

NATIONAL FLOOD INSURANCE PROGRAM

# Actuarial Rate Review

**In Support of the Recommended October 1, 2011,  
Rate and Rule Changes**

Thomas L. Hayes, ACAS, MAAA  
Actuary

Federal Insurance and Mitigation Administration (FIMA)  
Federal Emergency Management Agency

D. Andrew Neal, FSA  
Actuary

Federal Insurance and Mitigation Administration (FIMA)  
Federal Emergency Management Agency



**FEMA**

## DISCLAIMER

This National Flood Insurance Program (“NFIP”) issues this Actuarial Rate Review annually to formally evaluate the adequacy of proposed flood insurance premium rates. The Actuarial Rate Review is a study based on projected data and does not establish any legal standards, liabilities, defenses, immunities or conclusions of law. This document, and the data contained herein, is not intended to be used for any other purpose.

The administration of the National Flood Insurance Program is governed solely by the National Flood Insurance Act of 1968, as amended (42 U.S.C. §4001, *et seq.*), the implementing regulations found at Title 44 of the Code of Federal Regulations, the Standard Flood Insurance Policies, and endorsements, bulletins, and other guidance issued by the Federal Emergency Management Agency.

# Contents

<b>Purpose of This Document</b> .....	<b>1</b>
<b>Overview</b> .....	<b>1</b>
A Brief History of the NFIP.....	1
Financial Structure of the NFIP .....	3
Premium Structure .....	3
Target Premium Level and the Historical Average Loss Year .....	5
Borrowing Authority.....	6
NFIP Funding and Overall Program Goals.....	6
<b>Ratemaking</b> .....	<b>8</b>
Subsidized Rates .....	9
Pre-FIRM Subsidized Rates.....	9
Special Post-FIRM Classes That Are Subsidized .....	9
Actuarial Rates .....	10
Rate Levels in Light of the Extreme Variability in Annual Flood Losses.....	11
<b>Target Level Premium Analysis</b> .....	<b>13</b>
The Role of the Non-Catastrophic Average Loss Year .....	15
<b>Rate Review Results</b> .....	<b>15</b>
Federal Policy Fee.....	15
Increased Cost of Compliance (ICC) Coverage.....	16
Impact of Community Rating System.....	16
B, C, and X Zones Experience.....	17
Preferred Risk Policies (PRPs) .....	17
X Zone Standard Policies (Non-PRP Policyholders).....	18
Special Flood Hazard Area Experience .....	18
V Zone Policies.....	18
A Zone Policies.....	19
Mortgage Portfolio Protection Program (MPPP).....	19
<b>Exhibits</b> .....	<b>20</b>
Exhibit A.    Proposed Rate Revision and Average Written Premium; Historical Rate Revisions .....	21
Exhibit B1-B5    Analyses of Underwriting Experience .....	23
Exhibit C.    Calendar/Accident Years 1978-2009 Experience for the Larger Risk Zones .....	32
Exhibit D.    Analysis of NFIP Projected Income and Expenses, October 1, 2011 – October 1, 2012.....	33
Exhibit E.    Projected Annual Premium Requirements Based on 1978-2009 Loss Experience vs. Projected Written Premium .....	34
<b>Appendix. Actuarial Rate Formula</b> .....	<b>A-1</b>



## NATIONAL FLOOD INSURANCE PROGRAM

# Actuarial Rate Review

**In Support of the October 1, 2011, Rate and Rule Changes**

## Purpose of This Document

An annual review of the National Flood Insurance Program (NFIP) underwriting experience, with accompanying Program revisions, is an integral part of maintaining the Program's goal of a fiscally sound rating and coverage structure. The purpose of this document is to share the results of the latest actuarial review of the rating structure in the context of the history and goals of the Program.

## Overview

Floods have been, and continue to be, the nation's most destructive natural hazard in terms of economic loss and life-threatening events. In response to this destructive natural hazard, Congress authorized numerous expensive flood protection works and disaster relief efforts. For many years, studies indicated that the Federal Government's reliance on these expensive flood protection works and disaster relief efforts urgently needed to be complemented by a national nonstructural floodplain management approach implemented at the State and local government level. Since the inception of the NFIP in 1968, the Federal Government has required communities to adopt a nonstructural floodplain management approach as the quid pro quo for providing Federal Government backed flood insurance at reasonable rates to ease the impact of flood damage on individuals and communities.

Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP provides the means by which flood insurance is made available through the cooperative efforts of the Federal Government and the private insurance industry. Subsequent studies have indicated that, although insurance does not and probably cannot respond to all the needs of disaster victims, insurance is the most efficient and equitable method of providing disaster assistance (e.g., [GAO Report PAD-80-39](#)).

The NFIP is a coordinated, three-pronged approach developed to (1) identify those areas within local communities that are most at risk of flooding, (2) reduce the impact of flooding through a combination of mitigation and floodplain management, and (3) make flood insurance available to help individuals and small businesses recover following a flood. The NFIP can provide the flexibility for flood insurance to be based on workable methods of pooling risks, minimizing costs, distributing burdens equitably among those protected by flood insurance and the general public, and structuring rates to support mitigation and floodplain management efforts.

### A Brief History of the NFIP

The National Flood Insurance Act of 1968 created the NFIP, which since 1979 has been part of the Federal Emergency Management Agency (FEMA). In 2003, FEMA became part of the newly created U.S. Department of Homeland Security (DHS). Within FEMA, the NFIP

is administered by the Federal Insurance and Mitigation Administrator as part of the Federal Insurance and Mitigation Administration (FIMA).

The basic structure of the NFIP was established by the 1968 Act, and that structure continues today. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management to reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. Flood insurance is made available within a community when it adopts and enforces a floodplain management ordinance to reduce the flood risk to new construction.

To encourage participation in the NFIP, the Flood Disaster Protection Act of 1973 expanded the use of premium subsidies<sup>1</sup> as an additional incentive to encourage widespread State, community, and property owner acceptance of Program requirements, including that Act's introduction of mandatory flood insurance purchase. For the next 7 years, the heavily subsidized premium charges remained in effect. During that period, nearly every community with a flood hazard joined the NFIP, and the insurance policy count increased dramatically, reaching 2 million by 1979. States also responded: governors appointed floodplain management coordinators to assist local communities' governments in working with the Federal Government on Program matters. These actions created the first nationwide response to address the flood peril.

In 1981, with the NFIP firmly established, FEMA initiated a multiyear series of coverage changes and large rate increases for all subsidized policies, which placed the Program on a fiscally sound basis. In establishing a fiscally sound program, which was achieved in 1986, FEMA stressed that, as opposed to the traditional insurance definition of fiscal solvency, the NFIP's intent was to generate premium at least sufficient to cover expenses and losses relative to what is called the "historical average loss year."<sup>2</sup>

The National Flood Insurance Reform Act of 1994 reinforced the objective of using insurance as the preferred mechanism for disaster assistance by expanding mandatory flood insurance purchase requirements and by prohibiting further flood disaster assistance for any property where flood insurance, after having been mandated as a condition for receiving disaster assistance, is not maintained. These measures were added in recognition of the fact that loan or grant programs, to the extent that they parallel the insurance mechanism, can undermine the ability of the insurance program to operate efficiently and equitably.

In June 2004, Congress passed and the President signed the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act (FIRA) of 2004. Title I of the Act provided additional tools for

---

<sup>1</sup> While the 1973 Act expanded the authority to grant premium subsidies, the NFIP continued to charge full-risk premiums to all new construction in Special Flood Hazard Areas, as well as all construction outside Special Flood Hazard Areas. In this way, through its premium structure, the NFIP has always supported sound floodplain management and helped to reduce the nation's exposure to flood risk.

<sup>2</sup> This concept of targeting the average Program-wide premium levels to the "historical average loss year" is explained in more detail in the section entitled "Target Premium Level and the Historical Average Loss Year" on page 5.

addressing the impact of repetitive loss properties on the National Flood Insurance Fund, increased the funding and scope of the Flood Mitigation Assistance (FMA) Program, and expanded Increased Cost of Compliance (ICC) coverage so that, even when there has not been a recent flood loss, it can be applied to the non-Federal cost-share requirement of FEMA-funded mitigation projects for individual buildings. To address concerns raised in the aftermath of Hurricane Isabel, Title II of FIRA 2004 sought to increase policyholders' knowledge of the Standard Flood Insurance Policy's provisions and of consumer rights under the NFIP.

In 2005 the NFIP recorded unprecedented losses from Hurricanes Katrina, Rita and Wilma. As of December 31, 2010, the program has paid \$18.5 billion in losses and loss adjustment expenses and more than \$2.4 billion in interest payments due to events in 2005. The program carries \$17.75 billion in debt with the U.S. Treasury and has repaid \$1.8 billion since 2005. In the aftermath of these events, Congress has considered various proposals to reform the NFIP, but none have been adopted yet.

With the NFIP's authority set to expire on September 30, 2011, the House of Representatives has passed H.R. 1309 and the Senate is working on a companion bill. In addition to extending the Program, the legislation could also change both the coverages provided and FEMA's administration of the NFIP. Until the Senate bill has passed and the differences between House and Senate versions are worked out in conference committee, it is too early to tell which, if any, of the changes will be included in a final bill.

In conjunction with Congressional efforts, FEMA is currently engaged in a comprehensive reform effort to address the concerns of the wide array of stakeholders involved in an ongoing dialog about the NFIP. The effort has examined a full array of reform options and will provide in depth analysis of these options to leadership to assist in their reform efforts. The initiative is a multi-staged process designed to engage stakeholders and consider the largest breadth of public policy options. FEMA believes this important process will ensure the program can efficiently and effectively meet the needs of the public. The results of this analysis will inform decisions regarding the future of the NFIP.

## **Financial Structure of the NFIP**

### *Premium Structure*

The objective of the NFIP's premium structure is to promote the Program's financial soundness, support floodplain management, and encourage the widespread purchase of flood insurance. The premium structure of the NFIP consists of two distinct approaches, the application of which depends on whether buildings have been constructed after the issuance of a Flood Insurance Rate Map (FIRM)<sup>3</sup> delineating a community's flood risk, or before the issuance of the FIRM.

---

<sup>3</sup> A Flood Insurance Rate Map, or FIRM, is an official map of a community on which FEMA has delineated both the Special Flood Hazard Areas and the risk premium zones that are applicable to the community. "Post-FIRM" pertains to a building for which construction or substantial improvement occurred after December 31, 1974, or on or after the effective date of an initial FIRM, whichever is later. "Pre-FIRM" pertains to a building for which construction or substantial improvement occurred on or before December 31, 1974, or before the effective date of an initial FIRM.

New buildings (Post-FIRM) are charged full-risk premiums that contemplate the full range of loss potential including catastrophic levels. If the building is constructed in compliance with local floodplain management ordinances (e.g., at or above the Base Flood Elevation in a Special Flood Hazard Area), the flood risk has been reduced to a level where the full-risk premiums should be reasonable. Buildings constructed below the Base Flood Elevation are also charged full-risk premiums, but these premiums can be quite high. In this way, the premium structure of the NFIP helps to reinforce wise building decisions by individuals.

Full-risk premiums are also charged to all buildings that are outside the Special Flood Hazard Area, where the flood risk is low to moderate and premiums are relatively modest.

By statute, highly discounted premiums—also known as subsidized premiums—have been made available for Pre-FIRM buildings in the Special Flood Hazard Area. For many such buildings, the full-risk premiums would be extremely high. Providing certain statutory amounts of insurance at less than full-risk rates was justified as public policy for the following reasons:

- (1) Lower premiums for existing construction made it easier to convince communities to join the NFIP. It was very important in the early years of the NFIP to increase community participation so that sound floodplain management was implemented and the nation's exposure to flood would thereby be slowly but significantly reduced.
- (2) It was anticipated that very high premiums would cause great resistance to insurance purchase. However, with reasonable premiums, property owners purchasing insurance at less than full-risk rates would still be funding at least part of their recovery from flood damage. This was considered preferable to the previous arrangement of disaster relief that came solely from taxpayer funding.
- (3) In the public policy discussions leading to the authorization of the NFIP, it was determined to be undesirable to potentially force, through high flood insurance premiums, the abandonment of otherwise economically viable buildings.

The average full-risk premium for these older buildings is currently estimated to be about five times greater than the average full-risk premium for compliant buildings. Even though these older, noncompliant buildings receive highly discounted premiums (estimated to be between 40% and 45% of the full-risk premium), subsidized premiums are still significantly higher than what actuarially rated policyholders pay for buildings constructed in compliance. This means that, if the Pre-FIRM subsidized portion of the business were charged full-risk premiums, affected policyholders would have to pay, on average, about two and a half times their current premium. To give a sense of the impact eliminating the subsidy would have on the program as whole, increasing the premium for subsidized policyholders while leaving the remaining policyholders unchanged would cause the aggregate premium for the entire NFIP to increase on the order of 50% to 75%.

It should be mentioned that not all older construction was built unwisely. Older buildings that can be documented, through an Elevation Certificate completed by a licensed surveyor, to be at or above the Base Flood Elevation, can use the less expensive actuarial

premium rates. Currently, about half of the older Pre-FIRM buildings insured by the NFIP have documented their compliance with new construction standards and pay the appropriate actuarial rates.

*Target Premium Level and the Historical Average Loss Year*

Because the NFIP, as explained above, charges highly discounted premiums for many older buildings, it is currently impractical for the NFIP to be actuarially sound in the aggregate. The question then becomes, what should be the overall targeted premium level for the Program? That, essentially, is a question of deciding the level of discount to be provided subsidized policyholders. This became especially relevant in the late 1970s and early 1980s, when subsidized premiums were much more heavily discounted than today. Following what was mostly a period of relatively modest loss years, NFIP borrowing grew to a level far in excess of annual premium receipts. As a result, a series of appropriations was provided to pay down the borrowing. At the same time, the NFIP established the goal for subsidized policyholder premiums to be at the level where, in combination with those policyholders paying full-risk<sup>4</sup> premiums, the Program would generate sufficient revenue to pay for the historical average loss year. The absence of a catastrophic loss year (prior to Hurricane Katrina in 2005) meant that the Program's historical average loss was less than could be expected over the long term.

With Katrina now in the loss experience, the historical average loss year is close to the estimated long-term average loss year. The automatic use of historical average loss year would result in the elimination of current subsidies. While the elimination of the subsidy is a long-term goal supported by FEMA, such a significant change should be explicitly supported by Congress and not simply the result of a formula.

Beginning with the rate review supporting May 1, 2007 rate changes, we have used an interim benchmark that gives a 1% weight to 2005 results (including Katrina, Rita, and Wilma<sup>5</sup>). This is an attempt to reflect the events of 2005 without allowing them to overwhelm the pre-Katrina experience of the Program.

The historical average loss year has been a useful benchmark that has functioned as a lower bound for Program revenue and resulted in lower subsidies for Pre-FIRM policyholders. Over the years, this approach has blunted downward pressure on rates and facilitated a series of increases on subsidized classes. As a result, rates had risen to a level 25% in excess of this benchmark, as documented in the 2004 Actuarial Rate Review. Having a cushion between the historical average loss year and the current rate level helps ensure the program's capacity to handle larger-than-average storms and to provide some contingency for the truly catastrophic event.

---

<sup>4</sup> Full-risk premium rates contemplate the full range of loss potential including catastrophic levels. The distribution of business written in 2011 is anticipated to be 22% at subsidized rates and 78% at full-risk premium rates.

<sup>5</sup> An analysis of past experience brought to today's policyholder distribution and dollar level reveals 5 loss years in the \$3 - \$3.5 billion range and no loss years in the \$3.5 - \$10 billion range. We recognize the 1% weight for 2005 may overweight the experience, but it was judgmentally selected to compensate for the lack of very large but not catastrophic experience.

*Borrowing Authority*

The Program has not been capitalized and pays losses and operating expenses out of policyholder premiums. The result is that during less-than-average-loss years the Program generates surplus, while during higher loss years accumulated surplus is used to help pay the insured flood losses that exceed that year's net premium revenue. For periods when losses exceed the accumulated surplus, the NFIP has borrowing authority with the U.S. Treasury that can be drawn upon in order to pay those losses. Initially, the NFIP was granted a \$1 billion borrowing authority, but in 1996 legislation was passed (and subsequently extended) providing an increase in borrowing authority from \$1 billion to \$1.5 billion in order to provide a greater cushion against potential losses. Following the catastrophic hurricanes of 2005, the borrowing authority was increased three more times, so that it now stands at \$20.775 billion. At the end of fiscal year 2010, the NFIP had borrowed \$17.75 billion. Currently, interest rates are at historically low levels, and the NFIP is able to meet its interest payments. When interest rates increase to historically normative levels it is unlikely, given the current annual revenue of the NFIP, that the National Flood Insurance Fund will be able to meet the future interest payments on that debt; we expect long term annual interest payments will be around \$710 million<sup>6</sup>.

Prior to Hurricane Katrina, the Fund had been in a debt position four times since the mid-1980s. Following the Midwest Flood of 1993, the Program borrowed \$100 million, which was quickly repaid. The Program borrowed again as a result of the heavy flood losses during 1995 and 1996 that were at twice the historical average. That borrowing peaked at \$922 million during fiscal year 1998, but was completely repaid by June 2001. However, Tropical Storm Allison (June 2001)—the first \$1 billion storm in the history of the NFIP—required the Program to borrow \$650 million. That amount was repaid as of October 31, 2002. Between then and the 2004 hurricane season, the balance of the Fund grew to just over \$1.1 billion. However, that entire amount, along with \$300 million of borrowing, was used to pay for claims from Hurricanes Charley, Frances, Ivan, and Jeanne, which occurred during August and September 2004. When Hurricane Katrina made landfall in August 2005, the Fund had outstanding borrowing of \$225 million and \$189 million of cash on hand.

*NFIP Funding and Overall Program Goals*

Funding of the Program from policyholder income or potentially from other sources must be addressed in the context of the long-term governmental goals for the NFIP, including its substitution for disaster relief and its encouragement of floodplain management. Because of the highly variable nature of flood losses, the possibility of borrowing funds would be present even if all NFIP policyholders paid full-risk premiums. But, with 21.5% of policyholders paying significantly less than full-risk premiums, the NFIP's ability to generate surplus or to repay borrowed funds is impeded. Subsidized insurance for older construction, built to lower standards in regard to the flood risk and for which full-risk premiums could be unreasonably high, was the quid pro quo for local community

---

<sup>6</sup> This estimate assumes a long-term annual interest rate of 4%. Since 2005 the highest interest rate paid for debt is 4.875%. Recently, debt has been financed as low as 0.25%. Exhibit D assumes an interest rate of 1% for debt refinanced during FY 2011.

adoption of ordinances controlling new construction in the floodplain. It is also a means by which owners of older construction can prefund at least part of their disaster recovery.

The NFIP's standards for new construction are now saving an estimated \$1.2 billion annually in flood damage avoided<sup>7</sup>. Additionally, in fiscal years 1986 through 2009 (excluding the extraordinary experience of 2005), the NFIP paid out, from policyholder funding, \$17.8 billion in insurance claims, which otherwise would have greatly increased taxpayer-funded disaster relief. These two facts are significant accomplishments and should be included in any evaluation of the NFIP achieving its goals.

The Program's financial status must be addressed in a context that is broader than the focus of this rate review. While low loss experience can provide opportunities to rebuild surplus from policyholder premiums, other measures and public policy issues must also be explored. For example, the passage of the Flood Insurance Reform Act of 2004 provided several tools for mitigating repetitive loss properties. These properties are primarily Pre-FIRM, and the premiums they are currently charged are some of the most heavily discounted relative to their full-risk premiums. Once the remaining provisions of FIRA 2004 are implemented and the number of repetitive loss properties is reduced, one benefit will be a reduction in the NFIP's level of subsidy.

Other public policy objectives that have a bearing on the Program's financial status must be accommodated by the NFIP. It is sound public policy to maximize the number of people who have flood insurance, so as to lessen the reliance on disaster assistance. Policy growth increased significantly from 2005 through 2008 as a result of increased public awareness from the 2004 and 2005 hurricane seasons, combined with the introduction of the NFIP "FloodSmart" marketing and advertising program in 2004. Since 2008, the number of policies in force has remained stagnant at about 5.6 million, possibly due to the combined effects of relatively light loss years, the economic downturn, and turmoil in housing markets.

Even though policy growth remains flat, average amounts of insurance continue to increase, which increases the potential dollar amounts borrowed. And apart from the Pre-FIRM subsidy, it is public policy to encourage the purchase of flood insurance in areas that are known to be experiencing temporary conditions of heightened flood risk, although the 30-day waiting period reduces some of the effects of this adverse selection.

---

<sup>7</sup> In addition to the \$1.2 billion in losses avoided due to building standards, mitigation grant activities such as elevations and buyouts save an estimated \$1.6 billion, for a combined estimated \$1.8 billion in annual losses avoided.

## Ratemaking

Generally accepted actuarial principles require at a minimum that a rating system provide protection against the economic uncertainty associated with chance occurrences by exchanging that uncertainty for a predetermined price. This price for insuring the uncertain event must:

- Protect the insurance system's financial soundness;
- Be fair, by allocating costs in proportion to risk; and
- Permit economic incentives to operate and thus encourage widespread availability of coverage.

For the purpose of setting prices, the grouping of risks with similar characteristics is a fundamental precept of a financially sound and equitable system. Because each property at risk is different, a rating system that attempts to identify and reflect in prices every risk characteristic is usually unworkable and costly. The basic features that must be present in sound risk groupings in order to meet the above criteria are that the system should:

- Reflect cost and experience differences on the basis of relevant risk characteristics;
- Be applied objectively and consistently;
- Be practical, cost-effective, and responsive to change;
- Minimize anti-selection; and
- Be acceptable to the public.

Also, in the case of flood insurance authorized under Public Law 90-448 (National Flood Insurance Act), the system of insurance and pricing must further the purposes of the Act, which include, among other things, to "(1) encourage State and local governments to make appropriate land use adjustments to constrict the development of land which is exposed to flood damage and minimize damage caused by flood losses, [and] (2) guide the development of proposed future construction, where practicable [emphasis added], away from locations which are threatened by flood hazards." In order to give practical meaning to these objectives, the standard of a 1% annual chance of flood is now used by virtually all Federal, State, and local agencies and participating communities in the administration of floodplain management programs. The risk of experiencing a flood of this magnitude or larger is one chance in four during a typical 30-year mortgage period. In terms of flood insurance, this standard yields reasonably priced insurance protection to the property owner.

The use of a lesser standard approximating pre-1969 building practices would expose future risks to a greater than 50% chance of being flood damaged during a 30-year mortgage period and result in insurance rates three to four times those reflecting the "1% annual chance of flood" standard. It was just this consideration of unaffordable full-risk (actuarial) premium rates that prompted Congress to "grandfather" existing construction at subsidized rates.

The National Flood Insurance Act of 1968 separated the flood insurance ratemaking process into two distinct categories, namely, subsidized rates and actuarial rates.

## Subsidized Rates

Subsidized rates are countrywide rates by broad occupancy type classifications, which produce a premium income less than the expected expense and loss payments for the flood insurance policies issued on that basis. The difference between the full-risk premiums for these policyholders and the subsidized premiums they actually pay is revenue foregone by the National Flood Insurance Fund.

### *Pre-FIRM Subsidized Rates*

FEMA has promulgated subsidized rates for use in two cases. The first case is for the Emergency Program (added to the NFIP in 1970). Subsidized rates are also used in the Regular Program on construction or substantial improvement started on or before either December 31, 1974<sup>8</sup>, or the effective date of the initial FIRM, whichever is later. Exhibit E details the relationship between the amount of subsidized premium to be collected and the amount of premium required to fund the historical average loss year. The Pre-FIRM properties that pay less than full-risk premium are estimated to pay between 40% and 45% of the full-risk premium needed to fund the long-term expectation for losses.

### *Special Post-FIRM Classes That Are Subsidized*

There are three other cases where classes of business are being subsidized either statutorily or by agreement with Congressional oversight committees.

The first of these is the class of risks located in Zone A99 areas that would be subject to the 1% annual chance flood, but for which structural measures that will protect to that level are at least 50% completed. By statute, rates are charged as if full protection were in place.

A second case, added by statute in 1998, is the class of risks located in Zone AR areas. These are areas for which structural measures have been decertified as no longer providing protection to the “1% annual chance of flood” standard. If the areas meet certain criteria pertaining to a scheduled restoration of protection levels, then rates for new and existing construction are capped at the Pre-FIRM subsidized level. After careful consideration of several public policy issues, FEMA set the initial rates for AR Zones at levels equivalent to X Zone Standard rates. Such rates are substantially lower than the cap allowed by statute.

The third case is the class of risks comprised of Post-FIRM construction in the V Zones built between 1975 and 1981. These buildings were constructed to NFIP standards that accounted for stillwater flood elevations but not the associated wave heights, which were not determinable by the engineering state-of-the-art of the time. In October 1981, the NFIP was able to make use of the latest engineering developments and began to require new construction to be built to more stringent standards and to charge rates that took into account the risks posed by the waves associated with the Base Flood<sup>9</sup>. Because the previously compliant construction would be subject to very high rates if held to the same new

---

<sup>8</sup> This additional “grandfathering” was added to the NFIP in 1973.

<sup>9</sup> The Base Flood is the flood associated with the Base Flood Elevation (BFE). In other words, there is a 1% chance in any given year that a flood will occur that equals or exceeds the Base Flood.

standards, discussions with Congressional oversight committee members led to the decision to “grandfather” the 1975-81 construction with less than the full-risk premium rates indicated by the latest knowledge of the risk. Those policies total only 0.1% of all NFIP policies in force.

### Actuarial Rates

Actuarial rates are promulgated by FEMA for use under the Regular Program (the phase of the National Flood Insurance Program that a community may enter after the initial publication of the FIRM). The actuarial rates are applied in the rating of Post-FIRM construction and second layer limits of insurance on all construction (e.g., in the case of 1- to 4-family residences including Pre-FIRM, amounts of insurance in excess of \$35,000).

These rates are based on consideration of the risk involved and accepted actuarial principles. An overview of the actuarial rate calculations utilized in developing the indicated rates can be found in the Appendix. The formula described there follows in principle the “hydrologic method of estimating flood damage risk” first outlined in the 1966 U.S. Department of Housing and Urban Development (HUD) report *Insurance and Other Programs for Financial Assistance to Flood Victims*. This method is still the basis for FEMA’s various Mitigation Grant programs and is used by the U.S. Army Corps of Engineers in evaluating their projects. It is important to note that the 1966 HUD report described the hydrologic method of ratemaking as a method that “uses available data on the occurrence of floods and damage, but is considerably more sophisticated than merely averaging losses over a period of time.”

The NFIP’s use of the hydrologic model to estimate loss exposure in flood-prone areas also incorporates other relevant factors, such as the building’s location, construction, and elevation relative to expected flood levels.

There are a few risk zones (Zones B, C, D, AO, AH, X, unnumbered A, and unnumbered V) where costs to obtain the hydrologic and topographic information needed to develop flood magnitude and frequency relationships would be extremely high in relation to the floodplain management benefits. Average rates based on actuarial and engineering judgments and underwriting experience have been promulgated for these zones.

Flood Insurance Rate Maps delineate and provide information about a community’s flood risk. Over time the flood risk in a community may change enough to warrant adoption of a new FIRM reflecting the updated risk. When this occurs structures are permitted to use “grandfathered” rates; that is, they may use the rate based on the most advantageous FIRM in effect since the building’s construction, with certain additional requirements<sup>10</sup>. This is achieved by defining actuarial risk classes to include not only those currently meeting the criteria for a certain risk class, but also those previously meeting the criteria. One of the most prominent forms of grandfathering is X Zone grandfathering for properties newly mapped into the SFHA. X Zone actuarial rates are adjusted to reflect the

---

<sup>10</sup> A structure may always be rated based on the FIRM in effect at the time of construction. In order to take advantage of a FIRM effective after the construction date, the structure must maintain continuous coverage.

practice of grandfathering. One exception to the general practice of grandfathering is that structures may not use grandfathering to qualify for Preferred Risk Policy (PRP) rates.

### **Rate Levels in Light of the Extreme Variability in Annual Flood Losses**

High-severity, low-frequency events such as floods, hurricanes, and earthquakes do not lend themselves to traditional actuarial pricing techniques. Results vary dramatically from year to year (see graphs on next page), and average results have little predictive value even when gathered over a long period of time. For example, the NFIP has paid more in flood losses from the single event of Hurricane Katrina than it has paid for all other events since its inception in 1968.

In recognition of the fact that historical flood loss experience is an improper basis for setting rates, the NFIP has always used modeling techniques to establish rate levels. This is similar to what is done by private insurers that provide coverage for other natural catastrophes. For those lines of insurance, the industry relies heavily on models of expected damage over many possible events in order to price their products.

So while the hydrologic model, as adapted by the NFIP to develop indicated rates<sup>11</sup>, is the only valid estimate of insured flood damage over a very long period of time, it is not useful for estimating future loss results in the short term. In fact, the estimated amount of losses in any future 1-year period is so uncertain that it can be provided for only by having available large loss reserves and replenishing those reserves by accumulating funds during good years to offset the drain on the reserve during bad years. Since the chargeable rates for so many policyholders are less than the actuarial rates by statute<sup>12</sup>, the ability to accumulate loss reserves during the good years is impeded.

However, the achievement of the goal of collecting sufficient premium to cover at least the historical average loss year now allows for some accumulation of reserves during years when losses are less than the historical average. In view of the catastrophic loss potential, the current statutory method of providing borrowing authority to finance the long-term loss and loss adjustment provision of the flood insurance program makes a good deal of sense. Even though the Federal Government became the sole insurer in 1978, the funding mechanism has essentially remained the same.

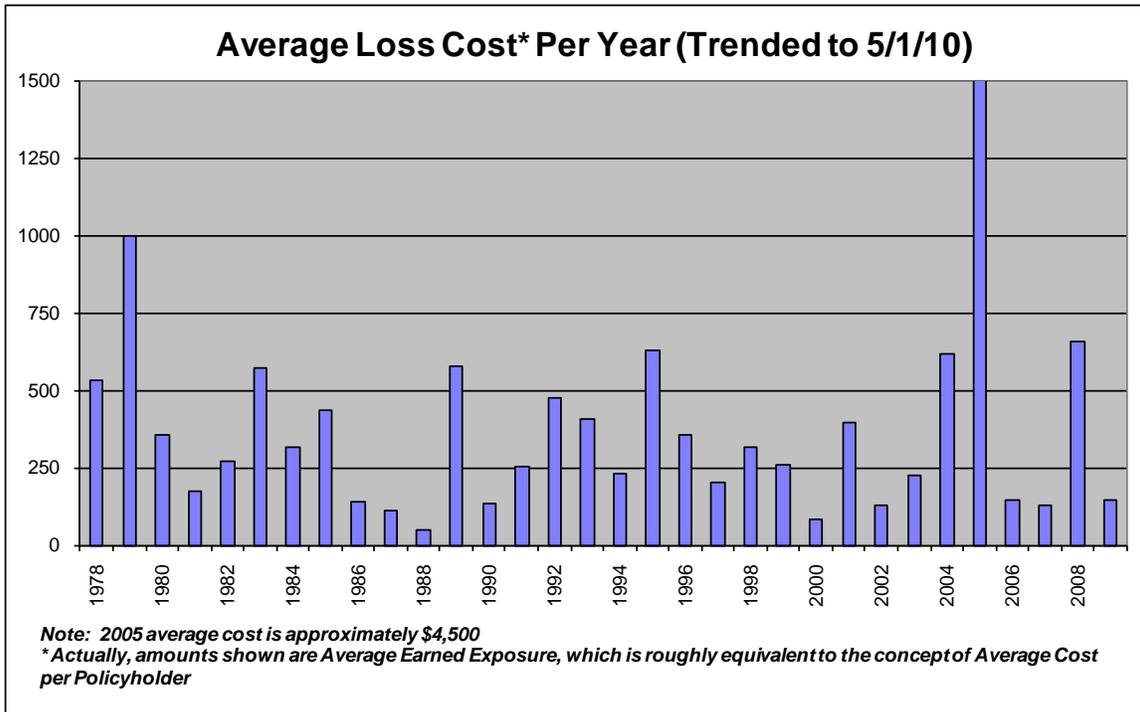
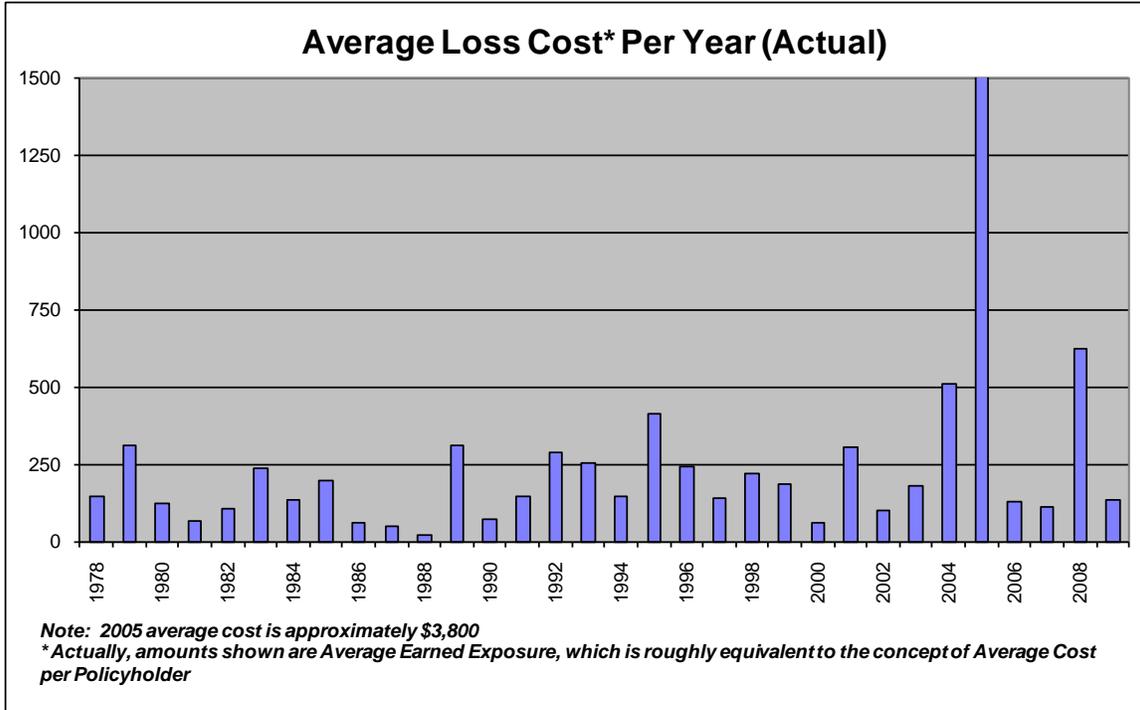
In light of the extreme variability in annual losses, the vast majority of loss years will vary significantly either above or below the historical average. In fact, the rare but catastrophic loss year has such a large influence on the expected long-term average loss year that most loss years probably will be below the long-term average. As a result of this flood loss behavior, it is misleading to rely on observed experience to reach conclusions about either

---

<sup>11</sup> The hydrologic model, as originally developed, estimated the expected annual total damage by flood. The NFIP's actuarial model adjusts that damage amount to reflect the portion of the damage covered by insurance after the application of deductibles and other factors. The NFIP actuarial model also loads operating expenses in order to arrive at indicated premium rates.

<sup>12</sup> By statute, all buildings in the Special Flood Hazard Area that were constructed before December 31, 1974, or the effective date of the initial FIRM, whichever is later, are to be charged less than actuarial rates. These policies are referred to as Pre-FIRM Subsidized.

the long-term loss year or the threshold for catastrophic loss years. Instead, FEMA has always used the hydrologic model to estimate those amounts.



## Target Level Premium Analysis

In 1981, FEMA established the goal of making the NFIP self-supporting for loss year levels at least equivalent to the historical average loss year.<sup>13</sup> This was accomplished by 1986. In order to achieve that goal, the Program undertook a series of aggressive rate increases on the subsidized portion of the book of business. The end result was that subsidized policyholders were then paying premiums that were sufficient, when combined with the premiums paid by actuarially priced policyholders, to provide the Program sufficient revenue to pay the losses associated with the historical average loss year.

In the years since 1986, additional rate increases have been made to bring the average Program premium to a level sufficient to pay for the historical average loss year and have additional funds available to build surplus. Prior to the four hurricanes of 2004, Program premiums were 125% of the historical average loss year. The adverse experience of the 2004 loss year decreased Program premiums to 115% of the historical average loss year. In 2005, Hurricane Katrina necessitated a change in approach. The new approach is discussed in the section Target Premium Level and the Historical Average Loss Year on page 5. Since this new approach was implemented beginning with the rate changes effective May 1, 2007, the interim benchmark has increased from 98.3% as of May 1, 2007 to 130.3% as of October 1, 2011 due to light loss experience of calendar years 2006 through 2009 (partially offset by Hurricane Ike in 2008) which reduced the historical average loss year. At the same time rates were increased an average of 6% per year between May 1, 2007 and October 1, 2011.

Establishing a target other than long-term expected annual losses is required by the presence of subsidies for many policyholders. The selected interim approach, which gives a 1% weight to Hurricane Katrina, results in a more aggressive benchmark than that previously used. This is in keeping with a long-standing goal to reduce the level of subsidies provided by the Program. In recent years, only modest gains have been made toward the goal. The new benchmark will enable the pace of subsidy reduction to increase.

The target level premium allows FEMA to assess, as part of each year's rate review, how well the NFIP's self-supporting status is being maintained overall. This approach to setting rates accommodates the statutory mandate that premium charges for Pre-FIRM risks, if less than full-risk premiums, must be reasonable. It provides a mathematical basis for determining rates for Pre-FIRM risks, which in the early years of the NFIP were determined solely on a political basis, and provides an important framework for making accurate estimates of fiscal soundness. This approach recognizes that the premiums for the two major categories of business, actuarial and Pre-FIRM subsidized, are developed very differently.

---

<sup>13</sup> This does not mean that rates are based on the NFIP's actual loss experience. Actuarial rates are based on the hydrologic model, and Subsidized rates are set so that the program's premium as a whole (Actuarial and Subsidized combined) is sufficient for the historical average loss year.

Actuarially rated policies are charged premiums that consider the full range of possible losses, including catastrophic levels. Thus, these premiums are targeted at the true long-term average. Written premiums for actuarial policies will generally be greater than those that would be based either on the historical average loss year or on the interim benchmark described above. This is consistent with the expectation that the long-term average annual losses will be higher than the historical experience to date because of the influence of relatively infrequent but catastrophic loss years.

Subsidized policies are defined as a category of business that does not make an adequate contribution to the loss reserve pool. These risks are charged premiums that are based on political and statutory considerations that override actuarial considerations. The probabilities of expected and/or catastrophic losses are not contemplated in the rates, which are established for Pre-FIRM construction as rate caps (limitations on chargeable rates) by occupancy type and flood risk zone. FEMA estimates that the premiums for policyholders in this category are between 40% and 45% of fully actuarial premiums.

Typically, during the rate review, it is first determined whether the actuarial rates need to be adjusted. The effects of any such adjustments on maintaining the overall target level are then projected. Adjustments to policy coverage or premiums for Pre-FIRM risks will likely be proposed to make up any overall shortfall so that, once again, the combination of actuarial and subsidized business can generate written premium at least to the level of the NFIP's self-supporting target.

The target premium level is also affected by inflation and the expected types of policies to be written, particularly in regard to those paying full-risk premiums versus those that will be subsidized.

As explained above, and throughout this paper, the issue of the proper level of subsidy for older Pre-FIRM structures has been addressed through the concept of the historical average loss year. However, there is also a companion issue of which policyholders should be eligible to receive subsidized premiums (that is, heavily discounted premiums that do not reflect the true long-term flood exposure of a structure). In determining who should receive subsidized premiums, FEMA has always worked with its Congressional oversight committees. Through the years, FEMA has made several proposals to reduce the amount of subsidy, by restricting who is eligible, introducing coverage limitations, and reducing the level of subsidy through a series of aggressive annual rate changes. Prior to Hurricane Katrina, FEMA discussed these proposals with Congressional committee staff and the Office of Management and Budget. The level of subsidy provided in the Program has been the subject of much Congressional debate, and the 1994 NFIP reform legislation directed FEMA to study the economic effects of charging actuarially based premium rates for Pre-FIRM buildings. PricewaterhouseCoopers was contracted to conduct this study, and FEMA released the results during fiscal year 2000. Several provisions of the Flood Insurance Reform Act of 2004 seek to reduce the adverse impact of repetitive loss properties on the National Flood Insurance Fund, which, when implemented, will help reduce the average overall subsidy level. The Act doubles the authorized funding for the Flood Mitigation Assistance (FMA) Program and directs that priority for mitigation assistance shall be given to such properties that are in the best interest of the National Flood Insurance Fund.

### **The Role of the Non-Catastrophic Average Loss Year**

Although, since Katrina, the definition of Target Level Premium has changed, “non-catastrophic average loss year” remains an important concept. It is the level around which the great preponderance of loss years will concentrate and allows for the accumulation of funds in years when losses are less than that level to help pay losses in years when they exceed that level.

## **Rate Review Results**

Costs based on the 1978 through 2009 underwriting experience and expected NFIP activities were projected to the 2011-2012 cost levels. Exhibit E shows the premiums required by these projections, the expected average written premiums, and the relationship of the written premium to the historical indicated premiums for flood insurance coverage excluding the premiums for Increased Cost of Compliance coverage. The written premium based on all rate and rule changes through October 2011 is expected to be 130.3% of the adjusted historical average loss year (see the section Target Premium Level and the Historical Average Loss Year on pages 5-6 for a discussion of this concept).

The rate and rule changes for October 1, 2011, implementation will result in an overall premium increase of 3.8% and include the following major points:

- An overall increase to X Zone rated policies of 1.3%, which is composed of a 4.5% increase to the standard rated policies and no increase to the Preferred Risk Policies (PRPs).
- Increases in the rates of V Zone policies ranging from 3.5% to 9.7%.
- An increase in the rates of AE Zone policies of 4.7%, with increases in the other A Zone (unnumbered A Zones, AO, AH, etc.) policies that average 2.0%.
- Pre-FIRM subsidized rate increases of 5.2%.
- Various increases in the Mortgage Portfolio Protection Program (MPPP) policies.

Exhibit A, Page 1, provides, by risk zone category, the average increases in premium projected as a result of the October 1, 2011 rate and rule recommendations.

### **Federal Policy Fee**

The expense of flood insurance studies, floodplain management, and FEMA administrative costs is charged to policyholders through the Federal Policy Fee. The Federal Policy Fees are unchanged since the last increase effective May 1, 2010.. PRPs are charged \$20 while except the Residential Condominium Building Association Policy (RCBAP) are charged a fee of \$40. Under RCBAP, the fee varies according to the number of units in the building. On the basis of recent historical trends, the Federal Policy Fee is expected to produce about \$170 million in revenue in 2011-2012.

FEMA believes that most of the salary, study, and floodplain management costs are Federal in nature and benefit taxpayers as a whole through programs that reduce future flood losses and resultant Federal expenditures. However, with the Budget Reconciliation

Act of 1990, Congress legislated that the full funding of these expenses<sup>14</sup> would be borne by flood insurance policyholders through a Federal Policy Fee. To keep this charge as low as possible, the legislation specifically states that the fee is not subject to agent commissions, company expense allowances, or State or local premium taxes. Therefore, although in this rate review the Federal Policy Fee is included in exhibits and analyses of rate level indications, for accounting and Write Your Own (WYO) company reporting purposes, the fee is not considered to be premium.

### **Increased Cost of Compliance (ICC) Coverage**

The 1994 National Flood Insurance Reform Act mandated a new coverage to compensate policyholders when they are required to bring their insured buildings into compliance with local floodplain ordinances as a result of being substantially damaged by a flood. The Act required this new coverage to be actuarially sound, but placed a \$75 limit on what any policyholder could be charged. Pursuant to these directives, FEMA introduced Increased Cost of Compliance (ICC) coverage in 1996, which provided payment of up to \$15,000 per eligible building. That amount was subsequently increased, first to \$20,000 in 2000, and then to \$30,000 in 2003. These increases in coverage were based on analyses of the expected claim frequency under this coverage.

Since the introduction of ICC coverage, the actual utilization of the benefit has been lower than expected, even in large scale events such as Hurricane Katrina. Therefore, ICC premiums for all policyholders were reduced as described in the Actuarial Rate Review supporting October 1, 2010 changes. There are no changes to ICC premiums as of October 1, 2011.

The Flood Insurance Reform Act of 2004 introduced additional refinements to ICC coverage. The most significant is allowing ICC coverage to apply, even when there has not been a recent flood loss, to the non-Federal cost-share requirement of FEMA-funded mitigation projects for individual buildings. The rule-making necessary to implement these changes is still in development.

### **Impact of Community Rating System**

Policyholders in communities that participate in the Community Rating System (CRS) are eligible for premium discounts based on the creditable activities undertaken by their communities. The impact is considered in the target premium level projections and in their comparison with expected written premium.

The success of CRS—both in terms of number of communities and policyholders and in terms of activities undertaken and losses avoided—has continued to grow. Currently,

---

<sup>14</sup> One current exception to the full funding of these expenses through the Federal Policy Fee is mapping. The Risk Analysis Division of the FIMA is currently in the midst of a multiyear Map Modernization initiative that is being funded primarily by taxpayer funds. However, those taxpayer funds are being supplemented by Federal Policy Fee revenue. Once the Map Modernization initiative is completed, it is anticipated that the Federal Policy Fee will revert to being the primary source for funding map studies and revisions.

nearly two-thirds of all NFIP policyholders are in participating CRS communities, with discounts ranging from 5% to 45%.

As a result of CRS communities improving their risk classes by adopting additional creditable activities, Special Flood Hazard Area policyholders in the participating CRS communities should receive an average premium discount of 15.1% in 2010-2011.

Furthermore, in most cases the CRS discount does not apply for most structures where the lowest floor elevation used for rating is 1 foot or more below the Base Flood Elevation.

### **B, C, and X Zones Experience<sup>15</sup>**

The NFIP has two types of policies in the X Zone: the Preferred Risk Policy (PRP) and the standard X Zone policy.

#### *Preferred Risk Policies (PRPs)*

PRPs are available to buildings that are outside of the Special Flood Hazard Area and have not flooded more than once. To ensure that these conditions are met, the following two underwriting requirements were implemented in 1998:

- The insured property must be in the X Zone at the time of the policy inception and at each subsequent renewal; hence, no “grandfathering” is allowed.
- The insured property’s flood history must meet additional requirements regarding paid insured losses and Federal Disaster Relief payments.

Since those underwriting rules were implemented, the PRP experience has substantially improved, except for 2001, when Tropical Storm Allison stalled over Harris County, Texas. While Allison also produced flooding in Louisiana, Mississippi, and Pennsylvania, most of the PRP losses were attributable to incorrectly mapped X Zones in Houston and the surrounding area. Flood maps have since been updated to more accurately reflect the true flood hazard in those areas. PRP experience slightly worsened during 2004 and 2005 but that is to be expected from a loss year that is moderately greater than the estimated long-term average.

For October 2011, PRP rates will not increase. Although Hurricane Katrina demonstrated the need for flood insurance coverage outside of the Special Flood Hazard Area, it also demonstrated that very few people outside of the Special Flood Hazard Area actually purchase flood coverage. Rates were not increased between May 2003 and April 2008 to encourage more people to buy policies in these low-hazard areas. During this time, PRP policies in force increased from 790,000 as of May 1, 2003, to 1,529,000 as of April 30, 2008. The rates were increased for May 2008 to ensure their adequacy.

---

<sup>15</sup> “B, C, and X Zones” is abbreviated to “X Zone” throughout this section and elsewhere in the document. As mentioned in the Appendix, since 1985 all new FIRMs have shown a reduced number of zones, with one of those being an X Zone. The X Zone encompasses areas formerly shown as Zones B or C.

*X Zone Standard Policies (Non-PRP Policyholders)*

For standard X Zone policies, rates are adjusted so the premium level relates to the historical indicated premium level at least in the same way as for actuarially rated AE Zone policies. This has resulted in X Zone premium increases for most years that are greater than other zones. In October 2010, X Zone premiums increased 7.4%, and are increasing again in October 2011 by 4.5%.

This produces a relationship of X Zone premium to historical indicated premium of 158%, compared to a similar relationship for AE Zone policies of 125%. This relationship is similarly balanced to last year's rate review, in which the X Zone and AE Zone premiums were 150% and 118% respectively of their historical indicated premiums. However, these relationships are out of balance compared to the X Zone standard premium and AE Zone premium relative to their historical indicated premium in the earlier rate reviews. In the rate review supporting the May 2006 rates, the X Zone and AE Zone premiums were 125% and 120% respectively of their historical indicated premiums. The change in this relationship is due to the impact of the Hurricane Katrina loss results, which significantly increased the historical indicated premiums. FEMA actuaries will continue to evaluate the appropriate benchmark for X Zone standard premiums.

**Special Flood Hazard Area Experience**

The Special Flood Hazard Area is differentiated into two zone classifications, the V Zone and the A Zone.

*V Zone Policies*

The increased risk of flooding brought about by erosion has been an area of concern for the NFIP. The 1994 NFIP reform legislation directed a study of a series of possible policy changes to address erosion hazards within Federal programs. The Heinz Center for Science, Economics, and the Environment was contracted to perform this analysis, and the study was released in June 2000. Study results demonstrated that the risk of flooding in those areas of V Zones that are susceptible to erosion will dramatically increase (a two- to three-fold increase in the risk in various areas of the country) during the next 30 to 60 years. The NFIP's ratemaking methodology for V Zones has not directly addressed this increased flood risk brought about by erosion. FEMA is currently investigating ways to do so in the flood maps and the flood rates. The Flood Insurance Rate Maps could be refined to delineate erosion zones. However, that will depend upon funding, development of mapping standards, and political acceptance of higher premiums targeted at those subject to the increased flood risk due to erosion.

In order to at least partially address the increasing hazard of flooding as a result of ongoing erosion, the NFIP undertook a multiyear plan, beginning in May 2001, to increase rates for all V Zone policies. In October 2011, V Zone rates will increase about 3.5%. Since 2000, actuarial V Zone rates have more than doubled, with an aggregate increase of 121.6%. This increase is in addition to any increases due to increased amounts of insurance.

*A Zone Policies*

Indicated rates for AE Zones have always been calculated using the hydrologic method described in the Appendix. This model contemplates the full range of loss probabilities, and combines the distribution of likely events with damageability factors provided by the U.S. Army Corps of Engineers. This model has been enhanced through the years to reflect advances in our understanding of hydrology and the actual experience of the NFIP. Events of all sizes are anticipated by the model, so that the impact of Katrina does not change our perception of the exposure as much as some may expect.

As a result of the indications produced by this model, we are increasing rates in the AE Zones by 4.7% for October 2011.

**Mortgage Portfolio Protection Program (MPPP)**

The Mortgage Portfolio Protection Program (MPPP) was introduced in 1991 as an additional tool to assist the mortgage lending and servicing industries in bringing their mortgage portfolios into compliance with the flood insurance requirements of the Flood Disaster Protection Act of 1973, as amended. Since the lender or servicer issuing the MPPP policy usually does not have adequate underwriting data for the building being insured, a policy written through the MPPP requires less underwriting data. For this reason, FEMA has targeted MPPP rates at levels that will compensate us for the greater uncertainty in these risks. Effective May 1, 2003, MPPP rates were increased for the first time in several years. In a continuing effort to keep these rates in line with those charged to our non-MPPP policyholders, we are increasing MPPP rates in line with the revisions to the AE and VE Zone rates.

## **Exhibits**

The exhibits on the following pages include the information below.

- A.** Effects of Rate Revisions on Written Premium
- B.** Insurance Underwriting Experience (five exhibits, B1 through B5)
- C.** Calendar/Accident Years 1978-2009 Experience for the Larger Risk Zones
- D.** Analysis of NFIP Projected Income and Expenses, October 1, 2011 – October 1, 2012
- E.** Projected Annual Premium Requirements Based on 1978-2009 Loss Experience vs. Projected Written Premium

NATIONAL FLOOD INSURANCE PROGRAM

Effects of Rate Revision on Average Annual Written Premium (plus FPF) per Policyholder\*  
Based on Projected Distribution of Business and Projected Amounts of Insurance

	Distribution of Business	Average Annual Premium with October 2011 Rates	Increase over Annual Premium with Current Rates
REGULAR PROGRAM - ACTUARIAL RATES			
AE	29.2%	527.93	4.7%
A	1.7%	864.66	5.5%
<u>AO, AH, AOB &amp; AHB</u>	<u>8.2%</u>	<u>389.34</u>	<u>0.5%</u>
ZONES AE,A,AO,AH,AOB,AHB	39.0%	513.18	4.1%
POST-81 V,VE	0.8%	3,088.06	3.5%
B,C,X (Standard)	7.8%	637.87	4.5%
<u>PRP</u>	<u>30.9%</u>	<u>362.08</u>	<u>0.0%</u>
TOTAL ZONES B,C,X	38.7%	417.48	1.3%
SUBTOTAL ACTUARIAL	<u>78.5%</u>	<u>491.74</u>	<u>2.9%</u>
REGULAR PROGRAM - SUBSIDIZED RATES			
Pre-FIRM AE	16.3%	1,219.87	5.1%
Pre-FIRM V,VE	0.7%	1,897.37	7.4%
<u>Pre-FIRM Other</u>	<u>3.8%</u>	<u>1,115.27</u>	<u>4.8%</u>
PRE-FIRM SUBSIDIZED	20.8%	1,229.18	5.2%
75-81 POST V,VE	0.1%	1,571.23	9.7%
A99 & AR	0.5%	960.71	4.9%
EMERGENCY	0.0%	433.62	0.0%
SUBTOTAL SUBSIDIZED	<u>21.5%</u>	<u>1,224.04</u>	<u>5.2%</u>
TOTAL	<u>100.0%</u>	<u>649.11</u>	<u>3.8%</u>

\*Computations are based on counting and pricing units insured under Condo Master Policies separately.

\*\* Includes all other Pre FIRM zones, including AO, AH, AOB, AHB, D, AR, and A99.

**Exhibit A.** Effects of Rate Revisions on Written Premium, Page 1

FEDERAL EMERGENCY MANAGEMENT AGENCY  
NATIONAL FLOOD INSURANCE PROGRAM  
History of Rate Changes by Risk Group for the Latest 5 Years

	Distribution of Business	Percentage Rate Change Effective:				
		Oct-11	Oct-10	May-09	May-08	May-07
REGULAR PROGRAM - ACTUARIAL RATES						
AE	29.2%	4.7%	5.9%	9.8%	6.0%	5.7%
A	1.7%	5.5%	5.3%	9.5%	8.2%	8.3%
<u>AO, AH, AOB &amp; AHB</u>	<u>8.2%</u>	<u>0.5%</u>	<u>1.1%</u>	<u>7.5%</u>	<u>7.8%</u>	<u>9.1%</u>
ZONES AE,A,AO,AH,AOB,AHB	39.0%	4.1%	5.0%	9.4%	6.5%	6.5%
POST-81 V,VE	0.8%	3.5%	9.2%	10.0%	10.3%	9.9%
B,C,X (Standard)	7.8%	4.5%	7.4%	7.7%	10.1%	9.7%
<u>PRP</u>	<u>30.9%</u>	<u>0.0%</u>	<u>0.0%</u>	<u>0.0%</u>	<u>8.4%</u>	<u>0.0%</u>
TOTAL ZONES B,C,X	38.7%	1.3%	2.1%	2.8%	9.1%	3.7%
SUBTOTAL ACTUARIAL	78.5%	2.9%	4.0%	6.5%	7.8%	5.4%
REGULAR PROGRAM - SUBSIDIZED RATES						
Pre-FIRM AE	16.3%	5.1%	2.6%	N/A	N/A	N/A
Pre-FIRM V,VE	0.7%	7.4%	3.4%	9.9%	9.7%	9.4%
<u>Pre-FIRM Other</u>	<u>3.8%</u>	<u>4.8%</u>	<u>2.6%</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
PRE-FIRM SUBSIDIZED	20.8%	5.2%	2.7%	9.7%	7.5%	6.8%
75-81 POST V,VE	0.1%	9.7%	9.5%	9.9%	9.6%	9.4%
A99 & AR	0.5%	4.9%	9.0%	9.6%	10.4%	10.3%
EMERGENCY	0.0%	0.0%	0.0%	4.1%	1.4%	0.0%
SUBTOTAL SUBSIDIZED	21.5%	5.2%	2.9%	9.7%	7.6%	7.0%
TOTAL	100.0%	3.8%	3.6%	7.8%	7.8%	6.0%

FEDERAL EMERGENCY  
MANAGEMENT AGENCY

NATIONAL FLOOD INSURANCE PROGRAM  
UNDERWRITING EXPERIENCE BY CALENDAR/ACCIDENT YEAR

EXHIBIT B1  
Page 1

Year	Earned Exposure (Millions)	Average Amount of Insurance per Policy	Earned Premium (\$ Millions)	Loss Cost & LAE (\$ Millions)	Average Premium	Average Operating Expense incl. Agt. Comm.	Average Loss Cost & LAE per Policy	Interest on 2005 Borrowing per Policy	Underwriting Profit/ (Deficit) per Policy
2009	5.62	\$213,659	\$2,975.3	\$786.8	\$529.76	\$171.79	\$140.08	\$38.17	\$179.72
2008	5.59	\$205,768	\$2,781.3	\$3,606.7	\$497.77	\$160.65	\$645.49	\$145.24	(\$453.61)
2007	5.46	\$196,009	\$2,538.5	\$652.4	\$464.64	\$156.70	\$119.40	\$133.65	\$54.89
2006	5.13	\$185,090	\$2,246.0	\$682.5	\$437.58	\$150.74	\$132.96	\$102.00	\$51.88
2005	4.66	\$170,683	\$1,967.6	\$18,631.2	\$422.46	\$145.32	\$4,000.37	\$1.12	(\$3,724.34)
2004	4.50	\$155,816	\$1,811.8	\$2,373.3	\$402.81	\$138.89	\$527.65		(\$263.73)
2003	4.42	\$147,617	\$1,697.5	\$835.4	\$384.06	\$136.82	\$189.02		\$58.23
2002	4.37	\$140,771	\$1,611.4	\$463.1	\$368.94	\$129.93	\$106.03		\$132.98
2001	4.29	\$132,928	\$1,511.5	\$1,363.6	\$352.62	\$124.42	\$318.13		(\$89.93)
2000	4.25	\$126,322	\$1,416.4	\$270.7	\$333.33	\$122.52	\$63.70		\$147.11
1999	4.17	\$119,569	\$1,319.4	\$812.4	\$316.39	\$115.55	\$194.80		\$6.04
1998	4.09	\$115,639	\$1,224.8	\$948.4	\$299.74	\$104.03	\$232.10		(\$36.39)
1997	3.80	\$108,397	\$1,041.3	\$555.5	\$274.31	\$95.62	\$146.33		\$32.35
1996	3.52	\$102,309	\$904.9	\$880.3	\$256.73	\$91.49	\$249.75		(\$84.51)
1995	3.20	\$99,023	\$819.4	\$1,371.7	\$256.14	\$88.10	\$428.76		(\$260.73)

Exhibit B1. Key Underwriting Components by Year, 1978-2009, Page 1

FEDERAL EMERGENCY  
MANAGEMENT AGENCY

NATIONAL FLOOD INSURANCE PROGRAM  
UNDERWRITING EXPERIENCE BY CALENDAR/ACCIDENT YEAR

EXHIBIT B1  
Page 2

Year	Earned Exposure (Millions)	Average Amount of Insurance per Policy	Earned Premium (\$ Millions)	Loss Cost & LAE (\$ Millions)	Average Premium	Average Operating Expense incl. Agt. Comm.	Average Loss Cost & LAE per Policy	Interest on 2005 Borrowing per Policy	Underwriting Profit/ (Deficit) per Policy
1994	2.85	\$96,712	\$734.6	\$435.1	\$258.20	\$89.24	\$152.92		\$16.04
1993	2.67	\$94,301	\$667.9	\$694.2	\$250.45	\$86.68	\$260.33		(\$96.56)
1992	2.54	\$90,400	\$626.9	\$753.6	\$246.90	\$84.36	\$296.80		(\$134.26)
1991	2.47	\$87,527	\$602.2	\$375.7	\$243.48	\$81.56	\$151.89		\$10.02
1990	2.33	\$85,005	\$570.4	\$177.3	\$244.40	\$81.00	\$75.98		\$87.41
1989	2.17	\$83,044	\$531.3	\$696.5	\$244.59	\$78.82	\$320.66		(\$154.90)
1988	2.10	\$80,350	\$491.3	\$54.7	\$234.44	\$73.00	\$26.09		\$135.35
1987	2.07	\$76,700	\$462.1	\$111.5	\$222.74	\$69.51	\$53.72		\$99.50
1986	2.03	\$71,110	\$403.4	\$132.1	\$198.25	\$63.17	\$64.94		\$70.15
1985	1.92	\$66,888	\$364.8	\$385.1	\$189.95	\$54.07	\$200.50		(\$64.62)
1984	1.92	\$61,862	\$334.9	\$265.9	\$174.68	\$48.04	\$138.73		(\$12.08)
1983	1.92	\$58,105	\$313.0	\$460.8	\$163.24	\$42.07	\$240.31		(\$119.15)
1982	1.89	\$55,168	\$247.7	\$209.4	\$130.90	\$38.76	\$110.68		(\$18.55)
1981	1.97	\$50,883	\$181.0	\$134.9	\$92.00	\$31.60	\$68.57		(\$8.17)
1980	1.95	\$45,101	\$149.2	\$244.0	\$76.38	\$29.51	\$124.92		(\$78.05)
1979	1.62	\$37,650	\$125.5	\$505.8	\$77.26	\$23.80	\$311.40		(\$257.94)
1978	1.06	\$33,150	\$81.8	\$155.6	\$77.20	\$26.85	\$146.87		(\$96.52)

Exhibit B1 (cont'd.). Key Underwriting Components by Year, 1978-2009, Page 2

	2000	2001	2002	2003	2004
1) Average Amount of Insurance per Policy	\$126,322	\$132,928	\$140,771	\$147,617	\$155,816
2) Earned Premium (A)	\$1,416,380,461	\$1,511,487,080	\$1,611,438,106	\$1,697,509,226	\$1,811,799,962
3) Losses Cost Incurred (B)	\$248,743,369	\$1,271,591,040	\$427,536,881	\$770,087,217	\$2,207,292,971
4A) Allocated Loss Adjustment Expense (ALAE)	\$12,483,629	\$49,553,741	\$20,435,702	\$34,654,039	\$88,232,060
4B) Special All. Loss Adjustment Expense (SALAE)	\$1,667,168	\$3,505,766	\$2,719,421	\$7,986,482	\$9,482,814
4C) Unallocated Loss Adjustment Expense (ULAE)	\$7,762,027	\$38,987,308	\$12,440,316	\$22,694,850	\$68,303,041
5) Loss Cost & LAE per Policy	\$270,656,193	\$1,363,637,855	\$463,132,320	\$835,422,588	\$2,373,310,886
6) Loss & LAE Ratio	0.191	0.902	0.287	0.492	1.310
7A) Direct Agent Commission	\$14,409,800	\$14,378,966	\$14,101,186	\$13,648,484	\$13,397,898
7B) WYO Agent Commission Allowance	\$198,047,270	\$212,344,096	\$227,614,530	\$240,977,900	\$258,372,096
8A) Direct & Bureau General Expense	\$75,472,000	\$59,575,000	\$46,954,000	\$60,912,000	\$45,900,000
8B) Interest on 2005 Borrowing					
8C) WYO Operating Allowance (w/o ULAE)	\$232,705,542	\$247,026,965	\$278,827,799	\$289,173,480	\$307,032,174
9) Earned Exposure (C)	4,249,238	4,286,469	4,367,746	4,419,861	4,497,861
10) Average Premium	\$333.33	\$352.62	\$368.94	\$384.06	\$402.81
11) Average Operating Expense Other than Agent Commission & Loss Adjustment Expense	\$72.53	\$71.53	\$74.59	\$79.21	\$78.47
12) Average Agent Commission	\$50.00	\$52.89	\$55.34	\$57.61	\$60.42
13) Average Loss Cost & LAE per Policy	\$63.70	\$318.13	\$106.03	\$189.02	\$527.65
14) Underwriting Profit/(Deficit) per Policy	\$147.11	(\$89.93)	\$132.98	\$58.23	(\$263.73)

(A) Does not include Federal Policy Fee, nor are the expenses covered by that fee reflected in this exhibit. Also, Group Flood and MPPP premium is excluded.

(B) Includes an allowance for open claims. In addition, Group Flood and MPPP losses are excluded.

(C) This exhibit now counts exposures by policy and by each unit covered by a Residential Condominium Building Association Policy (RCBAP).

**Exhibit B2.** Detailed Underwriting Experience by Year for the Latest 10 Years, Page 1

	2005	2006	2007	2008	2009
1) Average Amount of Insurance per Policy	\$170,683	\$185,090	\$196,009	\$205,768	\$213,659
2) Earned Premium (A)	\$1,967,567,898	\$2,246,009,756	\$2,538,508,566	\$2,781,296,850	\$2,975,306,740
3) Losses Cost Incurred (B)	\$17,574,729,866	\$632,729,059	\$605,120,360	\$3,362,868,736	\$727,585,902
4A) Allocated Loss Adjustment Expense (ALAE)	\$456,472,905	\$28,755,619	\$27,540,260	\$129,548,476	\$38,051,385
4B) Special All. Loss Adjustment Expense (SALAE)	\$41,507,953	\$3,189,318	\$2,935,928	\$10,201,394	\$1,948,928
4C) Unallocated Loss Adjustment Expense (ULAE)	\$558,464,178	\$17,804,122	\$16,757,316	\$104,041,398	\$19,172,477
5) Loss Cost & LAE per Policy	\$18,631,174,902	\$682,478,119	\$652,353,863	\$3,606,660,004	\$786,758,692
6) Loss & LAE Ratio	9.469	0.304	0.257	1.297	0.264
7A) Direct Agent Commission	\$13,358,493	\$13,404,745	\$13,949,376	\$14,608,696	\$14,850,458
7B) WYO Agent Commission Allowance	\$281,776,692	\$323,496,719	\$366,826,909	\$402,585,831	\$431,445,553
8A) Direct & Bureau General Expense	\$54,800,000	\$58,320,000	\$68,753,000	\$72,501,000	\$81,315,000
8B) Interest on 2005 Borrowing	\$5,232,217	\$523,535,548	\$730,185,164	\$811,515,698	\$214,368,255
8C) WYO Operating Allowance (w/o ULAE)	\$326,860,963	\$378,491,161	\$406,566,491	\$407,953,642	\$437,198,160
9) Earned Exposure (C)	4,657,365	5,132,786	5,463,375	5,587,482	5,616,311
10) Average Premium	\$422.46	\$437.58	\$464.64	\$497.77	\$529.76
11) Average Operating Expense Other than Agent Commission & Loss Adjustment Expense	\$83.07	\$187.10	\$220.65	\$231.23	\$130.49
12) Average Agent Commission	\$63.37	\$65.64	\$69.70	\$74.67	\$79.46
13) Average Loss Cost & LAE per Policy	\$4,000.37	\$132.96	\$119.40	\$645.49	\$140.08
14) Underwriting Profit/(Deficit) per Policy	(\$3,724.34)	\$51.88	\$54.89	(\$453.61)	\$179.72

(A) Does not include Federal Policy Fee, nor are the expenses covered by that fee reflected in this exhibit. Also, Group Flood and MPPP premium is excluded.

(B) Includes an allowance for open claims. In addition, Group Flood and MPPP losses are excluded.

(C) This exhibit now counts exposures by policy and by each unit covered by a Residential Condominium Building Association Policy (RCBAP).

**Exhibit B2 (cont'd.).** Detailed Underwriting Experience by Year for the Latest 10 Years, Page 2

1986 to Present (excluding 2005) represents period of reduced subsidies, excluding high-impact year of 2005 (Katrina, Rita, Wilma)

	1969-1977	1978-1985	1986-2009 (ex-2005)	2005	1986-2009	1969-2009
<b>FINANCIAL DATA</b>						
1) Earned Exposure	2,933,939	14,252,026	83,633,166	4,657,365	88,290,532	105,476,497
2) Earned Premium	208,191,752	\$1,797,881,733	28,989,696,719	\$1,967,567,898	30,957,264,617	32,963,338,102
3) Losses Incurred	290,363,185	\$2,249,149,682	17,758,893,744	\$17,574,729,866	35,333,623,610	37,873,136,477
4) Loss Adjustment Expense	22,146,853	\$112,488,998	1,274,498,292	\$1,056,445,036	2,330,943,327	2,465,579,179
5) Agent Commission	44,817,526	\$283,079,715	\$4,348,454,508	\$295,135,185	4,643,589,693	4,971,486,933
6) Direct & Bureau General Expense and WYO Operating Allowance	75,071,236	\$253,796,201	\$5,555,948,943	\$381,660,963	5,937,609,905	6,266,477,343
7) Interest on 2005 Borrowing*				\$2,284,836,882	2,284,836,882	2,284,836,882
<b>ANALYSIS OF COSTS</b>						
Per Policy Averages						
8) Average Premium	\$70.96	\$126.15	\$346.63	\$422.46	\$350.63	\$312.52
9) Average Loss Cost & LAE	\$106.52	\$165.71	\$227.58	\$4,000.37	\$426.60	\$382.44
10) Average Agent Commission	\$15.28	\$19.86	\$51.99	\$63.37	\$52.59	\$47.13
11) Average Operating Expense Other Than Agent Commission & LAE	\$25.59	\$17.81	\$66.43	\$81.95	\$67.25	\$59.41
12) Interest on 2005 Borrowing				\$490.59	\$25.88	\$21.66
13) Underwriting Profit/(Deficit) per Policy	(\$76.42)	(\$77.23)	\$0.62	(\$4,213.81)	(\$221.69)	(\$198.13)
14) LAE as a Percentage of Loss	7.6%	5.0%	7.2%	6.0%	6.6%	6.5%
15) Agent Commission as a Percentage of Premium	21.5%	15.7%	15.0%	15.0%	15.0%	15.1%

\* All interest on 2005 borrowings are attributed to the 2005 year regardless of when the interest payments are actually paid (\$2,285M interest includes \$5M paid in CY 2005, \$524M paid in CY 2006, \$730M paid in CY 2007, \$812M paid in CY 2008, and \$214M paid in CY 2009).

**Exhibit B3.** Detailed Underwriting Experience Aggregated by Experience Period

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 NATIONAL FLOOD INSURANCE PROGRAM  
 ACTUARIAL INFORMATION SYSTEM

LOSS AND EXPENSE EXPERIENCE  
 Accident Period 1978-2009

	VE, V1-V30 Post-FIRM Post 10/81	Unnumbered A Zone Post-FIRM	AE, A1-A30 Post-FIRM & Pre-FIRM Actuarial	B, C, X Standard	B, C, X PRP	AO & AH Post-FIRM	AOB & AHB	Actuarial Totals
1) Earned Exposure	596,354	1,762,691	27,147,343	17,960,182	13,017,502	521,507	5,997,070	67,002,650
2) Average Premium	\$1,304.73	\$385.10	\$251.28	\$244.92	\$251.27	\$464.34	\$198.42	\$259.39
3) Number of Paid Losses	10,104	11,120	218,293	190,749	112,051	2,254	19,308	563,879
4) Average Loss Payment	\$35,892.71	\$19,889.55	\$51,069.11	\$23,150.36	\$38,856.73	\$42,839.43	\$26,688.10	\$37,443.42
5) Loss Ratio	0.47	0.33	1.63	1.00	1.33	0.40	0.43	1.21
6) Loss Frequency per 100 Policy Contracts	2.8	0.7	1.1	1.3	0.9	0.5	0.4	1.0
7) Average Loss per Policy	\$608.13	\$125.47	\$410.65	\$245.87	\$334.47	\$185.16	\$85.92	\$315.12
8) Other Expenses (Average per Policy)								
a) Direct & Bureau General Expense and WYO Operating Allowance	\$122.96	\$63.21	\$54.52	\$54.11	\$65.74	\$68.36	\$51.09	\$57.23
b) Agent Commission	\$195.71	\$57.76	\$37.69	\$36.74	\$37.69	\$69.65	\$29.76	\$38.91
c) Loss Adjustment Exp.	\$48.07	\$9.48	\$26.17	\$15.52	\$22.99	\$11.95	\$6.17	\$20.55
d) Int. on 2005 Borrowing <sup>1</sup>	\$16.54	\$1.72	\$39.83	\$9.09	\$24.78	\$15.72	\$6.40	\$24.28
e) Total	\$383.29	\$132.18	\$158.21	\$115.45	\$151.20	\$165.69	\$93.42	\$140.96
9) Underwriting Profit/ (Deficit) <sup>2</sup> per policy on Paid Basis	\$313.32	\$127.44	(\$317.58)	(\$116.40)	(\$234.40)	\$113.49	\$19.07	(\$196.68)
10) Total Underwriting Profit/(Deficit)	\$186,847,353	\$224,643,933	(\$8,621,556,868)	(\$2,090,575,515)	(\$3,051,250,007)	\$59,187,999	\$114,386,990	(\$13,178,316,115)

<sup>1</sup> Interest on 2005 borrowings has been allocated based on the Total Operating Deficit for the year 2005 alone.

<sup>2</sup> The underwriting profit is the policyholder contribution in periods of relatively better loss experience towards reserves used to fund high loss years.

**Exhibit B4. Detailed Underwriting Experience by Zone and by Actuarial vs. Subsidized, 1978-2009, Page 1**

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 NATIONAL FLOOD INSURANCE PROGRAM  
 ACTUARIAL INFORMATION SYSTEM

LOSS AND EXPENSE EXPERIENCE  
 Accident Period 1978-2009

	VE, V1-V30		A Zone Pre-FIRM	AE, A1-A30 Pre-FIRM	AO & AH Pre-FIRM	Emergency Program	Subsidized Totals	Program Totals
	Pre-FIRM	Post-FIRM Pre 10/81						
1) Earned Exposure	1,478,665	278,521	5,031,147	20,744,842	1,607,877	3,215,024	32,356,075	102,542,558
2) Average Premium	\$551.63	\$455.60	\$371.24	\$465.60	\$456.65	\$112.85	\$419.27	\$310.16
3) Number of Paid Losses	33,363	4,592	90,604	460,929	9,660	105,129	704,277	1,303,081
4) Average Loss Payment	\$25,188.58	\$31,380.60	\$16,618.70	\$26,234.10	\$24,517.05	\$5,687.95	\$21,890.60	\$28,404.00
5) Loss Ratio	1.03	1.14	0.81	1.25	0.32	1.65	1.14	1.16
6) Loss Frequency per 100 Policy Contracts	2.8	2.6	1.8	2.4	0.6	3.3	2.3	1.5
7) Average Loss per Policy	\$568.33	\$517.37	\$299.28	\$582.89	\$147.30	\$185.99	\$476.48	\$360.95
8) Other Expenses (Average per Policy)								
a) Direct & Bureau General Expense and WYO Operating Allowance	\$74.03	\$67.80	\$62.31	\$68.44	\$67.86	\$45.53	\$65.44	\$59.77
b) Agent Commission	\$82.74	\$68.34	\$55.69	\$69.84	\$68.50	\$16.93	\$62.89	\$46.52
c) Loss Adjustment Exp.	\$36.15	\$33.78	\$19.85	\$37.92	\$10.54	\$10.85	\$30.94	\$23.45
d) Int. on 2005 Borrowing <sup>1</sup>	\$17.90	\$11.67	\$1.26	\$28.47	\$7.76	\$0.01	\$19.75	\$22.28
e) Total	\$210.83	\$181.58	\$139.12	\$204.67	\$154.66	\$73.31	\$179.02	\$152.03
9) Underwriting Profit/ (Deficit) <sup>2</sup> per policy on Paid Basis	(\$227.52)	(\$243.35)	(\$67.16)	(\$321.97)	\$154.69	(\$146.46)	(\$236.23)	(\$202.82)
10) Total Underwriting Profit/(Deficit)	(\$336,429,157)	(\$67,779,027)	(\$337,891,733)	(\$6,679,119,734)	\$248,723,398	(\$470,871,678)	(\$7,643,367,932)	(\$20,797,441,850)

<sup>1</sup> Interest on 2005 borrowings has been allocated based on the Total Operating Deficit for the year 2005 alone.

<sup>2</sup> The underwriting profit is the policyholder contribution in periods of relatively better loss experience towards reserves used to fund high loss years.

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 NATIONAL FLOOD INSURANCE PROGRAM  
 ACTUARIAL INFORMATION SYSTEM

LOSS AND EXPENSE EXPERIENCE  
 Accident Period 1986-2009 excluding 2005

	VE,V1-V30 Post-FIRM Post 10/81	Unnumbered A Zone Post-FIRM	AE,A1-A30 Post-FIRM & Pre-FIRM Actuarial	B,C,X Standard	B,C,X PRP	AO & AH Post-FIRM	AOB & AHB	Actuarial Totals
1) Earned Exposure	553,907	1,517,806	24,076,220	13,359,651	12,119,780	486,407	5,528,148	57,641,919
2) Average Premium	\$1,292.53	\$398.08	\$257.41	\$283.20	\$250.70	\$461.06	\$197.67	\$271.62
3) Number of Paid Losses	7,813	9,081	127,916	115,280	87,480	1,396	13,890	362,856
4) Average Loss Payment	\$32,284.46	\$18,124.51	\$24,497.98	\$23,344.10	\$22,257.47	\$19,952.59	\$14,177.90	\$23,186.85
5) Loss Ratio	0.35	0.27	0.51	0.71	0.64	0.12	0.18	0.54
6) Loss Frequency per 100 Policy Contracts	2.3	0.6	0.7	1.1	0.7	0.3	0.3	0.8
7) Average Loss per Policy	\$455.38	\$108.44	\$130.16	\$201.44	\$160.65	\$57.26	\$35.62	\$145.96
8) Other Expenses (Average per Policy)								
a) Direct & Bureau General Expense and WYO								
Operating Allowance	\$129.45	\$68.96	\$59.45	\$61.20	\$65.50	\$73.22	\$55.41	\$61.78
b) Agent Commission	\$193.88	\$59.71	\$38.61	\$42.48	\$37.61	\$69.16	\$29.65	\$40.74
c) Loss Adjustment Exp.	\$38.34	\$8.51	\$9.79	\$13.45	\$13.14	\$4.48	\$3.04	\$10.89
d) Int. on 2005 Borrowing <sup>1</sup>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
e) Total	\$361.68	\$137.19	\$107.86	\$117.13	\$116.24	\$146.86	\$88.10	\$113.41
9) Underwriting Profit/ (Deficit) <sup>2</sup> per policy on Paid Basis	\$475.47	\$152.45	\$19.39	(\$35.36)	(\$26.19)	\$256.93	\$73.94	\$12.24
10) Total Underwriting Profit/(Deficit)	\$263,368,441	\$231,388,124	\$466,928,039	(\$472,446,694)	(\$317,451,998)	\$124,974,327	\$408,763,935	\$705,524,174

<sup>1</sup> Interest on 2005 borrowings has been allocated based on the Total Operating Deficit for the year 2005 alone.

<sup>2</sup> The underwriting profit is the policyholder contribution in periods of relatively better loss experience towards reserves used to fund high loss years.

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 NATIONAL FLOOD INSURANCE PROGRAM  
 ACTUARIAL INFORMATION SYSTEM

LOSS AND EXPENSE EXPERIENCE  
 Accident Period 1986-2009 excluding 2005

	VE,V1-V30		A Zone	AE,A1-A30	AO & AH	Emergency	Subsidized	Program
	Pre-FIRM	Post-FIRM	Pre-FIRM	Pre-FIRM	Pre-FIRM	Program	Totals	Totals
		Pre 10/81						
1) Earned Exposure	1,042,578	216,955	4,020,219	16,902,287	1,432,627	211,891	23,826,556	83,633,166
2) Average Premium	\$663.18	\$491.97	\$409.26	\$509.82	\$470.93	\$210.99	\$494.40	\$336.18
3) Number of Paid Losses	20,656	3,101	67,315	308,787	7,226	4,356	411,441	788,006
4) Average Loss Payment	\$26,306.18	\$34,448.68	\$18,264.37	\$22,169.89	\$15,987.64	\$10,817.61	\$21,602.36	\$22,191.94
5) Loss Ratio	0.79	1.00	0.75	0.79	0.17	1.05	0.75	0.62
6) Loss Frequency per 100 Policy Contracts	2.6	2.6	1.7	2.0	0.5	2.1	1.9	1.1
7) Average Loss per Policy	\$521.19	\$492.39	\$305.82	\$405.02	\$80.64	\$222.39	\$373.03	\$209.10
8) Other Expenses (Average per Policy)								
a) Direct & Bureau General Expense and WYO								
Operating Allowance	\$86.89	\$75.31	\$69.72	\$76.52	\$73.89	\$56.31	\$75.48	\$65.72
Agent Commission	\$99.48	\$73.80	\$61.39	\$76.47	\$70.64	\$31.65	\$74.16	\$50.43
Loss Adjustment Exp.	\$34.52	\$32.80	\$21.13	\$28.27	\$6.35	\$14.01	\$25.94	\$15.03
Int. on 2005 Borrowing <sup>1</sup>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
e) Total	\$220.89	\$181.91	\$152.24	\$181.26	\$150.88	\$101.97	\$175.58	\$131.18
9) Underwriting Profit/(Deficit) <sup>2</sup> per policy on Paid Basis	(\$78.90)	(\$182.33)	(\$48.81)	(\$76.47)	\$239.41	(\$113.37)	(\$54.20)	(\$4.09)
10) Total Underwriting Profit/(Deficit)	(\$82,257,083)	(\$39,557,203)	(\$196,211,688)	(\$1,292,448,537)	\$342,986,965	(\$24,021,528)	(\$1,291,509,072)	(\$342,170,261)

Exhibit B5 (cont'd.). Detailed Underwriting Experience by Zone and by Actuarial vs. Subsidized, 1986-2009 excluding 2005, Page 2

NATIONAL FLOOD INSURANCE PROGRAM  
**Analysis of Pure Premium per Policyholder**  
 Based on Claims and Policy Data for Accident Years 1978-2009  
 Consolidated Data (excluding ICC)

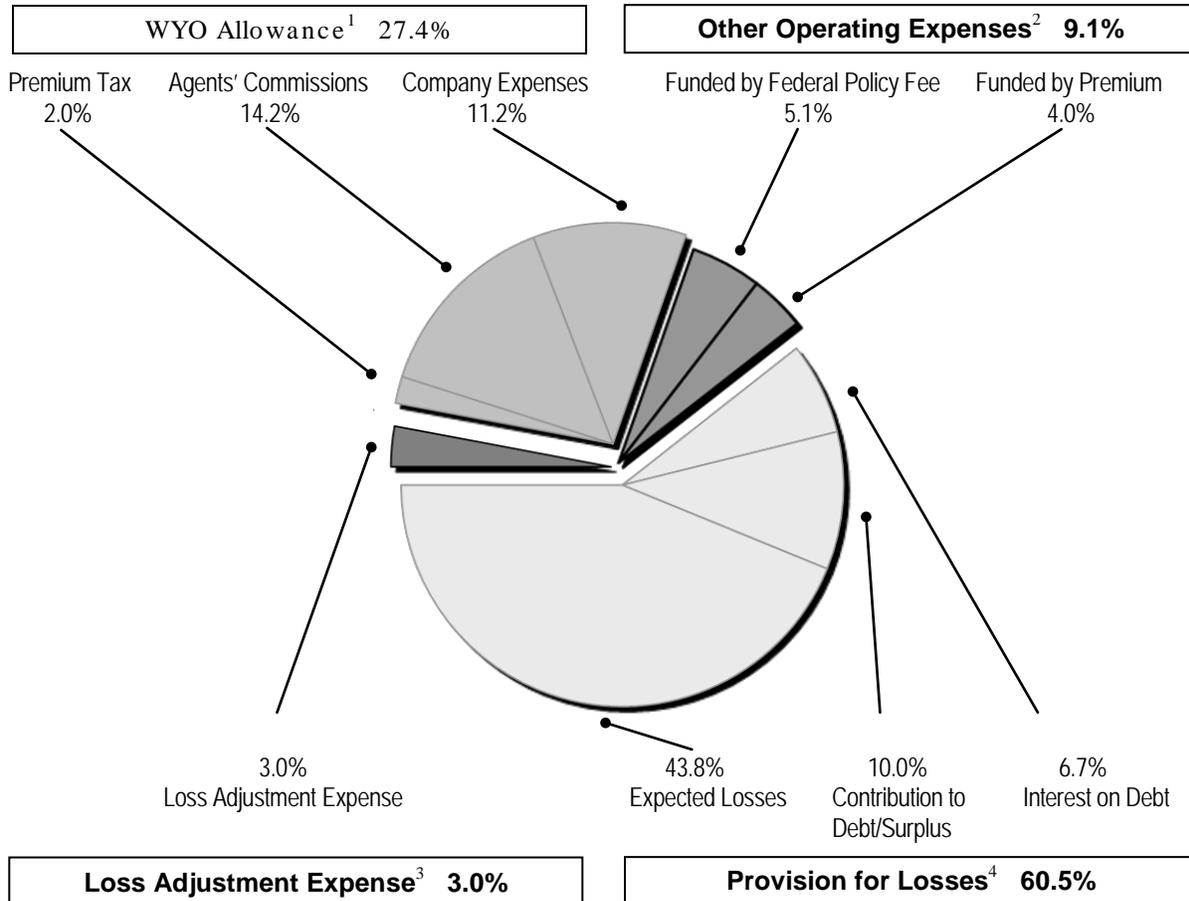
EXHIBIT C

Program Type / Zone	(1) Earned Exposure (M)	(2) Earned Premium (\$M)	(3) Losses Paid (\$M)	(4) Allocated Loss Adjustment Expense (\$M)	(5) Loss Cost & ALAE on 5/1/2012 Cost Level (\$M)	(6) Number of Paid Losses	(7) Pure Premium on 5/1/2012 Cost Level
<b>Post-FIRM – Subject to Actuarial Rate Schedules</b>							
AE, A01-A30							
+ Elevated	13.04	2,651.7	3,976.1	129.3	4,961.4	80,880	380.49
0 Elevated	3.91	1,474.5	2,428.8	71.3	2,974.4	33,771	760.46
- Elevated	1.31	759.2	561.4	22.9	701.8	16,403	535.85
Subtotal	18.26	4,885.4	6,966.3	223.5	8,637.7	131,054	473.02
A	1.76	678.9	221.4	10.2	306.4	11,133	173.78
AO and AH	0.52	242.2	96.6	3.3	120.2	2,254	230.45
AOB and AHB	4.35	904.4	303.5	13.2	397.5	13,448	91.37
Post-'81 VE, V01-V30							
+ Elevated	0.40	399.0	256.8	11.1	326.5	7,498	822.51
0 Elevated	0.06	97.1	30.1	1.5	38.8	795	687.73
- Elevated	0.14	278.0	74.7	4.7	92.1	1,781	658.30
Subtotal	0.59	774.2	361.6	17.3	457.5	10,074	770.97
B, C, X							
Standard	5.44	1,603.6	1,260.7	44.4	1,705.9	33,057	313.60
Preferred Risk (PRP)	7.01	1,843.4	1,787.0	61.7	2,163.8	38,626	308.56
Subtotal	12.45	3,447.0	3,047.7	106.0	3,869.8	71,683	310.76
<b>ALL ZONES COMBINED</b>	<b>38.05</b>	<b>10,983.0</b>	<b>11,009.2</b>	<b>374.1</b>	<b>13,807.5</b>	<b>240,200</b>	<b>362.90</b>
<b>Pre-FIRM – Electing Actuarial Rate Schedules</b>							
AOB and AHB	1.65	285.5	211.8	7.2	271.4	5,860	164.88
AE, A01-A30							
+ Elevated	6.76	1,186.1	2,484.0	81.1	3,167.7	56,215	468.82
0 Elevated	2.06	721.5	1,693.8	52.3	2,111.8	30,761	1,023.60
Subtotal	8.82	1,907.6	4,177.8	133.4	5,279.5	86,976	598.59
B, C, X							
Standard	12.52	2,795.2	3,155.2	120.8	4,963.7	157,692	396.45
Preferred Risk (PRP)	6.00	1,427.5	2,566.9	96.7	3,147.4	73,425	524.14
Subtotal	18.53	4,222.7	5,722.1	217.5	8,111.0	231,117	437.84
<b>ALL ZONES COMBINED</b>	<b>28.99</b>	<b>6,415.9</b>	<b>10,111.7</b>	<b>358.1</b>	<b>13,661.9</b>	<b>323,953</b>	<b>471.25</b>
<b>Post-FIRM – Electing Subsidized Rate Schedules</b>							
A99	0.35	120.9	38.5	1.1	47.5	823	135.76
Pre-'81 VE, V01-V30							
+ Elevated	0.19	74.4	93.2	3.4	144.3	3,366	746.34
0 Elevated	0.05	18.9	27.4	0.9	36.8	532	711.44
- Elevated	0.03	32.5	23.0	1.0	31.6	655	1,023.35
Subtotal	0.28	125.8	143.6	5.4	212.8	4,553	770.77
<b>ALL ZONES COMBINED</b>	<b>0.65</b>	<b>258.1</b>	<b>182.7</b>	<b>6.6</b>	<b>261.2</b>	<b>5,420</b>	<b>401.33</b>
<b>Pre-FIRM – Electing Subsidized Rate Schedules</b>							
A	6.16	2,080.8	1,697.5	72.7	2,798.6	112,182	454.16
AE, A01-A30	20.74	9,658.7	12,092.1	451.3	16,896.7	460,929	814.50
All Other A Zones	2.90	1,131.01	379.69	14.54	505.01	0.01	173.96
V, VE	1.48	815.7	840.4	31.3	1,273.4	33,363	861.18
Other (Pre- & Post-FIRM)	0.35	98.9	101.5	3.9	187.9	7,401	537.19
<b>ALL ZONES COMBINED</b>	<b>31.64</b>	<b>13,785.1</b>	<b>15,111.2</b>	<b>573.8</b>	<b>21,661.6</b>	<b>628,379</b>	<b>684.66</b>
<b>TOTAL</b>	<b>99.33</b>	<b>31,442.1</b>	<b>36,414.7</b>	<b>1,312.6</b>	<b>49,392.2</b>	<b>1,197,952</b>	<b>497.27</b>
Emergency	3.22	362.8	598.0	33.8	1,772.7	105,129	551.39
Group Flood Ins Policy (GFIP)	0.39	59.8	85.4	4.1	107.5	8,233	278.22
Mortgage Portfolio (MPPP)	0.07	65.9	13.8	0.7	17.6	599	243.39
<b>GRAND TOTAL</b>	<b>103.00</b>	<b>31,930.7</b>	<b>37,111.9</b>	<b>1,351.2</b>	<b>51,290.1</b>	<b>1,311,913</b>	<b>497.96</b>

Note: Pure premium reflects full weight for AY 2005 and Katrina. Our analysis suggests 2005 should be accorded perhaps 1% weight, to reflect the relative likelihood of such an event. See Rate Review for further discussion.

Exhibit C. Calendar/Accident Years 1978-2009 Experience for the Larger Risk Zones

Federal Emergency Management Agency  
National Flood Insurance Program  
**Analysis of the Components of Premium and Federal Policy Fee**



The chart above shows the prospective expenses and losses associated with the average premium resulting from the October 1, 2011, rate changes.

<sup>1</sup> **WYO Allowance** (27.4%) consists of three components. Premium Tax (2.0%) and Agents' Commissions (14.2%) are pass-through costs incurred by the WYO (Write Your Own) companies. The remaining amount, Company Expenses (11.2%), is retained by the WYO companies to cover their expenses.

<sup>2</sup> **Other Operating Expenses** (9.1%) consists of the Federal Policy Fee (5.1%), which covers salaries, mapping, mitigation grants, etc. and Fixed Expenses (4.0%), which covers such items as contractor costs, the NFIP Servicing Agent, and the NFIP FloodSmart marketing and advertising program.

<sup>3</sup> **Loss Adjustment Expense** (3.0%) includes compensation to adjusters and claims office overhead.

<sup>4</sup> **Provision for Losses** (60.5%) is the portion of premium available, after all expenses, to current and former losses. If losses during the 12 months these rates will be in effect are equal to the historical average loss year (discussed on pages 5-6), then current losses will equal 43.8% of premium, and interest on current debt will equal 6.7% of premium, leaving 10.0% to pay down the current debt or to build a cash reserve that would be used to pay claims during future heavy loss years.

**Exhibit D.** Analysis of NFIP Projected Income and Expenses, October 1, 2011 – October 1, 2012

Average Annual Premium Required per Policyholder  
for Historical Average Loss Year (w/o ICC)  
vs.  
Projected Premium Written with October 2011 Rates

Based on 2011/2012 Cost Levels

Distribution of Business	Average Annual Premium Indicated by Historical Average Loss Levels and Projected Expenses	Projected Average Annual Written Premium* with October 2011 Rates (excluding ICC)	Projected Premium Expressed as Percentage of Historical Indicated Premium**
<b>REGULAR PROGRAM - ACTUARIAL RATES</b>			
AE	29.2%	419.59	125.1%
A	1.7%	322.26	266.8%
<u>AO, AH, AOB &amp; AHB</u>	<u>8.2%</u>	<u>237.07</u>	<u>162.9%</u>
ZONES AE,A,AO,AH,AOB,AHB	39.0%	377.25	135.2%
POST-81 V,VE	0.8%	929.45	331.3%
B,C,X (Standard)	7.8%	401.78	158.2%
<u>PRP</u>	<u>30.9%</u>	<u>396.93</u>	<u>90.0%</u>
TOTAL ZONES B,C,X	38.7%	397.90	103.8%
SUBTOTAL ACTUARIAL	<u>78.5%</u>	<u>392.95</u>	<u>124.2%</u>
<b>REGULAR PROGRAM - SUBSIDIZED RATES</b>			
Pre-FIRM AE	16.3%	883.02	132.5%
Pre-FIRM V,VE	0.7%	922.49	202.1%
<u>Pre-FIRM Other</u>	<u>3.8%</u>	<u>656.38</u>	<u>161.4%</u>
PRE-FIRM SUBSIDIZED	20.8%	842.72	139.9%
75-81 POST V,VE	0.1%	868.88	179.8%
A99 & AR	0.5%	239.75	399.0%
EMERGENCY	0.0%	881.28	49.2%
SUBTOTAL SUBSIDIZED	<u>21.5%</u>	<u>834.56</u>	<u>140.8%</u>
TOTAL	<u>100.0%</u>	<u>487.85</u>	<u>130.3%</u>

\*All computations are based on counting and pricing condominium units insured under Condo Master Policies separately. Projected Annual Written Premium includes \$40 Federal Policy Fee (\$20 for PRPs) for individual policies and prorates the schedule of charges for CMPs to the units covered. Historical Indicated Premium includes the equivalent of \$33.87 Federal Policy Fee on all non-PRP policy/units and a \$20.00 Federal Policy Fee on PRPs.

\*\* Based on 1978 - 2009 experience, with an assumption that the events of 2005 (including Katrina, Rita, and Wilma) represent a 1% occurrence. Experience for that year is weighted at 1%, with all prior years weighted at 99%.

**Exhibit E. Projected Annual Premium Requirements Based on 1978-2009 Loss Experience vs. Projected Written Premium**

APPENDIX  
**Actuarial Rate Formula**



## Actuarial Rate Formula

Actuarial rates are applied in the rating of Post-FIRM construction and additional layer limits of insurance on all construction. This Appendix provides an overview of the actuarial rate formula that is utilized in developing these rates.

The actuarial rates are based on consideration of the risk involved and accepted actuarial principles. The actuarial rate formula may be expressed as follows:

$$RATE = \left[ \sum_{i=Min}^{Max} (PELV_i \times DELV_i) \right] \times \frac{LADJ \times DED \times UINS}{EXLOSS}$$

Where: *Min* = minimum elevation relative to lowest floor at which flood damage occurs.

*Max* = elevation relative to lowest floor at which flood damage approaches a maximum.

The variable *PELV* is the probability of a particular water surface elevation relative to the 100-year Base Flood Elevation (BFE). For example, in Zone A10, the probability of water's rising to or above an elevation 1 foot less than the 100-year flood elevation is 1.6%, and 1 foot or more above the 100-year flood elevation is 0.6%, whereas the probability of water's rising to or above BFE is 1%. There are many risk zones, and they are based on information gathered and calculations made by engineers and hydrologists. Various Federal agencies, such as the U.S. Army Corps of Engineers, and private engineering firms are performing detailed risk zone and elevation studies of all major flood-prone areas. The flood risk zones are determined from these detailed studies and *PELV* values are assigned to these zones. The results of these studies are published on a Flood Insurance Rate Map (FIRM) showing zones and, where appropriate, BFEs.

The assignment of *PELV* values must be accomplished in such a way as to keep the rating of policies as simple as possible and still distinguish expected average cost differences among the rate zones. There are 30 numbered A Zones for which different sets of *PELV* values may be assigned. However, there are three main technical reasons for combining risk zones for rating purposes<sup>16</sup>:

- Lowest Floor Elevations are measured to the nearest foot.
- Due to the difficulty in estimating the extremely rare flood, the base frequency curves are truncated at about the 350- to 500-year event.
- The BFEs are approximations based on the best available data about the major sources of flood.

As a practical approach, in 1982 five risk zone combinations were established reflecting 1.0 foot elevations, and a minimum elevation difference of 1.5 feet between the maximum

---

<sup>16</sup> Some of the factors that increase flood hazard (e.g., local urban drainage problems and urbanization of other parts of the watershed) are virtually impossible to quantify if the Flood Insurance Study process is to remain cost effective.

flood level and the BFE was established for the risk zones that had the lowest flood hazard factors. Considering the relative variance in flood levels that can occur because of conditions that affect a particular building site during an actual flood, even more averaging for insurance rating is reasonable for buildings constructed with a Lowest Floor Elevation of -1.0 foot or above, relative to the BFE (the elevation of a flood with an exceedance probability of 1%). In 1983, the transition to a single rate schedule was approved. This approach has provided the NFIP with the means for simplifying FIRMs.

Since 1985, all new FIRMs have shown at most ten zones. These are A, AE, V, VE, AH, AO, AR, A99, X, and D. Zone AE includes all zones formerly designated as A1-A30, and Zone VE includes all those formerly designated as V1-V30. Zone X encompasses areas formerly shown as Zones B or C.

To assure consideration of the maximum flood level that might damage a building located in a Special Flood Hazard Area (even though elevated to the BFE or higher) and to recognize a minimum price associated with the risk transfer, the use of a minimum insurance rate has been continued. This is virtually mandated when adverse selection and the uncertainty of risk elevation are factors as important as they are in flood insurance. The minimum rate is \$.16 per \$100 of basic limits building coverage.

The need to establish minimum values also can be found in the manner that the Flood Insurance Study process treats hydrologic uncertainties. The accepted methods used in the studies tend to underestimate the calculated flood frequencies when there is little or no recorded flood data. Generally, recorded data relating to flooding events exceeding the 100-year event are sparse. The number of years of recorded flood data rarely exceeds a 30-year period. Even in those instances where longer records exist, changes in floodplain characteristics partly invalidate the usefulness of the data. It is generally accepted that the uncertainties involved in calculating the 500-year flood level are significant. Statistical analysis of these calculations has been published in the American Society of Engineers *Proceedings*. It has been projected that complete reliance on the traditional flood frequency tables in the calculation of insurance rates would produce only about one-half the insurance premium required to meet the insured risk.

The variable *DELV* is the ratio of the flood damage to the value of the insurable property and is obtained from depth percent damage tables. These tables are subject to experience checks by FEMA from a review of actual flood insurance claim files. The *DELV* values are calculated by weighting the actual insurance claims experience and the previously established depth percent damage values. The weighting is accomplished by using standard actuarial techniques (credibility).

The variable *LADJ* is the loss adjustment expense factor expressed as a percentage of losses (claim payments to policyholders). This provides funds for the payment of loss adjusters' fees and special claims investigation costs that are required to determine the appropriate insurance value of the flood damage and the amount due the policyholder under the terms

and conditions of the flood insurance policy. The value of *LADJ* is currently projected to be 4.99% under the adjuster fee schedule that was implemented during 2004.

The variable *DED* is the deductible offset. This variable is required to reflect the insurance policy condition that the first \$2,000 of damage does not qualify for an indemnification payment. The factor *DED* is based on size of claim data produced from insurance claim files.

The variable *UINS* is the under-insurance factor and is included in the formula because flood insurance policyholders do not always insure to value. This requires that the impact of the *DELV* values in the formula be adjusted to account for the difference between property values and the amount of insurance purchased within basic and additional coverage limits for each category of risk. The value of *UINS* is determined by a review of insurance claims data.

The variable *EXLOSS* is the expected loss ratio and serves to load the actuarial rates for insurance agents' commissions and other acquisition expenses incurred in the selling of flood insurance policies and a small contingency loading. The contingency loading is 10% in non-velocity zones and 20% in velocity zones.