evaluation is to gather data and information to formulate policies for future floodplain management, risk assessment, and flood insurance and to support long-term planning and policy making for the NFIP.

FEMA selected the American Institutes for Research (AIR) to perform the evaluation of the NFIP. In September 2002, as part of the evaluation, FEMA tasked AIR with conducting a comprehensive nationwide assessment of the level of compliance with the NFIP minimum floodplain management standards as set forth in Title 44, Section 60.3, of the *Code of Federal Regulations* (44 CFR §60.3). That assessment has been completed through two coordinated studies: Study Part A, *An Evaluation of Compliance with the National Flood Insurance Program Part A: Achieving Community Compliance*, *Monday et al., 2006,* prepared by AIR assesses the processes for ensuring community compliance with NFIP regulations. The areas of inquiry include the NFIP's approach to training and technical assistance; the effectiveness of tools for monitoring community compliance and defining and remedying violations; the roles of FEMA's headquarters and regional offices as well as state floodplain management agencies in supporting the NFIP; the capabilities of communities to identify and address violations; and the appropriateness of sanctions for noncompliance.

This study, hereafter referred to as Study Part B, prepared by Dewberry under subcontract to AIR, quantitatively addresses the percentage of post-Flood Insurance Rate Map (FIRM) buildings[16] – both insured and uninsured in Special Flood Hazard Areas (SFHAs)[17] – that are in compliance with the NFIP's floodplain management regulations, especially those regulations related to construction standards. Study Part B estimates, within the areas selected, which floodplain management regulations have the highest and lowest rates of compliance and characterizes levels of compliance by type and size of community, geographical area, foundation type, occupancy, building type, and similar factors.

---

[16] Post-FIRM buildings are those buildings constructed or substantially improved after the effective date of the FIRM on which the building is shown. A FIRM typically includes BFEs and other hazard information needed to better protect new construction from flood damage. The flood hazards presented on the FIRM determine the NFIP minimum floodplain management regulations applicable to the construction of the building. Flood insurance premiums for post-FIRM buildings are based on "actuarial" rates, i.e., rates based on the true risk the building is exposed to.

[17] The SFHA is the area that is predicted to be inundated by the flood events having a 1-percent or greater chance of being equaled or exceeded in any given year. The SFHA, which is shown as either an A Zone or V Zone, is identified on a Flood Hazard Boundary Map or Flood Insurance Rate Map prepared by FEMA.

Knowledge of compliance is a crucial element of any assessment of the NFIP; without compliance, lives and property may be at risk, and the actuarial soundness of the NFIP jeopardized. By dividing the topic of compliance into two interrelated studies, AIR distinguished between the processes and organizations that support and enforce compliance with NFIP regulations and the actual compliance of buildings with NFIP construction standards. Although the two studies require different forms of analysis, they have not been considered in isolation. References to Study Part A can be found throughout this report.

1.2. Overview of the NFIP

The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against property losses caused by flooding. Participation in the NFIP is based on an agreement between communities and the federal government: if a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses.

Many federal, state, and local agencies and non-governmental organizations are involved in different components of the NFIP. FEMA, which is responsible for administering much of the NFIP, conducts flood studies, publishes the NFIP maps, and makes flood insurance available within communities participating in the NFIP. The objectives of the NFIP are to 1) decrease risk of flood losses, 2) reduce costs and adverse consequences of flooding, 3) reduce demands and expectations for federal disaster assistance after floods, and 4) restore and preserve natural and beneficial values of floodplains.[18]

In cooperation with states and communities, FEMA has produced FIRMs depicting SFHAs for over 20,000 communities nationwide. The SFHA represents the flood that has a 1-percent annual chance of occurring in any given year (base flood). The base flood is the national standard used by the NFIP and all federal agencies for the purposes of regulating development and requiring the purchase of flood insurance. All FIRMs include SFHAs, but the SFHAs (also referred to as flood zones) reflect varying degrees of analyzes. Rural communities or areas within communities with limited existing or potential development are typically mapped by approximate methods. Areas studied by approximate methods show the approximate outline of the SFHA and carry a Zone A flood hazard designation. While the elevation of the 1-percent annual chance flood is represented by the approximate Zone A boundary, the exact BFE is not shown in Zone A areas and is typically unknown to communities and property owners. In contrast, areas studied by detailed methods reflect complex hydrologic and hydraulic studies that

[18] These goals were reached by a consensus of FEMA and the NFIP Evaluation team in 2002 *Design for the Evaluation of the National Flood Insurance Program.* The Fourth goal is not included in statute, however. The primary legislatively stated purposes of the 1968 Act creating the NFIP were to "Through insurance, better indemnify individuals for flood losses that created personal hardships and economic distress; reduce future flood damages through State and community floodplain management regulations; and reduce Federal expenditures for disaster assistance and flood control",

analyze flood duration, drainage area, structures, the amount of impermeable surface, and other factors that affect flood hazards. These studies assign statistical probabilities to different size floods. This is done to understand what might be a common or ordinary flood for a particular area versus a less likely or severe flood for that same river or coastline. Flood studies developed using detailed methods include the computed elevation to which floodwaters are anticipated to rise during the base flood.

Detailed flood studies are a vital part of a floodplain management program and provide the necessary flood elevations, flood velocities, and floodway dimensions to ensure newly constructed buildings are built to reduce flood damages to acceptable levels. This study focused solely on areas studied by detailed methods (Zones AE, VE, AH and AO). These areas are more developed and, thus, have more buildings at risk than in Zone A areas. In addition, the buildings are subject to the elevation requirements and more stringent floodplain management requirements than are applicable in Zone A areas. The detailed flood zones relevant to Study Part B are defined in the box on the right.

DESCRIPTION OF FLOOD ZONES INCLUDED IN THIS STUDY

All SFHAs are subject to inundation by the 1 percent annual chance flood event.

Zone AE: Zone AE represents riverine and lacustrine (lake) floodplains and coastal floodplains landward of Zone VE. These areas have been studied by detailed methods including the use of hydrologic and hydraulic analyses to develop Base (1% annual chance) Flood Elevations (BFEs), accurate floodplain boundaries, and, at times, regulatory floodway boundaries. (Zone AE is used on new and revised maps in place of Zones A1-A30.)

Zone VE: Also known as coastal high hazard areas, these zones are mapped along the nation's coastlines and include areas subject to additional hazards due to storm-induced velocity wave action. BFEs derived from detailed hydraulic analyses are shown within these zones. (Zone VE is used on new and revised maps in place of Zones V1-V30.) NFIP regulations contain specific elevation and structural performance requirements for buildings constructed in Zone VE.

Zone AH: SFHAs subject to shallow flooding (usually areas of ponding) where average depths are between one and three feet. BFEs derived from detailed hydraulic analyses are shown in this zone.

Zone AO: SFHAs subject to shallow flooding (usually sheet flow on sloping terrain or ponding) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone.

Mandatory flood insurance purchase requirements apply as a condition of federal or federally related financial assistance for acquisition and/or construction of buildings in SFHAs of any community.

For more detailed NFIP flood zone definitions, refer to 44 CFR §60.3.

Development may take place within the SFHA provided that the development complies with local floodplain management ordinances, which must meet the minimum federal requirements. Communities participating in the NFIP must adopt legally enforceable floodplain management measures that are compliant with 44 CFR §60.3 of the NFIP regulations. Requirements in 44 CFR §60.3 are based on the level of mapping that FEMA has provided to the community, that is, whether FEMA has designated SFHAs, BFEs, a regulatory floodway, and/or coastal high hazards on the community's FIRM. The regulatory floodway is the area identified on a FIRM or

a Flood Boundary Floodway Map[19] that represents the portion of the floodplain that carries the majority of the flood flow and often is associated with high velocity flows and debris impact. The specific requirements in 44 CFR §60.3 associated with the construction in the flood zones relevant to Study Part B are discussed in section 1.3 below.

1.3. NFIP Regulations for Construction in the SFHA

Study Part B, addresses buildings located within SFHAs designated as Zones AE, VE, AO, or AH. The zone designation and the BFE are critical factors in determining what requirements apply to a building and, as a result, how it is built. Minimum federal requirements for Zones AE, AH, and AO are found in 44 CFR §60.3(c) of the NFIP regulations. For Zone VE, the minimum requirements are found in 44 CFR §60.3(e). NFIP regulations governing construction in the regulatory floodway are found in 44 CFR §60.3(d). The requirements for each of the zones and the regulatory floodway are summarized below.

Zones AE and AH: In Zones AE and AH, all new construction and substantial improvements[20] of residential buildings must have the lowest floor (including the basement, if any) elevated to or above the BFE. Nonresidential buildings in Zones AE and AH must either be elevated to the BFE or dry floodproofed to the BFE so that their walls are substantially impermeable to the passage of floodwaters. Manufactured homes must 1) be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to or above the BFE and 2) be secured to an adequately anchored foundation system to resist floatation collapse and lateral movement. An adequately anchored manufactured home typically includes over-the-top or frame tie-downs in addition to standard connections to the foundation that will withstand flood and wind forces.[21]

Zone AO: In Zone AO, all new construction and substantial improvements of residential buildings must have the lowest floor (including the basement, if any) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified). Nonresidential buildings in Zone AO must either be elevated or dry floodproofed to the BFE.

Zone VE: In Zone VE (Coastal High Hazard Areas), there are four NFIP minimum requirements for new construction and substantial improvements (both residential and commercial): 1) the building must be elevated on pile, post, pier, or column foundations; 2) the

---

[19] A Flood Boundary Floodway Map (FBFM) is an official FEMA map that depicts the regulatory floodway. In the late 1980s, FEMA began combining the FIRM and FBFM into one map, but, prior to that time, the FIRM and FBFM were published as two separately published products. FBFMs remain in effect in a limited number of communities around the country.

[20] "Substantial improvement" is defined in 44 CFR §59.1 as "any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the 'start of construction' of the improvement. This term includes structures which have incurred 'substantial damage,' regardless of the actual repair work performed."

[21] For more on regulations governing placement of manufactured homes, see 44 CFR §60.3[c] and [e].

building must be adequately anchored to the foundation; 3) the building must have the bottom of the lowest horizontal structural member (LHSM) at or above the BFE; and 4) the building design and method of construction must be certified by a design professional. The area below the BFE must be built of flood-resistant materials and be free of obstructions; if enclosed, the enclosure must be made of lightweight wood lattice, insect screening, or breakaway walls. Use of the space below BFE must be confined to parking of vehicles, building access, or storage. Materials such as carpeting, paneling, drywall, or sheet rock are not allowed. The requirements for manufactured homes in VE Zones are the same as for Zone AE.

In each of the above flood zones, all new construction and substantial improvements must be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding. In addition, for all new construction and substantial improvements, fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access, or storage in an area other than a basement and which are subject to flooding must be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding; and the bottom of all openings must be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Regulatory Floodway: Within the regulatory floodway, the community is responsible for prohibiting encroachments, including fill, new construction, and substantial improvements of existing buildings, unless it has been demonstrated through hydrologic and hydraulic analyses that the proposed encroachment will not increase flood levels within the community or adjacent communities.

The community must require permits for all development in the SFHA and ensure that construction materials and methods used will minimize future flood damage in accordance with 44 CFR §60.3 of the NFIP regulations. Permit files must contain documentation to substantiate how buildings actually were constructed. The role of the community in ensuring, through its permitting and inspection process, that construction of new or substantially improved buildings meets the minimum NFIP regulations is crucial to the NFIP's success.

Flood insurance and floodplain management measures are strongly linked since flood insurance rates for buildings built after the issuance of the initial FIRM (post-FIRM construction) for a community are based on the building's risk of flooding. Most rates are determined based on the elevation of the lowest floor of the building in relation to the BFE. Generally, buildings that comply with the community's floodplain management regulations (and NFIP minimum requirements) are charged the lowest rates, and those that do not comply may be charged much higher rates. Enforcement of floodplain management regulations by communities is critical for the NFIP to achieve its objectives of protecting lives and property and providing flood insurance within participating communities at affordable insurance rates.

Occasionally, as a result of willful disregard for the NFIP requirements or a lack of understanding of the requirements, a community may not fully enforce all of the provisions of its ordinance. This failure to enforce puts its participation in the NFIP in peril. FEMA imposes sanctions on communities for failure to enforce their floodplain management program. These sanctions are examined more thoroughly in Part A of the evaluation, *Achieving Community Compliance* (Monday et al., 2006).

The regulatory standards of the NFIP discussed above are minimum standards in that they are generally applicable everywhere and provide a basic measure of protection. However, the minimum standards of the NFIP often do not provide sufficient protection from all flood hazards, nor do they take into consideration the effects of urbanizing watersheds on future flood elevations. In recognition of the limitations inherent in the NFIP minimum standards, many states have imposed more restrictive requirements on their communities. In addition, many communities have voluntarily adopted higher regulatory standards at the local level based upon local conditions and anticipated development.

1.4. Scope and Limitations of Study

High levels of compliance are vital to the NFIP's fiscal soundness, its ability to pay claims, and the protection of millions of structures. FEMA has established a compliance program, monitors compliance by NFIP communities, and takes action when it identifies communities that are not meeting program requirements. However, as discussed in Study Part A, it is not clear that FEMA or their partners in the program have sufficient resources to assess compliance in all communities on a regular basis. Studies Part A and B of the evaluation of compliance were initiated to answer core evaluation questions[22] aimed at gaining an understanding of what levels of noncompliance exist, why they exist, and the efficacy of the sanctions available when noncompliance is detected. Additional coordination with FEMA and AIR yielded a subset series of comprehensive questions this report seeks to address. Specifically, Study Part B was designed to determine the level of compliance of residential and nonresidential buildings with minimum NFIP requirements. The study responds to the following questions.

- How widespread are floodplain development violations?
- What are the most common violations?
- Does compliance vary in different geographic areas?
- Does community size affect compliance?
- Do economic factors influence compliance?
- Does compliance vary by the source of flooding—coastal or riverine?

[22] These core questions were developed by the NFIP Steering Committee. The committee is comprised of a group of in-house FEMA staff, retired government executives, and private sector and academic experts from various disciplines with extensive knowledge of the history, objectives, and issues faced by the NFIP, that were convened to develop the candidate evaluation questions the AIR sub-studies set out to answer.

- Is compliance better in Community Rating System (CRS)[23] communities?
- Are communities meeting the 44 CFR §60.3 requirement to issue building permits for all development in the SFHA, ensure that the proposed lowest floor and "as-built" elevations (after construction has been completed) are at or above BFE, and obtain and retain documentation of design and construction methods?
- Does compliance vary depending on the flood zone?
- Is there a difference in compliance between buildings insured by the NFIP and those not insured by the program?
- Has compliance improved over time?
- Does the method of construction of buildings affect compliance?
- Is there better compliance among commercial buildings, manufactured homes, or other residential structures?

The study design addresses buildings meeting the following criteria.

- Completed on or after January 1, 1990. This ensures an adequate sample of buildings in most communities and allows comparison of changes in floodplain management practices over a 14-year time period while avoiding the need for local officials to locate permits issued before 1990.
- Constructed after FEMA had issued a FIRM for the community (post-FIRM construction).
- Located in SFHAs that were studied by detailed methods, that is, for which FEMA had established BFEs or flood depths. The study does not include buildings constructed in approximate Zone A flood zones because development in these zones is subjected to fewer measurable floodplain management requirements. Approximate Zone A designates SFHAs for which FEMA has not conducted detailed hydraulic analyses and, therefore, has not provided BFEs or flood depths. In general, these areas were not subject, or projected to be subjected, to development pressure at the initiation of the community's FIS.
- Either insured or not insured by an NFIP flood insurance policy.

This study focused only on buildings; it did not identify violations in other types of floodplain development such as mining, dredging, filling, grading, paving, or channel alterations and maintenance. Compliance with the NFIP regulatory requirements of these other floodplain development activities is critical to the success of the NFIP. Floodplain development not properly enforced can result in increased flood hazards and damages to existing buildings. The scope of this study was further limited primarily to violations; it addressed program deficiencies only in that it determined whether communities maintained building permits and inspection records. FEMA's guidance for monitoring compliance differentiates explicitly between a

[23] The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. See Section 3.3 for further information about the CRS.

program deficiency and a violation. A program deficiency is defined as "a defect in a community's floodplain management regulations or administrative procedures that impairs effective implementation of floodplain management regulations." A violation is defined as "the failure of a building or other development to be fully compliant with the community's floodplain management regulations."

1.5. Organization of This Report

The remainder of this report discusses the study's methods, survey results and conclusions, and recommendations evolving from this study. Section 2 discusses the methods used to select the communities and buildings for inclusion in the sample. It also discusses preparations that were made prior to the actual survey (team selection and training, contact with the selected communities, and the project database). Section 2 then sets forth the limitations of the study, describes the characteristics of the communities and buildings in the sample, and defines the compliance classification categories created for the study. Section 3 presents the study results. First, it discusses the findings regarding community record keeping and retention (permit files and elevation certificates and other data). Then, it presents the building construction survey results, by compliance classification categories and by community characteristics (e.g., geographic area, population, per-capita income, source of flooding, CRS participation) and next by building characteristic (building construction type, building usage, etc). Section 4 includes an overall summary and conclusions about community compliance with the NFIP building regulations and Section 5 offers recommendations growing out of this study.

2. METHOD

2.1. Community Selection Process

In the first stage of selection, geographic areas (referred to herein as "clusters") of the nation were selected with large concentrations of post-FIRM buildings. Clusters were selected to provide geographic spread across the nation and ensure representation of most community and building types. This systematic sampling approach to selection of the clusters was necessary to ensure that sufficient structures meeting our criteria of being post-FIRM construction located in a detailed flood hazard area (Zone VE, AE, AO or AH) and built after January 1, 1990, were available within the communities to be sampled. While the exact number of structures located within the nation's SFHAs remains unknown, almost two-thirds of the 20,000 communities in the NFIP have 20 or fewer policy holders. Because the available budget for the study was limited, clusters were chosen to maximize inference about rates of compliance within communities where a preponderance of NFIP post-FIRM policies are found rather than across the country nationally.

In the second stage of selection, a community selection process, described in the next subsection, was used to develop a viable list of communities. From this list, communities were selected randomly to be studied. Because communities were selected randomly at the second stage, inferential statistics can be conducted within the sample. While we cannot define point estimates and confidence intervals around estimates of findings at the national level, we expect that our results are roughly representative of what we would expect to find among communities that fit the study criteria. The communities included in this study are predominantly rapidly-growing coastal communities on the Atlantic, Gulf, and West coasts and inland communities in the Southwest and along the Mississippi River. Fifty communities ultimately were included in Study Part B. The cluster and community selection processes are discussed below.

2.1.1. Cluster Selection Process

Eighteen clusters were identified for potential inclusion in Study Part B, but for cost reasons the clusters were reduced to 10 (representing different geographic areas). Although the additional 8 clusters would have provided better geographic spread, they either represented areas with relatively small numbers of post-FIRM policies or had similar types of development as in the 10 clusters ultimately selected for inclusion.

Each cluster was made up of either a metropolitan area or a group of several closely located counties or communities. The clusters selected were geographically and economically diverse and included areas with high growth rates both in terms of population and the number of post-FIRM policies. Although the clusters were systematically selected (to ensure the desired large concentration of post-FIRM buildings and diversity, and to minimize costs), a random process was used to select the communities sampled in the second stage of selection. The cluster areas selected cover states that account for 84 percent of NFIP post-FIRM policies. The 10 cluster areas and their central nodal communities are as follows:

Washington/Baltimore (Loudoun Co., VA)	Coastal North Carolina (Dare Co., NC)
Florida West Coast (Tampa, FL)	Mid-Atlantic (New Castle Co., DE)
Florida Panhandle (Escambia Co., FL)	Northern California (Contra Costa Co., CA)
Louisiana (New Orleans, LA)	Mississippi River (St. Louis, MO)
Coastal Texas (Galveston, TX)	Southwest (Maricopa Co., AZ)

2.1.2. Community Selection Process

To select the communities for Study Part B, Geographic Information System (GIS) application methods were used to generate a list of communities within a 100-mile radius of each central node community identified within the clusters shown above. That effort yielded a list of potential communities, which was processed against FEMA's Community Information System.[24] Using the Community Information System, the community identification number, NFIP participation status, map type and dates, community ordinance levels, and policy information were added to the list. Next, the communities were categorized as participating with a map, participating without a map, and non-participating. This categorization yielded a subset list of viable candidate communities for inclusion in the study from the participating mapped communities. The list then was further refined by eliminating communities where post-FIRM buildings constructed after January 1, 1990, numbered fewer than the desired sample size. A breakdown of the number of communities identified within each cluster using this approach is shown in Table 1. All communities were selected from those included within the Participating Communities with Detailed SFHAs column. A comprehensive list of the communities within this category can be found in Appendix A.

[24] FEMA's Community Information System is the primary database used to record community-specific NFIP participation status, mapping and general insurance information.

TABLE 1. Breakdown of Communities in Cluster Areas

Cluster	Participating Communities with Detailed SFHAs	Participating Communities with Only Approximate Zone A SFHAs	Participating Communities without Maps	Non-Participating Communities with Maps	Non-Participating Communities without maps	Undetermined[1]	Total
California-North	129	18	27	0	12	22	208
Coastal North Carolina/ Virginia	84	17	5	0	34	16	156
Florida Panhandle	69	33	3	2	25	1	133
Florida-West Coast	92	10	3	0	19	11	135
Louisiana	126	47	12	0	28	13	226
Mid-Atlantic	364	51	13	0	72	26	526
Mississippi River	218	77	30	5	182	9	521
Southwest	47	2	1	0	2	0	52
Texas-Coastal	132	27	7	0	10	3	179
Washington/ Baltimore	243	63	13	2	67	13	401

[1] The undetermined category includes communities with identified discrepancies between the 44 CFR §60.3 ordinance level (see Page12 for ordinance level information) and map information in the Community Information System.

Within each cluster, seven communities were randomly selected from the participating communities with detailed SFHAs that had a viable sample size (more than 35 insured properties within Zone AE, VE, AO, or AH). While it was the intent to survey only five communities within each cluster area, there was a risk that the selected communities may opt not to participate in the study or that it might not be possible to locate the now-superseded map panel[25] in effect at the time of construction of numerous buildings within one of the communities. The latter could result in an inadequate sample size for an otherwise viable candidate community because the BFE at the time of construction could not be verified. As discussed in Section 1.3, the BFE determines the required elevation of new construction; thus, identifying the BFE in effect at the time of construction is a key component necessary to verify compliance. Accordingly, the selection of the specific communities to be surveyed within each cluster was at times governed

[25] Depending on the size of the community or county and the scale of the map, the FIRM may consist of one or more individual pages, each of which is known as a panel.

by the completeness of the mapping records for the communities. All of the selected communities agreed to participate; therefore, selection of the two communities in each cluster to be ultimately eliminated was based first on whether there were problems in obtaining copies of now-superseded FIRMs for use in verifying the BFE in effect at the time of construction. Then, if all FIRM panels for all of the communities within a cluster could be located, two communities were eliminated through a random selection process.

To protect the anonymity of the communities surveyed, the names of the specific communities sampled as part of Study Part B have not been included in this report. However, the community characteristics and a unique identification number assigned to each community randomly selected for inclusion in the study are shown in Table 2. The characteristics include the floodplain management ordinance level (44 CFR §60.3 of the NFIP regulations) that apply in the community, population group, per-capita income group, whether the community is subject to inland or coastal flooding[26], and whether the community has joined the NFIP's CRS. Three of these characteristics are defined in the paragraphs that follow.

NFIP regulations identify minimum requirements that communities must fulfill in order to join and stay in the program. The requirements that apply to a particular community depend on its flood hazards and level of detail of the data FEMA provides the community. The specific requirements are found in §60.3 and apply to communities as follows:

- 60.3(a) FEMA has not provided any maps or flood data;
- 60.3(b) FEMA has provided a map with approximate A Zones;
- 60.3(c) FEMA has provided a FIRM with BFEs;
- 60.3(d) FEMA has provided a FIRM with BFEs and a floodway;
- and 60.3(e) FEMA has provided a FIRM that shows coastal high hazard areas (V Zones).

The communities sampled have been categorized into six population groups based on the number of full-time residents[27] residing within the community. The groups are as follows:

- Group 1: less than or equal to 9,999;
- Group 2: 10,000 – 49,999;
- Group 3: 50,000-99,999;
- Group 4: 100,000-499,999;
- Group 5: 500,000-999,999; and

[26] Coastal flooding includes flooding from any body of water subject to tidal fluctuations and includes large numbers of communities on estuaries. Communities classified as coastal can also be subject to flooding from rivers that are not associated with tidal fluctuations and may or may not include "V" flood zones.

[27] Based on 2004 Census Data

- Group 6: 1,000,000 or greater.

The sampled communities have also been categorized into three per-capita income groups. Group 1 represents annual per-capita income ranging from $10,000 to $19,999 per year; Group 2 represents annual per-capita income ranging from $20,000-29,999; and Group 3 represents annual per-capita income of $30,000 or greater.

Each surveyed community will be provided with the survey data for use in their floodplain management programs, and FEMA regional offices will work with the communities to help resolve any problems that are identified. The two reserve communities eliminated from the survey are shown as shaded on Table 2.

TABLE 2. Randomly Selected Communities

Cluster	Community Identification No.	Applicable 60.3 Level Regulations	Population 2004[1]	Per-capita Income[2]	Flooding Source	CRS Community
California – North	NOCA-1	D	Group 6	Group 3	Coastal	Yes
California – North	NOCA-2	D	Group 3	Group 2	Inland	Yes
California – North	NOCA-3	E	Group 3	Group 3	Coastal	Yes
California - North	NOCA-4	D	Group 3	Group 2	Coastal	Yes
California - North	NOCA-5	C	Group 2	Group 2	Coastal	No
California - North	NOCA-6	D	Group 2	Group 3	Inland	Yes
California - North	NOCA-7	C	Group 3	Group 1	Inland	No
Florida - West Coast	WCFL-1	E	Group 3	Group 2	Coastal	Yes
Florida - West Coast	WCFL-2	E	Group 2	Group 2	Coastal	Yes
Florida - West Coast	WCFL-3	D	Group 2	Group 1	Inland	Yes
Florida - West Coast	WCFL-4	C	Group 2	Group 1	Coastal	Yes
Florida - West Coast	WCFL-5	E	Group 2	Group 2	Coastal	Yes
Florida - West Coast	WCFL-6	E	Group 2	Group 2	Coastal	No
Florida - West Coast	WCFL-7	E	Group 2	Group 2	Coastal	No
Florida Panhandle	FL/AL-1	E	Group 2	Group 3	Coastal	Yes
Florida Panhandle	FL/AL-2	E	Group 1	Group 3	Coastal	Yes
Florida Panhandle	FL/AL-3	D&E	Group 4	Group 1	Coastal	No
Florida Panhandle	FL/AL-4	D	Group 1	Group 2	Inland	Yes
Florida Panhandle	FL/AL-5	D	Group 2	Group 1	Inland	No
Florida Panhandle	FL/AL-6	E	Group 4	Group 1	Coastal	Yes
Florida Panhandle	FL/AL-7	E	Group 2	Group 2	Coastal	No
Louisiana	LA-1	D	Group 1	Group 2	Coastal	Yes
Louisiana	LA-2	C	Group 2	Group 1	Coastal	Yes
Louisiana	LA-3	E	Group 3	Group 1	Coastal	Yes
Louisiana	LA-4	D	Group 4	Group 2	Inland	No
Louisiana	LA-5	E	Group 3	Group 1	Coastal	No
Louisiana	LA-6	D	Group 2	Group 1	Inland	Yes
Louisiana	LA-7	C	Group 1	Group 1	Inland	Yes

[1]2004 US Census data

[2]1999 US Census data

TABLE 2. Randomly Selected Communities (continued)

Cluster	Community Identification No.	Applicable 60.3 Level Regulations	Population 2004[1]	Per-capita Income[2]	Flooding Source	CRS Community
Mid-Atlantic	DE/NJ-1	E	Group 1	Group 3	Coastal	Yes
Mid-Atlantic	DE/NJ-2	E	Group 1	Group 3	Coastal	No
Mid-Atlantic	DE/NJ-3	E	Group 1	Group 3	Coastal	Yes
Mid-Atlantic	DE/NJ-4	E	Group 1	Group 3	Coastal	Yes
Mid-Atlantic	DE/NJ-5	D&E	Group 4	Group 2	Coastal	No
Mid-Atlantic	DE/NJ-6	C	Group 3	Group 1	Coastal	No
Mid-Atlantic	DE/NJ-7	E	Group 2	Group 2	Coastal	No
Mississippi River	MO/IL-1	D	Group 2	Group 3	Inland	No
Mississippi River	MO/IL-2	D	Group 3	Group 2	Inland	No
Mississippi River	MO/IL-3	D	Group 4	Group 1	Inland	No
Mississippi River	MO/IL-4	D	Group 3	Group 2	Inland	No
Mississippi River	MO/IL-5	D	Group 1	Group 2	Inland	No
Mississippi River	MO/IL-6	D	Group 2	Group 1	Inland	No
Mississippi River	MO/IL-7	D	Group 2	Group 1	Inland	No
North Carolina/Virginia	NC/VA-1	E	Group 2	Group 1	Coastal	No
North Carolina/Virginia	NC/VA-2	E	Group 1	Group 2	Coastal	Yes
North Carolina/Virginia	NC/VA-3	E	Group 2	Group 2	Coastal	Yes
North Carolina/Virginia	NC/VA-4	D	Group 1	Group 1	Inland	Yes
North Carolina/Virginia	NC/VA-5	E	Group 3	Group 2	Coastal	No
North Carolina/Virginia	NC/VA-6	D&E	Group 2	Group 1	Coastal	Yes
North Carolina/Virginia	NC/VA-7	D	Group 3	Group 1	Inland	Yes
Southwest	SW-1	D	Group 2	Group 1	Inland	Yes
Southwest	SW-2	D	Group 2	Group 2	Inland	No
Southwest	SW-3	D	Group 6	Group 2	Inland	Yes
Southwest	SW-4	D	Group 6	Group 1	Inland	Yes
Southwest	SW-5	D	Group 4	Group 3	Inland	Yes
Southwest	SW-6	D	Group 2	Group 1	Inland	No
Southwest	SW-7	D	Group 2	Group 2	Inland	Yes
Texas-Coastal	CTX-1	D	Group 2	Group 1	Inland	No
Texas-Coastal	CTX-2	D	Group 4	Group 1	Coastal	No
Texas-Coastal	CTX-3	C	Group 1	Group 1	Coastal	No
Texas-Coastal	CTX-4	E	Group 1	Group 2	Coastal	Yes
Texas-Coastal	CTX-5	D	Group 4	Group 2	Inland	No
Texas-Coastal	CTX-6	E	Group 2	Group 2	Coastal	No
Texas-Coastal	CTX-7	C	Group 2	Group 3	Inland	No
Washington/Baltimore	Balt/Wash-1	D	Group 4	Group 3	Inland	yes
Washington/Baltimore	Balt/Wash-2	D&E	Group 5	Group 2	Coastal	No
Washington/Baltimore	Balt/Wash-3	D&E	Group 5	Group 1	Coastal	No
Washington/Baltimore	Balt/Wash-4	E	Group 1	Group 2	Coastal	No
Washington/Baltimore	Balt/Wash-5	D&E	Group 2	Group 2	Coastal	No
Washington/Baltimore	Balt/Wash-6	D&E	Group 3	Group 2	Coastal	No
Washington/Baltimore	Balt/Wash-7	D&E	Group 2	Group 2	Coastal	No

[1]2004 US Census data

[2]1999 US Census data

2.2. Building Selection Process

All or most of the post-FIRM buildings (both insured and uninsured) located within the detailed SFHAs (Zone AE, VE, AO, or AH) of each candidate community were identified using two sources. Data on insured post-FIRM buildings were obtained from the NFIP Policy-in-Force database.[28] Address records from First American Real Estate Solutions' GIS database system were acquired to obtain comprehensive records of floodprone properties, both insured and uninsured.[29] Uninsured buildings were included to determine if there was a correlation between uninsured and noncompliant buildings, that is, to test the hypothesis that owners of noncompliant buildings may have dropped flood insurance policies because of high flood insurance premiums resulting from their noncompliant status. From the comprehensive list of buildings, 35 to 45 candidate buildings suitable for survey in each community were selected randomly.

The list of candidate buildings was processed to eliminate duplicate buildings (e.g., units within the same condominium or apartment building). However, no effort was made to eliminate buildings within the same row of townhouses or commercial compound units, or to ascertain whether a given parcel of land may have been removed from the SFHA by a Letter of Map Revision based on Fill (LOMR-F)[30] before the building on the site was constructed.

The primary objective of this study was to determine what percentage of buildings in the sample were built to the requirements of the BFE and/or flood zone in effect at the time of construction. Accordingly, it was necessary to obtain both current as well as now-superseded copies of FISs and FIRMs for use in determining the BFE and/or flood zone in effect at the time of construction of the selected buildings. Many of the communities' FIRMs were found to have been revised multiple times to reflect updated flood hazards. While most superseded FISs and FIRM panels were located, there were instances where the FIRM panels and/or the FIS report in effect at the time of construction could not be located and an otherwise viable pre-selected building was eliminated from the list of buildings to be surveyed. As was the practice with the selection of reserve communities, reserve buildings beyond the number that would ultimately be surveyed were randomly selected. This would ensure an adequate sample size even if buildings were eliminated because the BFE in effect at the time of construction could not be verified or access to the property once in the field was not possible.

2.3. Preparation for Survey of Buildings

In preparation for the survey of buildings, survey team members were selected and trained, the selected communities were contacted, and a database was created and pre-populated with information already available on the buildings.

---

[28] The Policy-in-Force database retains FEMA's flood insurance policy records.

[29] First American Real Estate Solutions is a private firm that offers flood map reading and zone determination services to mortgage lenders, insurance companies, etc.

[30] A LOMR-F is an official revision, by letter, to an effective NFIP map. A LOMR-F provides FEMA's determination concerning whether a structure or parcel has been elevated on fill above the BFE and excluded from the SFHA. The letter becomes effective on the date sent.

2.3.1. Team Member Selection and Training

Four Association of State Floodplain Managers Certified Floodplain Managers (CFMs)[31] from Dewberry's staff were assigned to this study. In addition, Study Part B was conducted using a single surveyor who performed the elevation surveys in all the cluster/communities studied. This surveyor passed the CFM exam midway through completion of the field work for this study.

In December 2004, Dewberry held specialized training for the project staff. The training gave the CFMs and surveyor an overview of the project and its objectives, and provided them with guidance on the measurements to be recorded and potential violations they were likely to encounter.

2.3.2. Community Coordination

Several weeks before each community visit, the surveyed communities were contacted to identify the community officials involved with the NFIP, verify their willingness to participate, and establish dates for a community visit. This initial contact was followed by a formal letter explaining the objectives of the study and purpose of the visit, and transmitting a list of the randomly selected buildings to be surveyed. The letter encouraged the community officials to notify their residents of the survey by placing an article in their local newspaper or through written notification sent to individual property owners. A template press release was enclosed to be used at the community's discretion.

The letter sent to each community requested that they make the permit file, including at a minimum the following documents, available for each building on the accompanying list during the site visit:

- Building permits
- Elevation Certificates or other records of the "as-built" elevations of the buildings
- Records of floodproofing of nonresidential commercial buildings (where applicable)
- Information on the placement of fill
- Records of all variances requested (both denied and approved)
- Certification by a registered professional engineer or architect of the building design and methods of construction

Most of the communities visited were helpful in reviewing the list of buildings randomly pre-selected for survey in advance of the meeting and in identifying problems with the list.

---

[31] Program developed and administered by the Association of State Floodplain Managers to recognize individuals who have demonstrated their understanding of floodplain management. Certification has three requirements: an individual must pass a standardized exam; obtain a specified number of continuing education credits every two years; and pay a fee for initial certification and recertification every two years.

Problems with the lists were relatively common. First, dates of construction in the dataset proved incorrect in some instances. Where available, on-line tax assessor websites served as an excellent resource for verifying construction dates, but they were not available for all communities. Second, many communities had experienced annexations and de-annexations. A building now within a selected community's corporate limits may not have been so at the time of construction, and vice versa. Permit records and Elevation Certificates were thus unavailable. Although the community could falsely identify a building as outside their jurisdiction at the time of construction or as "too old" (built before January 1, 1990) in order to avoid detection of gross violations, the survey team felt confident of the integrity of the community officials they dealt with most notably because many were very candid about violations they were aware of within their community.

To account for the possibility of having to eliminate randomly selected buildings from the sample due to the problems noted above, building address lists sent out to communities during later months of the study included as many as 45 buildings to ensure an adequate sample would be achieved without the need for further coordination with the communities, which could result in delays and in a non-random sample. All selections of the buildings to be surveyed were done randomly from the validated list reviewed by community officials.

2.3.3. Project Database

A database was created for this project to process and record the key data collected during the study. Prior to the community visit, the database was populated with address records including flood zone, building type, occupancy, date of construction, policy information, etc., obtained from the Policy-in-Force database and from First American Real Estate Solutions. Its first use was in developing the list of randomly selected buildings to be surveyed discussed in section 1.3.2.

The database was formatted to receive pertinent data from the community's permit files and all data collected during the building elevation survey and inspection including, but not limited to, the following:

- Flood zone in effect at time of construction
- BFE at time of construction
- Date building permit was issued and the date of construction
- Occupancy type (i.e., residential, nonresidential, manufactured housing, etc.)
- Building type (i.e., slab-on-grade, split level, basement, etc.)
- Elevation Certificate and inspection records
- Elevation of the lowest floor as recorded in the community's permit files as well as the field-verified elevations as recorded by the study survey team
- Existence and size of flood openings in the foundation
- Location of electrical and mechanical equipment

The database also contains a record of the specific noncompliant findings and photographs linked to the survey data captured for each building.

2.4. Survey Approach

The survey approach included an administrative survey – an inspection of the community's permit files – and a field survey. The objective of the administrative survey was to review community record keeping and retention as it relates to the construction of buildings in SFHAs, and the objective of the field survey was to determine if buildings built within the surveyed communities had been built to minimum NFIP standards.

2.4.1. Administrative Survey

The CFM was deployed several days before the surveyor to meet with the appropriate community officials and review the floodplain development permit files. As discussed in Section 1.2, a minimum of 35 suitable buildings were pre-selected for survey in each community. During the background research to identify the location of each building and the BFE in effect at the time of construction, some of the buildings were eliminated because of errors in the source databases or the inability to locate the map panel in effect at the time of construction or through verification by the community that the building was "too old" or outside its jurisdiction. All buildings that remained within the sample (typically 25-35) were "administratively" surveyed by the CFM through inspection of the community's permit files during the community visit. The CFM recorded relevant information on the availability of documents retained by the community including floodplain development permit applications, Elevation Certificates or other elevation data sources, floodproofing certificates, variances issued, etc. The CFM also recorded the date of construction and FIRM zone and BFE in effect on the date of construction as identified in the available permit records.

If no elevation certificate or comparable elevation data were on file for a building, a physical survey of the building was performed. From the remaining pool of administratively surveyed buildings for which elevation data existed, enough buildings were selected to ensure that physical surveys were conducted for a total of 25 buildings within the community. For example, if the permit file did not include elevation data for 15 out of the 35 pre-selected buildings, the 15 buildings without existing elevation data were physically surveyed, and 10 of the remaining buildings for which elevation data did exist in the permit files were randomly chosen to verify the accuracy of the data in the permit files. This approach ensured that elevation data were captured on at least 1,250 buildings.

2.4.2. Elevation Surveys and Building Inspections

For the elevation surveys and building inspections, a two-person survey team was deployed to each of the communities selected. The survey team consisted of a CFM and a surveyor equipped with dual-frequency Global Positioning System (GPS) receivers as well as conventional survey equipment. In preparation for the field surveys, the survey team queried the National Spatial Reference System (NSRS), maintained by the National Geodetic Survey (NGS) at www.ngs.noaa.gov, to obtain the Data Sheets that describe the available vertical control

monuments within the selected communities. This information was essential to identify GPS control points within the communities and ensure that the monument with the best vertical control was used to establish elevations.

All surveys conducted by the survey team were performed with rigorous GPS survey procedures accurate to 5 centimeters (2 inches) at the 95-percent confidence level. The surveyor selected a minimum of three target points per building to be surveyed: (1) lowest floor elevation, e.g., bottom of front door or top of foundation from which 8 feet is subtracted to the basement floor where applicable, (2) lowest adjacent grade point, and (3) highest adjacent grade point. Elevations were also shot of any visible electrical and mechanical equipment and any accessory buildings on site. Where access was possible, the CFM briefly looked around the building and into the backyard to see if there was evidence of a full or walk-out basement. This inspection by the CFM also served to validate that the correct reference levels were captured. (Community surveyors commonly do not understand the correct reference levels to be surveyed, which is a major reason why some Elevation Certificates are in error) The remainder of the survey included recording the building diagram number, foundation type, and estimated square footage of each building and taking digital photos of the front and back of each building. In addition, the CFM inspected each building for the following noncompliance issues and recorded his or her findings in the project database:

- Buildings with enclosures below BFE being used for purposes other than parking, access, or limited storage
- Enclosure walls below the lowest floor of an elevated building in a Zone VE that do not appear to be free of obstruction or appear to have non-breakaway walls
- Attached garages not properly wet floodproofed
- Nonresidential buildings not elevated or floodproofed
- The presence of fill in coastal high hazard areas (Zone VE)
- Size, location, and design of flood openings in Zone AE not meeting the minimum NFIP criteria
- Manufactured homes improperly anchored or elevated

Dewberry then determined if each building was constructed so that it's top of bottom floor elevation (Zone AE), LHSM (Zone VE), and electrical and mechanical are at or above the BFE.

2.5. Limitations

This study does not reflect a statistical sample of communities or a truly random sample of post-FIRM buildings; thus, the percentages included in this report do not represent national rates of compliance. The percentages represent rates of compliance for only the 1,591 buildings administratively surveyed and 1,253 buildings physically surveyed. The cost of surveying a random sample of communities and buildings sufficient to draw inference statistically within and across communities nationally would have been prohibitive. Instead, as discussed in subsection

2.1.1, 10 cluster areas were chosen that generally represent the various types of flooding experienced by NFIP communities and various geographical areas. These clusters were located primarily in the areas with the preponderance of NFIP post-FIRM policies. Five communities were randomly selected from each cluster node, and 25 buildings were randomly selected within each community. The sample has the following limitations:

- The sample has limited geographic spread. The study selected the 10 clusters in the areas of the nation that had the most post-FIRM policies; these communities are generally coastal communities on the Atlantic, Gulf, and West coasts and inland communities in the Southwest and along the Mississippi River.
- The sample is not proportional. Only seven of the communities surveyed are in Florida even though that state has about half of all post-FIRM insured buildings. Further, the distribution of foundation types may not reflect the distribution of foundation types in the NFIP policy base.
- Only developing communities were sampled, and only communities with more than 25 post-FIRM buildings built after 1990 were sampled. As a result, smaller slow-growing communities generally are not represented in the sample, and, thus, the study can draw no conclusions on the levels of compliance in these communities. However, a very high percentage of the post-FIRM construction is occurring in larger, fast-growing communities as well as smaller tourist destinations along the coasts.
- Substantial improvements have not been included within the sample. To fully address compliance within post-FIRM construction, substantial improvements would be included. However, they have not been addressed by this study because of the difficulty of obtaining and verifying construction/improvement dates.

In spite of these limitations, the data collected through this study allow important observations to be made about compliance in post-FIRM buildings within communities that fit the study criteria.[32] These data help address quantitatively, if not with statistical results that generalize nationally, one facet of compliance. That facet is compliance with the construction standards for individual buildings. The data collected are essential for evaluating the effectiveness of promoting, monitoring, and enforcing the NFIP requirements as discussed in *An Evaluation of Compliance with the National Flood Insurance Program Part A: Achieving Community Compliance*, *Monday et al., 2006* (also referred to throughout this report as Study Part A). These data when used in conjunction with the information collected through Study Part A help identify deficiencies in the compliance program and will help direct focus towards areas where resources are most needed.

[32] The communities selected are predominantly rapidly-growing coastal communities on the Atlantic, Gulf, and West coasts and inland communities in the Southwest and along the Mississippi River. Buildings included in the study are post-FIRM buildings constructed after January 1, 1990 in detailed SFHAs. Buildings both insured and uninsured by a flood insurance policy are included.

2.6. Study Sample Characteristics

This study was limited to 10 cluster areas and five communities within each cluster. As a result, 50 communities were included in the sample. Within those communities, a total of 1,591 buildings were surveyed administratively; that is, their floodplain development permit files were reviewed. Physical inspections and Elevation Certificates were prepared for 1,253 of the 1,591 total buildings. The key characteristics of the communities, as well as the buildings reviewed as part of Study Part B are identified below.

As discussed in subsection 2.1.2, two reserve communities identified within each cluster were eliminated. Communities were selected for elimination if there were problems in obtaining copies of now-superseded FIRMs for use in verifying the BFE in effect at the time of construction. If all FIRM panels for all communities within a cluster could be located, a random selection process was used.

Table 3 provides a breakdown of the number and percentage of communities included in Study Part B based on community characteristics including: source of flooding (coastal or inland), level of 44 CFR §60.3 regulations adopted, CRS status, population, and per-capita income. Also included in Table 3 for comparison are the percentages of these characteristics for all NFIP communities. While the percentages found in this study may not correspond with the national percentages, they are representative of the distribution of floodprone buildings nationwide. Five coastal states – Florida, Texas, Louisiana, California, and New Jersey – account for nearly 70 percent of all policies. These five states plus five other coastal states account for 81 percent of all policies. Floridians have about 41 percent of all policies – but more than half of these policies are in 20 of the state's 437 participating communities. Outside of Florida, the median policy count per community is eight, but this number disguises the fact that many communities have no policies. Among participating communities, for example, 3,452 had no policies in August 2004. Almost two-thirds of the 20,000 communities in the NFIP have 20 or fewer policyholders. One percent of participating communities have almost 65 percent of all policies.[33]

[33] Source: FEMA's Community Information System, 2004

TABLE 3. Community Characteristics

Characteristic	Percentage of Communities-Study B Sample	Percentage of Communities-Nationwide[1]
Source of Flooding		
Coastal	62.0%	7.9%
Inland	38.0%	84.1%
Unknown	0.0%	7.9%
Level of 44 CFR §60.3 Regulations		
60.3 c (communities with BFEs but no floodway)	8.0%	17.3%
60.3 d (communities with BFEs and floodways)	46.0%	78.3%
60.3 d and e (communities with BFEs, floodways, and coastal VE zones	10.0%	1.3%
60.3 e (communities with coastal VE Zones only)	36.0%	3.1%
CRS Community		
Yes	52.0%	.05%
No	48.0%	99.95%
Population (Full-time Residents)		
Less than or Equal to 9,999	26.0%	N/A
10,000 - 49,999	30.0%	N/A
50,000 - 99,999	18.0%	N/A
100,000 - 499,999	16.0%	N/A
500,000 - 999,999	4.0%	N/A
1,000,000 or greater	6.0%	N/A
Per-capita Income		
$10,000 - $19,999	32.0%	N/A
$20,000 - $29,999	46.0%	N/A
$30,000 or greater	22.0%	N/A

Source: FEMA Community Information System 2004

N/A - Data Unavailable

[1]The percentages shown are representative of the subset of communities in the NFIP with detailed flood hazards (Zones AE, AO, AH, or VE). 11,581 communities were included in this subset during the sample selection phase of this study performed in 2004.

Table 4 provides a breakdown of the number and percentage of buildings included in Study Part B based on the following characteristics: insured or uninsured, located in each of the different applicable flood zone designations, and representing different building types/uses.

TABLE 4. Building Characteristics

Characteristic	Number of Buildings	Percentage of Buildings
Insured Versus Uninsured		
Uninsured	272	21.7%
Insured	981	78.3%
Flood Zone		
AE	1,046	83.5%
AH	38	3.0%
AO	103	8.2%
VE	66	5.3%
Building Type/Usage		
Single Family Detached	920	73.4%
Duplex	14	1.1%
Manufactured Home	48	3.8%
Townhouse/ Row House	90	7.2%
Multi-Family (Condo/ Apartment)	48	3.8%
Commercial/Industrial	118	9.4%
Multi-Use Building	10	0.8%
Public Building	5	0.4%

The National Flood Insurance Program's Market Penetration Rate: Estimates and Policy Implications (Dixon, *et al.*, 2006), prepared as part of the NFIP Evaluation, estimates overall market penetration rates of insured single family homes in SFHAs at 50-52 percent. A greater percentage of insured buildings were found in this study, but because these findings are the byproduct of a different research design, they are not necessarily suggestive of greater rates of market penetration within our study area than might be found nationally. The "Market Penetration" study found that the number of insured buildings was higher in the South and West than in the Northeast and Midwest, in communities subject to coastal flooding than to inland flooding, and in buildings with newer mortgages, which is perhaps supportive of our findings of the number of insured buildings within our sample.

The percentages of buildings within the different flood zones found here also are in line with the percentages of NFIP policies in force. Slightly fewer than 2 percent of NFIP policies are in Zone VE, about 68 percent are in Zone AE, and the remaining 30 percent are in other zones, primarily those outside of the SFHA.[34]

[34] As of September 30, 2004.

2.7. Compliance Classification Categories

When this study was initiated, it was anticipated that, in general, compliance with basic elevation requirements would be good but that many problems with items like enclosures, mechanical and utility equipment, flood openings, etc., would be encountered. Local officials have the greatest misunderstandings concerning these items, and the regulations governing them are technically the most difficult to apply and enforce. Further, even if these items are compliant when a building is constructed, they can be modified later by the property owner without the community's knowledge. In terms of damage reduction, however, the real cost savings result from ensuring that the first full finished floor is elevated above the BFE. As the tables presented in this report demonstrate, the percentages of fully compliant buildings in many of the cluster areas are low; however, a fair evaluation needs to distinguish between those types of violations that are and are not likely to result in significant damage to a building during the 1 percent annual chance flood.

As discussed in Section 1.3, the NFIP regulations set forth requirements that new and substantially improved buildings be constructed in ways that will minimize or prevent damage. Communities that guide development following the standards of the NFIP have seen positive results – new buildings and neighborhoods typically experience less damage from flooding.[35] This report does not address specifically the costs or consequences associated with noncompliance with specific NFIP building requirements, which would require additional modeling.[36] The data presented, however, are provided in a format that will allow the user to distinguish between violations that are likely to result in the building experiencing costly damages and those that are likely to result in minimal flood damages and costs. For example, a slab-on-grade building 2 feet below the BFE will likely sustain at least 20- to 30-percent damage in value in a 1 percent annual chance flood.[37] In contrast, a building with an air conditioning condenser 2 feet below the BFE, but otherwise fully compliant, will sustain damages limited to the cost of replacing the air conditioning unit, which has a useful life of only 7 to 10 years. To allow for detailed analysis of the survey findings, noncompliance found within the communities and buildings surveyed has been broken out in detail. The compliance category classifications, which were developed in coordination with FEMA, allow for distinction between violations, are as follows.

---

[35] Based on NFIP evidence that buildings built to the minimum NFIP standards suffer 80 percent less damage than unprotected buildings. Source: www.fema.gov/plan/prevent/floodplain/How_the_NFIP_works.shtm.

[36] See the *Costs and Consequences of Flooding and the Impact on the National Flood Insurance Program* (Sarmiento and Miller, 2006) study shows the financial impact of NFIP flood plain management guidelines by payer under different levels of flood insurance penetration.

[37] Based on depth damage curves used by FEMA to set actuarial flood insurance rates.

- Fully Compliant – Used for buildings with no compliance issues.
- Noncompliant-Within 6 inches – Used for any building with the lowest floor below the BFE by 6 inches or less and no other compliance issues. When other compliance issues were present, the Noncompliant-Within 6 Inches and Other Issues category was used (see below).
- Noncompliant-Within 6 Inches and Other Issues – Used for buildings with the finished floor or LHSM below the BFE by 6 inches or less where there are other compliance issues present such as lowest electrical and mechanical equipment (LEM) below the BFE, insufficient openings, etc.
- Noncompliant-Openings Issue – Used for buildings that do not meet the requirement that the flood openings have a net area of not less than one square inch for each square foot of enclosed area or where the bottom of the opening was not within one foot of grade.
- Noncompliant-LEM Issue – Used for buildings with electrical and mechanical equipment below the BFE. Most often this applied to heating, ventilation, and air conditioning (HVAC) units, either air conditioning condensers or heat pumps, with the top of the slab or platform below the BFE.
- Noncompliant-Multiple Issues. Used when multiple compliance issues apply. For instance, where the LEM were below the BFE and insufficient flood openings applied. The Noncompliant-Multiple Issues category was not used if the finished floor or LHSM was below the BFE. A description of the issues encountered with each individual building was recorded in the Comments section of the project database.
- Noncompliant-Finished Enclosure – Used to identify enclosed areas used as habitable living space below the BFE of Zone VE construction (Building Diagram Types 5 and 6).[38] The threshold set for this classification was that the enclosed finished space comprised more than 300 square feet but did not exceed more than one third of the square footage of the bottom level of the building. Finished enclosures exceeding one third of the square footage were classified as having their finished floor below the BFE and classified as Noncompliant-LHSM (see below).
- Noncompliant-Finished Space – Used to identify enclosed areas used as habitable living space below the BFE in Building Diagram Type 7 (building elevated on full-story foundation walls with a fully enclosed area below the elevated floor). This category was applicable in this study to buildings where the lowest finished floor was designed for parking, access, or storage but where a portion exceeding one third

[38] FEMA uses building diagram types to distinguish between different construction methods. Building Diagrams 5 includes all buildings elevated on piers, posts, piles, columns, or shear parallel walls with no obstruction below the elevated floor. Diagram 6 includes all buildings elevated on piers, posts, piles, columns, or shear parallel walls with a full or partial enclosure below the elevated floor. See subsection 3.2.2 (page 45) for full list of the building diagram types.

of the total bottom floor had been converted to habitable living space. When in doubt as to the use of the space, this categorization was not applied.

- Noncompliant-LHSM Issue – Used for coastal construction (Zone VE) with its LHSM more than 6 inches below the BFE. This category takes precedence and is used if the LHSM is more than 6 inches below the BFE regardless of whether other compliance issues also exist. The Noncompliant-Multiple Issues category is not used if the LHSM is more than 6 inches below the BFE.
- Noncompliant-In Floodway – Applied to buildings located within the floodway shown on the effective FIRM at the time of construction.
- Noncompliant- Lowest floor – Used for buildings with their lowest floor more than 6 inches below the BFE. This category takes precedence and is used if the lowest floor is more than 6 inches below the BFE regardless of whether other compliance issues also exist. The Noncompliant-Multiple Issues category is not used if the finished floor is more than 6 inches below the BFE.
- Undetermined – Applied when compliance could not be verified. Within this study, this classification was applied to 3 buildings where the GPS elevation data were lost and to 10 buildings located in AO Zones where the natural (pre-fill) ground elevation could not be obtained. The requirement in AO zones is that the building be above the highest adjacent grade of the natural ground elevation by an amount equal to the AO depth shown on the FIRM at the time of construction.

3. STUDY RESULTS

Participating communities are monitored individually on a regular, though fairly infrequent basis, and there have been studies of the performance of buildings under certain circumstances and in certain locales. But the overall questions of how well the NFIP is being administered across the United States, and what proportion of flood-prone buildings is built to the program's standards have been unanswered. It is those questions that this study has sought to address.

The data collected allow important observations to be made about compliance within areas where current and future flood risk is greatest and thus where success in compliance is most important. These surveys were concentrated primarily, but not exclusively, in many of the nation's most vulnerable communities (e.g., several in the New Orleans area) as well as in communities with high concentrations of policyholders across the country, such as coastal Florida and Texas.

The data gathered help address quantitatively, compliance with record-keeping requirements and construction standards for individual buildings. Section 3.1 presents the study results as regards community record keeping and retention. Section 3.2 presents the study results as regards the elevation surveys; it presents the results first by compliance classification categories (Section 3.2.1) and then by community and building characteristics (Section 3.2.2). The final section, Section 3.2.3, extrapolates select findings from the sample to communities and structures in the 10 clusters areas as a whole.

The tables and discussion in the sections that follow include point estimates derived from the sample of communities and buildings included in this study. These point estimates are based in some cases on limited numbers of communities or buildings that meet the criteria being evaluated. As a result, lower and upper confidence limits are provided for the point estimates to give the reader an understanding of the precision of the estimation. A large range between the lower and upper confidence interval signifies considerable uncertainty. For certain categories of compliance being evaluated, setting meaningful confidence intervals was not possible due to very small numbers of communities or buildings that meet the criteria being evaluated. In these instances, conclusions about rates of compliance outside the sample can not be drawn. All estimates provided in Study Part B are provided at the 95 percent confidence interval.

3.1. Community Record Keeping and Retention

Part of the field visit to each community included a review of the community's permit files. The permit file review served three purposes: 1) It allowed the study team to verify that the community was issuing building permits for all floodplain development, ensuring that the lowest floor elevation proposed and "as-built" were at or above BFE, and obtaining and retaining documentation of design and construction methods; 2) It allowed the study team to verify, when records were present, that the building met the sample criteria of having been constructed after January 1, 1990; and 3) It allowed the study team to determine whether the CRS communities in the sample had more complete permit files than the non-CRS communities.

The CRS, initiated in 1990, is an NFIP program that encourages communities to perform floodplain management activities that exceed the NFIP's minimum requirements by rewarding such communities with discounted flood insurance. Any community participating in the NFIP may join the CRS provided that the community is in full compliance with the NFIP's minimum requirements and that it makes a commitment to perform a minimum number of additional floodplain management activities. As a basic requirement, CRS communities must keep permit files that include Elevation Certificates for all structures built, substantially damaged, or substantially improved in the SFHA since the community entered the CRS. The CRS classes (one through nine, with Class 10 for not participating in the CRS and Class 1 for the highest level of participation) are based on 18 creditable activities, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Further information on the CRS is available at http://www.fema.gov/business/nfip/crs.shtm and in *An Evaluation of Compliance with the National Flood Insurance Program Part A: Achieving Community Compliance, Monday et al., 2006.*

3.1.1. Permit Files

As illustrated in Table 5, permit files were available for greater than 76 percent of the randomly selected buildings in 35 of the communities surveyed. In contrast, three communities were able to produce fewer than 25 percent of the permit files for the buildings selected for survey.

TABLE 5. Permit Files

Percentage of Permit Files Available	Number of Communities within Percentage Range	Percentage of Total Communities within Percentage Range
0 – 25%	3	6.0%
26% - 50%	4	8.0%
51% - 75%	8	16.0%
76% - 100%	35	70.0%
Total	50	100.0%

As discussed in Section 2.3.2, each community was contacted by phone and in writing in advance of the field visit. In addition, each was provided with a copy of the list of the randomly selected buildings to be surveyed. In most instances, the communities reviewed the list in advance, ensured that the selections complied with the Study Part B criteria,[39] and had the permit

[39] Buildings eligible for survey as Part of Study B were located within a detailed SFHA and built after January 1, 1990.

files pulled and ready for the survey team's visit. However, there were communities that made no preparation for the visit. For example, in one community, the CFM contacted the community three times while in the community for a week but did not gain access to the files because the community stated that they were too shorthanded to pull the files.

Within many of the communities, the survey team found that files containing the comprehensive set of records for flood prone buildings they sought to review did not exist. While most of the records were typically in the possession of the Zoning or Building Department, it was common for the team to be sent to the Engineering Department for elevation data and "as-built" plans. The survey team also encountered instances where the files had been archived off site and were discarded in accordance with a records management schedule used within the community, which may have contributed to low percentages of permit files being available in some communities.

The review of each permit file addressed the following issues:

- Was a building permit issued? If so, when was it dated?
- Was a fill permit issued?
- If the building was in the floodway, was there a "No-Rise Certificate"[40] on file?
- Was there an Elevation Certificate or the equivalent on file? If so, when was it dated?
- What was the date of the map panel, BFE, and flood zone at the time of construction?
- What was the lowest floor elevation, lowest adjacent grade, floodproofed elevation, etc., as recorded on the Elevation Certificate?
- Was a variance issued? If so, was justification provided?
- Was a post-construction inspection performed?
- Were the design and construction methods certified?

As illustrated in summary Table 6, communities participating in the CRS had a better record of making permit files available to the survey team. This may be the result of the focus that is placed on good record keeping and retention by the CRS. The overall average for non-CRS community permit file availability was 66.5 percent compared to 86.5 percent for CRS communities.

[40] Certification, presented prior to construction, that hydrologic and hydraulic analyses have been conducted and that these analyses demonstrate that the proposed encroachment will not increase flood levels within the community.

TABLE 6. CRS versus Non-CRS Community Permit File Availability

Community Type	Total Number of Permit Files Reviewed	Percentage of Permit Files Available[1]	Confidence Interval	
			Lower	Upper
Non-CRS Communities	756	66.5%	55.4%	81.4%
CRS Communities	835	86.5%	81.4%	93.8%

[1]95-Percent statistical confidence interval for estimate

3.1.2. Elevation Certificates

The availability of a FEMA Elevation Certificate or equivalent elevation data within the permit file for the randomly selected buildings was of particular interest, primarily because, as discussed in Sections 2.1.2 and 2.4.1, the study's approach to reducing the number of buildings to be physically surveyed included the review of the permit files for the existence of an Elevation Certificate or equivalent elevation data. When no Elevation Certificate or comparable elevation data was on file for a building, a physical survey of the building was performed. From the remaining pool of administratively surveyed buildings for which elevation data existed, enough buildings were randomly selected to ensure that physical surveys were conducted for a total of 25 buildings within the community. For example, if the permit file did not include elevation data for 15 out of the 35 pre-selected buildings, the 15 buildings without existing elevation data were physically surveyed, and 10 of the remaining buildings for which elevation data did exist in the permit files were randomly chosen to verify the accuracy of the existing survey.

Overall, Elevation Certificates or equivalent elevation data often were missing from community permit files, as illustrated by Table 7.

TABLE 7. Breakdown of the Number of Elevation Certificates or Equivalent Elevation Data

Percentage of Elevation Certificates or Equivalent Available	Number of Communities within Percentage Range	Percentage of Total Communities within Percentage Range
0 - 25%	6	12.0%
26% - 50%	14	28.0%
51% - 75%	7	14.0%
76% - 100%	23	46.0%
Total	50	100.0%

Elevation Certificates or equivalent elevation data were available more widely among the sample of communities participating in the CRS but did not reach rates expected for CRS communities given the requirement for obtaining and retaining Elevation Certificates for all floodplain development after participation in CRS begins. All of the CRS communities included in this study except one have participated in the NFIP since the early 1990s and thus should have been able to produce close to 100 percent of the Elevation Certificates requested in accordance with their commitment through CRS, which requires that they obtain and retain Elevation Certificates for all floodplain development.[41] A breakdown of availability of Elevation Certificates or equivalent elevation data for CRS versus non-CRS communities is shown in Table 8. It should be noted that since this table does not distinguish between true Elevation Certificates and equivalent "as-built" elevation data retained in the community permit file, the number of Elevation Certificates found within the sample are fewer than shown below.

TABLE 8. Availability of Elevation Data for CRS versus Non-CRS Communities

Community Type	Total Number of Permit Files Reviewed	Percentage of Permit Files Available[1]	Confidence Interval	
			Lower	Upper
Non-CRS Participant	756	44.2%	32.6%	57.8%
CRS Participant	835	72.1%	64.2%	83.0%

[1] 95-percent Statistical confidence interval for estimate

3.2. Elevation Survey Results

This Section of the report summarizes and characterizes the elevation survey results. Section 3.2.1 presents the elevation survey results by compliance classification categories (defined in Section 2.7). This section includes some analysis and possible explanations for the findings seen within the 1,253 buildings surveyed, but does not attempt to draw any inferences about violations that might be found in similar communities or structures found within the cluster areas they represent. Section 3.2.2 discusses elevation survey results by community and structure characteristics (discussed in Section 2.6) and attempts to answer the key study questions presented in Section 1.4 of this report. The questions are also presented again in Section 3.2.2 for the reader's reference. Within Section 3.2.2, the results of statistical tests of significance used to draw comparisons between community and structure characteristics are presented. Notably, for example, the analysis performed examines if statistically significant evidence can be found that better compliance exists within communities participating in the CRS than in non-CRS communities. All comparisons found within this section, unless otherwise noted, are based on statistical analysis and tests conducted at the 5-percent significance level (95-

[41] Twenty six of the communities surveyed participate in the CRS. Nine of the communities joined CRS in 1991, 12 joined in 1992, 2 joined in 1993, 2 joined in 1994, and the one joined in 2001. One additional community included in this study was accepted into the CRS in October 2005; however, since the date the community joined is after the date they were assessed, it is evaluated as a non-CRS community throughout this study.

percent confidence interval). The final section, Section 3.2.3, uses statistical tests to extrapolate findings from the sample to communities and structures in the 10 clusters areas as a whole.

3.2.1. Results by Compliance Classification Categories

The percentages of compliant and noncompliant buildings identified in the sample of the 1,253 buildings physically surveyed as part of Study Part B are presented in Table 9 and discussed below. A more detailed table showing a breakdown by cluster, community, and compliance category, is provided in Appendix B.

TABLE 9. Compliance Results

Compliance Category	Percentage	Confidence Interval[1] Lower	Confidence Interval[1] Upper
Fully Compliant	63.1%	58.0%	69.9%
Noncompliant-Low Floor	5.3%	3.4%	7.4%
Noncompliant-LHSM	0.2%	N/A[2]	N/A[2]
Noncompliant-Basement	1.9%	0.0%	4.2%
Noncompliant-Within 6"	1.4%	0.6%	2.1%
Noncompliant-Within 6" and Other Issue(s)	1.9%	0.9%	3.0%
Noncompliant-Finished Enclosure (Building Type 5 and 6)	1.3%	0.5%	2.1%
Noncompliant-Finished Space Issue (Building Diagram 7)	1.1%	0.0%	2.3%
Noncompliant-Flood Opening Issue	9.3%	6.2%	12.6%
Noncompliant-LEM Issue	9.3%	6.0%	13.0%
Noncompliant-Multiple Issues	3.8%	2.1%	5.4%
Noncompliant-Located within Floodway	0.3%	N/A[2]	N/A[2]
Undetermined	1.0%	0.0%	2.2%

[1]95-Percent statistical confidence interval for estimate.

[2]Insufficient number of data points to set meaningful confidence intervals.

Fully Compliant – Of the buildings surveyed, 63.1 percent (791) were found to be in full compliance with all of the building requirements of the NFIP. The 95 percent confidence interval for this estimate runs from 58.0 percent to 69.9 percent. This means that were we to repeatedly survey other communities or buildings within these clusters, 95 percent of the time we would find the percent of fully compliant buildings would be between 58.0 and 69.9 percent.

Noncompliant - Lowest floor Violations – Of the buildings surveyed, 7.2 percent (90) had their lowest floors more than 6 inches below BFE. The 7.2 percent is comprised of the following:

- Noncompliant – Lowest floor (Zone AE): Sixty-six (5.3 percent) of the buildings in the sample had their lowest floor more than 6 inches below BFE. The confidence interval for this estimate runs from 3.4 percent to 7.4 percent. The majority of the violations are found in single family detached residential homes located in Zone AE. In several instances, elevated buildings with non-compliant enclosures were included

- in this category. The lowest floor elevation in most of these buildings is 1 to 3 feet below BFE. These buildings generally are subject to high flood insurance rates.
- Noncompliant LHSM (Zone VE): Three (0.2 percent) of the buildings found in the sample had their LHSM more than six inches below BFE[42].
- Noncompliant – Basement: Twenty four (1.9 percent) of the buildings within the sample have basements below BFE. Sixteen of these noncompliant basement buildings are in one subdivision. The basements in this subdivision are generally 1 to 3 feet below BFE. Further investigation into this community revealed that Letter of Map Revision requests based on fill (LOMR-F)[43] applications were submitted to FEMA both prior to and after the construction of the subject subdivision. The FEMA response letters to the request to remove the area from the SFHA by LOMR-F were denied and identified widespread compliance problems within the community. Specifically, the response letters identified 17 buildings with basements built below the BFE, eight of which were determined to be located within the floodway. It is unclear which, if any, of the buildings noted in the letters described above and within the sample overlap. Nonetheless, the community has a pattern of noncompliance that has been identified on more than one occasion.

  The flood depths that would be expected during the 1 percent annual chance flood do not appear to be high enough within the buildings sampled to result in overtopping or failure of the basement walls or floors. Nonetheless, the flood insurance premiums on these building will reflect their exposure to damages. Because of limitations on basement coverage, the rates for noncompliant basements are much lower than for buildings without a basement with lowest floor violations at the same elevation.

Noncompliant - Lowest Floor Violations within 6 Inches of BFE and Noncompliant within 6 Inches and Other Issues – Of the buildings in the survey, 3.3 percent (41) have their lowest floor 6 inches or less below BFE[44]. Most of these buildings are only 1-2 inches below BFE. These probably are not intentional violations of the regulations and may be errors on the part of the surveyor that established the elevation at the time of construction. The following factors must be considered:

- For flood insurance rating purposes, these buildings are rounded up and rated as being at BFE.

---

[42] Upper and lower confidence levels are not provided due to the small number buildings in the sample found within the compliance category.

[43] A LOMR-F is an official revision, by letter, to an effective NFIP map. A LOMR-F provides FEMA's determination concerning whether a structure or parcel has been elevated on fill above the BFE and excluded from the SFHA. The letter becomes effective on the date sent.

[44] 1.4 percent (17) buildings were found to have their lowest floor within 6 inches of the BFE and 1.9 percent (24) buildings were found to be have their lowest floor within 6 inches of the BFE and other compliance issues.

- Many of these violations may result from surveyor error and may have been thought by the community to be compliant buildings.
- Some of the differences may be due to how the surveyor and/or community interpolated between cross sections in establishing the BFE and how Dewberry interpolated those same elevations. It is very difficult to read the BFE from the flood profile to 0.1- or 0.2-foot accuracy.
- Dewberry is confident that their GPS elevation surveys are accurate to ± 5 cm or about 2 inches at the 95 percent confidence level; however, it is unclear what assumptions can be made about the accuracy of local surveyors. Further discussion on elevation surveys is included in subsection 2.6.4.

These buildings point out the need for accurate surveys as well as the advisability of constructing buildings above BFE rather than trying to place the top of the floor at BFE as builders appear to have done in several of the communities surveyed. The NFIP encourages communities to regulate development beyond the minimum NFIP standards through programs such as the CRS. In addition, some states also require that their communities regulate to a higher standard for certain aspects of floodplain management. Nineteen states have stricter building construction requirements than does the NFIP. The most common additional standard is freeboard (requiring new buildings to be elevated higher than the BFE). Typically, one to two feet of freeboard is applied. This additional protection has multiple benefits including: lowering flood insurance premiums,[45] allowing for errors that may be introduced by inaccurate interpretation of flood profiles, benchmarks, and surveying errors, as well as providing added protection against increased flood levels brought about by future development.

Noncompliant Buildings with Finished Enclosures below BFE (Building Diagram Type 5 and 6)[46] – Of the buildings surveyed, 1.3 percent[47] (16) had finished enclosures below BFE. This study distinguished between enclosed areas used as habitable living space below the BFE of Zone VE post, pile, or column construction and buildings elevated on full-story foundation walls below the elevated floor (Building Diagram Type 7). The "finished enclosure" classification was applied to pile and column buildings (Building Diagram 5 and 6) built to Zone VE standards. Within our sample, these buildings typically had the majority of the area under the elevated floor reserved for parking but in each case had an enclosed finished room with non-flood resistant materials and furnishings.

---

[45] Flood insurance premiums for post-FIRM buildings are actuarial, meaning they are based on the known risk the building is exposed to. Post-FIRM buildings base the risk on the elevation of the lowest finished floor in relation to the BFE. The higher the floor is above the BFE, the lower the rate.

[46] Building Diagrams 5 includes all buildings elevated on piers, posts, piles, columns, or shear parallel walls with no obstruction below the elevated floor. Diagram 6 includes all buildings elevated on piers, posts, piles, columns, or shear parallel walls with a full or partial enclosure below the elevated floor. See subsection 3.2.2 (page 45) for a full list of the building diagram types.

[47] The confidence interval for this estimate runs from 0.5 percent to 2.1 percent.

Noncompliant Buildings with Finished Space below BFE (Building Diagram Type 7) – Of the buildings surveyed, 1.1 percent[48] (14) had finished enclosures below BFE. As noted above, this study distinguished between finished enclosed areas found within Zone VE construction and buildings elevated on full-story foundation walls below the elevated floor. The "Finished Space" classification applied in this category is applicable to Diagram 7 buildings (buildings elevated on full-story foundation walls with a partially or fully enclosed area below the elevated floor). The walls of the enclosures in this category are subject to hydrostatic and hydrodynamic forces. The buildings within the sample placed in this category typically had a garage and adjacent fully finished room with non-flood-resistant materials such as carpeting, wall board (drywall or sheet rock), and household furnishings. These types of violations can be hard to identify definitively in the field, and it is possible that some finished enclosures were designated as unfinished by the survey team. When the survey team was uncertain as to the use of the space, they assumed the space was used for storage only and did not recognize the room as finished space.

Noncompliant - Openings Issue – Of the buildings surveyed, 9.3 percent (117) do not meet the flood openings requirements at 44 CFR §60.3(c)(5). The 95 percent confidence interval for this estimate runs from 6.2 percent to 12.6 percent. The openings requirement was added to the regulations in the 1986 revision and was not incorporated into community ordinances until the late 1980s or early 1990s. It is possible that some buildings without openings were built in compliance with the community ordinance in effect at the time of construction. Some observations on openings within the survey are as follows:

- Buildings with Insufficient Openings: Seventy-two of these buildings have openings but the number or size of the openings is insufficient to meet the 1-square-inch-per-1-square-foot criteria. Many of these buildings have 50 to 90 percent of the required area and fall within the factors of safety built into the requirement.
- Coastal AE Zones: Although the NFIP encourages Zone VE type construction in coastal AE Zones subject to wave impacts, openings are required in breakaway walls built in a coastal Zone AE. 13 of the noncompliant buildings identified by this study as having insufficient openings are pile and column buildings that appear to be built to Zone VE standards in Zone AE. One subdivision that contains five of these buildings has since been re-mapped as Zone VE. These buildings may have been built to Zone VE standards in anticipation of the re-mapping. While these buildings are noncompliant, they were observed to have "performed well under Zone VE flooding conditions during Hurricane Ivan" (Robinson, 2005).
- Stem Wall Foundations: Stem wall foundations (also called raised slabs) do not require openings since they are back-filled to above the BFE. In the field, it is difficult to distinguish these buildings from crawl space buildings. As a result, Study Part B may have identified buildings of this foundation type as noncompliant. However, because most of the openings violations found were the result of

[48] The confidence interval for this estimate runs from 0 percent to 2.3 percent.

inadequate opening size, it is anticipated that the misclassification will have little to no impact on the percentage of buildings in the category.

- Attached Garages: Sixteen of the buildings have attached garages with their floors below BFE and without openings. The slab for the living area of these buildings is at or above BFE, but to meet the requirements of local building codes in many states, the garage floor has to be 6 or more inches lower. Many of these garage floors are approximately 6 inches below BFE. If these buildings had compliant openings, the openings would be above the BFE to meet the 1 foot above grade requirement and would thus not serve to allow the free flow of flood waters during the 1 percent annual chance flood as intended by the openings requirement.
- Buildings Openings that are Too High: Eighteen buildings have openings that are more than 1 foot above the lowest adjacent grade. Some of these may, in fact, be openings to allow air flow in lieu of flood waters. In other instances, the problem may be in how the lot was graded and landscaped after the construction was completed.
- Older Buildings: Many of the buildings with no openings were built between 1990 and 1992 when communities were just adopting the requirement. The requirement may not have been included in the community ordinance or not well understood by local officials and builders.

Although these buildings are violations of the local ordinance, many are unlikely to sustain significant damage during a 1 percent annual chance flood.[49] For the walls to collapse due to hydrostatic pressure, there generally would have to be a difference of several feet between the floodwaters outside the building and those inside the buildings, or there would have to be high-velocity floodwaters. It is unlikely that many of the buildings found within the sample would suffer severe damage under base flood conditions. Further, many of the buildings surveyed either have enough openings to be within the factors of safety of the requirement or have garage doors that will leak enough to equalize the hydrostatic pressures.

Noncompliant - Electrical and Mechanical Equipment (LEM) Issue – Of the buildings surveyed, 9.3 percent (117) have electrical and mechanical equipment below the BFE. The confidence interval for this estimate runs from 6.0 to 13.0 percent. In nearly all cases, these were HVAC units, either air conditioning condensers or heat pumps, with the top of the slab or platform below the BFE. These units are designed to be outside in the weather and can take a certain amount of moisture but not inundation of their electrical motors. In rating flood insurance premiums, HVAC equipment generally is not considered.

- The majority of these violations are HVAC units placed on concrete pads on the ground next to slab buildings. These HVAC units are generally 6 inches or less below the BFE. These units will probably survive a base flood with little or no

[49] Solid walls can collapse if floodwaters get too deep. To prevent collapse the enclosure must have openings to allow floodwaters to enter and exist, thus automatically equalizing hydrostatic flood forces on the walls.

damage. The reason for the large number of violations may be that communities are verifying that the slab of the building is at the proper elevation but not inspecting the property to ensure that the HVAC equipment is installed above the BFE. HVAC contractors generally install HVAC units late in the construction process. The contractor places a pre-fabricated pad on the ground and installs the HVAC unit on top of that pad. Because the pad is typically placed at natural ground level rather than at a level consistent with the slab of the building, the HVAC unit is situated below BFE. Generally, many of these HVAC units could be made compliant with a wheelbarrow full of gravel placed under the concrete pad.

HVAC units that are only a few inches below the BFE may not sustain damage. Besides being weather resistant, the HVAC unit itself is elevated slightly above the pad, and the lower part of the unit generally consists of sealed coils. Electrical motors that can be damaged are generally at the top of the unit. HVAC units generally have a limited economic life and can be replaced at reasonable cost. In some climates, damage to HVAC units may result in residences being uninhabitable until the unit is repaired or replaced.

- The other violations found were generally HVAC units placed on the ground next to other types of foundations. These units are often 1 to 3 feet below BFE and will sustain significant damages during a base flood.

Noncompliant - Building located within the Floodway – Four buildings within the sample were found to be located within the floodway[50]. All four were located in one community. Two of the buildings were located within the same subdivision, and all four buildings were located along the same flooding source. Three had their lowest finished floor above BFE, and the fourth had its lowest finished floor within 6 inches of BFE. Three out of the four buildings also had Elevation Certificates and permits available within the community file. The dates of construction spanned from 1995 to 2000. During this time span, the community maps in effect included the published FIRM and a separately published Flood Boundary Floodway Map (FBFM) that depicted the boundaries of the floodway. It cannot be stated with any certainty, but the study team believes that the FBFM panels may not have been in use at the community. In the late 1980s, FEMA discontinued the practice of creating separately published FIRMs and FBFMs and began combining the two maps into one product, the FIRM. This combining of the two maps was done after more than two years of review and discussion of the NFIP map products by a task force comprised of representatives from the major map user groups. The maps for the community were not revised and put into the new map format until 2002, well after most communities' FIRMs and FBFMs had been combined. It is speculated that this could have contributed to confusion about the FBFM and resulted in it not being used. Based on the few occurrences of buildings found to have been built within the floodway, it is surmised that

[50] Upper and lower confidence levels not provided due to the small number buildings in the sample found within the compliance category.

communities are generally doing an adequate job of keeping new development out of the floodway.

3.2.2. Results by Community and Building Characteristics

Section 3.2.2 characterizes levels of compliance by community characteristics (geographic area, population, per-capita income, source of flooding, CRS participation, flood zone, insured versus uninsured, date of construction, construction method, and building type/usage). The results are analyzed in an effort to answer the following questions:

- Size or Type of Community: Can any conclusions be drawn about the types or sizes of the communities that have higher and lower compliance rates?
- CRS: Are rates of compliance higher in CRS communities? Are there explanations for any differences between CRS and non-CRS communities other than their participation in the CRS?
- Geographic Areas: Are there regional differences in levels of compliance? Do some parts of the nation appear to have lower or higher levels of compliance than others?
- Flooding Source: Does coastal construction have higher or lower rates of compliance than buildings subject to other flooding sources?
- Foundation Types: Are there differences in rates of compliance for different types of building foundations?
- Occupancy Types: Are there marked differences in the rates of compliance for single family versus multi-family and commercial/industrial buildings?
- Age of the Building: Has the level of compliance increased over time?

Included below is a discussion of the compliance findings by community characteristics across all cluster areas.

Geographic Area – The 10 clusters selected for this study are located primarily in the areas with the preponderance of NFIP post-FIRM policies and include primarily coastal communities on the Atlantic, Gulf, and West coasts and inland communities in the Southwest and along the Mississippi River. The geographic areas and the clusters and states they include are shown in Table 10.

TABLE 10. Geographic Areas and Their Clusters and States

Geographic Area	Cluster	States
Atlantic Coast	Mid-Atlantic, Washington/Baltimore, Coastal North Carolina/Virginia	New Jersey, Delaware, Maryland, Virginia, North Carolina
Gulf Coast	Florida-West Coast, Florida Panhandle, Louisiana, Coastal Texas	Florida, Alabama, Louisiana, Texas
Inland Mississippi River	Mississippi River	Illinois, Missouri
West Coast	California-North	California
Inland Southwest	Southwest	Arizona

Our results show that geography does matter. Our analysis suggests that rates of compliance are better in the Southwest and lower on the West Coast. When looked at on a cluster by cluster basis, better rates of compliance were found in the Southwest and Washington-Baltimore cluster and lower rates of compliance were found in the California-North, Coastal Texas, and Florida Panhandle clusters. It is speculated that these differences in rates of compliance are attributable to the prevailing building construction method found within the region. Generally higher rates of compliance were observed in communities with primarily slab-on-grade construction such as that found in the Southwest and Washington-Baltimore clusters and lower rates in communities that use various types of elevated foundations such as were found in the California-North, Coastal Texas, and Florida Panhandle clusters.

TABLE 11. Compliance Comparison by Geographic Region

Geographic Region	Total No. of Surveyed Buildings	Fully Compliant[1]	Confidence Interval		Non Compliant (All Categories)[1]	Confidence Interval		Undetermined[2]
			Lower	Upper		Lower	Upper	
Atlantic Coast	379	70.7%	61.2%	80.2%	29.3%	19.8%	38.8%	0.0%
Gulf Coast	501	59.1%	50.7%	67.6%	33.7%	32.4%	49.3%	7.2%
Inland Mississippi River	124	58.9%	20.9%	99.4%	41.1%	0.6%	79.1%	0.0%
West Coast	125	52.8%	16.7%	88.9%	42.7%	11.1%	83.3%	4.5%
Inland Southwest	124	71.0%	41.7%	93.8%	23.3%	6.2%	58.3%	5.7%

[1]95-Percent statistical confidence interval for estimate

[2]Insufficient number of data points to set meaningful confidence intervals.

Population – For analysis purposes, this study places communities into groups based on their permanent resident population as found on the Census Bureau website. The data were stratified by population to determine whether larger communities have better rates of compliance than smaller communities. The rates of fully compliant buildings range from an average of 57.4 percent in the smallest communities (population below 9,999) to a high of 86.3 percent in the larger communities (population ranging from 500,000 to 999,999). Table 12 compares community compliance by population range. We found little evidence of a strong relationship between the size of the community and the number of compliant buildings. It should be noted that many tourist destinations are included in the overall sample; thus, the population included in Census is not a true indicator of the communities' actual size. Rather, it reflects only the population of full-time, year-round residents. Given this fact, no definitive conclusions or explanations for the possible differences are offered about the impact of community size on compliance within the sample.

TABLE 12. Community Compliance by Population

Population Range	No. Communities in Population Range	Total No. of Surveyed Buildings	Percent Fully Compliant[1]	Confidence Interval		Percent Noncompliant (All Categories)[1]	Confidence Interval	
				Lower	Upper		Lower	Upper
Below 9,999	13	329	57.7%	46.70%	68.78%	42.3%	31.22%	53.30%
10,000-49,999	15	370	62.2%	50.66%	73.72%	37.8%	26.28%	49.34%
50,000-99,000	9	226	68.8%	49.60%	87.96%	31.2%	12.04%	50.40%
100,000-499,999	8	203	61.3%	47.07%	75.43%	38.8%	24.57%	52.93%
500,000-999,999	2	51	86.2%	N/A[2]	N/A[2]	13.8%	N/A[2]	N/A[2]
Over 1,000,000	3	74	60.9%	N/A[2]	N/A[2]	39.1%	N/A[2]	N/A[2]

[1]95-percent statistical confidence interval for estimate.

[2]N/A - Number of data points are insufficient to set meaningful confidence intervals.

Per-capita Income – For the purposes of this study, communities were placed into three groups based on their per-capita income as found on the Census Bureau website: 1) per-capita income less than $19,999; 2) per-capita income $20,000 to $29,999; and 3) per-capita income $30,000 or higher. The data were stratified by per-capita income to determine whether communities with more economic resources have better compliance. As shown in Table 13, the study found that rates of fully compliant buildings are strikingly similar across all per-capita income categories identified for this study. However, many of the communities in the Study Part B sample are tourist destinations and, thus, per-capita income may not be truly indicative of the community tax base and resources. The number of communities within the sample that are participating in the CRS provides further evidence of the resources and commitment to floodplain management of the communities in the sample that may not be fully evident without looking at other variables in conjunction with per-capita income.

TABLE 13. Compliance by Communities' Per-Capita Income

Per Capita Income Group	No. Communities in Income Range	Total No. of Surveyed Buildings	Percent Fully Compliant[1]	Confidence Interval		Percent Noncompliant (All Categories)*	Confidence Interval	
				Lower	Upper		Lower	Upper
Group 1: Per-Capita Income Less Than $19,999	16	405	64.3%	52.4%	76.1%	35.7%	23.9%	47.6%
Group 2: Per-Capita Income $20,000 to $29,999	23	553	63.0%	54.2%	71.9%	37.0%	28.1%	45.8%
Group 3: Per-Capita Income $30,000 or Higher	11	270	60.8%	46.5%	75.1%	39.2%	24.9%	53.5%

[1]95-Percent statistical confidence interval for estimate

Source of Flooding – Each NFIP community carries a classification in FEMA's Community Information System as being subject to either inland or coastal flooding. "Coastal flooding includes flooding from any body of water subject to tidal fluctuations and includes large numbers of communities on estuaries. For example, Albany, New York is a coastal community since the Hudson River is tidal within the city limits. Communities classified as coastal can also be subject to flooding from rivers that are not associated with tidal fluctuations. It should be further noted that coastal communities may or may not include "V" flood zones. V Zones are areas that are inundated by tidal floods with velocity waters and breaking waves. The classification of each community was further validated through the 44 CFR §60.3 level of regulations field in the Community Information System or, where absent, through the flood hazard information present on the FIRM for the community.

Generally, our analysis showed that no significant difference exists in the rate of compliance between buildings affected by coastal versus inland flooding. At the onset of this study, it was surmised that a greater occurrence of lowest floor violations would be found in buildings subject to inland flooding than in buildings subject to coastal flooding. This assumption was made based on the complexity of determining the BFE along riverine flooding sources and of elevating the foundation to the proper height. BFEs along the coasts and lakes and in ponding and shallow flooding areas (AH and AO Zones) are printed on the FIRM in parentheses below the flood zone designation and, thus, not subject to interpretation. On the other hand, BFEs along river channels typically must be interpolated using the published flood profile.[51] Using flood profiles can be difficult. While this study did not find evidence that the fraction of buildings with lowest floor violations in coastal versus inland flooding sources was significantly different, it is nonetheless speculated that some of the violations found may be due

[51] A flood profile is a graph showing the relationship of water surface elevations to a specific location, the latter generally is expressed as a distance above a mouth of a stream or confluence.

to how the surveyor and/or community interpolated between cross sections in determining the BFE.

It is also believed that lowest floor violations may have resulted from the use of unstable bench marks by the local surveyors. Most land surveyors cannot afford the time to determine or use the most accurate benchmark as their starting point (base station) for Elevation Certificate surveys. Instead, to keep costs to a minimum, surveyors normally select any benchmark that is nearest to the property to be surveyed. Accuracy to them is less important than selecting benchmarks based on proximity and convenience of use; to do otherwise would remove their profit incentive. This is not a violation of professional ethics but is standard practice. FEMA's own Elevation Reference Marks are notorious for being inaccurate and unstable, and, therefore, they are no longer being used on new Digital FIRMs. When a surveyor starts from an elevation that is erroneous, the Elevation Certificate's elevation of lowest floor, lowest adjacent grade, highest adjacent grade, etc., will also have errors, even if the most accurate conventional or GPS survey procedures are used to extend control from the benchmark to the structure being surveyed.

A second observation made about the difference in percentages of noncompliant buildings in coastal versus inland areas, albeit not statistically significant, is that there is a higher occurrence of problems with flood openings in the coastal sample. As discussed in Section 2.5, contributing to the higher number in coastal areas is the number of buildings in coastal Zone AE built to Zone VE standards. In addition, a variety of foundations are used in coastal communities because of the variations in flood depth, which may result in more problems with flood openings in these areas than in areas where slab foundations are the norm. Table 14 compares compliance of buildings subject to inland and coastal flooding sources.

TABLE 14. Compliance of Buildings Subject to Inland versus Coastal Flooding

Community Type	No. of Communities Represented	Total No. of Surveyed Buildings	Percent Fully Compliant[1]	Confidence Interval		Percent Noncompliant (all Categories)[1]	Confidence Interval		Undetermined[2]
				Lower	Upper		Lower	Upper	
Coastal	31	779	59.9%	53.1%	66.8%	39.7%	33.2%	46.9%	0.4%
Inland	19	449	68.4%	56.5%	79.3%	29.5%	20.7%	43.5%	2.1%

[1]95-Percent statistical confidence interval for estimate.

[2]Insufficient number of data points to set meaningful confidence intervals.

Community Rating System – As discussed in Section 3.1.2, all of the CRS communities included in this study have participated in CRS since the early 1990s except one which joined in 2001. As a result, at the start of this study the team expected to find better rates of compliance among communities participating in the CRS than in those not participating in the program. The percentage of fully compliant structures within the group of CRS and non-CRS communities, however, are strikingly similar (62.2 as opposed to 64.1 percent, respectively), and, thus, there is no evidence to support that compliance is better or worse in CRS than in non-CRS communities.

However, there is significant evidence to suggest that fewer lowest floor and LHSM violations are found in the CRS communities as compared to non-CRS communities.

Also of interest was the number of violations found in one of the individual CRS communities. One community has a low CRS classification,[52] but within the community, the survey team identified numerous problems including five lowest floor violations, five finished enclosures, problems with flood openings, etc. In contrast, there were five CRS communities that had 90 percent or more of their buildings in full compliance with all of the NFIP requirements. A comparison of the number and percentage of fully compliant structures within the CRS communities versus the non-CRS communities in the sample is shown in Table 15.

TABLE 15. Compliance of CRS Communities and Non-CRS Communities

Communities Type	No. of Communities Represented	Total No. of Surveyed Buildings	Percent Fully Compliant[1]	Confidence Interval		Percent Noncompliant (all Categories)[1]	Confidence Interval		Undetermined[2]
				Lower	Upper		Lower	Upper	
CRS	26	648	62.2%	53.0%	70.1%	36.60%	29.9%	47.0%	1.20%
Non-CRS	24	605	64.1%	55.7%	73.2%	35.00%	26.8%	44.3%	0.9%

[1]95-Percent statistical confidence interval for estimate.

[2]Insufficient number of data points to set meaningful confidence intervals.

Flood Zone – Generally our analysis showed a significantly better rate of compliance in Zone AO than in other flood zones. Elevations associated with Zone AO are represented on the FIRM as whole foot elevations. All new construction and substantial improvements of residential buildings must have the lowest floor (including the basement, if any) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified). As discussed above, it is theorized that the existence of a whole foot flood depth or elevation that is clearly identified on the FIRM, may increase the accuracy of the flood elevation determined and placement of fill or the lowest floor. The Zone AO buildings found within our sample were primarily slab-on-grade construction on filled pads and predominantly located in the Southwest and Coastal Texas. Slab-on-grade construction is one of the easiest construction methods for which to determine the proper lowest floor elevation. While on a whole there is no evidence of significant differences in rates of compliance other than in AO zones, there is mild evidence to suggest that VE Zones have a higher fraction of buildings with LHSM violations than found in the other flood zones. An overall summary that breaks down the sample by flood zone and compliance is included below.

[52] A low CRS classification as defined here is a classification between 5 to 7. To protect the anonymity of the community, the specific classification for NOCA-1 is not provided here.

TABLE 16. Building Compliance by Flood Zone

Flood Zone	Total No. of Buildings Surveyed	Percent Fully Compliant[1]	Confidence Interval		Percent Noncompliant-All Categories[1]	Confidence Interval		Undetermined[2]
			Lower	Upper		Lower	Upper	
AE	1,046	61.9%	58.6%	69.3%	37.1%	30.7%	41.4%	0.2%
AH	38	65.8%	24.3%	98.4%	34.2%	1.6%	75.7%	0.0%
AO	103	78.6%	74.7%	98.9%	14.6%	1.1%	25.3%	10.7%
VE	66	57.6%	29.2%	79.1%	42.4%	20.9%	70.8%	0.0%
Total	1253							

[1]95-Percent statistical confidence interval for estimate.

[2]Insufficient number of data points to set meaningful confidence intervals.

Insured versus Uninsured – As discussed in Section 2.2 of this report, the study team acquired address information from First American Real Estate Solutions for the purpose of obtaining a comprehensive set of addresses of buildings located within the detailed SFHAs within the Study Part B community sample. These addresses then were processed against addresses found in FEMA's BureauNet Policy-in-Force database to identify those structures covered and not covered by an active flood insurance policy. Including both insured and uninsured buildings within the sample was important because through this verification of compliance, FEMA sought to ascertain if flood insurance may have been dropped for structures where serious violations may have resulted in high premiums. Marginally significant evidence was found of a relationship between compliance and uninsured buildings. Table 17 shows the percentage of insured and uninsured buildings broken down into compliant, noncompliant, and undetermined categories.

TABLE 17. Building Compliance by Insured versus Uninsured

Structure Type	Total No. Surveyed	Fully Compliant[1]	Confidence Interval		Noncompliant (All Categories)[1]	Confidence Interval		Undetermined[2]
			Lower	Upper		Lower	Upper	
Insured	981	63.6%	53.8%	69.5%	36.4%	30.5%	46.2%	0.0%
Uninsured	272	58.8%	46.5%	68.3%	41.2%	31.7%	53.5%	0.0%

[1]95-Percent statistical confidence interval for estimate.

[2]Percentage total small to be shown or to set meaningful confidence intervals.

Date of Construction – Study Part B looks at the number of building constructed from 1990 to 2004 by compliance category. Table 17 compares compliance category by date of construction during three segments of this time period: 1990 to 1995, 1996 to 2000, and 2001 to 2004. The analysis showed a significant increase in the percentage of fully compliant buildings from the earliest to the most recent time period. While a decline in the percentages of buildings with basement and lowest-floor violations can be seen in Table 18, statistical analysis of the data

did not demonstrate a significant trend of improvement over time. The specific improvement in the number of basement violations can be explained by the fact that 16 of the 24 total basement violations are located in one subdivision built during the time period 1990-1995 in community.

TABLE 18. Building Compliance by Date of Construction

Compliance Category	Date of Construction 1990-1996[1]	Confidence Interval Lower	Confidence Interval Upper	Date of Construction 1996-2001[1]	Confidence Interval Lower	Confidence Interval Upper	Date of Construction 2001-2005[1]	Confidence Interval Lower	Confidence Interval Upper
Fully Compliant	53.1%	48.5%	66.2%	66.2%	57.4%	71.2%	71.3%	58.2%	77.8%
Noncompliant-LEM Issue	10.9%	9.0%	24.1%	9.7%	9.0%	19.5%	7.6%	3.8%	15.1%
Noncompliant-Multiple Issues	4.1%	3.3%	17.0%	3.2%	3.5%	12.6%	4.0%	1.6%	14.0%
Noncompliant-Flood Opening Issue	13.0%	9.1%	23.5%	7.1%	8.4%	18.4%	8.0%	4.8%	24.6%
Noncompliant-Within 6"	1.6%	0.8%	8.9%	1.1%	0.8%	8.1%	1.2%	0.0%	21.0%
Noncompliant-Within 6" and Other Issue(s)	2.3%	4.9%	14.3%	2.1%	0.6%	8.4%	0.8%	0.0%	7.6%
Noncompliant-Basement	4.1%	0.0%	55.2%	0.7%	0.0%	33.8%	0.8%	0.0%	22.0%
Noncompliant-Finished Enclosure	1.1%	0.0%	20.0%	1.2%	0.8%	11.1%	1.6%	0.0%	20.2%
Noncompliant-Finished Space Issue	2.1%	N/A[2]	N/A[2]	0.9%	N/A[2]	N/A[2]	0.8%	N/A[2]	N/A[2]
Noncompliant-In Floodway	0.9%	N/A[2]	N/A[2]	0.2%	N/A[2]	N/A[2]	0.4%	N/A[2]	N/A[2]
Noncompliant-LHSM	0.5%	N/A[2]	N/A[2]	0.2%	N/A[2]	N/A[2]	0.0%	N/A[2]	N/A[2]
Noncompliant-Low Floor	5.7%	2.7%	16.7%	5.8%	7.1%	14.0%	3.2%	0.0%	18.0%
Undetermined	0.7%	N/A*	N/A*	1.6%	N/A[2]	N/A[2]	0.4%	N/A[2]	N/A[2]

[1]95-Percent statistical confidence interval for estimate.

[2]Percentage total small to be shown or to set meaningful confidence intervals.

Building Construction Method – Eight building diagrams are used by FEMA to distinguish between construction methods under the NFIP. These classifications are applied to ensure uniformity in the preparation of Elevation Certificates and for validating building elevation information and the appropriate insurance premium rate. Descriptions of the building types in each diagram follow:

- Diagram 1 – All slab-on-grade single- and multiple-floor buildings (other than split-level) and multi-story buildings either detached or row type (e.g., townhouses); with or without attached garage.
- Diagram 2 – All single- and multiple-floor buildings with basement (other than split-level) and multi-story buildings with basement either detached or row type (e.g., townhouses); with or without attached garage.

- Diagram 3 – All split-level buildings that are slab-on-grade either detached or row type (e.g., townhouses); with or without attached garage. The distinguishing feature that sets Diagram 3 apart from Diagram 4 is the bottom floor (excluding garage) is at or above ground level on at least one side.
- Diagram 4 – All split-level buildings (other than slab-on-grade), either detached or row type (e.g., townhouses); with or without attached garage. The distinguishing feature that sets Diagram 4 apart from Diagram 3 is the bottom floor (basement or underground garage) is below ground level (grade) on all sides.
- Diagram 5 – All buildings elevated on piers, posts, piles, columns, or shear parallel walls. No obstruction below the elevated floor.
- Diagram 6 – All buildings elevated on piers, posts, piles, columns, or shear parallel walls with full or partial enclosure below the elevated floor.
- Diagram 7 – All buildings elevated on full story foundation walls with a partially or fully enclosed area below the elevated floor. This includes walkout levels, where at least one side is at or above grade. The principal use of this building is located in the elevated floors of the building.
- Diagram 8 – All buildings elevated on a crawl space with the floor of the crawl space at or above grade on at least one side, with or without an attached garage.

As illustrated in Table 19, good levels of compliance were found within Diagram 1 (slab-on-grade) and Diagram 3 (split-level buildings that are slab-on-grade with the bottom floor at or above ground level on at least one side). Evidence of worse compliance was seen among Building Diagram 4 (split-level buildings that are slab-on-grade with the bottom floor basement or underground garage below ground level on all sides) and 7 (buildings elevated on full story foundation walls with a partially or fully enclosed area below the elevated floor). Openings were problematic for Diagram 6 (buildings elevated on piers, posts, piles, columns, or shear parallel walls with full or partial enclosure below the elevated floor), Diagram 7 and Diagram 8 (buildings elevated on a crawl space with the floor of the crawl space at or above grade on at least one side). These finding lend further support to the general observation that higher rates of compliance were observed in communities with primarily slab-on-grade construction and lower rates in communities that use various types of elevated foundations.

TABLE 19. Building Compliance by Building Diagram Number

Building Diagram Number	Total No. of Buildings Surveyed	Fully Compliant[1]	Confidence Interval		Noncompliant-All Categories[1]	Confidence Interval		Undetermined[2]
			Lower	Upper		Lower	Upper	
1	627	71.5%	60.7%	77.6%	26.4%	22.4%	39.3%	2.1%
2	58	55.2%	14.4%	80.7%	44.8%	19.3%	85.6%	0
3	13	76.9%	30.5%	100.0%	23.1%	0.0%	69.5%	0
4	3	33.3%	N/A[2]	N/A[2]	66.7%	N/A[2]	N/A[2]	0
5	58	60.3%	35.3%	76.8%	39.7%	23.2%	64.7%	0
6	151	58.9%	34.3%	66.9%	41.1%	33.1%	65.7%	0
7	77	35.1%	11.6%	49.3%	64.9%	50.7%	88.4%	0
8	266	52.6%	41.7%	66.3%	47.4%	33.7%	58.3%	0
Total Surveyed	1,253							

[1]95-Percent statistical confidence interval for estimate.

[2]Insufficient number of data points to set meaningful confidence intervals.

Building Types/Usage – To allow for detailed analysis of the compliance findings as they relate to the type and building uses found within our sample, the study team identified and recorded the following classifications of buildings:

- Single Family Detached
- Duplex
- Townhouse or Row House
- Manufactured home
- Multi-Family (Condos or Apartments)
- Commercial/Industrial
- Multi-Use (Includes building with shared commercial and residential space)
- Public Building

In general, as illustrated by Table 20, higher levels of compliance were observed in townhomes/rowhouses and in public buildings included within the sample. Poor compliance was found in manufactured homes. Within the manufactured buildings, there was a high occurrence of electrical and mechanical below the BFE. These were primarily air conditioning condensers found at grade.

TABLE 20. Building Compliance by Building Type/Usage

Building Description	Total No. of Buildings Surveyed	Fully Compliant[1]	Confidence Interval Lower	Confidence Interval Upper	Noncompliant (All Categories)[1]	Confidence Interval Lower	Confidence Interval Upper	Undetermined[2]
Single Family Detached	920	60.4%	54.8%	68.7%	38.6%	31.3%	45.2%	1.0%
Duplex	14	64.3%	14.9%	93.4%	37.7%	6.6%	85.1%	0.0%
Townhouse/Row house	90	80.0%	35.7%	87.5%	20.0%	12.5%	64.3%	0.0%
Manufactured Home	48	37.5%	16.3%	62.1%	62.5%	37.9%	83.7%	0.0%
Multi-Family (Condo/Apartments)	48	77.1%	49.4%	90.9%	22.9%	9.1%	50.6%	0.0%
Commercial/Industrial	118	74.6%	66.4%	88.3%	22.0%	11.7%	33.6%	3.4%
Multi-Use Building	10	70.0%	N/A[2]	N/A[2]	30.0%	N/A[2]	N/A[2]	0.0%
Public Building	5	80.0%	N/A[2]	N/A[2]	20.0%	N/A[2]	N/A[2]	0.0%
Total Structures	1,253.00							

[1]95-Percent statistical confidence interval for estimate.

[2]Insufficient number of data points to set meaningful confidence intervals.

3.2.3. Results Extrapolated to Community Clusters

This section presents the results of statistical methods used to extrapolate the results found in the sample of the 1,253 structures surveyed as part of this study to the communities and structures that share characteristics in common with our sample. As discussed in Section 2.1, the sample is representative of areas of the country where a preponderance of NFIP post-FIRM policies are found. Our objective was to examine compliance within communities where detailed hydrologic and hydraulic studies have been performed to establish BFEs and or flood depths. Accordingly, sampling for this study identified all the participating NFIP communities within our cluster areas with BFEs and or flood depths. The 1513 communities, shown in Appendix A, were found to meet our criteria. From those 1513 communities, 50 were randomly selected for inclusion in this study. Within the 50 communities included, 18,742 buildings[53] were identified as being located in the detailed flood hazards zones (AE, VE, AO and AH) addressed by Study Part B.

It must be noted that analyses have been conducted on a limited basis and the data are presented for only the most commonly found compliance categories included in this study.

[53] The 18,742 buildings represent those buildings included in the project database. These buildings and their corresponding addresses were obtained from the NFIP Policy-in-Force database and First American Real Estate Solutions' GIS database (see Section 3.2 for further detail).

We project that there are an estimated 984,792 buildings within our cluster areas located in the detailed SFHAs addressed by our study. Based on our findings within the 1,253 buildings within the 50 communities we surveyed we would expect to find 644,539 fully complaint buildings within the cluster areas addressed by this study. The confidence interval for this estimate runs from 263,518 to 984,326 at the 95 percent confidence interval. This means that were we to survey other communities or buildings, 95 percent of the time we would find the number of fully compliant buildings would be between 263,518 and 984,326. A table including cluster wide projections of the number and percentage of compliant buildings and the most commonly found compliance problems and their corresponding projections is shown as Table 21.

TABLE 21. Building Compliance (Extrapolated to all clusters)

		Confidence Interval	
Compliance Category	**Weighted Projection[1]**	**Lower**	**Upper**
Fully Compliant Buildings	644,539	263,518	984,326[2]
Percentage of fully compliant buildings	65.45%	26.8%	100%[2]
Noncompliant Buildings with LEM Issues	90,501	16,571	164,432
Percentage of noncompliant buildings with LEM Issues	9.19%	1.7%	16.7%
Noncompliant Buildings with openings Issue	69,673	23,078	116,269
Percentage of noncompliant buildings with openings Issues	7.07%	2.3%	11.8%
Noncompliant with Low Floor or LHSM issues	55,075	7,042	103,109
Percentage of noncompliant buildings with Low Floor or LHSM issues	5.59%	0.7%	10.5%

[1]95-Percent statistical confidence interval for estimate.

[2]Value exceeded total number of buildings; it was replaced with the total number of buildings minus the number of buildings established as noncompliant through this survey.

This page left intentionally blank

4. SUMMARY AND CONCLUSIONS

Part A and Part B the Evaluation of Community Compliance and previous research have shown that, among the 20,000 participating communities nationwide, there is, in fact, a high level of willingness to comply with the NFIP standards; many exemplary local programs; and real progress being made by many communities in coping with flood risk. The fact that most of those communities are operating competent programs supports the underlying assumption of the NFIP, as discussed in Part A, that communities will elect to participate in the program and that they will adequately enforce NFIP standards, with the incentive for participation being the availability of flood insurance for the community and its property owners. It also confirms that a predominantly cooperative enforcement model is an appropriate match for the NFIP.

When Study B was initiated, it was anticipated that, in general, compliance with the requirement that the lowest floor (Zone AE) or LHSM (Zone VE) be at or above BFE would be good, but that many problems would be encountered with items like enclosures, mechanical and utility equipment, and openings. This study found the original assumptions to be well founded. While only 63 percent[54] of the 1,253 buildings physically surveyed were in full compliance with all of the building requirements of the NFIP, communities were found to be successfully meeting the elevation requirements of the program. Eighty-nine percent[55] of all buildings surveyed have their lowest floor at or above the BFE or within 6 inches of that elevation. In terms of damage reduction, ensuring that the lowest floor elevated to or above the BFE is significant and results in minimizing flood insurance claims and federal disaster assistance.

In addition to the 89 percent of buildings found to have been built to the BFE or within 6 inches of that elevation, an additional 4.3 percent have their main working\living floors above BFE. This 4.3 percent is comprised of buildings with finished enclosures or basements below the BFE. The buildings with noncompliant finished enclosures typically had the majority of the area under the elevated floor reserved for parking but in each case had an enclosed finished room with non-flood resistant materials and furnishings. The noncompliant basements found were one to three feet below BFE and not likely to experience damages due to hydrostatic pressure[56] during base flood conditions. For these reasons, as well as, limitations on flood insurance coverage for basements and noncompliant finished enclosures, the claims on these buildings and corresponding cost to the NFIP would be much lower than for buildings with lowest floor violations at the same elevation.

---

[54] This estimate runs between 58 to 70 percent at the 95 percent confidence interval

[55] The confidence inteval for this estimate runs between 86 and 94 at the 95 percent confidence interval

[56] Solid walls can collapse if floodwaters get too deep. To prevent collapse the enclosure must have openings to allow floodwaters to enter and exist, thus automatically equalizing hydrostatic flood forces on the walls.

As anticipated, the most common violations found were mechanical and utility equipment located below the BFE and openings that do not meet the openings requirements at 44 CFR §60.3(c)(5). Between them, these two types of violations account for 50.6 percent of the violations found within our sample. The prevalence of these problems varied widely among clusters. The regulations governing mechanical and utility equipment and openings are technically the most difficult to apply and enforce. Further, although these items can be compliant when a building is built, they can be modified later by the property owner without the community's knowledge. For these reasons, it is difficult to determine if the violations found are the result of misunderstandings by local officials of the requirements, willful disregard, less importance or focus placed on ensuring that the requirements are met, or lack of enforcement.

Another speculation made at the start of this study was that better levels of compliance would be found in larger communities with large areas of their community located within flood hazard areas and more economic resources. This assumption was based on the premise that more economic resources would be available within the community to support full-time floodplain management staff and more resources would be devoted to outreach and public education. It was further surmised that because FEMA and its state partners put the vast majority of their resources and effort into promotion of compliance within communities with the greatest number of policies in an effort to protect the financial stability of the Flood Insurance Fund, better levels of compliance would be found in the larger communities within the sample. While the vast majority of the communities participating in the NFIP have little development at risk and are experiencing no or very slow growth, many of the communities included in this study face enormous risk to millions of dollars of property and are likely to have received more training and technical assistance than NFIP communities with smaller policy bases and less development at risk. Although this study found little evidence of a strong relationship between the size or economic resources of the community and the number of compliant buildings, there was one exception.

Some regional differences in the number of compliant buildings were found. Better rates of compliance were found in the Southwest and Washington-Baltimore cluster and lower rates of compliance were found in the California-North, Coastal Texas, and Florida Panhandle clusters. It is speculated that these differences in rates of compliance are attributable to the prevailing building construction method found within the region. Generally higher rates of compliance were observed in communities with primarily slab-on-grade construction and lower rates in communities that use various types of elevated foundations such as were found in the California-North, Coastal Texas, and Florida Panhandle clusters. Although no hard data was gathered through this study to support the speculation that regional differences in the number of fully compliant buildings are the result of Floodplain Manager education, States with broad participation in floodplain management associations and large numbers of CFMs generally were observed to have good rates of compliance.

This study revealed surprising findings about the level of compliance within communities participating in the CRS. Twenty-six of the 50 communities included in Study B participate in the CRS. All have participated since the early 1990s except for one that joined in 2001. At the start of this study, the team expected to find better rates of compliance with the NFIP building

requirements among communities participating in the CRS than in those not participating in the program. However, the percentage of fully compliant structures within the group of CRS and non-CRS communities are strikingly similar (62.2 as opposed to 64.1 percent, respectively), and, thus, there is no statistically significant evidence that compliance is better or worse in CRS communities than in non-CRS communities. Nevertheless, there is significant evidence to suggest that fewer lowest floor and LHSM violations are found in the CRS communities as compared to non-CRS communities. Due to the record keeping and retention requirements of the CRS, it was anticipated that communities participating in the program would be able to provide permit files and Elevation Certificates for all buildings permitted since they joined the CRS program. Communities participating in the CRS had a better record of making permit files available to the survey team (86.5 percent) as compared to communities that do not participate in CRS (66.5 percent). They also had a better record of making Elevation Certificates or equivalent elevation data available to the team (72.1 percent) than communities not participating in the program (50.6 percent). Nonetheless, the sample of communities participating in the CRS fell far short of the rates expected for CRS communities given the requirement for obtaining and retaining Elevation Certificates for all floodplain development after participation in CRS begins.

In general, this study found problems with record keeping and retention by communities. As a result, it is unclear to what degree communities are meeting the 44 CFR §60.3 requirement to issue building permits for all development in the SFHA, if they are commonly ensuring that the proposed lowest floor and "as-built" elevations (after construction has been completed) are at or above BFE, and if they obtain and retain documentation of design and construction methods. As discussed in Section 3.1.1, many communities archive or dispose of their older permit files periodically, and many do not understand that they need to retain their floodplain development permit records and Elevation Certificates indefinitely. This study did not perform analyses to make a direct correlation between where incomplete community permit records[57] were found and if violations were found in those same buildings. However, a community's floodplain development files, especially its building and zoning permits, are widely regarded as an excellent means of assessing the effectiveness of the community's floodplain management program. Community permit files are reviewed during community assistance visits and often serve as harbingers of violations to be encountered. Incomplete permit files are often indicative of a community program that does not have adequate administrative procedures in place or the staff resources to ensure that buildings are built and remain in compliance with the NFIP regulations.

There is evidence that compliance has improved over time. Study B compares results by compliance category for three segments of time: 1990 to 1995, 1996 to 2000, and 2001 to 2004. The analysis shows a significant increase in the percentage of fully compliant buildings from the earliest to the most recent time period.

---

[57] Incomplete as defined here includes building permits and or Elevation Certificates or equivalent elevation data that were unavailable to the study team. In a larger context, a community's permit file should include, but not limited to, the permit application form, "as-built" lowest floor elevation, certification of design standards, certificate of compliance or occupancy.

In conclusion, as discussed in Part A of this study, *Achieving Community Compliance,* (Monday *et al*., 2006) and throughout this study, the NFIP's success is based on two conditions. The first is that communities will choose to participate in the program and, therefore, will adopt and agree to enforce floodplain management ordinances established under authority of the National Flood Insurance Act, as amended. The incentive for such participation, and all that it entails, is the availability of flood insurance for the community and its property owners.

Second, once a community begins participating in the NFIP, it is assumed that it administers and enforces its ordinance in such a way that development in its floodprone areas actually does meet the local (and NFIP) standards and, thus, is protected from future flood damage. If either condition is not met—if communities do not elect to participate in the program or if they do so but fail to adequately enforce the standards – lives and property are placed in harm's way; buildings will suffer unnecessary flood damage; sound land use planning in floodplains is discouraged; the NFIP's actuarial soundness is jeopardized; changes in public policies and regulations may be based on unreliable data; and the costs to society from future floods will be increased unnecessarily. In short, a high level of continuous compliance with the NFIP standards is crucial to the program's success. Thus, the question of the extent and nature of compliance and noncompliance is an important element of any assessment of the NFIP and must be continually monitored.

5. RECOMMENDATIONS

The $1.1 billion in estimated flood damages prevented annually due to reduced frequency and severity of losses[58] resulting from enforcement of floodplain management regulations provides testament to the successful implementation of many of the NFIP's floodplain management measures. However, the data gathered through this study point to the need for greater focus on enforcement and additional training and technical guidance in several areas. In addition, this study identified problems with community record keeping and retention related to construction of buildings in the nation's SFHAs.

Recommendations for improving the specific deficiencies identified through Part B of the Evaluation of Community Compliance follow. These recommendations include specific actions that communities can take to improve compliance as well as actions FEMA and its state partners can take to promote improved compliance.

Community Compliance Part B Recommendation #1 (CCB1): Adoption of freeboard should be strongly promoted

The prevalence of lowest floor (Zone AE) and LHSM (Zone VE) violations, and noncompliant buildings found to be within 6 inches of the BFE, reinforces the advisability of communities or states adding a requirement for freeboard rather than meeting the minimum requirement that the top of the floor be built at BFE. Freeboard is the additional height requirement above the BFE that provides a factor of safety against flooding and wave run-up. Freeboard compensates for the many unknown or not easily measured factors that could contribute to increased flood heights, such as wave action, obstructed culverts or bridges, and the effects of urbanization. It reduces the risk of flood damage, helping account for the one-foot rise in flood levels allowed by the NFIP floodway standard and reduced floodplain storage due to development. It also reflects the uncertainties in flood hazard modeling, topography, and mapping limitations. Freeboard also provides a measure of safety against errors that may be introduced by inaccurate interpretation of flood profiles, the use of unstable benchmarks, and surveying errors. Further, floods at levels above the 1-percent annual chance elevation do occur, so added freeboard provides some protection against higher floods as well.

Incentive programs such as the CRS encourage the adoption of higher regulatory standards such as freeboard. In addition, some states also require that their communities regulate to a higher standard for certain aspects of floodplain management. Nineteen states have stricter building construction requirements than does the NFIP. The most common of which is freeboard. The measure of protection bestowed buildings where freeboard has been applied is also rewarded through lower flood insurance premiums.[59] The benefits of adopting freeboard

[58] Source: FEMA website http://www.fema.gov/plan/prevent/floodplain/How_the_NFIP_works.shtm.

[59] Flood insurance premiums for post-FIRM buildings are intended to be actuarial, meaning they are based on the known risk the building is exposed to. The anticipated risk to a post-FIRM building is based on the elevation of the lowest finished floor in relation to the BFE. The higher the floor is above the BFE, the lower the rate.

should be widely promoted through training, FEMA and community websites, and in technical publications. Communities should be strongly encouraged to codify the requirement in their local ordinances.

CCB#2: Promote frequent verification inspections during construction

One of the most effective ways to ensure compliance with the NFIP building standards, as well as higher standards such as freeboard requirements that a community may have adopted, is to inspect the site frequently during construction. Errors in the elevation of the lowest floor are most easily found and corrected in earlier phases of construction, while detection of errors in the placement of electrical and mechanical equipment is not possible until later in the construction process. An inspection program also puts builders, developers, and property owners on notice that the community will insist that projects are completed in compliance with the regulations.

CCB#3: Perform periodic checks to ensure that the property continues to remain in compliance

Communities should periodically check to ensure that the property continues to remain in compliance over time. Later inspections are particularly important when a building has an enclosure below the lowest floor. Such areas can be easily modified into habitable fully furnished space in violation of the NFIP regulations creating safety hazards. This study identified 30 noncompliant finished enclosures. Many of these are surmised to have been converted to habitable fully finished living space without community consent.

CCB#4: A concerted effort is needed to focus greater attention on community permit file record keeping and retention

Strong adherence to a floodplain management program that requires permits for all floodplain development, monitors construction as it takes place as well as periodically over time to ensure compliance with the NFIP requirements or the community's own higher standards, and ensures adequate documentation of those activities, benefits the NFIP compliance program in two ways. First, it allows FEMA and its state partners involved in community assistance visits to quickly assess the adequacy of the community's program and direct limited resources towards communities with the greatest needs. Second, good records show what was approved, forming a "paper trail" needed for administrative or legal proceedings when buildings are found to be in violation of the community's ordinance. Complete records are also of value to future buyers and owners seeking information about the property. This information may include information on the placement of fill on the site, building standards, and key elevation data needed for flood insurance rating.

Improvements in this area may be brought about by having FEMA regional offices, FEMA state partners, and ISO/CRS personnel focus greater attention on the record keeping and retention requirements of the program during contacts with communities.

CCB#5: FEMA should consider revising the opening requirements found in 44 CFR 60.3 (c)(5) for buildings in coastal AE zones with non supporting breakaway walls.

The FEMA 2000 *Coastal Construction Manual* recommends that buildings in Coastal AE zones[60] be constructed to be more resistant to coastal flood forces. Further, the nation's private sector building code organizations and consensus standards groups (i.e., IBC, IRC, NFPA 5000, ASCE 7, ASCE 24) recognize the Coastal AE zone hazard and require appropriate design and construction requirements similar to those established for VE zones under the NFIP. Nonetheless, the Coastal AE zone, has yet to be included in the NFIP regulations. At present, buildings in Coastal AE zones constructed to Zone VE standards that include non supporting breakaway walls below the lowest floor and do not also have openings that meet the openings requirements of 44 CFR 60.3(c)(5) are considered noncompliant. Thirteen of the noncompliant buildings identified by this study as having insufficient openings are pile and column buildings that appear to be built to Zone VE standards in Zone AE. It is recognized that a regulatory change does not happen without great deliberation. Until such time as a regulatory change might be implemented, FEMA should issue clear guidance regarding the opening requirement in breakaway walls in coastal AE zones.

CCB#6: FEMA should continue its support of training for local staff, state training requirements, and certification of local floodplain managers.

It is impossible to know if the instances of noncompliance found in this study are the result of misunderstandings concerning NFIP requirements by local officials, willful disregard, less importance or focus placed on ensuring that certain requirements are met, or lack of enforcement once violations are found. Nonetheless, it is widely believed that most communities and individuals are willing to abide by technical standards set for the program and that public servants are interested in protecting people and their property. With the latter premise in mind, it is surmised that community compliance could be improved by making more resources available for both FEMA and the states to increase staff levels and travel support, and to produce and deliver more workshop and training materials. This recommendation is also found in Part A of the evaluation of community compliance.

[60] The Coastal Construction Manual identifies a new hazard zone called a Coastal A zone, that is not included in the NFIP regulations. Coastal A zones are those areas located landward of an open coast with or without mapped V Zones where the principal sources of flooding are tides, storm surges, seiches or tsunamis instead of riverine sources. Coastal A Zones are subject to wave effects, velocity flows, erosion, scour, and all combinations of the above. These areas are expected to receive 1½ - 3 foot breaking waves during a 100-year event.

CCB#7: FEMA and ISO/CRS Personnel should monitor compliance in communities participating in CRS more closely and take decisive action to bring communities into compliance or retrograde their CRS class.

All CRS communities are required to maintain programs that are compliant with the NFIP standards. Compliance of CRS communities is arguably even more important to the success of the NFIP than that of other communities, for two reasons.

First, CRS communities are being recognized and rewarded for having "better" floodplain management programs. Equity dictates that they be held to that standard and thus there ought to be no question about the NFIP minimum requirements' being met.

Second, noncompliance in CRS communities increases the overall costs of the NFIP and affects the vitality of the flood insurance fund, just as noncompliance in other communities does. However, it could be argued that CRS community noncompliance is marginally even more costly, because the policyholders in those communities are contributing less to the National Flood Insurance Fund because they pay lower premiums.

FEMA/ISO is supposed to retrograde a community to Class 10 (non-participation in the CRS and no discount on flood insurance) if it finds that a community does not meet the minimum requirements of the NFIP (i.e., has program deficiencies or violations). FEMA/ISO also is supposed to retrograde a community to Class 10 if it is not meeting the other prerequisites of participation in the CRS (for example, the community does not keep elevation certificates on file or does not conduct enough activities to receive 500 points). A retrograde to Class 10 removes a community from the CRS.

Part A of the evaluation of community compliance found monitoring and enforcement in CRS communities to be deficient. These shortcomings are perceived to be the result of poor recordkeeping and retention, confusion within ISO/CRS personnel and the FEMA regional offices about their roles and responsibilities, unclear policy on CAVs, and communication gaps between ISO and FEMA. Study B found further evidence of noncompliant programs in CRS communities in the areas of both recordkeeping and retention and noncompliant buildings. A concerted effort is needed to remedy the deficiencies in this program.

6. APPENDICES

APPENDIX A – PARTICIPATING COMMUNITIES WITH DETAILED SFHAS

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
California - North	CA	Alameda	Alameda	7/16/1991	C
California - North	CA	Contra Costa	Antioch	9/4/1987	D
California - North	CA	Marin	Belvedere	5/2/1977	C
California - North	CA	Contra Costa	Benicia	8/3/1989	D
California - North	CA	Solano	Benicia	8/3/1989	D
California - North	CA	Alameda	Berkeley	9/1/1978	D
California - North	CA	Santa Clara	Burbank	1/20/1999	D
California - North	CA	San Mateo	Burlingame	9/16/1981	E
California - North	CA	Santa Cruz	Capitola	6/3/1986	D
California - North	CA	Contra Costa	Clayton	9/7/2001	D
California - North	CA	Lake	Clearlake	8/3/1992	D
California - North	CA	Sonoma	Cloverdale	7/16/1996	D
California - North	CA	Contra Costa	Concord	9/7/2001	D
California - North	CA	Marin	Corte Madera	12/15/1977	C
California - North	CA	Sonoma	Cotati	12/5/1996	D
California - North	CA	Santa Clara	Cupertino	5/1/1980	D
California - North	CA	Solano	Davis	12/20/2002	D
California - North	CA	Solano	Dixon	5/19/1981	C
California - North	CA	Contra Costa	El Cerrito	6/1/1977	C
California - North	CA	Marin	Fairfax	1/5/1978	C
California - North	CA	Solano	Fairfield	9/15/1993	D
California - North	CA	Sacramento	Folsom	9/30/1992	D
California - North	CA	San Mateo	Foster City	1/19/1995	E
California - North	CA	Santa Clara	Fremont	2/9/2000	D
California - North	CA	San Joaquin	Galt	8/16/1995	D
California - North	CA	Santa Clara	Gilroy	8/17/1998	D
California - North	CA	Nevada	Grass Valley	2/5/1997	D
California - North	CA	San Mateo	Half Moon Bay	6/3/1986	E
California - North	CA	Alameda	Hayward	2/9/2000	D
California - North	CA	Sonoma	Healdsburg	10/18/1983	D
California - North	CA	Contra Costa	Hercules	9/30/1982	D
California - North	CA	San Benito	Hollister	9/27/1991	D
California - North	CA	Amador	Ione	6/6/2000	C
California - North	CA	Sacramento	Isleton	7/2/1987	C
California - North	CA	Amador	Jackson	7/17/1997	D
California - North	CA	Contra Costa	Lafayette	12/20/2002	D
California - North	CA	Lake	Lakeport	9/28/1990	D
California - North	CA	Marin	Larkspur	4/17/1984	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
California - North	CA	Placer	Lincoln	11/21/2001	D
California - North	CA	Alameda	Livermore	9/17/1997	D
California - North	CA	Merced	Livingston	8/2/1995	D
California - North	CA	San Joaquin	Lodi	6/18/1987	D
California - North	CA	Placer	Loomis	11/21/2001	D
California - North	CA	Santa Clara	Los Altos	7/16/1980	D
California - North	CA	Santa Clara	Los Altos Hills	1/2/1980	D
California - North	CA	Santa Clara	Los Gatos	1/17/1979	C
California - North	CA	Contra Costa	Martinez	5/2/2002	C
California - North	CA	Sutter	Marysville	8/10/1982	D
California - North	CA	San Mateo	Millbrae	9/30/1981	C
California - North	CA	Santa Clara	Milpitas	6/22/1998	D
California - North	CA	Stanislaus	Modesto	5/7/2001	D
California - North	CA	Contra Costa	Moraga	5/19/1981	D
California - North	CA	Santa Clara	Morgan Hill	12/22/1998	D
California - North	CA	Contra Costa	Mountain View	6/19/1997	D
California - North	CA	Napa	Napa	1/19/2000	D
California - North	CA	Alameda	Newark	2/9/2000	D
California - North	CA	Stanislaus	Newman	1/3/1990	D
California - North	CA	Marin	Novato	9/29/1989	D
California - North	CA	Stanislaus	Oakdale	9/5/1979	C
California - North	CA	Alameda	Oakland	9/30/1982	E
California - North	CA	Contra Costa	Oakley	2/2/2002	C
California - North	CA	Contra Costa	Orinda	7/17/1997	D
California - North	CA	San Mateo	Pacifica	2/19/1987	C
California - North	CA	San Mateo	Palo Alto	6/2/1999	E
California - North	CA	Stanislaus	Patterson	1/3/1990	C
California - North	CA	Sonoma	Petaluma	9/29/1989	D
California - North	CA	Contra Costa	Pinole	8/15/1980	D
California - North	CA	Contra Costa	Pittsburg	9/7/2001	D
California - North	CA	El Dorado	Placerville	9/30/1983	D
California - North	CA	Contra Costa	Pleasant Hill	9/30/1983	D
California - North	CA	Alameda	Pleasanton	9/30/1997	D
California - North	CA	Mendocino	Point Arena	6/3/1986	E
California - North	CA	San Mateo	Portola Valley	9/22/1981	C
California - North	CA	San Mateo	Redwood City	5/17/1982	E
California - North	CA	Contra Costa	Richmond	9/7/2001	E
California - North	CA	Solano	Rio Vista	8/4/1987	D
California - North	CA	Placer	Rocklin	11/21/2001	D
California - North	CA	Sonoma	Rohnert Park	6/1/1981	D
California - North	CA	Placer	Roseville	11/21/2001	D
California - North	CA	Marin	Ross	2/4/1981	C
California - North	CA	Sacramento	Sacramento	7/6/1998	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
California - North	CA	San Mateo	San Carlos	8/21/1979	D
California - North	CA	Alameda	San Jose	8/17/1998	D
California - North	CA	San Benito	San Juan Bautista	9/27/1991	C
California - North	CA	Alameda	San Leandro	2/9/2000	D
California - North	CA	Contra Costa	San Pablo	11/17/1993	C
California - North	CA	Santa Clara	Santa Clara	1/20/1999	D
California - North	CA	Santa Cruz	Santa Cruz	6/17/1986	D
California - North	CA	Sonoma	Santa Rosa	8/3/1981	D
California - North	CA	Marin	Sausalito	9/30/1980	D
California - North	CA	Sonoma	Sebastopol	9/28/1990	C
California - North	CA	San Mateo	South San Francisco	9/2/1981	E
California - North	CA	Napa	St. Helena	1/7/1998	D
California - North	CA	San Joaquin	Stockton	4/2/2002	D
California - North	CA	Solano	Suisun City	6/1/1982	C
California - North	CA	Amador	Sutter Creek	9/28/1990	D
California - North	CA	Marin	Tiburon	5/16/1977	C
California - North	CA	San Joaquin	Tracy	6/18/1987	C
California - North	CA	Mendocino	Ukiah	8/5/1985	D
California - North	CA	Alameda	Unincorporated Areas	7/16/1991	C
California - North	CA	Yuba	Unincorporated Areas	9/15/1983	C
California - North	CA	Butte	Unincorporated Areas	4/20/2000	D
California - North	CA	Contra Costa	Unincorporated Areas	9/7/2001	D
California - North	CA	El Dorado	Unincorporated Areas	10/18/1995	D
California - North	CA	Glenn	Unincorporated Areas	6/5/1997	D
California - North	CA	Lake	Unincorporated Areas	9/28/1990	D
California - North	CA	Marin	Unincorporated Areas	2/3/1993	D
California - North	CA	Merced	Unincorporated Areas	8/2/1995	D
California - North	CA	Napa	Unincorporated Areas	1/19/2000	D
California - North	CA	Placer	Unincorporated Areas	11/21/2001	D
California - North	CA	Sacramento	Unincorporated Areas	7/6/1998	D
California - North	CA	San Joaquin	Unincorporated Areas	4/2/2002	D
California - North	CA	Santa Clara	Unincorporated Areas	1/20/1999	D
California - North	CA	Santa Cruz	Unincorporated Areas	6/17/1986	D
California - North	CA	Stanislaus	Unincorporated Areas	5/7/2001	D
California - North	CA	Sutter	Unincorporated Areas	9/28/1990	D
California - North	CA	Yolo	Unincorporated Areas	12/20/2002	D
California - North	CA	Mendocino	Unincorporated Areas	6/16/1992	D & E
California - North	CA	Solano	Unincorporated Areas	5/7/2001	D & E
California - North	CA	Solano	Vacaville	5/7/2001	D
California - North	CA	Contra Costa	Walnut Creek	10/4/2002	D
California - North	CA	Santa Cruz	Watsonville	6/15/1984	D
California - North	CA	Sacramento	West Sacramento	1/19/1995	C
California - North	CA	Colusa	Williams	5/15/2003	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
California - North	CA	Glenn	Willows	12/7/1982	C
California - North	CA	Yolo	Winters	11/20/1998	C
California - North	CA	Yolo	Woodland	4/2/2002	C
California - North	CA	San Mateo	Woodside	11/15/1979	D
California - North	CA	Napa	Yountville	9/28/1990	D
Coastal NC/VA	NC	Pamlico	Alliance	8/5/1985	D
Coastal NC/VA	NC	Beaufort	Aurora	5/15/2003	C
Coastal NC/VA	NC	Beaufort	Bath	5/15/2003	E
Coastal NC/VA	NC	Pamlico	Bayboro	12/4/1985	C
Coastal NC/VA	NC	Carteret	Beaufort	10/18/1983	C
Coastal NC/VA	NC	Beaufort	Belhaven	5/15/2003	C
Coastal NC/VA	NC	Carteret	Bogue	6/2/1999	D
Coastal NC/VA	NC	Craven	Bridgeton	5/4/1987	C
Coastal NC/VA	NC	Carteret	Cape Carteret	10/18/1983	E
Coastal NC/VA	NC	Tyrrell	Columbia	8/5/1985	D
Coastal NC/VA	NC	Washington	Creswell	2/4/1987	D
Coastal NC/VA	NC	Pasquotank	Elizabeth City	8/5/1985	E
Coastal NC/VA	NC	Pitt	Farmville	4/17/1989	D
Coastal NC/VA	NC	Pitt	Greenville	4/30/1986	D
Coastal NC/VA	NC	Lenoir	Grifton	11/20/1998	D
Coastal NC/VA	NC	Craven	Havelock	5/4/1987	D
Coastal NC/VA	NC	Perquimans	Hertford	7/3/1985	C
Coastal NC/VA	NC	Dare	Kill Devil Hills	4/2/1993	E
Coastal NC/VA	NC	Lenoir	Kinston	6/15/1982	D
Coastal NC/VA	NC	Dare	Kitty Hawk	4/2/1993	E
Coastal NC/VA	NC	Edgecombe	Leggett	12/20/1999	D
Coastal NC/VA	NC	Pamlico	Minnesott Beach	8/5/1985	C
Coastal NC/VA	NC	Carteret	Morehead City	10/18/1983	E
Coastal NC/VA	NC	Dare	Nags Head	12/20/2000	E
Coastal NC/VA	NC	Craven	New Bern	5/4/1987	C
Coastal NC/VA	NC	Carteret	Newport	10/18/1983	C
Coastal NC/VA	NC	Pamlico	Oriental	12/4/1985	C
Coastal NC/VA	NC	Beaufort	Pantego	5/15/2003	D
Coastal NC/VA	NC	Edgecombe	Pinetops	3/28/1980	D
Coastal NC/VA	NC	Washington	Plymouth	8/19/1985	D
Coastal NC/VA	NC	Edgecombe	Princeville	4/15/1980	D
Coastal NC/VA	NC	Craven	River Bend	8/19/1986	D
Coastal NC/VA	NC	Washington	Roper	8/5/1985	D
Coastal NC/VA	NC	Dare	Southern Shores	4/2/1993	E
Coastal NC/VA	NC	Edgecombe	Speed	7/2/1987	D
Coastal NC/VA	NC	Pamlico	Stonewall	12/4/1985	C
Coastal NC/VA	NC	Edgecombe	Tarboro	2/4/1988	D
Coastal NC/VA	NC	Craven	Trent Woods	9/8/1999	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Coastal NC/VA	NC	Camden	Unincorporated Areas	12/4/1985	C
Coastal NC/VA	NC	Hertford	Unincorporated Areas	7/3/1985	C
Coastal NC/VA	NC	Tyrrell	Unincorporated Areas	8/19/1985	C
Coastal NC/VA	NC	Beaufort	Unincorporated Areas	5/15/2003	D
Coastal NC/VA	NC	Bertie	Unincorporated Areas	12/4/1985	D
Coastal NC/VA	NC	Chowan	Unincorporated Areas	7/3/1985	D
Coastal NC/VA	NC	Craven	Unincorporated Areas	12/5/1997	D
Coastal NC/VA	NC	Edgecombe	Unincorporated Areas	8/3/1981	D
Coastal NC/VA	NC	Greene	Unincorporated Areas	1/6/1983	D
Coastal NC/VA	NC	Halifax	Unincorporated Areas	5/5/1981	D
Coastal NC/VA	NC	Lenoir	Unincorporated Areas	8/16/1988	D
Coastal NC/VA	NC	Martin	Unincorporated Areas	7/16/1991	D
Coastal NC/VA	NC	Northampton	Unincorporated Areas	11/4/1988	D
Coastal NC/VA	NC	Pasquotank	Unincorporated Areas	12/4/1985	D
Coastal NC/VA	NC	Perquimans	Unincorporated Areas	7/3/1985	D
Coastal NC/VA	NC	Washington	Unincorporated Areas	5/15/2003	D
Coastal NC/VA	NC	Pamlico	Unincorporated Areas	9/4/1985	D & E
Coastal NC/VA	NC	Carteret	Unincorporated Areas	11/6/1998	E
Coastal NC/VA	NC	Currituck	Unincorporated Areas	5/5/2003	E
Coastal NC/VA	NC	Dare	Unincorporated Areas	5/5/2003	E
Coastal NC/VA	NC	Hyde	Unincorporated Areas	5/15/2003	E
Coastal NC/VA	NC	Craven	Vanceboro	8/4/1988	D
Coastal NC/VA	NC	Beaufort	Washington	5/15/2003	D
Coastal NC/VA	NC	Beaufort	Washington Park	5/15/2003	C
Coastal NC/VA	NC	Bertie	Williamston	9/20/1996	D
Coastal NC/VA	NC	Bertie	Windsor	8/19/1985	D
Coastal NC/VA	NC	Perquimans	Winfall	7/3/1985	C
Coastal NC/VA	VA	Southampton	Boykins	9/4/2002	D
Coastal NC/VA	VA	Indep City	Chesapeake	5/2/1999	C
Coastal NC/VA	VA	Southampton	Courtland	9/4/2002	D
Coastal NC/VA	VA	Indep City	Franklin	9/4/2002	D
Coastal NC/VA	VA	Indep City	Hampton	7/3/1995	E
Coastal NC/VA	VA	Indep City	Newport News	1/17/1986	D
Coastal NC/VA	VA	Indep City	Norfolk	7/16/1996	E
Coastal NC/VA	VA	Indep City	Poquoson	8/3/1992	E
Coastal NC/VA	VA	Indep City	Portsmouth	11/2/1983	D
Coastal NC/VA	VA	Indep City	Suffolk	9/4/2002	D & E
Coastal NC/VA	VA	Newport News	Unincorporated Areas	1/17/1986	D
Coastal NC/VA	VA	Portsmouth	Unincorporated Areas	11/2/1983	D
Coastal NC/VA	VA	Southampton	Unincorporated Areas	9/4/2002	D
Coastal NC/VA	VA	Isle of Wight	Unincorporated Areas	9/4/2002	D & E
Coastal NC/VA	VA	Suffolk	Unincorporated Areas	9/4/2002	D & E
Coastal NC/VA	VA	Virginia Beach	Unincorporated Areas	12/5/1996	D & E

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Coastal NC/VA	VA	Norfolk	Unincorporated Areas	7/16/1996	E
Coastal NC/VA	VA	Northampton	Unincorporated Areas	7/20/1998	E
Coastal NC/VA	VA	Indep City	Virginia Beach	12/5/1996	D & E
Florida - West Coast	FL	Seminole	Altamonte Springs	4/17/1995	D
Florida - West Coast	FL	Orange	Apopka	12/6/2000	C
Florida - West Coast	FL	De Soto	Arcadia	6/3/1988	D
Florida - West Coast	FL	Lake	Astatula	7/3/2002	C
Florida - West Coast	FL	Polk	Bartow	12/20/2000	D
Florida - West Coast	FL	Orange	Belle Isle	12/6/2000	C
Florida - West Coast	FL	Polk	Bowling Green	5/4/1988	D
Florida - West Coast	FL	Manatee	Bradenton	11/16/1983	E
Florida - West Coast	FL	Hernando	Brooksville	9/18/1986	D
Florida - West Coast	FL	Lee	Cape Coral	9/18/1985	C
Florida - West Coast	FL	Orange	Casselberry	4/17/1995	D
Florida - West Coast	FL	Sumter	Center Hill	1/18/1989	C
Florida - West Coast	FL	Lake	Clermont	7/3/2002	C
Florida - West Coast	FL	Citrus	Crystal River	8/15/1984	E
Florida - West Coast	FL	Pasco	Dade City	8/17/1981	C
Florida - West Coast	FL	Polk	Davenport	12/20/2000	C
Florida - West Coast	FL	Polk	Dundee	12/20/2000	D
Florida - West Coast	FL	Pinellas	Dunedin	7/2/1992	E
Florida - West Coast	FL	Marion	Dunnellon	2/1/1985	C
Florida - West Coast	FL	Orange	Edgewood	12/6/2000	C
Florida - West Coast	FL	Lake	Eustis	7/3/2002	C
Florida - West Coast	FL	Polk	Fort Meade	12/20/2000	D
Florida - West Coast	FL	Polk	Frostproof	12/20/2000	C
Florida - West Coast	FL	Lake	Fruitland Park	7/3/2002	C
Florida - West Coast	FL	Lake	Groveland	7/3/2002	C
Florida - West Coast	FL	Polk	Haines City	12/20/2000	D
Florida - West Coast	FL	Citrus	Inglis	3/1/1984	C
Florida - West Coast	FL	Citrus	Inverness	5/17/1982	C
Florida - West Coast	FL	Pinellas	Kenneth City	9/1/1983	D
Florida - West Coast	FL	Osceola	Kissimmee	6/6/2001	D
Florida - West Coast	FL	Lake	Lady Lake	7/3/2002	C
Florida - West Coast	FL	Polk	Lake Hamilton	12/20/2000	C
Florida - West Coast	FL	Seminole	Lake Mary	5/17/1995	D
Florida - West Coast	FL	Polk	Lake Wales	12/20/2000	C
Florida - West Coast	FL	Polk	Lakeland	12/20/2000	D
Florida - West Coast	FL	Pinellas	Largo	3/16/1983	C
Florida - West Coast	FL	Lake	Leesburg	7/3/2002	C
Florida - West Coast	FL	Sumter	Leesburg	7/3/2002	C
Florida - West Coast	FL	Seminole	Longwood	4/17/1995	C
Florida - West Coast	FL	Pinellas	Madeira Beach	3/2/1983	E

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Florida - West Coast	FL	Lake	Mascotte	7/3/2002	C
Florida - West Coast	FL	Lake	Minneola	7/3/2002	C
Florida - West Coast	FL	Lake	Montverde	7/3/2002	C
Florida - West Coast	FL	Polk	Mulberry	12/20/2000	D
Florida - West Coast	FL	Pasco	New Port Richey	7/5/1983	C
Florida - West Coast	FL	Sarasota	North Port	9/2/1981	D
Florida - West Coast	FL	Orange	Ocoee	12/6/2000	C
Florida - West Coast	FL	Orange	Orlando	12/6/2000	D
Florida - West Coast	FL	Seminole	Oviedo	4/17/1995	D
Florida - West Coast	FL	Manatee	Palmetto	11/16/1983	E
Florida - West Coast	FL	Pinellas	Pinellas Park	2/17/1989	C
Florida - West Coast	FL	Sarasota	Plantation	7/21/1995	D
Florida - West Coast	FL	Pasco	Port Richey	7/5/1983	D
Florida - West Coast	FL	Charlotte	Punta Gorda	5/5/2003	E
Florida - West Coast	FL	Pinellas	Redington Shores	3/2/1983	E
Florida - West Coast	FL	Seminole	Sanford	4/17/1995	D
Florida - West Coast	FL	Pinellas	Seminole	1/18/1984	C
Florida - West Coast	FL	Osceola	St. Cloud	6/6/2001	C
Florida - West Coast	FL	Pinellas	St. Petersburg	11/2/1994	E
Florida - West Coast	FL	Hillsborough	Tampa	9/30/1982	E
Florida - West Coast	FL	Pinellas	Tarpon Springs	6/1/1983	E
Florida - West Coast	FL	Lake	Tavares	7/3/2002	C
Florida - West Coast	FL	Hillsborough	Temple Terrace	6/18/1990	D
Florida - West Coast	FL	Pinellas	Treasure Island	3/2/1983	E
Florida - West Coast	FL	Lake	Umatilla	7/3/2002	C
Florida - West Coast	FL	Marion	Unincorporated Areas	1/19/1983	C
Florida - West Coast	FL	Glades	Unincorporated Areas	5/17/1982	D
Florida - West Coast	FL	Hardee	Unincorporated Areas	5/4/1988	D
Florida - West Coast	FL	Highlands	Unincorporated Areas	2/16/1983	D
Florida - West Coast	FL	Osceola	Unincorporated Areas	6/6/2001	D
Florida - West Coast	FL	Sumter	Unincorporated Areas	3/15/1982	D
Florida - West Coast	FL	Charlotte	Unincorporated Areas	5/5/2003	D & E
Florida - West Coast	FL	Manatee	Unincorporated Areas	6/30/1999	DE
Florida - West Coast	FL	Pasco	Unincorporated Areas	6/30/1999	D & E
Florida - West Coast	FL	Pinellas	Unincorporated Areas	5/6/1996	D & E
Florida - West Coast	FL	Volusia	Unincorporated Areas	2/19/2003	D & E
Florida - West Coast	FL	Citrus	Unincorporated Areas	11/6/1998	E
Florida - West Coast	FL	Dixie	Unincorporated Areas	11/2/1983	E
Florida - West Coast	FL	Hillsborough	Unincorporated Areas	6/30/1999	E
Florida - West Coast	FL	Lee	Unincorporated Areas	5/5/2003	E
Florida - West Coast	FL	Levy	Unincorporated Areas	6/2/1992	E
Florida - West Coast	FL	Sarasota	Unincorporated Areas	9/29/1996	E
Florida - West Coast	FL	Sarasota	Venice	5/18/1992	E

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Florida - West Coast	FL	Hardee	Wauchula	5/4/1988	D
Florida - West Coast	FL	Orange	Windermere	12/6/2000	C
Florida - West Coast	FL	Orange	Winter Garden	12/6/2000	D
Florida - West Coast	FL	Polk	Winter Haven	12/20/2000	C
Florida - West Coast	FL	Orange	Winter Park	12/6/2000	D
Florida - West Coast	FL	Seminole	Winter Springs	4/17/1995	D
Florida - West Coast	FL	Citrus	Yankeetown	3/1/1984	E
Florida - West Coast	FL	Pasco	Zephyrhills	12/17/1991	C
Florida - West Coast	FL	Hardee	Zolfo Springs	5/4/1988	D
Florida Panhandle	AL	Baldwin	Bay Minette	6/17/2002	D
Florida Panhandle	AL	Mobile	Bayou La Batre	7/6/1998	E
Florida Panhandle	AL	Escambia	Brewton	4/16/1990	D
Florida Panhandle	AL	Mobile	Chickasaw	7/6/1998	D
Florida Panhandle	AL	Mobile	Citronelle	7/6/1998	D
Florida Panhandle	AL	Baldwin	Creola	7/6/1998	D
Florida Panhandle	AL	Baldwin	Daphne	6/17/2002	D & E
Florida Panhandle	AL	Escambia	East Brewton	12/4/1979	D
Florida Panhandle	AL	Coffee	Elba	5/7/1976	D
Florida Panhandle	AL	Coffee	Enterprise	7/2/1980	D
Florida Panhandle	AL	Baldwin	Fairhope	6/17/2002	E
Florida Panhandle	AL	Escambia	Flomaton	12/17/1987	C
Florida Panhandle	AL	Geneva	Geneva	3/4/1987	D
Florida Panhandle	AL	Butler	Greenville	5/1/1980	D
Florida Panhandle	AL	Baldwin	Gulf Shores	6/17/2002	E
Florida Panhandle	AL	Washington	Jackson	12/17/1987	D
Florida Panhandle	AL	Baldwin	Loxley	6/17/2002	D
Florida Panhandle	AL	Baldwin	Mobile	7/6/1998	E
Florida Panhandle	AL	Mobile	Mobile	7/6/1998	E
Florida Panhandle	AL	Baldwin	Orange Beach	6/17/2002	D
Florida Panhandle	AL	Mobile	Prichard	7/6/1998	D
Florida Panhandle	AL	Baldwin	Robertsdale	6/17/2002	D
Florida Panhandle	AL	Mobile	Saraland	7/6/1998	D
Florida Panhandle	AL	Mobile	Satsuma	7/6/1998	D
Florida Panhandle	AL	Baldwin	Spanish Fort	6/17/2002	E
Florida Panhandle	AL	Choctaw	Unincorporated Areas	9/30/1988	C
Florida Panhandle	AL	Dale	Unincorporated Areas	7/4/1989	C
Florida Panhandle	AL	Marengo	Unincorporated Areas	1/17/1990	C
Florida Panhandle	AL	Butler	Unincorporated Areas	7/5/1982	D
Florida Panhandle	AL	Dallas	Unincorporated Areas	9/29/1986	D
Florida Panhandle	AL	Lowndes	Unincorporated Areas	8/15/1984	D
Florida Panhandle	AL	Monroe	Unincorporated Areas	6/4/1990	D
Florida Panhandle	AL	Baldwin	Unincorporated Areas	6/17/2002	D & E
Florida Panhandle	AL	Mobile	Unincorporated Areas	7/6/1998	D & E

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Florida Panhandle	FL	Holmes	Bonifay	12/5/1990	C
Florida Panhandle	FL	Washington	Caryville	6/17/1991	D
Florida Panhandle	FL	Okaloosa	Cinco Bayou	12/6/2002	C
Florida Panhandle	FL	Okaloosa	Crestview	12/6/2002	D
Florida Panhandle	FL	Okaloosa	Destin	12/6/2002	E
Florida Panhandle	FL	Washington	Ebro	6/17/1991	D
Florida Panhandle	FL	Okaloosa	Fort Walton Beach	12/6/2002	E
Florida Panhandle	FL	Walton	Freeport	3/7/2000	C
Florida Panhandle	FL	Escambia	Gulf Breeze	1/19/2000	E
Florida Panhandle	FL	Okaloosa	Mary Esther	12/6/2002	C
Florida Panhandle	FL	Santa Rosa	Milton	7/18/1985	DE
Florida Panhandle	FL	Okaloosa	Niceville	12/6/2002	D & E
Florida Panhandle	FL	Escambia	Pensacola	7/17/2002	D & E
Florida Panhandle	FL	Walton	Ponce de Leon	12/5/1990	C
Florida Panhandle	FL	Bay	Unincorporated Areas	7/17/1995	C
Florida Panhandle	FL	Washington	Unincorporated Areas	6/17/1991	D
Florida Panhandle	FL	Okaloosa	Valparaiso	12/6/2002	C
Florida Panhandle	FL	Washington	Vernon	6/17/1991	D
Florida Panhandle	FL	Holmes	Westville	12/5/1990	C
Florida Panhandle	MS	Perry	Beaumont	8/16/1988	C
Florida Panhandle	MS	Harrison	Biloxi	3/15/1984	D
Florida Panhandle	MS	Jackson	Gautier	8/18/1992	E
Florida Panhandle	MS	Harrison	Gulfport	10/4/2002	D
Florida Panhandle	MS	Greene	Leakesville	9/30/1988	C
Florida Panhandle	MS	Greene	McLain	12/1/1983	C
Florida Panhandle	MS	Jackson	Moss Point	9/4/1987	D
Florida Panhandle	MS	Jackson	Ocean Springs	8/18/1992	E
Florida Panhandle	MS	Jackson	Pascagoula	3/15/1984	E
Florida Panhandle	MS	George	Unincorporated Areas	8/16/1988	C
Florida Panhandle	MS	Wayne	Unincorporated Areas	8/16/1988	C
Florida Panhandle	MS	Greene	Unincorporated Areas	5/2/1994	D
Florida Panhandle	MS	Perry	Unincorporated Areas	7/2/1991	D
Florida Panhandle	MS	Harrison	Unincorporated Areas	10/4/2002	E
Florida Panhandle	MS	Jackson	Unincorporated Areas	4/16/1993	E
Florida Panhandle	MS	Wayne	Waynesboro	8/16/1988	C
Louisiana	LA	Vermilion	Abbeville	8/3/1981	C
Louisiana	LA	St. Tammany	Abita Springs	5/17/1988	C
Louisiana	LA	West Baton Rouge	Addis	9/7/2000	C
Louisiana	LA	Rapides	Alexandria	9/3/1997	D
Louisiana	LA	St. Mary	Baldwin	12/15/1978	D
Louisiana	LA	Rapides	Ball	11/22/1999	C
Louisiana	LA	Acadia	Basile	1/15/1988	D
Louisiana	LA	St. Mary	Berwick	4/3/1995	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Louisiana	LA	Washington	Bogalusa	5/4/1988	C
Louisiana	LA	St. Martin	Breaux Bridge	3/16/1988	C
Louisiana	LA	St. Martin	Broussard	1/20/1999	D
Louisiana	LA	Lafayette	Carencro	1/20/1999	D
Louisiana	LA	Rapides	Cheneyville	3/2/1981	D
Louisiana	LA	Acadia	Church Point	11/5/1980	D
Louisiana	LA	Concordia	Clayton	1/31/1980	D
Louisiana	LA	East Feliciana	Clinton	12/4/1979	D
Louisiana	LA	St. Tammany	Covington	11/19/1980	D
Louisiana	LA	Acadia	Crowley	7/27/1982	D
Louisiana	LA	Iberia	Delcambre	4/4/1983	D
Louisiana	LA	East Baton Rouge	Denham Springs	8/23/2001	D
Louisiana	LA	Ascension	Donaldsonville	5/15/1980	D
Louisiana	LA	Lafayette	Duson	1/20/1999	C
Louisiana	LA	Jefferson Davis	Elton	2/3/1982	D
Louisiana	LA	Vermilion	Erath	4/4/1983	C
Louisiana	LA	Acadia	Estherwood	2/4/1981	D
Louisiana	LA	St. Landry	Eunice	6/1/1981	D
Louisiana	LA	Concordia	Ferriday	12/15/1977	C
Louisiana	LA	St. Mary	Franklin	4/15/1992	C
Louisiana	LA	Rapides	Glenmora	2/3/1982	D
Louisiana	LA	LaFourche	Golden Meadow	7/11/1975	C
Louisiana	LA	Ascension	Gonzales	8/18/1992	C
Louisiana	LA	St. Helena	Greensburg	4/1/1980	D
Louisiana	LA	Jefferson	Gretna	3/23/1995	C
Louisiana	LA	Iberville	Grosse Tete	3/1/1978	C
Louisiana	LA	Tangipahoa	Hammond	7/21/1999	D
Louisiana	LA	Jefferson	Harahan	3/23/1995	C
Louisiana	LA	Catahoula	Harrisonburg	4/5/1988	C
Louisiana	LA	St. Martin	Henderson	5/3/1982	D
Louisiana	LA	Terrebonne	Houma	5/19/1981	C
Louisiana	LA	East Feliciana	Jackson	6/4/1980	D
Louisiana	LA	Jefferson	Jean Lafitte	3/23/1995	C
Louisiana	LA	Jefferson Davis	Jennings	4/15/1981	D
Louisiana	LA	Catahoula	Jonesville	3/1/1978	C
Louisiana	LA	Jefferson	Kenner	3/23/1995	E
Louisiana	LA	Tangipahoa	Kentwood	4/15/1980	D
Louisiana	LA	Pointe Coupee	Krotz Springs	1/15/1988	D
Louisiana	LA	Lafayette	Lafayette	1/20/1999	D
Louisiana	LA	Jefferson Davis	Lake Arthur	4/15/1981	D
Louisiana	LA	Vermilion	Lake Arthur	4/15/1981	D
Louisiana	LA	Rapides	Lecompte	6/2/1999	D
Louisiana	LA	LaFourche	Lockport	8/15/1980	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Louisiana	LA	St. Tammany	Madisonville	3/16/1983	E
Louisiana	LA	St. Tammany	Mandeville	4/4/1983	E
Louisiana	LA	Avoyelles	Marksville	7/16/1980	C
Louisiana	LA	St. Landry	Melville	7/3/1978	D
Louisiana	LA	Acadia	Mermentau	3/2/1981	D
Louisiana	LA	St. Mary	Morgan City	5/20/1996	C
Louisiana	LA	Acadia	Morse	4/15/1981	C
Louisiana	LA	Pointe Coupee	New Roads	11/16/1995	D
Louisiana	LA	St. Landry	Opelousas	8/3/1981	D
Louisiana	LA	St. Martin	Parks	7/16/1980	D
Louisiana	LA	St. Mary	Patterson	5/2/1995	C
Louisiana	LA	St. Tammany	Pearl River	5/4/1988	C
Louisiana	LA	Rapides	Pineville	9/5/1984	C
Louisiana	LA	West Baton Rouge	Port Allen	9/7/2000	C
Louisiana	LA	St. Landry	Port Barre	4/15/1981	C
Louisiana	LA	Ascension	Port Vincent	8/23/2001	C
Louisiana	LA	Acadia	Rayne	12/14/1982	D
Louisiana	LA	Concordia	Ridgecrest	4/3/1978	D
Louisiana	LA	Iberville	Rosedale	2/26/1980	C
Louisiana	LA	Lafayette	Scott	1/20/1999	D
Louisiana	LA	Avoyelles	Simmesport	7/16/1980	C
Louisiana	LA	St. Tammany	Slidell	4/21/1999	D
Louisiana	LA	Ascension	Sorrento	12/28/1982	D
Louisiana	LA	West Feliciana	St. Francisville	5/2/1977	C
Louisiana	LA	St. Martin	St. Martinville	12/16/1980	D
Louisiana	LA	Tangipahoa	Tangipahoa	9/28/1979	D
Louisiana	LA	LaFourche	Thibodaux	12/15/1989	C
Louisiana	LA	Tangipahoa	Tickfaw	8/23/2000	D
Louisiana	LA	Allen	Unincorporated Areas	1/3/1990	C
Louisiana	LA	Ascension	Unincorporated Areas	1/20/1993	C
Louisiana	LA	Catahoula	Unincorporated Areas	5/4/2000	C
Louisiana	LA	Iberville	Unincorporated Areas	8/5/1991	C
Louisiana	LA	LaFourche	Unincorporated Areas	5/4/1992	C
Louisiana	LA	St. Landry	Unincorporated Areas	10/16/1991	C
Louisiana	LA	West Baton Rouge	Unincorporated Areas	9/7/2000	C
Louisiana	LA	Concordia	Unincorporated Areas	6/2/1994	D
Louisiana	LA	East Baton Rouge	Unincorporated Areas	5/17/1993	D
Louisiana	LA	Grant	Unincorporated Areas	11/16/1995	D
Louisiana	LA	Jefferson Davis	Unincorporated Areas	6/15/1988	D
Louisiana	LA	Lafayette	Unincorporated Areas	1/20/1999	D
Louisiana	LA	Pointe Coupee	Unincorporated Areas	11/16/1995	D
Louisiana	LA	Rapides	Unincorporated Areas	6/2/1999	D
Louisiana	LA	St. Helena	Unincorporated Areas	9/27/1991	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Louisiana	LA	St. Martin	Unincorporated Areas	12/16/1980	D
Louisiana	LA	Tangipahoa	Unincorporated Areas	9/28/1979	D
Louisiana	LA	Tensas	Unincorporated Areas	4/3/1978	D
Louisiana	LA	Terrebonne	Unincorporated Areas	4/2/1992	D
Louisiana	LA	Washington	Unincorporated Areas	5/4/1988	D
Louisiana	LA	Cameron	Unincorporated Areas	5/4/1992	E
Louisiana	LA	Jefferson	Unincorporated Areas	3/23/1995	E
Louisiana	LA	Plaquemines	Unincorporated Areas	9/30/1993	E
Louisiana	LA	St. Bernard	Unincorporated Areas	6/30/1999	E
Louisiana	LA	St. Charles	Unincorporated Areas	6/16/1992	E
Louisiana	LA	St. John the Baptist	Unincorporated Areas	2/2/1983	E
Louisiana	LA	St. Mary	Unincorporated Areas	6/30/1999	E
Louisiana	LA	Vermilion	Unincorporated Areas	5/4/1992	E
Louisiana	LA	Concordia	Vidalia	1/5/1982	D
Louisiana	LA	Livingston	Walker	8/23/2001	D
Louisiana	LA	Jefferson	Westwego	3/23/1995	C
Louisiana	LA	Lafayette	Youngsville	1/20/1999	C
Louisiana	LA	East Baton Rouge	Zachary	8/3/1982	D
Louisiana	MS	Lincoln	Brookhaven	1/7/2000	D
Louisiana	MS	Pike	McComb	8/1/1979	D
Louisiana	MS	Adams	Natchez	9/29/1989	D
Louisiana	MS	Pearl River	Picayune	3/3/1992	D
Louisiana	MS	Walthall	Tylertown	1/16/1992	C
Louisiana	MS	Copiah	Unincorporated Areas	8/4/1988	C
Louisiana	MS	Lawrence	Unincorporated Areas	9/15/1989	C
Louisiana	MS	Wilkinson	Unincorporated Areas	7/16/1990	C
Louisiana	MS	Adams	Unincorporated Areas	9/29/1989	D
Louisiana	MS	Claiborne	Unincorporated Areas	5/1/1978	D
Louisiana	MS	Lamar	Unincorporated Areas	7/2/1991	D
Louisiana	MS	Pearl River	Unincorporated Areas	1/19/1996	D
Louisiana	MS	Pike	Unincorporated Areas	9/15/1989	D
Louisiana	MS	Hancock	Unincorporated Areas	8/18/1992	E
Mid-Atlantic	DE	Sussex	Bethany Beach	5/5/2003	E
Mid-Atlantic	DE	Sussex	Bethel	5/5/2003	D
Mid-Atlantic	DE	Sussex	Blades	5/5/2003	D
Mid-Atlantic	DE	Kent	Bowers	5/5/2003	D
Mid-Atlantic	DE	Sussex	Bridgeville	5/5/2003	D
Mid-Atlantic	DE	Kent	Camden	5/5/2003	D
Mid-Atlantic	DE	New Castle	Clayton	5/5/2003	D
Mid-Atlantic	DE	Sussex	Dagsboro	5/5/2003	D
Mid-Atlantic	DE	New Castle	Delaware City	5/5/2003	C
Mid-Atlantic	DE	Sussex	Dewey Beach	5/5/2003	E
Mid-Atlantic	DE	Kent	Dover	5/5/2003	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	DE	New Castle	Elsmere	5/5/2003	D
Mid-Atlantic	DE	Sussex	Fenwick Island	5/5/2003	E
Mid-Atlantic	DE	Sussex	Frankford	5/5/2003	D
Mid-Atlantic	DE	Kent	Frederica	5/5/2003	C
Mid-Atlantic	DE	Sussex	Greenwood	5/5/2003	D
Mid-Atlantic	DE	Kent	Harrington	5/5/2003	D
Mid-Atlantic	DE	Sussex	Henlopen Acres	5/5/2003	E
Mid-Atlantic	DE	Sussex	Laurel	5/5/2003	D
Mid-Atlantic	DE	Kent	Leipsic	5/5/2003	C
Mid-Atlantic	DE	Sussex	Lewes	5/5/2003	E
Mid-Atlantic	DE	Kent	Little Creek	5/5/2003	D
Mid-Atlantic	DE	Sussex	Milford	12/20/2000	D
Mid-Atlantic	DE	Sussex	Millsboro	5/5/2003	D
Mid-Atlantic	DE	Sussex	Millville	5/5/2003	D
Mid-Atlantic	DE	Sussex	Milton	5/5/2003	D
Mid-Atlantic	DE	New Castle	New Castle	5/5/2003	C
Mid-Atlantic	DE	New Castle	Newark	5/5/2003	D
Mid-Atlantic	DE	New Castle	Newport	5/5/2003	D
Mid-Atlantic	DE	Sussex	Ocean View	5/5/2003	D
Mid-Atlantic	DE	Sussex	Rehoboth Beach	5/5/2003	E
Mid-Atlantic	DE	Sussex	Seaford	5/5/2003	D
Mid-Atlantic	DE	Sussex	Selbyville	5/5/2003	D
Mid-Atlantic	DE	Kent	Smyrna	5/5/2003	D
Mid-Atlantic	DE	Sussex	South Bethany	5/5/2003	E
Mid-Atlantic	DE	New Castle	Unincorporated Areas	5/5/2003	D
Mid-Atlantic	DE	Sussex	Unincorporated Areas	5/5/2003	D & E
Mid-Atlantic	DE	New Castle	Wilmington	5/5/2003	D
Mid-Atlantic	DE	Kent	Wyoming	5/5/2003	D
Mid-Atlantic	MD	Harford	Aberdeen	1/7/2000	D
Mid-Atlantic	MD	Worcester	Berlin	9/18/1986	D
Mid-Atlantic	MD	Queen Annes	Centreville	9/27/1985	D
Mid-Atlantic	MD	Cecil	Charlestown	11/17/1982	C
Mid-Atlantic	MD	Cecil	Chesapeake City	10/15/1981	D
Mid-Atlantic	MD	Kent	Chestertown	2/15/1984	DE
Mid-Atlantic	MD	Caroline	Denton	12/18/1979	D
Mid-Atlantic	MD	Talbot	Easton	9/28/1984	D
Mid-Atlantic	MD	Cecil	Elkton	6/16/1992	D
Mid-Atlantic	MD	Caroline	Federalsburg	9/7/1998	D
Mid-Atlantic	MD	Wicomico	Fruitland	11/15/1985	D
Mid-Atlantic	MD	Caroline	Greensboro	11/1/1979	D
Mid-Atlantic	MD	Cecil	Havre de Grace	1/7/2000	D
Mid-Atlantic	MD	Kent	Millington	11/3/1982	D
Mid-Atlantic	MD	Cecil	North East	10/15/1981	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	MD	Worcester	Ocean City	2/4/1988	E
Mid-Atlantic	MD	Cecil	Perryville	9/30/1992	C
Mid-Atlantic	MD	Cecil	Port Deposit	2/16/1977	D
Mid-Atlantic	MD	Queen Annes	Queenstown	9/28/1984	D
Mid-Atlantic	MD	Cecil	Rising Sun	5/15/1986	D
Mid-Atlantic	MD	Kent	Rock Hall	9/1/1983	D
Mid-Atlantic	MD	Wicomico	Salisbury	9/28/1984	C
Mid-Atlantic	MD	Dorchester	Secretary	4/2/1992	C
Mid-Atlantic	MD	Wicomico	Sharptown	9/27/1985	C
Mid-Atlantic	MD	Worcester	Snow Hill	5/15/1980	D
Mid-Atlantic	MD	Somerset	Unincorporated Areas	7/20/1998	C
Mid-Atlantic	MD	Caroline	Unincorporated Areas	9/7/1998	D
Mid-Atlantic	MD	Dorchester	Unincorporated Areas	6/16/1992	D
Mid-Atlantic	MD	Harford	Unincorporated Areas	1/7/2000	D
Mid-Atlantic	MD	Kent	Unincorporated Areas	6/16/1992	D
Mid-Atlantic	MD	Talbot	Unincorporated Areas	6/16/1992	D
Mid-Atlantic	MD	Queen Annes	Unincorporated Areas	6/16/1992	D & E
Mid-Atlantic	MD	Worcester	Unincorporated Areas	4/21/1999	E
Mid-Atlantic	NJ	Atlantic	Absecon	8/23/1999	E
Mid-Atlantic	NJ	Monmouth	Allenhurst	9/15/1983	E
Mid-Atlantic	NJ	Mercer	Allentown	9/16/1981	C
Mid-Atlantic	NJ	Monmouth	Asbury Park	9/15/1983	D
Mid-Atlantic	NJ	Atlantic	Atlantic City	2/1/1985	E
Mid-Atlantic	NJ	Cape May	Avalon	2/2/1983	E
Mid-Atlantic	NJ	Monmouth	Avon-by-the-Sea	7/5/1983	E
Mid-Atlantic	NJ	Ocean	Barnegat	6/20/2000	C
Mid-Atlantic	NJ	Ocean	Bay Head	9/7/2000	E
Mid-Atlantic	NJ	Hudson	Bayonne	8/15/1983	C
Mid-Atlantic	NJ	Ocean	Beachwood	3/2/1983	D
Mid-Atlantic	NJ	Essex	Belleville	9/4/1987	D
Mid-Atlantic	NJ	Camden	Bellmawr	2/15/1980	C
Mid-Atlantic	NJ	Monmouth	Belmar	3/1/1984	E
Mid-Atlantic	NJ	Morris	Berkeley Heights	11/21/2001	D
Mid-Atlantic	NJ	Morris	Bernardsville	3/17/2003	D
Mid-Atlantic	NJ	Burlington	Beverly	2/5/1992	D
Mid-Atlantic	NJ	Essex	Bloomfield	9/4/1987	D
Mid-Atlantic	NJ	Hunterdon	Bloomsbury	12/1/1981	D
Mid-Atlantic	NJ	Burlington	Bordentown	2/2/1990	D
Mid-Atlantic	NJ	Somerset	Bound Brook	7/4/1988	D
Mid-Atlantic	NJ	Monmouth	Bradley Beach	6/15/1983	E
Mid-Atlantic	NJ	Cumberland	Bridgeton	1/18/1984	D
Mid-Atlantic	NJ	Monmouth	Brielle	9/30/1983	D
Mid-Atlantic	NJ	Burlington	Burlington	1/2/1987	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	NJ	Hunterdon	Califon	8/3/1981	D
Mid-Atlantic	NJ	Camden	Camden	12/1/1981	C
Mid-Atlantic	NJ	Salem	Carneys Point	6/1/1982	D
Mid-Atlantic	NJ	Union	Carteret	4/15/1992	C
Mid-Atlantic	NJ	Essex	Chatham	7/19/2001	D
Mid-Atlantic	NJ	Gloucester	Chester	4/1/1982	D
Mid-Atlantic	NJ	Union	Clark	9/2/1982	D
Mid-Atlantic	NJ	Hunterdon	Clinton	3/1/1984	D
Mid-Atlantic	NJ	Camden	Collingswood	3/19/1982	D
Mid-Atlantic	NJ	Atlantic	Corbin City	9/30/1981	C
Mid-Atlantic	NJ	Middlesex	Cranbury	5/17/1982	D
Mid-Atlantic	NJ	Union	Cranford	2/16/1983	D
Mid-Atlantic	NJ	Monmouth	Deal	8/6/2002	E
Mid-Atlantic	NJ	Middlesex	Dunellen	2/4/1988	D
Mid-Atlantic	NJ	Middlesex	East Brunswick	5/3/1990	D
Mid-Atlantic	NJ	Essex	East Newark	9/30/1977	C
Mid-Atlantic	NJ	Essex	East Orange	2/4/1988	D
Mid-Atlantic	NJ	Bergen	East Rutherford	9/20/1995	D
Mid-Atlantic	NJ	Monmouth	Eatontown	9/16/1981	C
Mid-Atlantic	NJ	Middlesex	Edison	6/19/1985	D
Mid-Atlantic	NJ	Union	Elizabeth	11/1/1985	D
Mid-Atlantic	NJ	Monmouth	Englishtown	3/16/1981	D
Mid-Atlantic	NJ	Essex	Essex Fells	1/2/1980	D
Mid-Atlantic	NJ	Mercer	Ewing	6/6/2001	D
Mid-Atlantic	NJ	Monmouth	Fair Haven	10/16/1979	C
Mid-Atlantic	NJ	Monmouth	Fairview	9/20/1995	D
Mid-Atlantic	NJ	Somerset	Far Hills	7/3/1978	D
Mid-Atlantic	NJ	Hunterdon	Flemington	7/16/1996	D
Mid-Atlantic	NJ	Atlantic	Folsom	1/6/1982	D
Mid-Atlantic	NJ	Monmouth	Freehold	4/4/1983	D
Mid-Atlantic	NJ	Hunterdon	Frenchtown	7/19/2001	D
Mid-Atlantic	NJ	Union	Garwood	5/17/1988	D
Mid-Atlantic	NJ	Camden	Gibbsboro	10/15/1981	D
Mid-Atlantic	NJ	Hunterdon	Glen Gardner	5/17/1982	D
Mid-Atlantic	NJ	Hudson	Guttenberg	7/16/1984	C
Mid-Atlantic	NJ	Camden	Haddonfield	12/23/1977	D
Mid-Atlantic	NJ	Atlantic	Hammonton	1/6/1982	D
Mid-Atlantic	NJ	Hunterdon	Hampton	2/2/1990	D
Mid-Atlantic	NJ	Essex	Harrison	9/30/1977	C
Mid-Atlantic	NJ	Middlesex	Helmetta	10/16/1984	D
Mid-Atlantic	NJ	Hunterdon	High Bridge	9/30/1981	D
Mid-Atlantic	NJ	Middlesex	Highland Park	6/1/1977	C
Mid-Atlantic	NJ	Mercer	Hightstown	3/15/1977	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	NJ	Hudson	Hoboken	11/17/1982	C
Mid-Atlantic	NJ	Mercer	Hopewell	6/6/2001	D
Mid-Atlantic	NJ	Essex	Irvington	11/14/1980	D
Mid-Atlantic	NJ	Ocean	Island Heights	5/16/1983	D
Mid-Atlantic	NJ	Middlesex	Jamesburg	5/15/1984	D
Mid-Atlantic	NJ	Hudson	Jersey City	3/1/1984	E
Mid-Atlantic	NJ	Monmouth	Keansburg	5/16/1983	E
Mid-Atlantic	NJ	Bergen	Kearny	12/1/1977	C
Mid-Atlantic	NJ	Union	Kenilworth	3/2/1983	D
Mid-Atlantic	NJ	Monmouth	Keyport	7/15/1992	D
Mid-Atlantic	NJ	Ocean	Lakehurst	12/15/1982	D
Mid-Atlantic	NJ	Monmouth	Lakewood	1/18/1989	D
Mid-Atlantic	NJ	Hunterdon	Lambertville	4/1/1981	D
Mid-Atlantic	NJ	Camden	Lawnside	9/1/1978	D
Mid-Atlantic	NJ	Hunterdon	Lebanon	2/3/1982	D
Mid-Atlantic	NJ	Union	Linden	3/2/1994	D
Mid-Atlantic	NJ	Camden	Lindenwold	9/17/1980	D
Mid-Atlantic	NJ	Atlantic	Linwood	1/19/1983	D
Mid-Atlantic	NJ	Monmouth	Little Silver	12/15/1982	E
Mid-Atlantic	NJ	Essex	Livingston	6/20/2001	D
Mid-Atlantic	NJ	Monmouth	Long Branch	1/5/1984	E
Mid-Atlantic	NJ	Bergen	Lyndhurst	9/20/1995	D
Mid-Atlantic	NJ	Morris	Madison	4/15/2002	D
Mid-Atlantic	NJ	Monmouth	Manasquan	12/15/1983	E
Mid-Atlantic	NJ	Ocean	Mantoloking	12/20/2000	E
Mid-Atlantic	NJ	Somerset	Manville	2/15/1978	D
Mid-Atlantic	NJ	Essex	Maplewood	8/15/1977	D
Mid-Atlantic	NJ	Middlesex	Matawan	9/30/1981	C
Mid-Atlantic	NJ	Burlington	Medford Lakes	6/1/1981	D
Mid-Atlantic	NJ	Middlesex	Metuchen	12/4/1979	D
Mid-Atlantic	NJ	Middlesex	Middlesex	3/18/1986	D
Mid-Atlantic	NJ	Hunterdon	Milford	11/18/1981	D
Mid-Atlantic	NJ	Essex	Millburn	3/17/2002	D
Mid-Atlantic	NJ	Somerset	Millstone	4/3/1978	D
Mid-Atlantic	NJ	Middlesex	Milltown	2/4/1981	D
Mid-Atlantic	NJ	Cumberland	Millville	6/15/1982	D
Mid-Atlantic	NJ	Monmouth	Monmouth Beach	7/15/1992	E
Mid-Atlantic	NJ	Essex	Montclair	8/4/1987	D
Mid-Atlantic	NJ	Morris	Morris Plains	7/5/2000	D
Mid-Atlantic	NJ	Morris	Morristown	7/3/1986	D
Mid-Atlantic	NJ	Union	Mountainside	2/16/1977	D
Mid-Atlantic	NJ	Gloucester	National Park	9/2/1982	D
Mid-Atlantic	NJ	Middlesex	New Brunswick	12/4/1979	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	NJ	Morris	New Providence	12/20/2001	D
Mid-Atlantic	NJ	Union	Newark	3/28/1980	D
Mid-Atlantic	NJ	Essex	North Arlington	9/20/1995	D
Mid-Atlantic	NJ	Somerset	North Plainfield	3/1/1984	C
Mid-Atlantic	NJ	Essex	Nutley	6/18/1987	D
Mid-Atlantic	NJ	Cape May	Ocean City	7/15/1992	E
Mid-Atlantic	NJ	Ocean	Ocean Gate	5/19/1981	C
Mid-Atlantic	NJ	Monmouth	Oceanport	2/16/1977	D
Mid-Atlantic	NJ	Middlesex	Old Bridge	8/3/1992	D
Mid-Atlantic	NJ	Essex	Orange	6/15/1984	D
Mid-Atlantic	NJ	Burlington	Palmyra	5/4/1992	D
Mid-Atlantic	NJ	Gloucester	Paulsboro	9/2/1982	D
Mid-Atlantic	NJ	Morris	Peapack and Gladstone	12/15/1977	D
Mid-Atlantic	NJ	Burlington	Pemberton	3/4/1980	D
Mid-Atlantic	NJ	Salem	Penns Grove	7/5/1982	C
Mid-Atlantic	NJ	Burlington	Pennsauken	10/16/1991	D
Mid-Atlantic	NJ	Salem	Pennsville	12/15/1982	D
Mid-Atlantic	NJ	Warren	Phillipsburg	7/19/2001	D
Mid-Atlantic	NJ	Somerset	Plainfield	7/16/1997	D
Mid-Atlantic	NJ	Atlantic	Pleasantville	1/19/1983	C
Mid-Atlantic	NJ	Ocean	Point Pleasant	6/13/1980	C
Mid-Atlantic	NJ	Atlantic	Port Republic	7/15/1992	D
Mid-Atlantic	NJ	Union	Rahway	12/20/2002	D
Mid-Atlantic	NJ	Somerset	Raritan	12/15/1981	D
Mid-Atlantic	NJ	Monmouth	Red Bank	5/19/1981	D
Mid-Atlantic	NJ	Burlington	Riverton	8/19/1991	D
Mid-Atlantic	NJ	Somerset	Rocky Hill	8/21/1981	D
Mid-Atlantic	NJ	Essex	Roseland	12/20/2001	D
Mid-Atlantic	NJ	Union	Roselle	7/17/1978	D
Mid-Atlantic	NJ	Union	Roselle Park	11/5/1997	D
Mid-Atlantic	NJ	Monmouth	Rumson	7/15/1992	E
Mid-Atlantic	NJ	Camden	Runnemede	1/2/1980	C
Mid-Atlantic	NJ	Bergen	Rutherford	9/20/1995	D
Mid-Atlantic	NJ	Salem	Salem	8/2/1982	D
Mid-Atlantic	NJ	Middlesex	Sayreville	1/16/1987	D
Mid-Atlantic	NJ	Somerset	Scotch Plains	1/19/2001	D
Mid-Atlantic	NJ	Cape May	Sea Isle City	1/6/1983	E
Mid-Atlantic	NJ	Monmouth	Shrewsbury	8/1/1979	D
Mid-Atlantic	NJ	Atlantic	Somers Point	11/17/1982	C
Mid-Atlantic	NJ	Somerset	Somerville	1/6/1983	D
Mid-Atlantic	NJ	Middlesex	South Amboy	9/4/1986	D
Mid-Atlantic	NJ	Monmouth	South Belmar	11/2/1995	C
Mid-Atlantic	NJ	Middlesex	South Bound Brook	9/30/1982	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	NJ	Essex	South Orange	7/18/1977	D
Mid-Atlantic	NJ	Middlesex	South Plainfield	8/1/1980	D
Mid-Atlantic	NJ	Middlesex	South River	9/18/1986	D
Mid-Atlantic	NJ	Ocean	South Toms River	1/6/1983	D
Mid-Atlantic	NJ	Middlesex	Spotswood	2/16/1990	D
Mid-Atlantic	NJ	Monmouth	Spring Lake Heights	12/15/1981	D
Mid-Atlantic	NJ	Essex	Springfield	8/2/1982	D
Mid-Atlantic	NJ	Hunterdon	Stockton	6/6/2001	D
Mid-Atlantic	NJ	Camden	Stratford	9/17/1980	D
Mid-Atlantic	NJ	Essex	Summit	5/2/2002	D
Mid-Atlantic	NJ	Gloucester	Swedesboro	7/5/1982	D
Mid-Atlantic	NJ	Monmouth	Tinton Falls	4/15/1982	D
Mid-Atlantic	NJ	Mercer	Trenton	2/2/1990	D
Mid-Atlantic	NJ	Ocean	Tuckerton	5/2/1983	D
Mid-Atlantic	NJ	Camden	Unincorporated Areas	12/1/1981	C
Mid-Atlantic	NJ	Burlington	Unincorporated Areas	1/2/1987	D
Mid-Atlantic	NJ	Essex	Unincorporated Areas	1/2/1980	D
Mid-Atlantic	NJ	Gloucester	Unincorporated Areas	12/1/1982	D
Mid-Atlantic	NJ	Middlesex	Unincorporated Areas	3/18/1986	D
Mid-Atlantic	NJ	Morris	Unincorporated Areas	7/3/1986	D
Mid-Atlantic	NJ	Salem	Unincorporated Areas	8/2/1982	D
Mid-Atlantic	NJ	Union	Unincorporated Areas	8/1/1978	D
Mid-Atlantic	NJ	Warren	Unincorporated Areas	1/4/2002	D
Mid-Atlantic	NJ	Monmouth	Unincorporated Areas	7/15/1992	E
Mid-Atlantic	NJ	Ocean	Unincorporated Areas	7/15/1992	E
Mid-Atlantic	NJ	Union	Union	8/1/1978	D
Mid-Atlantic	NJ	Monmouth	Union Beach	7/15/1992	E
Mid-Atlantic	NJ	Essex	Verona	2/15/1980	D
Mid-Atlantic	NJ	Atlantic	Vineland	7/5/1982	D
Mid-Atlantic	NJ	Cumberland	Vineland	7/5/1982	D
Mid-Atlantic	NJ	Union	Watchung	8/20/2002	D
Mid-Atlantic	NJ	Monmouth	West Long Branch	1/16/1981	D
Mid-Atlantic	NJ	Hudson	West New York	5/1/1984	C
Mid-Atlantic	NJ	Essex	West Orange	12/12/1980	D
Mid-Atlantic	NJ	Union	Westfield	12/18/1979	D
Mid-Atlantic	NJ	Middlesex	Woodbridge	9/1/1983	D
Mid-Atlantic	NJ	Camden	Woodlynne	12/1/1981	D
Mid-Atlantic	NY	Nassau	Cedarhurst	7/16/1997	D
Mid-Atlantic	NY	Nassau	Freeport	4/2/1997	C
Mid-Atlantic	NY	Nassau	Hewlett Bay Park	7/16/1997	C
Mid-Atlantic	NY	Nassau	Hewlett Neck	7/16/1997	E
Mid-Atlantic	NY	Nassau	Malverne	4/2/1997	D
Mid-Atlantic	NY	Kings	New York	5/21/2001	D & E

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	NY	Nassau	Rockville Centre	4/2/1997	C
Mid-Atlantic	NY	Queens	Unincorporated Areas	8/16/1996	D
Mid-Atlantic	NY	Queens	Valley Stream	7/16/1997	D
Mid-Atlantic	NY	Nassau	Woodsburgh	7/16/1997	C
Mid-Atlantic	PA	Delaware	Aldan	9/30/1993	D
Mid-Atlantic	PA	Lehigh	Allentown	7/2/2003	D
Mid-Atlantic	PA	Montgomery	Ambler	10/19/2001	D
Mid-Atlantic	PA	Chester	Atglen	3/17/2002	D
Mid-Atlantic	PA	Chester	Avondale	3/17/2002	D
Mid-Atlantic	PA	Berks	Bechtelsville	5/21/2001	D
Mid-Atlantic	PA	Northampton	Bethlehem	4/6/2001	D
Mid-Atlantic	PA	Berks	Birdsboro	5/21/2001	D
Mid-Atlantic	PA	Montgomery	Bridgeport	10/19/2001	D
Mid-Atlantic	PA	Bucks	Bristol	6/20/2001	D
Mid-Atlantic	PA	Delaware	Brookhaven	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Bryn Athyn	10/19/2001	D
Mid-Atlantic	PA	Bucks	Chalfont	6/20/2001	D
Mid-Atlantic	PA	Delaware	Chester	9/30/1993	D
Mid-Atlantic	PA	Delaware	Chester Heights	9/30/1993	D
Mid-Atlantic	PA	Lancaster	Christiana	4/15/1981	D
Mid-Atlantic	PA	Delaware	Clifton Heights	9/30/1993	D
Mid-Atlantic	PA	Chester	Coatesville	3/17/2002	D
Mid-Atlantic	PA	Montgomery	Collegeville	10/19/2001	D
Mid-Atlantic	PA	Delaware	Collingdale	9/30/1993	D
Mid-Atlantic	PA	Delaware	Colwyn	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Conshohocken	10/19/2001	D
Mid-Atlantic	PA	Delaware	Darby	9/30/1993	D
Mid-Atlantic	PA	Bucks	Doylestown	6/20/2001	D
Mid-Atlantic	PA	Montgomery	East Norriton	10/19/2001	D
Mid-Atlantic	PA	Northampton	Easton	4/6/2001	D
Mid-Atlantic	PA	Delaware	Eddystone	9/30/1993	D
Mid-Atlantic	PA	Lehigh	Emmaus	11/7/2001	D
Mid-Atlantic	PA	Delaware	Folcroft	9/30/1993	D
Mid-Atlantic	PA	Lehigh	Fountain Hill	11/7/2001	D
Mid-Atlantic	PA	Northampton	Freemansburg	4/6/2001	D
Mid-Atlantic	PA	Montgomery	Green Lane	10/19/2001	D
Mid-Atlantic	PA	Bucks	Hatboro	10/19/2001	D
Mid-Atlantic	PA	Montgomery	Hatfield	10/19/2001	D
Mid-Atlantic	PA	Bucks	Horsham	10/19/2001	D
Mid-Atlantic	PA	Montgomery	Jenkintown	10/19/2001	C
Mid-Atlantic	PA	Chester	Kennett Square	3/17/2002	D
Mid-Atlantic	PA	Bucks	Langhorne	4/2/2002	D
Mid-Atlantic	PA	Bucks	Langhorne Manor	4/2/2002	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	PA	Montgomery	Lansdale	10/19/2001	D
Mid-Atlantic	PA	Delaware	Lansdowne	9/30/1993	D
Mid-Atlantic	PA	Lehigh	Macungie	11/7/2001	D
Mid-Atlantic	PA	Delaware	Marcus Hook	9/30/1993	D
Mid-Atlantic	PA	Delaware	Media	9/30/1993	D
Mid-Atlantic	PA	Chester	Modena	3/17/2002	C
Mid-Atlantic	PA	Bucks	Morrisville	6/20/2001	D
Mid-Atlantic	PA	Delaware	Morton	9/30/1993	D
Mid-Atlantic	PA	Bucks	New Britain	6/20/2001	D
Mid-Atlantic	PA	Bucks	New Hope	6/20/2001	D
Mid-Atlantic	PA	Bucks	Newtown	6/20/2001	D
Mid-Atlantic	PA	Montgomery	Norristown	10/19/2001	D
Mid-Atlantic	PA	Montgomery	North Wales	10/19/2001	C
Mid-Atlantic	PA	Delaware	Norwood	9/30/1993	C
Mid-Atlantic	PA	Lancaster	Paradise	9/2/1988	C
Mid-Atlantic	PA	Chester	Parkesburg	3/17/2002	D
Mid-Atlantic	PA	Delaware	Parkside	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Pennsburg	10/19/2001	D
Mid-Atlantic	PA	Bucks	Perkasie	6/20/2001	D
Mid-Atlantic	PA	Philadelphia	Philadelphia	8/2/1996	D
Mid-Atlantic	PA	Montgomery	Phoenixville	3/17/2002	D
Mid-Atlantic	PA	Montgomery	Pottstown	10/19/2001	D
Mid-Atlantic	PA	Delaware	Prospect Park	9/30/1993	D
Mid-Atlantic	PA	Bucks	Quakertown	6/20/2001	D
Mid-Atlantic	PA	Delaware	Ridley Park	9/30/1993	D
Mid-Atlantic	PA	Bucks	Riegelsville	6/20/2001	D
Mid-Atlantic	PA	Delaware	Rose Valley	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Royersford	10/19/2001	D
Mid-Atlantic	PA	Delaware	Rutledge	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Schwenksville	10/19/2001	D
Mid-Atlantic	PA	Bucks	Sellersville	6/20/2001	D
Mid-Atlantic	PA	Philadelphia	Sharon Hill	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Skippack	10/19/2001	D
Mid-Atlantic	PA	Chester	South Coatesville	3/17/2002	D
Mid-Atlantic	PA	Montgomery	Spring City	3/17/2002	D
Mid-Atlantic	PA	Delaware	Springfield	10/19/2001	D
Mid-Atlantic	PA	Berks	St. Lawrence	5/21/2001	D
Mid-Atlantic	PA	Montgomery	Stowe	9/21/2001	D
Mid-Atlantic	PA	Delaware	Swarthmore	9/30/1993	D
Mid-Atlantic	PA	Delaware	Trainer	9/30/1993	D
Mid-Atlantic	PA	Montgomery	Trappe	10/19/2001	D
Mid-Atlantic	PA	Bucks	Tullytown	6/20/2001	D
Mid-Atlantic	PA	Northampton	Unincorporated Areas	4/3/1987	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mid-Atlantic	PA	Philadelphia	Unincorporated Areas	8/2/1996	D
Mid-Atlantic	PA	Delaware	Upland	9/30/1993	D
Mid-Atlantic	PA	Chester	West Chester	3/17/2002	D
Mid-Atlantic	PA	Montgomery	West Conshohocken	10/19/2001	D
Mid-Atlantic	PA	Northampton	West Easton	4/6/2001	D
Mid-Atlantic	PA	Chester	West Goshen	3/17/2002	D
Mid-Atlantic	PA	Montgomery	West Norriton	10/19/2001	D
Mid-Atlantic	PA	Bucks	Yardley	6/20/2001	D
Mid-Atlantic	PA	Delaware	Yeadon	9/30/1993	D
Mississippi River	IL	St. Clair	Alorton	6/4/1980	D
Mississippi River	IL	Madison	Alton	5/1/1984	D
Mississippi River	IL	St. Clair	Belleville	11/19/1980	D
Mississippi River	IL	Madison	Bethalto	7/2/1980	D
Mississippi River	IL	Scott	Bluffs	6/15/1981	D
Mississippi River	IL	Madison	Brooklyn	3/28/1980	D
Mississippi River	IL	Calhoun	Brussels	2/4/1981	D
Mississippi River	IL	Jackson	Carbondale	11/1/1979	D
Mississippi River	IL	St. Clair	Caseyville	3/16/1981	D
Mississippi River	IL	Marion	Central City	3/18/1996	D
Mississippi River	IL	Washington	Centralia	12/18/1984	D
Mississippi River	IL	St. Clair	Centreville	3/4/1980	C
Mississippi River	IL	Cass	Chandlerville	9/18/1986	D
Mississippi River	IL	Sangamon	Chatham	9/2/1981	D
Mississippi River	IL	Randolph	Chester	11/16/1983	C
Mississippi River	IL	St. Clair	Collinsville	2/18/1981	D
Mississippi River	IL	St. Clair	Columbia	3/17/2003	D
Mississippi River	IL	Jackson	Dowell	12/5/1989	C
Mississippi River	IL	St. Clair	Dupo	2/4/1981	D
Mississippi River	IL	Madison	East Alton	3/18/1980	D
Mississippi River	IL	St. Clair	East Carondelet	3/2/1981	D
Mississippi River	IL	St. Clair	East St. Louis	11/1/1979	D
Mississippi River	IL	Madison	Edwardsville	1/18/1984	D
Mississippi River	IL	Greene	Eldred	8/1/1983	D
Mississippi River	IL	Jackson	Elkville	12/18/1984	D
Mississippi River	IL	Jersey	Elsah	2/18/1981	D
Mississippi River	IL	Randolph	Evansville	4/15/1988	C
Mississippi River	IL	St. Clair	Fairmont City	3/28/1980	D
Mississippi River	IL	St. Clair	Fayetteville	6/15/1981	D
Mississippi River	IL	Pike	Florence	8/15/1983	D
Mississippi River	IL	Monroe	Fults	9/4/1985	C
Mississippi River	IL	Jersey	Grafton	10/23/1981	D
Mississippi River	IL	Madison	Granite City	6/1/1978	C
Mississippi River	IL	Calhoun	Hamburg	2/15/1984	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mississippi River	IL	Greene	Hardin	8/1/1983	D
Mississippi River	IL	Madison	Hartford	5/1/1979	D
Mississippi River	IL	Williamson	Herrin	4/16/1990	C
Mississippi River	IL	Madison	Highland	11/5/1986	D
Mississippi River	IL	Greene	Hillview	9/30/1983	D
Mississippi River	IL	Pike	Hull	9/18/1986	C
Mississippi River	IL	Morgan	Jacksonville	6/2/1994	D
Mississippi River	IL	Sangamon	Jerome	11/16/1983	D
Mississippi River	IL	Williamson	Johnston City	4/1/1982	D
Mississippi River	IL	Calhoun	Kampsville	8/1/1983	D
Mississippi River	IL	Greene	Kampsville	8/1/1983	D
Mississippi River	IL	Randolph	Kaskaskia	9/4/1985	C
Mississippi River	IL	St. Clair	Lebanon	7/2/1981	D
Mississippi River	IL	Sangamon	Leland Grove	12/16/1982	D
Mississippi River	IL	St. Clair	Madison	7/16/1980	D
Mississippi River	IL	Union	Makanda	3/15/1982	D
Mississippi River	IL	Williamson	Marion	9/15/1983	D
Mississippi River	IL	St. Clair	Mascoutah	6/15/1981	D
Mississippi River	IL	Morgan	Meredosia	4/15/1982	D
Mississippi River	IL	Jefferson	Mount Vernon	2/15/1984	D
Mississippi River	IL	Pike	Nebo	8/1/1984	D
Mississippi River	IL	Sangamon	Pawnee	5/3/1982	C
Mississippi River	IL	Pike	Pearl	9/5/1984	D
Mississippi River	IL	Menard	Petersburg	9/18/1986	D
Mississippi River	IL	Perry	Pinckneyville	9/16/1982	D
Mississippi River	IL	Sangamon	Pleasant Plains	9/2/1981	C
Mississippi River	IL	Madison	Pontoon Beach	2/5/1982	D
Mississippi River	IL	Randolph	Prairie du Rocher	9/4/1985	C
Mississippi River	IL	Adams	Quincy	10/15/1981	D
Mississippi River	IL	Sangamon	Riverton	12/1/1981	D
Mississippi River	IL	Sangamon	Rochester	6/15/1982	D
Mississippi River	IL	Randolph	Rockwood	11/16/1983	C
Mississippi River	IL	Madison	Roxana	5/1/1979	D
Mississippi River	IL	Marion	Salem	5/1/1979	D
Mississippi River	IL	St. Clair	Sauget	7/9/1982	D
Mississippi River	IL	Madison	South Roxana	11/26/1982	D
Mississippi River	IL	Sangamon	Springfield	2/2/1982	D
Mississippi River	IL	St. Clair	Swansea	12/1/1981	D
Mississippi River	IL	Sangamon	Thayer	5/3/1982	C
Mississippi River	IL	Brown	Unincorporated Areas	11/1/1985	C
Mississippi River	IL	Calhoun	Unincorporated Areas	2/1/1984	C
Mississippi River	IL	Cass	Unincorporated Areas	11/15/1985	C
Mississippi River	IL	Menard	Unincorporated Areas	9/2/1988	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mississippi River	IL	Randolph	Unincorporated Areas	6/3/1986	C
Mississippi River	IL	Schuyler	Unincorporated Areas	7/18/1985	C
Mississippi River	IL	Union	Unincorporated Areas	2/19/1986	C
Mississippi River	IL	Adams	Unincorporated Areas	1/19/1996	D
Mississippi River	IL	Clinton	Unincorporated Areas	9/29/1989	D
Mississippi River	IL	Fayette	Unincorporated Areas	6/15/1981	D
Mississippi River	IL	Greene	Unincorporated Areas	8/5/1985	D
Mississippi River	IL	Madison	Unincorporated Areas	7/16/1980	D
Mississippi River	IL	Monroe	Unincorporated Areas	3/17/2003	D
Mississippi River	IL	Morgan	Unincorporated Areas	1/17/1986	D
Mississippi River	IL	Pike	Unincorporated Areas	1/3/1986	D
Mississippi River	IL	Sangamon	Unincorporated Areas	1/6/1983	D
Mississippi River	IL	Scott	Unincorporated Areas	1/3/1986	D
Mississippi River	IL	St. Clair	Unincorporated Areas	8/5/1985	D
Mississippi River	IL	Pike	Valley City	8/1/1983	D
Mississippi River	IL	Monroe	Valmeyer	9/4/1985	C
Mississippi River	IL	Madison	Venice	1/5/1978	C
Mississippi River	IL	Franklin	West Frankfort	5/16/1983	D
Mississippi River	IL	Greene	Wilmington	3/17/2003	D
Mississippi River	IL	Madison	Wood River	5/1/1979	D
Mississippi River	MO	Pike	Annada	11/19/1986	C
Mississippi River	MO	St. Louis	Arnold	10/16/1996	D
Mississippi River	MO	St. Louis	Ballwin	8/23/2000	D
Mississippi River	MO	St. Louis City	Bellefontaine Neighbors	8/23/2000	D
Mississippi River	MO	St. Louis	Bel-Ridge	8/23/2000	D
Mississippi River	MO	Franklin	Berger	6/15/1982	C
Mississippi River	MO	St. Louis	Berkeley	8/23/2000	D
Mississippi River	MO	St. Louis	Black Jack	8/23/2000	D
Mississippi River	MO	Pike	Bowling Green	5/2/1977	D
Mississippi River	MO	St. Louis	Breckenridge Hills	8/23/2000	D
Mississippi River	MO	St. Louis	Brentwood	8/23/2000	D
Mississippi River	MO	Cape Girardeau	Cape Girardeau	11/5/1980	D
Mississippi River	MO	Osage	Chamois	3/18/1987	C
Mississippi River	MO	St. Louis	Chesterfield	8/23/2000	D
Mississippi River	MO	St. Louis	Clarkson Valley	8/23/2000	D
Mississippi River	MO	Pike	Clarksville	4/1/1977	C
Mississippi River	MO	St. Louis City	Clayton	8/23/2000	D
Mississippi River	MO	Boone	Columbia	8/16/1995	D
Mississippi River	MO	St. Louis	Cool Valley	8/23/2000	D
Mississippi River	MO	St. Charles	Cottleville	3/17/2003	D
Mississippi River	MO	St. Louis	Crestwood	8/23/2000	D
Mississippi River	MO	St. Louis	Creve Coeur	8/23/2000	D
Mississippi River	MO	Jefferson	Crystal City	12/28/1982	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mississippi River	MO	St. Charles	Dardenne Prairie	3/17/2003	D
Mississippi River	MO	Jefferson	De Soto	8/6/2002	D
Mississippi River	MO	St. Louis	Des Peres	8/23/2000	D
Mississippi River	MO	Reynolds	Ellington	1/16/1981	D
Mississippi River	MO	Lincoln	Elsberry	11/4/1988	D
Mississippi River	MO	Jefferson	Eureka	8/23/2000	D
Mississippi River	MO	St. Francois	Farmington	1/16/1981	D
Mississippi River	MO	St. Louis	Fenton	8/23/2000	D
Mississippi River	MO	St. Louis	Ferguson	8/23/2000	D
Mississippi River	MO	Jefferson	Festus	1/2/1981	D
Mississippi River	MO	St. Louis	Florissant	8/23/2000	D
Mississippi River	MO	Lincoln	Foley	3/1/1978	D
Mississippi River	MO	Madison	Fredericktown	12/6/2002	D
Mississippi River	MO	St. Louis	Frontenac	8/23/2000	D
Mississippi River	MO	Callaway	Fulton	5/15/1986	D
Mississippi River	MO	Gasconade	Gasconade	12/18/1984	C
Mississippi River	MO	Bollinger	Glen Allen	8/15/1990	D
Mississippi River	MO	St. Louis	Grantwood Village	8/23/2000	D
Mississippi River	MO	St. Louis	Hanley Hills	8/23/2000	D
Mississippi River	MO	Marion	Hannibal	3/1/1982	D
Mississippi River	MO	Boone	Hartsburg	8/16/1982	D
Mississippi River	MO	St. Louis	Hazelwood	8/23/2000	D
Mississippi River	MO	Jefferson	Herculaneum	11/17/1993	D
Mississippi River	MO	Gasconade	Hermann	4/23/1976	D
Mississippi River	MO	Iron	Ironton	12/4/1984	C
Mississippi River	MO	Cape Girardeau	Jackson	1/3/1986	D
Mississippi River	MO	Callaway	Jefferson City	10/6/1981	D
Mississippi River	MO	St. Louis City	Jennings	8/23/2000	D
Mississippi River	MO	Jefferson	Kimmswick	1/6/1982	D
Mississippi River	MO	St. Louis	Kirkwood	8/23/2000	D
Mississippi River	MO	St. Louis	Ladue	8/23/2000	D
Mississippi River	MO	St. Charles	Lake St. Louis	3/17/2003	D
Mississippi River	MO	Pike	Louisiana	4/3/1978	D
Mississippi River	MO	St. Louis	Mackenzie	8/23/2000	D
Mississippi River	MO	St. Louis	Manchester	8/23/2000	D
Mississippi River	MO	St. Louis City	Maplewood	8/23/2000	D
Mississippi River	MO	Bollinger	Marble Hill	8/15/1990	D
Mississippi River	MO	St. Louis	Maryland Heights	8/23/2000	D
Mississippi River	MO	Audrain	Mexico	2/16/1983	D
Mississippi River	MO	Callaway	Mokane	9/18/1986	D
Mississippi River	MO	St. Louis	Moline Acres	8/23/2000	D
Mississippi River	MO	Gasconade	Morrison	9/18/1986	C
Mississippi River	MO	Franklin	New Haven	2/18/1981	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mississippi River	MO	Phelps	Newburg	2/20/1976	C
Mississippi River	MO	St. Louis	Northwoods	8/23/2000	D
Mississippi River	MO	St. Louis	Oakland	8/23/2000	D
Mississippi River	MO	St. Charles	O'Fallon	3/17/2003	D
Mississippi River	MO	St. Charles	Old Monroe	6/5/1985	D
Mississippi River	MO	St. Louis	Olivette	8/23/2000	D
Mississippi River	MO	St. Louis	Overland	8/23/2000	D
Mississippi River	MO	St. Louis	Pacific	2/19/1992	D
Mississippi River	MO	St. Louis City	Pagedale	8/23/2000	D
Mississippi River	MO	St. Francois	Park Hills	2/18/1998	D
Mississippi River	MO	St. Charles	Portage Des Sioux	3/17/2003	D
Mississippi River	MO	St. Louis City	Richmond Heights	8/2/1995	D
Mississippi River	MO	St. Louis City	Riverview	8/23/2000	D
Mississippi River	MO	St. Louis	Rock Hill	8/23/2000	D
Mississippi River	MO	Phelps	Rolla	12/17/1993	D
Mississippi River	MO	Dent	Salem	8/1/1979	D
Mississippi River	MO	St. Louis	Shrewsbury	8/23/2000	D
Mississippi River	MO	Lincoln	Silex	9/16/1982	D
Mississippi River	MO	St. Louis	St. Charles	3/17/2003	D
Mississippi River	MO	St. Louis City	St. Louis	3/15/1993	D
Mississippi River	MO	Ste. Genevieve	St. Mary	8/16/1988	C
Mississippi River	MO	St. Charles	St. Paul	3/17/2003	D
Mississippi River	MO	St. Charles	St. Peters	3/17/2003	D
Mississippi River	MO	Ste. Genevieve	Ste. Genevieve	9/30/1977	C
Mississippi River	MO	Crawford	Steelville	12/6/2002	D
Mississippi River	MO	Franklin	Sullivan	6/15/1981	D
Mississippi River	MO	St. Louis	Sunset Hills	8/23/2000	D
Mississippi River	MO	St. Louis	Town and Country	8/23/2000	D
Mississippi River	MO	Lincoln	Troy	5/5/1981	D
Mississippi River	MO	Gasconade	Unincorporated Areas	12/18/1984	C
Mississippi River	MO	Iron	Unincorporated Areas	12/4/1984	C
Mississippi River	MO	Marion	Unincorporated Areas	5/16/1977	C
Mississippi River	MO	Ste. Genevieve	Unincorporated Areas	9/30/1977	C
Mississippi River	MO	Bollinger	Unincorporated Areas	8/15/1990	D
Mississippi River	MO	Boone	Unincorporated Areas	6/15/1983	D
Mississippi River	MO	Cape Girardeau	Unincorporated Areas	11/5/1980	D
Mississippi River	MO	Franklin	Unincorporated Areas	10/16/1984	D
Mississippi River	MO	Jefferson	Unincorporated Areas	10/6/1981	D
Mississippi River	MO	Pulaski	Unincorporated Areas	3/17/2002	D
Mississippi River	MO	St. Charles	Unincorporated Areas	3/17/2003	D
Mississippi River	MO	St. Louis	Unincorporated Areas	3/15/1993	D
Mississippi River	MO	Washington	Unincorporated Areas	11/3/1982	D
Mississippi River	MO	Franklin	Union	3/2/1983	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Mississippi River	MO	St. Louis City	University City	8/23/2000	D
Mississippi River	MO	St. Louis	Valley Park	8/23/2000	D
Mississippi River	MO	Audrain	Vandalia	2/4/1988	C
Mississippi River	MO	Warren	Washington	11/3/1982	D
Mississippi River	MO	St. Louis	Webster Groves	8/23/2000	D
Mississippi River	MO	St. Louis	Weldon Spring	3/17/2003	D
Mississippi River	MO	St. Louis City	Wellston	8/23/2000	D
Mississippi River	MO	St. Charles	Wentzville	3/17/2003	D
Mississippi River	MO	St. Louis	West Alton	3/17/2003	D
Mississippi River	MO	St. Louis	Westwood	8/23/2000	D
Mississippi River	MO	St. Louis	Winchester	8/23/2000	D
Mississippi River	MO	Lincoln	Winfield	11/17/1982	D
Southwest	AZ	Maricopa	Apache Junction	3/19/1990	D
Southwest	AZ	Maricopa	Avondale	7/19/2001	D
Southwest	AZ	Maricopa	Buckeye	7/19/2001	D
Southwest	AZ	Yavapai	Camp Verde	6/6/2001	D
Southwest	AZ	Maricopa	Carefree	7/19/2001	D
Southwest	AZ	Pinal	Casa Grande	9/29/1989	D
Southwest	AZ	Maricopa	Cave Creek	7/19/2001	D
Southwest	AZ	Maricopa	Chandler	7/19/2001	C
Southwest	AZ	Yavapai	Chino Valley	6/6/2001	D
Southwest	AZ	Yavapai	Clarkdale	6/6/2001	D
Southwest	AZ	Yavapai	Cottonwood	6/6/2001	D
Southwest	AZ	Maricopa	El Mirage	7/19/2001	D
Southwest	AZ	Pinal	Florence	8/17/1981	D
Southwest	AZ	Maricopa	Fountain Hills	7/19/2001	D
Southwest	AZ	Maricopa	Gila Bend	7/19/2001	D
Southwest	AZ	Maricopa	Gilbert	7/19/2001	C
Southwest	AZ	Maricopa	Glendale	7/19/2001	D
Southwest	AZ	Gila	Globe	5/1/1980	D
Southwest	AZ	Maricopa	Goodyear	7/19/2001	D
Southwest	AZ	Pinal	Kearny	8/17/1981	D
Southwest	AZ	Pima	Marana	2/8/1999	D
Southwest	AZ	Pinal	Mesa	7/19/2001	D
Southwest	AZ	Gila	Miami	5/1/1980	D
Southwest	AZ	Maricopa	Paradise Valley	7/19/2001	D
Southwest	AZ	Gila	Payson	3/18/1980	D
Southwest	AZ	Yavapai	Peoria	7/19/2001	D
Southwest	AZ	Maricopa	Phoenix	7/19/2001	D
Southwest	AZ	Yavapai	Prescott	6/6/2001	D
Southwest	AZ	Yavapai	Prescott Valley	6/6/2001	D
Southwest	AZ	La Paz	Quartzsite	12/22/1998	D
Southwest	AZ	Maricopa	Queen Creek	7/19/2001	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Southwest	AZ	Maricopa	Scottsdale	7/19/2001	D
Southwest	AZ	Pinal	Superior	11/4/1981	D
Southwest	AZ	Maricopa	Surprise	7/19/2001	D
Southwest	AZ	Maricopa	Tempe	7/19/2001	D
Southwest	AZ	Maricopa	Tolleson	7/19/2001	C
Southwest	AZ	Yuma	Unincorporated Areas	11/15/1985	C
Southwest	AZ	Coconino	Unincorporated Areas	9/30/1995	D
Southwest	AZ	Gila	Unincorporated Areas	7/19/2001	D
Southwest	AZ	La Paz	Unincorporated Areas	3/4/2002	D
Southwest	AZ	Maricopa	Unincorporated Areas	7/19/2001	D
Southwest	AZ	Mohave	Unincorporated Areas	10/20/2000	D
Southwest	AZ	Pima	Unincorporated Areas	2/8/1999	D
Southwest	AZ	Pinal	Unincorporated Areas	3/5/1990	D
Southwest	AZ	Yavapai	Unincorporated Areas	6/6/2001	D
Southwest	AZ	Maricopa	Wickenburg	7/19/2001	D
Southwest	AZ	Maricopa	Youngtown	7/19/2001	D
Texas - Coastal	LA	Calcasieu	Unincorporated Areas	6/8/1998	D
Texas - Coastal	LA	Cameron	Unincorporated Areas	5/4/1992	E
Texas - Coastal	TX	Galveston	Alvin	9/22/1999	D & E
Texas - Coastal	TX	Chambers	Anahuac	1/6/1983	E
Texas - Coastal	TX	Brazoria	Angleton	9/22/1999	D
Texas - Coastal	TX	Matagorda	Bay City	6/5/1985	D
Texas - Coastal	TX	Harris	Baytown	4/20/2000	D & E
Texas - Coastal	TX	Chambers	Beach City	1/19/1983	E
Texas - Coastal	TX	Jefferson	Beaumont	8/6/2002	D
Texas - Coastal	TX	Austin	Bellville	6/16/1999	D
Texas - Coastal	TX	Jefferson	Bevil Oaks	9/4/1987	D
Texas - Coastal	TX	Brazoria	Bonney	9/22/1999	D
Texas - Coastal	TX	Brazoria	Brazoria	9/22/1999	D
Texas - Coastal	TX	Washington	Brenham	8/17/1981	D
Texas - Coastal	TX	Orange	Bridge City	9/2/1982	C
Texas - Coastal	TX	Waller	Brookshire	2/17/1989	D
Texas - Coastal	TX	Brazoria	Brookside Village	9/22/1999	D
Texas - Coastal	TX	Galveston	Clear Lake Shores	4/4/1983	C
Texas - Coastal	TX	Liberty	Cleveland	8/4/1987	D
Texas - Coastal	TX	Brazoria	Clute	9/22/1999	D
Texas - Coastal	TX	Montgomery	Conroe	9/22/1999	D
Texas - Coastal	TX	Brazoria	Danbury	9/22/1999	D
Texas - Coastal	TX	Liberty	Dayton	9/30/1988	D
Texas - Coastal	TX	Liberty	Dayton Lakes	11/15/1989	D
Texas - Coastal	TX	Harris	Deer Park	4/20/2000	D
Texas - Coastal	TX	Galveston	Dickinson	3/4/1991	D
Texas - Coastal	TX	Jackson	Edna	7/5/1982	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Texas - Coastal	TX	Wharton	El Campo	3/1/1983	D
Texas - Coastal	TX	Harris	El Lago	4/20/2000	D & E
Texas - Coastal	TX	Brazoria	Freeport	9/22/1999	D & E
Texas - Coastal	TX	Harris	Friendswood	9/22/1999	D
Texas - Coastal	TX	Harris	Galena Park	4/20/2000	D
Texas - Coastal	TX	Galveston	Galveston	12/6/2002	D & E
Texas - Coastal	TX	Jackson	Ganado	9/28/1979	C
Texas - Coastal	TX	Jefferson	Groves	1/6/1983	C
Texas - Coastal	TX	Waller	Hempstead	6/15/1981	D
Texas - Coastal	TX	Harris	Hilshire Village	4/20/2000	D
Texas - Coastal	TX	Galveston	Hitchcock	4/4/1983	C
Texas - Coastal	TX	Brazoria	Holiday Lakes	9/22/1999	D
Texas - Coastal	TX	Montgomery	Houston	4/20/2000	D & E
Texas - Coastal	TX	Harris	Humble	4/20/2000	D
Texas - Coastal	TX	Walker	Huntsville	5/7/2001	D
Texas - Coastal	TX	Brazoria	Iowa Colony	9/22/1999	D
Texas - Coastal	TX	Harris	Jacinto City	4/20/2000	D
Texas - Coastal	TX	Galveston	Jamaica Beach	12/6/2002	E
Texas - Coastal	TX	Harris	Jersey Village	4/20/2000	D
Texas - Coastal	TX	Brazoria	Jones Creek	9/22/1999	D & E
Texas - Coastal	TX	Waller	Katy	2/8/1983	D
Texas - Coastal	TX	Galveston	Kemah	4/4/1983	E
Texas - Coastal	TX	Hardin	Kountze	4/17/1996	D
Texas - Coastal	TX	Galveston	La Marque	2/16/1983	D
Texas - Coastal	TX	Harris	La Porte	4/20/2000	D & E
Texas - Coastal	TX	Brazoria	Lake Jackson	9/22/1999	D
Texas - Coastal	TX	Harris	League City	9/22/1999	D & E
Texas - Coastal	TX	Liberty	Liberty	11/18/1988	D
Texas - Coastal	TX	Brazoria	Liverpool	9/22/1999	D
Texas - Coastal	TX	Hardin	Lumberton	4/17/1996	D
Texas - Coastal	TX	Montgomery	Magnolia	9/22/1999	D
Texas - Coastal	TX	Brazoria	Manvel	9/22/1999	D
Texas - Coastal	TX	Harris	Missouri City	4/20/2000	D
Texas - Coastal	TX	Liberty	Mont Belvieu	8/16/1982	D
Texas - Coastal	TX	Montgomery	Montgomery	9/22/1999	D
Texas - Coastal	TX	Harris	Nassau Bay	4/20/2000	D & E
Texas - Coastal	TX	Brazos	Navasota	2/4/1988	D
Texas - Coastal	TX	Jefferson	Nome	2/2/1983	D
Texas - Coastal	TX	Montgomery	Oak Ridge North	9/22/1999	D
Texas - Coastal	TX	Chambers	Old River-Winfree	2/17/1993	C
Texas - Coastal	TX	Orange	Orange	6/5/1997	D
Texas - Coastal	TX	Brazoria	Oyster Creek	9/22/1999	D & E
Texas - Coastal	TX	Matagorda	Palacios	2/5/1986	D & E

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Texas - Coastal	TX	Montgomery	Panorama Village	9/22/1999	D
Texas - Coastal	TX	Galveston	Pasadena	4/20/2000	D & E
Texas - Coastal	TX	Montgomery	Patton Village	9/22/1999	D
Texas - Coastal	TX	Harris	Pearland	4/20/2000	D
Texas - Coastal	TX	Orange	Pine Forest	2/16/1983	D
Texas - Coastal	TX	Orange	Pinehurst	1/6/1983	D
Texas - Coastal	TX	Harris	Piney Point Village	4/20/2000	D
Texas - Coastal	TX	Fort Bend	Pleak	4/20/2000	D
Texas - Coastal	TX	Montgomery	Plum Grove	7/16/1987	D
Texas - Coastal	TX	Jefferson	Port Neches	1/6/1983	C
Texas - Coastal	TX	Waller	Prairie View	4/15/1982	D
Texas - Coastal	TX	Fort Bend	Richmond	4/20/2000	D
Texas - Coastal	TX	Montgomery	Roman Forest	9/22/1999	D
Texas - Coastal	TX	Orange	Rose City	1/6/1983	C
Texas - Coastal	TX	Hardin	Rose Hill Acres	4/17/1996	D
Texas - Coastal	TX	Fort Bend	Rosenberg	4/20/2000	D
Texas - Coastal	TX	Austin	San Felipe	6/16/1999	C
Texas - Coastal	TX	Galveston	Seabrook	4/20/2000	D & E
Texas - Coastal	TX	Harris	Shoreacres	4/20/2000	D & E
Texas - Coastal	TX	Hardin	Silsbee	4/17/1996	D
Texas - Coastal	TX	Fort Bend	Simonton	4/20/2000	D
Texas - Coastal	TX	Harris	South Houston	4/20/2000	D
Texas - Coastal	TX	Harris	Southside Place	4/20/2000	D
Texas - Coastal	TX	Montgomery	Splendora	9/22/1999	D
Texas - Coastal	TX	Harris	Spring Valley	4/20/2000	D
Texas - Coastal	TX	Fort Bend	Stafford	4/20/2000	D
Texas - Coastal	TX	Montgomery	Stagecoach	9/22/1999	D
Texas - Coastal	TX	Fort Bend	Sugar Land	4/20/2000	D
Texas - Coastal	TX	Brazoria	Surfside Beach	9/22/1999	D & E
Texas - Coastal	TX	Brazoria	Sweeny	9/22/1999	D
Texas - Coastal	TX	Harris	Taylor Lake Village	4/20/2000	D
Texas - Coastal	TX	Galveston	Texas City	5/4/1992	D & E
Texas - Coastal	TX	Fort Bend	Thompsons	4/20/2000	C
Texas - Coastal	TX	Harris	Tomball	4/20/2000	D
Texas - Coastal	TX	Colorado	Unincorporated Areas	1/3/1990	C
Texas - Coastal	TX	Austin	Unincorporated Areas	4/15/2002	D
Texas - Coastal	TX	Brazoria	Unincorporated Areas	9/22/1999	D
Texas - Coastal	TX	Fort Bend	Unincorporated Areas	11/7/2001	D
Texas - Coastal	TX	Jackson	Unincorporated Areas	2/18/1981	D
Texas - Coastal	TX	Jasper	Unincorporated Areas	5/18/1992	D
Texas - Coastal	TX	Jefferson	Unincorporated Areas	8/6/2002	D
Texas - Coastal	TX	Liberty	Unincorporated Areas	11/18/1988	D
Texas - Coastal	TX	Montgomery	Unincorporated Areas	9/22/1999	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Texas - Coastal	TX	Tyler	Unincorporated Areas	2/19/1992	D
Texas - Coastal	TX	Waller	Unincorporated Areas	9/14/1979	D
Texas - Coastal	TX	Wharton	Unincorporated Areas	9/16/1982	D
Texas - Coastal	TX	Calhoun	Unincorporated Areas	11/7/2001	D & E
Texas - Coastal	TX	Chambers	Unincorporated Areas	5/18/1999	D & E
Texas - Coastal	TX	Galveston	Unincorporated Areas	12/6/2002	D & E
Texas - Coastal	TX	Hardin	Unincorporated Areas	4/17/1996	D & E
Texas - Coastal	TX	Harris	Unincorporated Areas	4/20/2000	D & E
Texas - Coastal	TX	Matagorda	Unincorporated Areas	5/4/1992	E
Texas - Coastal	TX	Orange	Vidor	1/6/1983	D
Texas - Coastal	TX	Waller	Waller	9/14/1979	D
Texas - Coastal	TX	Brazoria	West Columbia	9/22/1999	D
Texas - Coastal	TX	Orange	West Orange	1/6/1983	D
Texas - Coastal	TX	Harris	West University Place	4/20/2000	C
Texas - Coastal	TX	Wharton	Wharton	9/16/1982	D
Texas - Coastal	TX	Montgomery	Willis	9/22/1999	D
Texas - Coastal	TX	Montgomery	Woodbranch	9/22/1999	D
Texas - Coastal	TX	Montgomery	Woodloch	9/22/1999	D
Washington/Baltimore	MD	Harford	Aberdeen	1/7/2000	D
Washington/Baltimore	MD	Anne Arundel	Annapolis	11/4/1981	C
Washington/Baltimore	MD	Baltimore	Baltimore	9/30/1988	D & E
Washington/Baltimore	MD	Harford	Bel Air	1/7/2000	D
Washington/Baltimore	MD	Washington	Boonsboro	7/16/1980	D
Washington/Baltimore	MD	Montgomery	Brookeville	6/19/1989	D
Washington/Baltimore	MD	Dorchester	Cambridge	1/16/1981	C
Washington/Baltimore	MD	Queen Annes	Centreville	9/27/1985	D
Washington/Baltimore	MD	Cecil	Charlestown	11/17/1982	C
Washington/Baltimore	MD	Calvert	Chesapeake Beach	11/1/1984	E
Washington/Baltimore	MD	Kent	Chestertown	2/15/1984	D & E
Washington/Baltimore	MD	Dorchester	Church Creek	10/18/1988	C
Washington/Baltimore	MD	Allegany	Cumberland	9/1/1983	D
Washington/Baltimore	MD	Caroline	Denton	12/18/1979	D
Washington/Baltimore	MD	Talbot	Easton	9/28/1984	D
Washington/Baltimore	MD	Frederick	Frederick	8/19/1991	D
Washington/Baltimore	MD	Allegany	Frostburg	12/18/1979	D
Washington/Baltimore	MD	Washington	Funkstown	2/1/1978	D
Washington/Baltimore	MD	Montgomery	Gaithersburg	12/1/1982	D
Washington/Baltimore	MD	Caroline	Greensboro	11/1/1979	D
Washington/Baltimore	MD	Washington	Hagerstown	2/15/1984	D
Washington/Baltimore	MD	Washington	Hancock	2/17/1982	D
Washington/Baltimore	MD	Cecil	Havre de Grace	1/7/2000	D
Washington/Baltimore	MD	Anne Arundel	Highland Beach	10/15/1982	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Washington/Baltimore	MD	Charles	Indian Head	10/15/1985	C
Washington/Baltimore	MD	Washington	Keedysville	1/2/1980	D
Washington/Baltimore	MD	Prince Georges	Laurel	8/19/1985	D
Washington/Baltimore	MD	St. Marys	Leonardtown	11/19/1987	D
Washington/Baltimore	MD	Allegany	Midland	8/15/1979	D
Washington/Baltimore	MD	Queen Annes	Millington	11/3/1982	D
Washington/Baltimore	MD	Garrett	Mountain Lake Park	8/16/1994	D
Washington/Baltimore	MD	Anne Arundel	North Beach	9/28/1984	E
Washington/Baltimore	MD	Cecil	North East	10/15/1981	D
Washington/Baltimore	MD	Garrett	Oakland	10/18/1995	D
Washington/Baltimore	MD	Cecil	Perryville	9/30/1992	C
Washington/Baltimore	MD	Cecil	Port Deposit	2/16/1977	D
Washington/Baltimore	MD	Queen Annes	Queenstown	9/28/1984	D
Washington/Baltimore	MD	Cecil	Rising Sun	5/15/1986	D
Washington/Baltimore	MD	Kent	Rock Hall	9/1/1983	D
Washington/Baltimore	MD	Montgomery	Rockville	1/5/1978	D
Washington/Baltimore	MD	Dorchester	Secretary	4/2/1992	C
Washington/Baltimore	MD	Washington	Sharpsburg	1/2/1980	D
Washington/Baltimore	MD	Talbot	St. Michaels	11/1/1984	C
Washington/Baltimore	MD	Carroll	Sykesville	10/10/1980	D
Washington/Baltimore	MD	Allegany	Unincorporated Areas	9/29/1989	D
Washington/Baltimore	MD	Anne Arundel	Unincorporated Areas	9/27/1985	D
Washington/Baltimore	MD	Caroline	Unincorporated Areas	9/7/1998	D
Washington/Baltimore	MD	Carroll	Unincorporated Areas	8/7/1981	D
Washington/Baltimore	MD	Dorchester	Unincorporated Areas	6/16/1992	D
Washington/Baltimore	MD	Frederick	Unincorporated Areas	8/19/1991	D
Washington/Baltimore	MD	Garrett	Unincorporated Areas	8/16/1994	D
Washington/Baltimore	MD	Harford	Unincorporated Areas	1/7/2000	D
Washington/Baltimore	MD	Howard	Unincorporated Areas	4/2/1997	D
Washington/Baltimore	MD	Kent	Unincorporated Areas	6/16/1992	D
Washington/Baltimore	MD	Montgomery	Unincorporated Areas	6/16/1992	D
Washington/Baltimore	MD	St. Marys	Unincorporated Areas	5/17/1993	D
Washington/Baltimore	MD	Talbot	Unincorporated Areas	6/16/1992	D
Washington/Baltimore	MD	Washington	Unincorporated Areas	9/30/1992	D
Washington/Baltimore	MD	Baltimore	Unincorporated Areas	9/30/1988	D & E
Washington/Baltimore	MD	Charles	Unincorporated Areas	6/5/1985	D & E
Washington/Baltimore	MD	Queen Annes	Unincorporated Areas	6/16/1992	D & E
Washington/Baltimore	MD	Carroll	Union Bridge	8/1/1977	D
Washington/Baltimore	MD	Frederick	Walkersville	9/30/1980	D
Washington/Baltimore	MD	Carroll	Westminster	10/10/1980	D
Washington/Baltimore	PA	Adams	Abbottstown	9/2/1981	D
Washington/Baltimore	PA	Bedford	Bedford	9/2/1988	C
Washington/Baltimore	PA	Somerset	Berlin	7/15/1988	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Washington/Baltimore	PA	Perry	Bloomfield	3/1/1978	D
Washington/Baltimore	PA	Adams	Bonneauville	8/3/1981	D
Washington/Baltimore	PA	Cumberland	Camp Hill	12/11/1981	D
Washington/Baltimore	PA	Cumberland	Carlisle	2/3/1982	D
Washington/Baltimore	PA	Adams	Carroll Valley	9/2/1988	C
Washington/Baltimore	PA	Somerset	Central City	6/18/1990	C
Washington/Baltimore	PA	Franklin	Chambersburg	7/17/1978	D
Washington/Baltimore	PA	Huntingdon	Coalmont	8/3/1989	C
Washington/Baltimore	PA	Lancaster	Columbia	9/22/1999	D
Washington/Baltimore	PA	Dauphin	Dauphin	4/15/1977	D
Washington/Baltimore	PA	York	Delta	9/1/1983	D
Washington/Baltimore	PA	York	Dover	3/2/1981	D
Washington/Baltimore	PA	Dauphin	Duncannon	12/18/1979	D
Washington/Baltimore	PA	Lancaster	Elizabethtown	4/17/1978	D
Washington/Baltimore	PA	Bedford	Everett	11/16/1990	C
Washington/Baltimore	PA	Adams	Fairfield	8/2/1990	C
Washington/Baltimore	PA	York	Felton	7/2/1992	D
Washington/Baltimore	PA	Somerset	Garrett	6/4/1990	C
Washington/Baltimore	PA	Adams	Gettysburg	8/15/1983	D
Washington/Baltimore	PA	York	Goldsboro	2/15/1980	D
Washington/Baltimore	PA	Franklin	Guilford	6/18/1990	D
Washington/Baltimore	PA	York	Hallam	2/15/1980	D
Washington/Baltimore	PA	Adams	Hampton	9/21/2001	D
Washington/Baltimore	PA	Cumberland	Harrisburg	5/2/1977	D
Washington/Baltimore	PA	Dauphin	Highspire	12/11/1981	D
Washington/Baltimore	PA	Blair	Hollidaysburg	6/1/1982	D
Washington/Baltimore	PA	Somerset	Hooversville	6/18/1990	C
Washington/Baltimore	PA	Bedford	Hopewell	8/15/1989	C
Washington/Baltimore	PA	Dauphin	Hummelstown	3/15/1977	D
Washington/Baltimore	PA	Huntingdon	Huntingdon	5/16/1995	D
Washington/Baltimore	PA	Bedford	Hyndman	12/15/1989	C
Washington/Baltimore	PA	Huntingdon	Kistler	9/15/1977	D
Washington/Baltimore	PA	Lancaster	Lancaster	12/18/1979	D
Washington/Baltimore	PA	Cumberland	Lemoyne	12/4/1979	D
Washington/Baltimore	PA	York	Lewisberry	11/17/1982	D
Washington/Baltimore	PA	Cumberland	Lower Allen	9/30/1977	D
Washington/Baltimore	PA	York	Manchester	12/1/1981	D
Washington/Baltimore	PA	Lancaster	Manheim	4/4/1983	D
Washington/Baltimore	PA	Bedford	Manns Choice	9/6/1989	C
Washington/Baltimore	PA	Huntingdon	Mapleton	7/5/1977	D
Washington/Baltimore	PA	Lancaster	Marietta	2/1/1980	D
Washington/Baltimore	PA	Perry	Marysville	5/16/1977	D
Washington/Baltimore	PA	Adams	McSherrystown	6/8/1998	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Washington/Baltimore	PA	Cumberland	Mechanicsburg	3/3/1992	D
Washington/Baltimore	PA	Franklin	Mercersburg	7/15/1992	C
Washington/Baltimore	PA	Somerset	Meyersdale	6/17/1986	D
Washington/Baltimore	PA	Dauphin	Middletown	8/15/1983	D
Washington/Baltimore	PA	Adams	Midway	8/15/1989	C
Washington/Baltimore	PA	Huntingdon	Mill Creek	3/2/1989	C
Washington/Baltimore	PA	Franklin	Mont Alto	7/16/1990	C
Washington/Baltimore	PA	Cumberland	Mount Holly Springs	1/5/1996	D
Washington/Baltimore	PA	Huntingdon	Mount Union	7/18/1977	D
Washington/Baltimore	PA	York	Mount Wolf	5/15/1980	D
Washington/Baltimore	PA	Cumberland	New Cumberland	2/16/1977	D
Washington/Baltimore	PA	Blair	Newry	1/18/1984	D
Washington/Baltimore	PA	Mifflin	Newton Hamilton	2/15/1978	D
Washington/Baltimore	PA	York	North York	7/2/1982	D
Washington/Baltimore	PA	Huntingdon	Orbisonia	7/3/1995	C
Washington/Baltimore	PA	Chester	Oxford	12/1/1981	D
Washington/Baltimore	PA	Dauphin	Paxtang	3/18/1980	D
Washington/Baltimore	PA	Cumberland	Plainfield	4/6/2001	D
Washington/Baltimore	PA	Bedford	Pleasantville	9/30/1988	C
Washington/Baltimore	PA	Juniata	Port Royal	1/5/1978	D
Washington/Baltimore	PA	Blair	Roaring Spring	9/1/1977	D
Washington/Baltimore	PA	Somerset	Rockwood	6/18/1990	C
Washington/Baltimore	PA	Dauphin	Royalton	4/15/1977	D
Washington/Baltimore	PA	Somerset	Salisbury	7/2/2003	C
Washington/Baltimore	PA	York	Shrewsbury	12/15/1990	D
Washington/Baltimore	PA	Somerset	Somerset	3/3/1992	D
Washington/Baltimore	PA	York	Spring Grove	8/15/1983	D
Washington/Baltimore	PA	Dauphin	Steelton	4/15/1977	D
Washington/Baltimore	PA	Lancaster	Strasburg	2/4/1981	D
Washington/Baltimore	PA	Chester	Unincorporated Areas	11/2/1990	C
Washington/Baltimore	PA	Franklin	Unincorporated Areas	9/21/2001	C
Washington/Baltimore	PA	Adams	Unincorporated Areas	1/16/1981	D
Washington/Baltimore	PA	Cumberland	Unincorporated Areas	9/20/1995	D
Washington/Baltimore	PA	Dauphin	Unincorporated Areas	4/15/1977	D
Washington/Baltimore	PA	Fulton	Unincorporated Areas	4/15/1981	D
Washington/Baltimore	PA	Huntingdon	Unincorporated Areas	5/16/1995	D
Washington/Baltimore	PA	Juniata	Unincorporated Areas	5/1/1978	D
Washington/Baltimore	PA	Lancaster	Unincorporated Areas	12/18/1979	D
Washington/Baltimore	PA	Lebanon	Unincorporated Areas	1/2/1991	D
Washington/Baltimore	PA	Mifflin	Unincorporated Areas	11/15/1979	D
Washington/Baltimore	PA	Perry	Unincorporated Areas	5/21/2001	D
Washington/Baltimore	PA	Somerset	Unincorporated Areas	3/3/1992	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Washington/Baltimore	PA	York	Unincorporated Areas	12/18/1979	D
Washington/Baltimore	PA	Franklin	Waynesboro	11/1/1985	D
Washington/Baltimore	PA	Blair	Williamsburg	3/1/1978	D
Washington/Baltimore	PA	York	Windsor	11/3/1982	D
Washington/Baltimore	PA	Bedford	Woodbury	5/15/1980	D
Washington/Baltimore	PA	Cumberland	Wormleysburg	2/16/1977	D
Washington/Baltimore	PA	York	Wrightsville	9/22/1999	D
Washington/Baltimore	PA	York	Yoe	12/1/1982	D
Washington/Baltimore	PA	York	York	6/15/1977	D
Washington/Baltimore	PA	Lancaster	York Haven	12/18/1979	D
Washington/Baltimore	VA	Alexandria	Alexandria	5/15/1991	C
Washington/Baltimore	VA	Clarke	Berryville	5/2/2002	D
Washington/Baltimore	VA	Rockingham	Bridgewater	1/20/1993	C
Washington/Baltimore	VA	Rockingham	Broadway	8/18/1992	D
Washington/Baltimore	VA	Fairfax	Clifton	5/2/1977	D
Washington/Baltimore	VA	Goochland	Columbia	9/29/1978	D
Washington/Baltimore	VA	Culpeper	Culpeper	3/2/1989	C
Washington/Baltimore	VA	Rockingham	Dayton	10/15/1985	C
Washington/Baltimore	VA	Prince William	Dumfries	1/5/1995	D
Washington/Baltimore	VA	Rockingham	Elkton	9/3/1992	D
Washington/Baltimore	VA	Fairfax	Fairfax	2/19/2003	C
Washington/Baltimore	VA	Falls Chruch	Falls Church	2/3/1982	D
Washington/Baltimore	VA	Warren	Front Royal	7/15/1988	D
Washington/Baltimore	VA	Rockingham	Grottoes	12/20/2002	D
Washington/Baltimore	VA	Harrisonburg	Harrisonburg	11/3/1989	D
Washington/Baltimore	VA	Prince William	Haymarket	1/5/1995	D
Washington/Baltimore	VA	Fairfax	Herndon	8/1/1979	D
Washington/Baltimore	VA	Loudoun	Leesburg	7/5/2001	D
Washington/Baltimore	VA	Page	Luray	8/23/1999	D
Washington/Baltimore	VA	Prince William	Manassas	1/5/1995	D
Washington/Baltimore	VA	Prince William	Manassas Park	1/5/1995	D
Washington/Baltimore	VA	Prince William	Occoquan	1/5/1995	D
Washington/Baltimore	VA	Loudoun	Purcellville	7/5/2001	C
Washington/Baltimore	VA	Prince William	Quantico	1/5/1995	D
Washington/Baltimore	VA	Fauquier	Remington	3/18/1980	D
Washington/Baltimore	VA	Fluvanna	Scottsville	4/2/1990	D
Washington/Baltimore	VA	Page	Stanley	2/3/1982	D
Washington/Baltimore	VA	Staunton	Staunton	12/16/1988	D
Washington/Baltimore	VA	Essex	Tappahannock	8/4/1987	C
Washington/Baltimore	VA	Rockingham	Timberville	6/5/1985	C
Washington/Baltimore	VA	Caroline	Unincorporated Areas	8/15/1989	C
Washington/Baltimore	VA	Culpeper	Unincorporated Areas	3/2/1989	C
Washington/Baltimore	VA	Essex	Unincorporated Areas	12/16/1988	C

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Washington/Baltimore	VA	Fairfax	Unincorporated Areas	3/5/1990	C
Washington/Baltimore	VA	King George	Unincorporated Areas	12/15/1990	C
Washington/Baltimore	VA	Madison	Unincorporated Areas	4/3/1989	C
Washington/Baltimore	VA	Waynesboro	Unincorporated Areas	5/4/1988	C
Washington/Baltimore	VA	Albemarle	Unincorporated Areas	4/2/1990	D
Washington/Baltimore	VA	Augusta	Unincorporated Areas	5/17/1993	D
Washington/Baltimore	VA	Fauquier	Unincorporated Areas	8/19/1991	D
Washington/Baltimore	VA	Fluvanna	Unincorporated Areas	8/15/1978	D
Washington/Baltimore	VA	Goochland	Unincorporated Areas	3/1/1979	D
Washington/Baltimore	VA	Hanover	Unincorporated Areas	9/2/1981	D
Washington/Baltimore	VA	Harrisonburg	Unincorporated Areas	11/3/1989	D
Washington/Baltimore	VA	Henrico	Unincorporated Areas	2/4/1981	D
Washington/Baltimore	VA	King William	Unincorporated Areas	2/6/1991	D
Washington/Baltimore	VA	Loudoun	Unincorporated Areas	7/5/2001	D
Washington/Baltimore	VA	Nelson	Unincorporated Areas	8/1/1978	D
Washington/Baltimore	VA	Page	Unincorporated Areas	8/19/1991	D
Washington/Baltimore	VA	Powhatan	Unincorporated Areas	9/15/1978	D
Washington/Baltimore	VA	Prince William	Unincorporated Areas	1/5/1995	D
Washington/Baltimore	VA	Richmond	Unincorporated Areas	7/20/1998	D
Washington/Baltimore	VA	Rockingham	Unincorporated Areas	9/3/1992	D
Washington/Baltimore	VA	Shenandoah	Unincorporated Areas	8/1/1978	D
Washington/Baltimore	VA	Stafford	Unincorporated Areas	3/3/1992	D
Washington/Baltimore	VA	Warren	Unincorporated Areas	8/1/1979	D
Washington/Baltimore	VA	Winchester	Unincorporated Areas	11/15/1978	D
Washington/Baltimore	VA	Westmoreland	Unincorporated Areas	8/3/1992	E
Washington/Baltimore	VA	Fairfax	Vienna	2/3/1982	D
Washington/Baltimore	VA	Fauquier	Warrenton	8/1/1979	D
Washington/Baltimore	VA	Augusta	Waynesboro	5/4/1988	C
Washington/Baltimore	VA	Frederick	Winchester	11/15/1978	D
Washington/Baltimore	WV	Jefferson	Charles Town	9/30/1992	D
Washington/Baltimore	WV	Tucker	Davis	6/2/1992	D
Washington/Baltimore	WV	Pendleton	Franklin	8/15/1989	C
Washington/Baltimore	WV	Mineral	Keyser	9/27/1991	D
Washington/Baltimore	WV	Berkeley	Martinsburg	7/16/1997	D
Washington/Baltimore	WV	Hardy	Moorefield	1/19/2001	C
Washington/Baltimore	WV	Morgan	Paw Paw	3/5/1996	C
Washington/Baltimore	WV	Grant	Petersburg	5/4/2000	C
Washington/Baltimore	WV	Mineral	Piedmont	9/27/1991	D
Washington/Baltimore	WV	Jefferson	Shepherdstown	3/18/1980	C
Washington/Baltimore	WV	Grant	Unincorporated Areas	5/4/2000	C
Washington/Baltimore	WV	Hardy	Unincorporated Areas	1/19/2001	C
Washington/Baltimore	WV	Randolph	Unincorporated Areas	9/27/1991	C
Washington/Baltimore	WV	Berkeley	Unincorporated Areas	8/6/2002	D

Appendix A – Participating Communities with Detailed SFHAs (continued)

Community Cluster	State	County	Community	Current Map Date (As of 9/30/03)	Level of Regs
Washington/Baltimore	WV	Jefferson	Unincorporated Areas	1/6/1999	D
Washington/Baltimore	WV	Mineral	Unincorporated Areas	10/20/1999	D
Washington/Baltimore	WV	Morgan	Unincorporated Areas	5/18/2000	D
Washington/Baltimore	WV	Tucker	Unincorporated Areas	6/2/1992	D

APPENDIX B – NATIONAL SURVEY RESULTS BY COMPLIANCE CATEGORY

Comm Cluster	Community ID	Total No. of Surveyed Structures	No. Fully Compliant	% Fully Compliant	Noncompliant-LEM Issue	% Noncompliant-LEM Issue
California - North	NOCA-1	25.	6.	24.0%	1.	4.0%
California - North	NOCA-2	25.	25.	100.0%	0	0.0%
California - North	NOCA-3	25.	9.	36.0%	3.	12.0%
California - North	NOCA-4	25.	12.	48.0%	1.	4.0%
California - North	NOCA-5	25.	14.	56.0%	0	0.0%
California - North	**Total**	**125.**	**66.**	**52.8%**	**5.**	**4.0%**
Coastal North Carolina/Virginia	NC/VA-1	25.	21.	84.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-2	25.	24.	96.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	10.	40.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	15.	57.7%	2.	7.7%
Coastal North Carolina/Virginia	NC/VA-5	26.	18.	69.2%	0	0.0%
Coastal North Carolina/Virginia	**Total**	**127.**	**88.**	**69.3%**	**4.**	**3.1%**
Florida - West Coast	WCFL-1	27.	17.	63.0%	6.	22.2%
Florida - West Coast	WCFL-2	24.	9.	37.5%	2.	8.3%
Florida - West Coast	WCFL-3	25.	25.	100.0%	0	0.0%
Florida - West Coast	WCFL-4	24.	12.	50.0%	12.	50.0%
Florida - West Coast	WCFL-5	25.	13.	52.0%	9.	36.0%
Florida - West Coast	**Total**	**125.**	**76.**	**60.8%**	**29.**	**23.2%**
Florida Panhandle	FL/AL-1	23	16.	69.6%	4.	17.4%
Florida Panhandle	FL/AL-2	25.	14.	56.0%	1.	4.0%
Florida Panhandle	FL/AL-3	26.	12.	46.2%	4.	15.4%
Florida Panhandle	FL/AL-4	24.	14.	58.3%	1.	4.2%
Florida Panhandle	FL/AL-5	26	11.	42.3%	1.	3.8%
Florida Panhandle	**Total**	**124.**	**67.**	**54.0%**	**11.**	**8.9%**
Louisiana	LA-1	26.	13.	50.0%	3.	11.5%
Louisiana	LA-2	26	13.	50.0%	5.	19.2%
Louisiana	LA-3	25	21.	84.0%	0	0.0%
Louisiana	LA-4	25.	14.	56.0%	0	0.0%
Louisiana	LA-5	25	23.	92.0%	1.	4.0%
Louisiana	**Total**	**127.**	**84.**	**66.1%**	**9.**	**7.1%**
Mid-Atlantic	DE/NJ-1	25.	17.	68.0%	1.	4.0%
Mid-Atlantic	DE/NJ-2	25.	13.	52.0%	0	0.0%
Mid-Atlantic	DE/NJ-3	25.	13.	52.0%	6.	24.0%
Mid-Atlantic	DE/NJ-4	25.	17.	68.0%	5.	20.0%
Mid-Atlantic	DE/NJ-5	26.	14.	53.8%	4.	15.4%
Mid-Atlantic	**Total**	**126.**	**74.**	**58.7%**	**16.**	**12.7%**
Mississippi River	MO/IL-1	22	21.	95.5%	0	0.0%
Mississippi River	MO/IL-2	23.	8.	34.8%	12.	52.2%
Mississippi River	MO/IL-3	26.	13.	50.0%	3.	11.5%
Mississippi River	MO/IL-4	25.	23.	92.0%	1.	4.0%
Mississippi River	MO/IL-5	28	8.	28.6%	0	0.0%
Mississippi River	**Total**	**124.**	**73.**	**58.9%**	**16.**	**12.9%**
Southwest	SW-1	25.	10.	40.0%	9.	36.0%
Southwest	SW-2	25.	21.	84.0%	3.	12.0%
Southwest	SW-3	24.	20.	83.3%	3.	12.5%
Southwest	SW-4	25.	23.	92.0%	2.	8.0%
Southwest	SW-5	25.	14.	56.0%	2.	8.0%
Southwest	**Total**	**124.**	**88.**	**71.0%**	**19.**	**15.3%**
Texas-Coastal	CTX-1	25.	15.	60.0%	0	0.0%
Texas-Coastal	CTX-2	25.	13.	52.0%	2.	8.0%
Texas-Coastal	CTX-3	25.	9.	36.0%	2.	8.0%
Texas-Coastal	CTX-4	25.	11.	44.0%	1.	4.0%
Texas-Coastal	CTX-5	25.	21.	84.0%	1.	4.0%
Texas-Coastal	**Total**	**125.**	**69.**	**55.2%**	**6.**	**4.8%**
Washington/Baltimore	Balt/Wash-1	25.	23.	92.0%	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	20.	80.0%	1.	4.0%
Washington/Baltimore	Balt/Wash-3	26.	24.	92.3%	1.	3.8%
Washington/Baltimore	Balt/Wash-4	25.	21.	84.0%	0	0.0%
Washington/Baltimore	Balt/Wash-5	25.	18.	72.0%	0	0.0%
Washington/Baltimore	**Total**	**126.**	**106.**	**84.1%**	**2.**	**1.6%**
TOTAL NUMBER		**1253**	**791**	**63.1%**	**117**	**9.3%**
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**58% - 69.9%**		**6.0% - 13.0%**

95-percent statistical confidence level for estimate.

Appendix B – National Survey Results by Compliance Category (continued)

Comm Cluster	Community ID	Total No. of Surveyed Structures	Noncompliant-Multiple Issues	% Noncompliant-Multiple Issues	Noncompliant-Openings Issue	% Noncompliant-Openings Issue
California - North	NOCA-1	25.	3.	12.0%	3.	12.0%
California - North	NOCA-2	25.		0.0%	0	0.0%
California - North	NOCA-3	25.	4.	16.0%	8.	32.0%
California - North	NOCA-4	25.		0.0%	9.	36.0%
California - North	NOCA-5	25.	6.	24.0%	5.	20.0%
California - North	**Total**	**125.**	**13.**	**10.4%**	**25.**	**20.0%**
Coastal North Carolina/Virginia	NC/VA-1	25.		0.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-2	25.		0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	1.	4.0%	11.	44.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	3.	11.5%	5.	19.2%
Coastal North Carolina/Virginia	NC/VA-5	26.		0.0%	7.	26.9%
Coastal North Carolina/Virginia	**Total**	**127.**	**4.**	3.1%	**24.**	**18.9%**
Florida - West Coast	WCFL-1	27.	1.	3.7%	3.	11.1%
Florida - West Coast	WCFL-2	24.		0.0%	4.	16.7%
Florida - West Coast	WCFL-3	25.		0.0%	0	0.0%
Florida - West Coast	WCFL-4	24.		0.0%	0	0.0%
Florida - West Coast	WCFL-5	25.		0.0%	3.	12.0%
Florida - West Coast	**Total**	**125.**	**1.**	**0.8%**	**10.**	**8.0%**
Florida Panhandle	FL/AL-1	23		0.0%	0	0.0%
Florida Panhandle	FL/AL-2	25.	1.	4.0%	5.	20.0%
Florida Panhandle	FL/AL-3	26.	2.	7.7%	3.	11.5%
Florida Panhandle	FL/AL-4	24.	1.	4.2%	8.	33.3%
Florida Panhandle	FL/AL-5	26	3.	11.5%	2.	7.7%
Florida Panhandle	**Total**	**124.**	**7.**	**5.6%**	**18.**	**14.5%**
Louisiana	LA-1	26.	3.	11.5%	1.	3.8%
Louisiana	LA-2	26		0.0%	0	0.0%
Louisiana	LA-3	25		0.0%	0	0.0%
Louisiana	LA-4	25.	1.	4.0%	1.	4.0%
Louisiana	LA-5	25		0.0%	1.	4.0%
Louisiana	**Total**	**127.**	**4.**	**3.1%**	**3.**	**2.4%**
Mid-Atlantic	DE/NJ-1	25.		0.0%	3.	12.0%
Mid-Atlantic	DE/NJ-2	25.		0.0%	7.	28.0%
Mid-Atlantic	DE/NJ-3	25.	1.	4.0%	3.	12.0%
Mid-Atlantic	DE/NJ-4	25.	1.	4.0%	1.	4.0%
Mid-Atlantic	DE/NJ-5	26.	3.	11.5%	1.	3.8%
Mid-Atlantic	**Total**	**126.**	**5.**	**4.0%**	**15.**	**11.9%**
Mississippi River	MO/IL-1	22		0.0%	0	0.0%
Mississippi River	MO/IL-2	23.		0.0%	0	0.0%
Mississippi River	MO/IL-3	26.	1.	3.8%	2.	7.7%
Mississippi River	MO/IL-4	25.		0.0%	0	0.0%
Mississippi River	MO/IL-5	28		0.0%	0	0.0%
Mississippi River	**Total**	**124.**	**1.**	**0.8%**	**2.**	**1.6%**
Southwest	SW-1	25.		0.0%	2.	8.0%
Southwest	SW-2	25.		0.0%	0	0.0%
Southwest	SW-3	24.		0.0%	0	0.0%
Southwest	SW-4	25.		0.0%	0	0.0%
Southwest	SW-5	25.		0.0%	0	0.0%
Southwest	**Total**	**124.**	**0.**	**0.0%**	**2.**	**1.6%**
Texas-Coastal	CTX-1	25.		0.0%	2.	8.0%
Texas-Coastal	CTX-2	25.	4.	16.0%	1.	4.0%
Texas-Coastal	CTX-3	25.	3.	12.0%	1.	4.0%
Texas-Coastal	CTX-4	25.	4.	16.0%	7.	28.0%
Texas-Coastal	CTX-5	25.	1.	4.0%	2.	8.0%
Texas-Coastal	**Total**	**125.**	**12.**	**9.6%**	**13.**	**10.4%**
Washington/Baltimore	Balt/Wash-1	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	0	0.0%	1.	4.0%
Washington/Baltimore	Balt/Wash-3	26.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-4	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-5	25.	0	0.0%	4.	16.0%
Washington/Baltimore	**Total**	**126.**	**0.**	**0.0%**	**5.**	4.0%
TOTAL NUMBER		**1253**	**47**	**3.8%**	**117**	**9.3%**
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**2.1% - 5.4%**		**6.2% - 12.6%**

95-percent statistical confidence level for estimate.

Appendix B – National Survey Results by Compliance Category (continued)

Comm Cluster	Community ID	Total No. of Surveyed Structures	Noncompliant-Within 6"	% Noncompliant-Within 6"	Noncompliant-Within 6" and Other Issue(s)	% Noncompliant-Within 6" and Other Issue(s)
California - North	NOCA-1	25.	0	0.0%	0	0.0%
California - North	NOCA-2	25.	0	0.0%	0	0.0%
California - North	NOCA-3	25.	0	0.0%	0	0.0%
California - North	NOCA-4	25.	1.	4.0%	1.	4.0%
California - North	NOCA-5	25.	0	0.0%	0	0.0%
California - North	**Total**	**125.**	**1.**	**0.8%**	**1.**	**0.8%**
Coastal North Carolina/Virginia	NC/VA-1	25.	0	0.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-2	25.	0	0.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	0	0.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	0	0.0%	1.	3.8%
Coastal North Carolina/Virginia	NC/VA-5	26.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	**Total**	**127.**	**0.**	0.0%	**4.**	3.1%
Florida - West Coast	WCFL-1	27.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-2	24.	1.	4.2%	0	0.0%
Florida - West Coast	WCFL-3	25.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-4	24.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-5	25.	0	0.0%	0	0.0%
Florida - West Coast	**Total**	**125.**	**1.**	**0.8%**	**0.**	**0.0%**
Florida Panhandle	FL/AL-1	23	3.	13.0%	0	0.0%
Florida Panhandle	FL/AL-2	25.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-3	26.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-4	24.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-5	26	0	0.0%	2.	7.7%
Florida Panhandle	**Total**	**124.**	**3.**	**2.4%**	**2.**	**1.6%**
Louisiana	LA-1	26.	0	0.0%	1.	3.8%
Louisiana	LA-2	26	1.	3.8%	4.	15.4%
Louisiana	LA-3	25	0	0.0%	4.	16.0%
Louisiana	LA-4	25.	1.	4.0%	2.	8.0%
Louisiana	LA-5	25	0	0.0%	0	0.0%
Louisiana	**Total**	**127.**	**2.**	**1.6%**	**11.**	**8.7%**
Mid-Atlantic	DE/NJ-1	25.	1.	4.0%	0	0.0%
Mid-Atlantic	DE/NJ-2	25.	1.	4.0%	0	0.0%
Mid-Atlantic	DE/NJ-3	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-4	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-5	26.	0	0.0%	0	0.0%
Mid-Atlantic	**Total**	**126.**	**2.**	**1.6%**	**0.**	**0.0%**
Mississippi River	MO/IL-1	22	0	0.0%	0	0.0%
Mississippi River	MO/IL-2	23.	0	0.0%	0	0.0%
Mississippi River	MO/IL-3	26.	0	0.0%	0	0.0%
Mississippi River	MO/IL-4	25.	1.	4.0%	0	0.0%
Mississippi River	MO/IL-5	28	0	0.0%	0	0.0%
Mississippi River	**Total**	**124.**	**1.**	**0.8%**	**0.**	**0.0%**
Southwest	SW-1	25.	0	0.0%	1.	4.0%
Southwest	SW-2	25.	0	0.0%	0	0.0%
Southwest	SW-3	24.	1	4.2%	0	0.0%
Southwest	SW-4	25.	0	0.0%	0	0.0%
Southwest	SW-5	25.	0	0.0%	1.	4.0%
Southwest	**Total**	**124.**	**1.**	**0.8%**	**2.**	**1.6%**
Texas-Coastal	CTX-1	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-2	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-3	25.	1.	4.0%	2.	8.0%
Texas-Coastal	CTX-4	25.	1.	4.0%	1.	4.0%
Texas-Coastal	CTX-5	25.	0	0.0%	0	0.0%
Texas-Coastal	**Total**	**125.**	**2.**	**1.6%**	**3.**	**2.4%**
Washington/Baltimore	Balt/Wash-1	25.	2.	8.0%	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	1.	4.0%	0	0.0%
Washington/Baltimore	Balt/Wash-3	26.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-4	25.	0	0.0%	1.	4.0%
Washington/Baltimore	Balt/Wash-5	25.	1.	4.0%	0	0.0%
Washington/Baltimore	**Total**	**126.**	**4.**	**3.2%**	**1.**	**0.8%**
TOTAL NUMBER		**1253**	**17**	**1.4%**	**24**	**1.9%**
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**0.6% - 2.1%**		**0.9% - 3.0%**

95-percent statistical confidence level for estimate.

Appendix B – National Survey Results by Compliance Category (continued)

Comm Cluster	Community ID	Total No. of Surveyed Structures	Noncompliant-Basement	% Noncompliant-Basement	Noncompliant-Finished Enclosure (Bldg Diag 5-6)	%Noncompliant-Finished Enclosure (Bldg Diag 5-6)
California - North	NOCA-1	25.	0	0.0%	0	0.0%
California - North	NOCA-2	25.	0	0.0%	0	0.0%
California - North	NOCA-3	25.	0	0.0%	0	0.0%
California - North	NOCA-4	25.	0	0.0%	0	0.0%
California - North	NOCA-5	25.	0	0.0%	0	0.0%
California - North	**Total**	**125.**	**0.**	**0.0%**	**0.**	**0.0%**
Coastal North Carolina/Virginia	NC/VA-1	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-2	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-5	26.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	**Total**	**127.**	**0.**	**0.0%**	**0.**	**0.0%**
Florida - West Coast	WCFL-1	27.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-2	24.	0	0.0%	1.	4.2%
Florida - West Coast	WCFL-3	25.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-4	24.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-5	25.	0	0.0%	0	0.0%
Florida - West Coast	**Total**	**125.**	**0.**	**0.0%**	**1.**	**0.8%**
Florida Panhandle	FL/AL-1	23	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-2	25.	0	0.0%	2.	8.0%
Florida Panhandle	FL/AL-3	26.	0	0.0%	2.	7.7%
Florida Panhandle	FL/AL-4	24.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-5	26	0	0.0%	1.	3.8%
Florida Panhandle	**Total**	**124.**	**0.**	**0.0%**	**5.**	**4.0%**
Louisiana	LA-1	26.	0	0.0%	1.	3.8%
Louisiana	LA-2	26	0	0.0%	0	0.0%
Louisiana	LA-3	25	0	0.0%	0	0.0%
Louisiana	LA-4	25.	0	0.0%	0	0.0%
Louisiana	LA-5	25	0	0.0%	0	0.0%
Louisiana	**Total**	**127.**	**0.**	**0.0%**	**1.**	**0.8%**
Mid-Atlantic	DE/NJ-1	25.	0	0.0%	1.	4.0%
Mid-Atlantic	DE/NJ-2	25.	0	0.0%	3.	12.0%
Mid-Atlantic	DE/NJ-3	25.	0	0.0%	2.	8.0%
Mid-Atlantic	DE/NJ-4	25.	1.	4.0%	0	0.0%
Mid-Atlantic	DE/NJ-5	26.	0	0.0%	1.	3.8%
Mid-Atlantic	**Total**	**126.**	**1.**	**0.8%**	**7.**	**5.6%**
Mississippi River	MO/IL-1	22	0	0.0%	0	0.0%
Mississippi River	MO/IL-2	23.	0	0.0%	0	0.0%
Mississippi River	MO/IL-3	26.	4.	15.4%	0	0.0%
Mississippi River	MO/IL-4	25.	0	0.0%	0	0.0%
Mississippi River	MO/IL-5	28	16.	57.1%	0	0.0%
Mississippi River	**Total**	**124.**	**20.**	**16.1%**	**0.**	**0.0%**
Southwest	SW-1	25.	1.	4.0%	0	0.0%
Southwest	SW-2	25.	0	0.0%	0	0.0%
Southwest	SW-3	24.	0	0.0%	0	0.0%
Southwest	SW-4	25.	0	0.0%	0	0.0%
Southwest	SW-5	25.	0	0.0%	0	0.0%
Southwest	**Total**	**124.**	**1.**	**0.8%**	**0.**	**0.0%**
Texas-Coastal	CTX-1	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-2	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-3	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-4	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-5	25.	0	0.0%	0	0.0%
Texas-Coastal	**Total**	**125.**	**0.**	**0.0%**	**0.**	**0.0%**
Washington/Baltimore	Balt/Wash-1	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	2.	8.0%	0	0.0%
Washington/Baltimore	Balt/Wash-3	26.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-4	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-5	25.	0	0.0%	2.	8.0%
Washington/Baltimore	**Total**	**126.**	**2.**	**1.6%**	**2.**	**1.6%**
TOTAL NUMBER		**1253**	**24**	**1.9%**	**16**	
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**0% - 4.2%**		**0.5% - 2.1%**

95-percent statistical confidence level for estimate.

Appendix B – National Survey Results by Compliance Category (continued)

Comm Cluster	Community ID	Total No. of Surveyed Structures	Noncompliant-Finished Enclosure (Bldg Diag 7)	% Noncompliant-Finished Enclosure (Bldg Diag 7)	Noncompliant-In Floodway	% Noncompliant-In Floodway
California - North	NOCA-1	25.	5	20.0%	0	0.0%
California - North	NOCA-2	25.	0	0.0%	0	0.0%
California - North	NOCA-3	25.	0	0.0%	0	0.0%
California - North	NOCA-4	25.	0	0.0%	0	0.0%
California - North	NOCA-5	25.	0	0.0%	0	0.0%
California - North	**Total**	**125.**	**5.**	**4.0%**	**0.**	**0.0%**
Coastal North Carolina/Virginia	NC/VA-1	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-2	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-5	26.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	**Total**	**127.**	**0.**	**0.0%**	**0.**	**0.0%**
Florida - West Coast	WCFL-1	27.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-2	24.	4.	16.7%	0	0.0%
Florida - West Coast	WCFL-3	25.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-4	24.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-5	25.	0	0.0%	0	0.0%
Florida - West Coast	**Total**	**125.**	**4.**	**3.2%**	**0.**	**0.0%**
Florida Panhandle	FL/AL-1	23	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-2	25.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-3	26.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-4	24.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-5	26	1.	3.8%	0	0.0%
Florida Panhandle	**Total**	**124.**	**1.**	**0.8%**	**0.**	**0.0%**
Louisiana	LA-1	26.	1.	3.8%	0	0.0%
Louisiana	LA-2	26	0	0.0%	0	0.0%
Louisiana	LA-3	25	0	0.0%	0	0.0%
Louisiana	LA-4	25.	0	0.0%	0	0.0%
Louisiana	LA-5	25	0	0.0%	0	0.0%
Louisiana	**Total**	**127.**	**1.**	**0.8%**	**0.**	**0.0%**
Mid-Atlantic	DE/NJ-1	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-2	25.	1.	4.0%	0	0.0%
Mid-Atlantic	DE/NJ-3	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-4	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-5	26.	0	0.0%	0	0.0%
Mid-Atlantic	**Total**	**126.**	**1.**	**0.8%**	**0.**	**0.0%**
Mississippi River	MO/IL-1	22	0	0.0%	0	0.0%
Mississippi River	MO/IL-2	23.	0	0.0%	0	0.0%
Mississippi River	MO/IL-3	26.	0	0.0%	0	0.0%
Mississippi River	MO/IL-4	25.	0	0.0%	0	0.0%
Mississippi River	MO/IL-5	28	0	0.0%	0	0.0%
Mississippi River	**Total**	**124.**	**0.**	**0.0%**	**0.**	**0.0%**
Southwest	SW-1	25.	0	0.0%	0	0.0%
Southwest	SW-2	25.	0	0.0%	0	0.0%
Southwest	SW-3	24.	0	0.0%	0	0.0%
Southwest	SW-4	25.	0	0.0%	0	0.0%
Southwest	SW-5	25.	0	0.0%	0	0.0%
Southwest	**Total**	**124.**	**0.**	**0.0%**	**0.**	**0.0%**
Texas-Coastal	CTX-1	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-2	25.	0	0.0%	4.	16.0%
Texas-Coastal	CTX-3	25.	1	4.0%	0	0.0%
Texas-Coastal	CTX-4	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-5	25.	0	0.0%	0	0.0%
Texas-Coastal	**Total**	**125.**	**1.**	**0.8%**	**4.**	**3.2%**
Washington/Baltimore	Balt/Wash-1	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-3	26.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-4	25.	1	4.0%	0	0.0%
Washington/Baltimore	Balt/Wash-5	25.	0	0.0%	0	0.0%
Washington/Baltimore	**Total**	**126.**	**1.**	**0.8%**	**0.**	**0.0%**
TOTAL NUMBER		**1253**	**14**	**1.1%**	**4**	**0.3%**
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**0% - 2.3 %**		**N/A**

95-percent statistical confidence level for estimate.

Appendix B – National Survey Results by Compliance Category (continued)

Comm Cluster	Community ID	Total No. of Surveyed Structures	Noncompliant-LHSM	% Noncompliant-LHSM	Noncompliant-Low Floor	% Noncompliant-Low Floor
California - North	NOCA-1	25.	0	0.0%	5.	20.0%
California - North	NOCA-2	25.	0	0.0%	0	0.0%
California - North	NOCA-3	25.	0	0.0%	0	0.0%
California - North	NOCA-4	25.	0	0.0%	1.	4.0%
California - North	NOCA-5	25.	0	0.0%	0	0.0%
California - North	**Total**	**125.**	**0.**	**0.0%**	**6.**	**4.8%**
Coastal North Carolina/Virginia	NC/VA-1	25.	0	0.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-2	25.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	0	0.0%	1.	4.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	0	0.0%	0	0.0%
Coastal North Carolina/Virginia	NC/VA-5	26.	0	0.0%	1.	3.8%
Coastal North Carolina/Virginia	**Total**	**127.**	**0.**	**0.0%**	**3.**	**2.4%**
Florida - West Coast	WCFL-1	27.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-2	24.	0	0.0%	3.	12.5%
Florida - West Coast	WCFL-3	25.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-4	24.	0	0.0%	0	0.0%
Florida - West Coast	WCFL-5	25.	0	0.0%	0	0.0%
Florida - West Coast	**Total**	**125.**	**0.**	**0.0%**	**3.**	**2.4%**
Florida Panhandle	FL/AL-1	23	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-2	25.	2.	8.0%	0	0.0%
Florida Panhandle	FL/AL-3	26.	0	0.0%	3.	11.5%
Florida Panhandle	FL/AL-4	24.	0	0.0%	0	0.0%
Florida Panhandle	FL/AL-5	26	0	0.0%	5.	19.2%
Florida Panhandle	**Total**	**124.**	**2.**	**1.6%**	**8.**	**6.5%**
Louisiana	LA-1	26.	0	0.0%	3.	11.5%
Louisiana	LA-2	26	0	0.0%	3.	11.5%
Louisiana	LA-3	25	0	0.0%	0	0.0%
Louisiana	LA-4	25.	0	0.0%	6.	24.0%
Louisiana	LA-5	25	0	0.0%	0	0.0%
Louisiana	**Total**	**127.**	**0.**	**0.0%**	**12.**	**9.4%**
Mid-Atlantic	DE/NJ-1	25.	0	0.0%	2.	8.0%
Mid-Atlantic	DE/NJ-2	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-3	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-4	25.	0	0.0%	0	0.0%
Mid-Atlantic	DE/NJ-5	26.	1.	3.8%	2.	7.7%
Mid-Atlantic	**Total**	**126.**	**1.**	**0.8%**	**4.**	**3.2%**
Mississippi River	MO/IL-1	22	0	0.0%	1	4.5%
Mississippi River	MO/IL-2	23.	0	0.0%	3.	13.0%
Mississippi River	MO/IL-3	26.	0	0.0%	3.	11.5%
Mississippi River	MO/IL-4	25.	0	0.0%	0	0.0%
Mississippi River	MO/IL-5	28	0	0.0%	4.	14.3%
Mississippi River	**Total**	**124.**	**0.**	**0.0%**	**11.**	**8.9%**
Southwest	SW-1	25.	0	0.0%	2.	8.0%
Southwest	SW-2	25.	0	0.0%	1.	4.0%
Southwest	SW-3	24.	0	0.0%	0	0.0%
Southwest	SW-4	25.	0	0.0%	0	0.0%
Southwest	SW-5	25.	0	0.0%	3.	12.0%
Southwest	**Total**	**124.**	**0.**	**0.0%**	**6.**	**4.8%**
Texas-Coastal	CTX-1	25.	0	0.0%	3.	12.0%
Texas-Coastal	CTX-2	25.	0	0.0%	1.	4.0%
Texas-Coastal	CTX-3	25.	0	0.0%	6.	24.0%
Texas-Coastal	CTX-4	25.	0	0.0%	0	0.0%
Texas-Coastal	CTX-5	25.	0	0.0%	0	0.0%
Texas-Coastal	**Total**	**125.**	**0.**	**0.0%**	**10.**	**8.0%**
Washington/Baltimore	Balt/Wash-1	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	0	0.0%	0	0.0%
Washington/Baltimore	Balt/Wash-3	26.	0	0.0%	1.	3.8%
Washington/Baltimore	Balt/Wash-4	25.	0	0.0%	2.	8.0%
Washington/Baltimore	Balt/Wash-5	25.	0	0.0%	0	0.0%
Washington/Baltimore	**Total**	**126.**	**0.**	**0.0%**	**3.**	**2.4%**
TOTAL NUMBER		**1253**	**3**	**0.2%**	**66**	**5.3%**
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**N/A**		**3.4% - 7.4%**

95-percent statistical confidence level for estimate.

Appendix B – National Survey Results by Compliance Category (continued)

Comm Cluster	Community ID	Total No. of Surveyed Structures	Undetermined	% Undetermined
California - North	NOCA-1	25.	2.	8.0%
California - North	NOCA-2	25.	0	0.0%
California - North	NOCA-3	25.	1.	4.0%
California - North	NOCA-4	25.	0	0.0%
California - North	NOCA-5	25.	0	0.0%
California - North	**Total**	**125.**	**3.**	**2.4%**
Coastal North Carolina/Virginia	NC/VA-1	25.	0	0.0%
Coastal North Carolina/Virginia	NC/VA-2	25.	0	0.0%
Coastal North Carolina/Virginia	NC/VA-3	25.	0	0.0%
Coastal North Carolina/Virginia	NC/VA-4	26.	0	0.0%
Coastal North Carolina/Virginia	NC/VA-5	26.	0	0.0%
Coastal North Carolina/Virginia	**Total**	**127.**	**0.**	**0.0%**
Florida - West Coast	WCFL-1	27.	0	0.0%
Florida - West Coast	WCFL-2	24.	0	0.0%
Florida - West Coast	WCFL-3	25.	0	0.0%
Florida - West Coast	WCFL-4	24.	0	0.0%
Florida - West Coast	WCFL-5	25.	0	0.0%
Florida - West Coast	**Total**	**125.**	**0.**	**0.0%**
Florida Panhandle	FL/AL-1	23	0	0.0%
Florida Panhandle	FL/AL-2	25.	0	0.0%
Florida Panhandle	FL/AL-3	26.	0	0.0%
Florida Panhandle	FL/AL-4	24.	0	0.0%
Florida Panhandle	FL/AL-5	26	0	0.0%
Florida Panhandle	**Total**	**124.**	**0.**	**0.0%**
Louisiana	LA-1	26.	0	0.0%
Louisiana	LA-2	26	0	0.0%
Louisiana	LA-3	25	0	0.0%
Louisiana	LA-4	25.	0	0.0%
Louisiana	LA-5	25	0	0.0%
Louisiana	**Total**	**127.**	**0.**	**0.0%**
Mid-Atlantic	DE/NJ-1	25.	0	0.0%
Mid-Atlantic	DE/NJ-2	25.	0	0.0%
Mid-Atlantic	DE/NJ-3	25.	0	0.0%
Mid-Atlantic	DE/NJ-4	25.	0	0.0%
Mid-Atlantic	DE/NJ-5	26.	0	0.0%
Mid-Atlantic	**Total**	**126.**	**0.**	**0.0%**
Mississippi River	MO/IL-1	22	0	0.0%
Mississippi River	MO/IL-2	23.	0	0.0%
Mississippi River	MO/IL-3	26.	0	0.0%
Mississippi River	MO/IL-4	25.	0	0.0%
Mississippi River	MO/IL-5	28	0	0.0%
Mississippi River	**Total**	**124.**	**0.**	**0.0%**
Southwest	SW-1	25.	0	0.0%
Southwest	SW-2	25.	0	0.0%
Southwest	SW-3	24.	0	0.0%
Southwest	SW-4	25.	0	0.0%
Southwest	SW-5	25.	0	0.0%
Southwest	**Total**	**124.**	**0.**	**0.0%**
Texas-Coastal	CTX-1	25.	5.	20.0%
Texas-Coastal	CTX-2	25.	0	0.0%
Texas-Coastal	CTX-3	25.	0	0.0%
Texas-Coastal	CTX-4	25.	0	0.0%
Texas-Coastal	CTX-5	25.	0	0.0%
Texas-Coastal	**Total**	**125.**	**5.**	**4.0%**
Washington/Baltimore	Balt/Wash-1	25.	0	0.0%
Washington/Baltimore	Balt/Wash-2	25.	0	0.0%
Washington/Baltimore	Balt/Wash-3	26.	0	0.0%
Washington/Baltimore	Balt/Wash-4	25.	0	0.0%
Washington/Baltimore	Balt/Wash-5	25.	0	0.0%
Washington/Baltimore	**Total**	**126.**	**0.**	**0.0%**
TOTAL NUMBER		**1253**	**8**	**0.6%**
CONFIDENCE INTERVAL FOR TOTAL- ALL CLUSTERS				**0% - 2.2%**

95-percent statistical confidence level for estimate.

This page left intentionally blank

7. ACRONYMS

Acronym	Definition
AIR	American Institutes for Research
BFE	Base (1-percent-annual-chance) Flood Elevation
CAV	Community Assistance Visit
CFM	Certified Floodplain Manager
CFR	Code of Federal Regulations
CI	Confidence Interval
CID	Community identification number
CIS	Community Information System
CRS	Community Rating System
FBFM	Flood Boundary Floodway Map
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
44 CFR §60.3	Title 44, Section 60.3, of the *Code of Federal Regulations*
GIS	Geographic Information System
GPS	global positioning system
HVAC	heating, ventilation, and air conditioning
ISO	Insurance Services Office
LEM	lowest electrical and mechanical equipment
LHSM	lowest horizontal structural member
LOMR-F	Letter of Map Revision based on Fill
NFIP	National Flood Insurance Program
NGS	National Geodetic Survey
NSRS	National Spatial Reference System
SFHA	Special Flood Hazard Area

This page left intentionally blank

8. REFERENCES

FEMA. 1981. *Design Guidelines for Flood Damage Reduction.* Washington, DC

FEMA. 1986. *A Unified National Program for Floodplain Management.* Washington, DC.

FEMA. 1998. *Managing Floodplain Development through the National Flood Insurance Program.* Washington, DC.

FEMA. 2000. *Coastal Construction Manual*. Washington, DC.

FEMA. 2003. *National Flood Insurance Program: Flood Insurance Manual.* Washington, DC.

Dixon, Lloyd, et. al. 2006. *The Market Penetration Rate of Flood Insurance: Estimates and Policy Implications*. Washington, D.C.:

Monday, Jacquelyn, et. al. 2006. *An Evaluation of Compliance with the National Flood Insurance Program Part A: Achieving Community Compliance*.

Robinson, Michael. 2005. National Flood Insurance Program, personal communication.

Sarmiento, and Ted A. Miller. 2006. *Costs and Consequences of Flooding and the Impact on the National Flood Insurance Program*." Washington, D.C.: Pacific Institutes for Research and American Institutes for Research.

Dewberry

8401 Arlington Boulevard
Fairfax, VA 22031-4666
Tel: 703-849-0100
www.Dewberry.com

AMERICAN INSTITUTES FOR RESEARCH®

American Institutes for Research
1000 Thomas Jefferson Street, N.W.
Washington, D.C. 20007-3541
Tel: 202-944-5300
www.air.org