U.S. Department of Housing and Urban Development

Office of Single Family Housing

Washington, DC

Flood Insurance for FHA Loan Originations

Office of Audit, Region 7
Kansas City, KS

Audit Report Number: 2021-KC-0002
January 5, 2021

OFFICE OF INSPECTOR GENERAL
U.S. Department of Housing and Urban Development

To:	Joseph Gormley Deputy Assistant Secretary for Single Family Housing, HU
	//**signed**//
From:	Ronald J. Hosking Regional Inspector General for Audit, 7AGA
Subject:	FHA Insured $940 Million in Loans for Properties in Flood Zones Without the Required Flood Insurance

Attached is the U.S. Department of Housing and Urban Development (HUD), Office of Inspector General's (OIG) final results of our review of Federal Housing Administration (FHA)-insured loans to determine whether loans in special flood hazard areas met flood insurance requirements.

HUD Handbook 2000.06, REV-4, sets specific timeframes for management decisions on recommended corrective actions. For each recommendation without a management decision, please respond and provide status reports in accordance with the HUD Handbook. Please furnish us copies of any correspondence or directives issued because of the audit.

The Inspector General Act, Title 5 United States Code, appendix 8M, requires that OIG post its reports on the OIG website. Accordingly, this report will be posted at https://www.hudoig.gov.

If you have any questions or comments about this report, please do not hesitate to call me at 913-551-5870.

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FHA Insured $940 Million in Loans for Properties in Flood Zones Without the Required Flood Insurance

Highlights

What We Audited and Why

We audited Federal Housing Administration (FHA)-insured loans originated in calendar year 2019. We compared location data from FHA-insured loans to National Flood Insurance Program (NFIP) data to identify a targeted universe of properties that we believed were at risk of not having the required flood insurance. We reviewed a statistical sample of these loans. We initiated this audit because a prior Office of Inspector General audit found that FHA did not always ensure that lenders complied with Federal requirements for properties located in special flood hazard areas (SFHA)[1]. Increased access to data created an opportunity to perform a more comprehensive review of compliance with FHA's flood insurance requirement. Our audit objective was to determine whether FHA insured loans that were not eligible for insurance because they did not have the required flood insurance coverage.

What We Found

FHA insured at least 3,870 loans that closed in 2019, totaling $940 million, which were not eligible for insurance because they were made for properties in SFHA flood zones without the required NFIP coverage. We found loans that had private flood insurance instead of the required NFIP coverage, NFIP coverage that did not meet the minimum required amount, or no NFIP coverage at the time the loan was closed and endorsed.

What We Recommend

We recommend that FHA require lenders to provide evidence of sufficient flood insurance or execute indemnification agreements for the 43 loans in our statistical sample that did not have sufficient flood insurance at the time of our audit. We also recommend that FHA add to HUD databases the information necessary to ensure that the required flood insurance is in place at loan origination, including flood zone, flood insurance type, flood insurance amount, and site value of the property, and include system checks that prevent endorsement of loans without the required flood insurance.

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[1] HUD Did Not Always Ensure That FHA Lenders Complied with Federal Requirements When Submitting Loans for New Construction Properties Located in FEMA's Designated Special Flood Hazard Areas, Audit Report Number: 2008-CH-0002, Issue Date: September 29, 2008.

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Background and Objective

The Federal Housing Administration (FHA) provides mortgage insurance on loans made by FHA-approved lenders throughout the United States and its territories. FHA mortgage insurance provides lenders with protection against losses as the result of homeowners defaulting on their mortgage loans. The lenders bear less risk because FHA will pay a claim to the lender in the event of a homeowner's default. Loans must meet certain requirements established by FHA to qualify for insurance.

The National Flood Insurance Act of 1968 (Public Law 90-448) established the National Flood Insurance Program (NFIP). The NFIP is a Federal program that enables property owners in participating communities to purchase flood insurance as protection against flood losses, while requiring State and local governments to enforce floodplain management ordinances that aim to reduce future flood damage. More than 22,100 communities in the United States participate in the NFIP, and more than 5.1 million NFIP policies are in force, providing $1.25 trillion in content and building coverage.

The NFIP is managed by the Federal Emergency Management Agency (FEMA). Policies can be obtained from NFIP direct flood insurance or through the NFIP Write Your Own Program. The Write Your Own Program allows participating property and casualty insurance companies to write and service NFIP flood insurance policies in their own names. The Federal Government retains responsibility for underwriting losses. FEMA maintains a database of policy data for NFIP direct policies and policies obtained through the NFIP Write Your Own Program.

The Flood Disaster Protection Act of 1973 (Public Law 93-234) made the purchase of flood insurance mandatory for federally insured loans in special flood hazard areas (SFHA). An SFHA is an area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year. SFHAs are defined on maps issued by FEMA for individual communities. The National Flood Insurance Reform Act of 1994 directed regulated lending institutions not to make, increase, extend, or renew any loan secured by properties in SFHAs without meeting certain conditions. The Act also required development of a "Standard Flood Hazard Determination Form" that identified the type of flood-risk zone in which a property is located.

The Biggert-Waters Insurance Reform Act of 2012 (Public Law 112-141) further amended the Federal flood insurance statutes to encourage private-sector participation. It did not apply to FHA-insured loans but, instead, applied to other types of loans. The Act required that those lenders provide borrowers a notice encouraging them to consider and compare private market flood insurance policies with NFIP policies and to accept such private flood insurance policies as satisfaction of purchase and flood insurance coverage requirements. It additionally stated that acceptance of private flood insurance policies may require verification that insurers meet specific independent rating agency criteria relating to financial solvency, strength, or claims-paying ability, which indicate that the insurers can satisfy claims.

FHA's current rules regarding the requirement to maintain flood insurance coverage on property located in an SFHA do not permit private flood insurance as an option to satisfy the purchase requirement. Regulations at 24 CFR (Code of Federal Regulations) part 203 contain the borrower and lender requirements for flood insurance coverage. To qualify for FHA insurance, properties in an SFHA must be covered by NFIP insurance in an amount equal to either the outstanding balance of the mortgage, less estimated land costs, or the maximum amount of NFIP insurance available, whichever is less.

Our objective was to determine whether FHA insured loans that were not eligible for insurance because they did not have the required flood insurance coverage.

Results of Audit

Finding: FHA Insured $940 Million in Loans for Properties in SFHA Flood Zones Without the Required Flood Insurance

FHA insured loans for properties in SFHA flood zones that did not have the required flood insurance. This condition occurred because FHA did not have adequate controls to detect loans that did not have the required flood insurance. As a result, the FHA insurance fund and borrowers were exposed to greater risk from at least $940 million in loans that did not obtain adequate NFIP coverage.

Loans for Properties Without the Required Flood Insurance

FHA insured loans for properties in SFHA flood zones without the NFIP flood insurance required by Federal regulations.

Federal regulations require NFIP insurance for FHA loans for properties in flood zones known as SFHAs. FHA's Single Family Housing Policy Handbook 4000.1 states that lenders are prohibited from processing a loan for an FHA-insured mortgage for properties in an SFHA flood zone unless NFIP insurance is in place. The handbook also establishes minimum amounts of coverage. (See appendix C.)

FHA insured at least 3,870 loans that closed in 2019, which were not eligible for insurance because they were made for properties in SFHA flood zones without the required NFIP coverage. We compared location data from FHA-insured loans to FEMA flood zones. We identified 28,105 FHA-insured loans that closed in 2019, which appeared to be in areas that required flood insurance. We matched the properties to NFIP flood insurance policy records provided by FEMA to determine whether the required flood insurance appeared to be in place at closing. We identified 15,483 loans that either did not have the required flood policies or had policies that might not meet the minimum amount required by FHA guidance. We reviewed a statistical sample of 125 of these loans and determined that 43 loans in our sample were made for properties in SFHA flood zones that did not have sufficient flood insurance. These loans included 33 loans that had private flood insurance instead of the required NFIP coverage. Because FHA does not allow private flood insurance and has not issued any guidance for private policies, we did not have standards available to test these private policies for sufficiency of the provider, policy terms, or coverage amounts. Nine loans had an NFIP policy that did not meet the coverage minimum, including one loan that had a private policy in addition to the NFIP policy. Another loan did not have a flood insurance policy in place when the loan was closed or endorsed. (See appendix D.) We used these results to project the total number and value of ineligible loans insured by FHA. (See appendix E.)

Controls Lacking To Ensure Adequate Flood Insurance

FHA did not have adequate controls to detect loans that did not have the required flood insurance.

FHA did not require underwriters to enter information into HUD systems to show compliance with Federal flood insurance regulations. Underwriters did not enter information into FHA's system regarding whether an NFIP flood insurance policy was obtained or the coverage amount. They also did not enter the flood zone or the site value, both of which would be needed to determine whether insurance was required and if so, the minimum coverage amount. All of this information could be entered from documents within the case binder. The flood zone determination is on the Standard Flood Hazard Determination Form, the site value is on the appraisal, and the insurance type and coverage amount are on the insurance policy documents.

FHA also did not have a control to prevent endorsement of loans that did not comply with the flood insurance requirement. As discussed above, FHA did not have flood insurance information entered into its databases by underwriters. Additionally, FHA did not have an interface established with FEMA to verify whether NFIP policies existed for FHA-insured properties. Because flood insurance information was not in HUD databases, loan file review was required to detect loans with inadequate NFIP flood insurance. However, FHA's postendorsement underwriting reviews were unlikely to detect most flood insurance issues because only 3 to 4 percent of loans were selected for review, while less than 1 percent of the total loans closed in 2019 had flood insurance issues. If HUD had underwriters enter the necessary data into its system, edit checks would be the most practical way to address this issue.

Risk From Ineligible Loans

The FHA insurance fund and borrowers were exposed to greater risk from at least $940 million in loans that did not have adequate NFIP coverage.

The FHA insurance fund was exposed to greater risk because loans worth $940 million, which were not eligible for insurance coverage, were included in the FHA portfolio. The inclusion of these loans in FHA's portfolio negatively impacted FHA's achievement of Office of Management and Budget policies for Federal credit programs. Each department has a responsibility to make every effort to effectively target Federal assistance and mitigate risk by ensuring that lenders and servicers participating in Federal credit programs meet all applicable financial and programmatic requirements.

Borrowers with private flood insurance might be exposed to additional risks. Private insurance might not include guaranteed renewal, rates might increase dramatically, and the policies might include coverage limitations. While private insurance can be tailored to meet or exceed the NFIP standards, that cannot be assumed for private policies acquired without FHA guidance and oversight.

Conclusion

FHA improperly insured loans for properties in SFHA flood zones without the required NFIP insurance. This condition occurred because FHA did not have information in its system that would be needed to identify flood insurance issues, making it unable to prevent endorsement of ineligible loans. HUD would be able to detect and mitigate this issue during review of loan files, but because more than 96 percent of the loan files were not reviewed by HUD, the lack of the required flood insurance was often not detected. By implementing our recommendations, HUD will be able to identify the lack of flood insurance and avoid insuring at least $940 million in ineligible loans each year. The potential loss on these loans is $432.6 million, based on the FHA insurance fund average loss rate of 46 percent as of June 30, 2020.

Recommendations

We recommend that the Deputy Assistant Secretary for Single Family Housing

1A. Require lenders to provide evidence of sufficient flood insurance or execute indemnification agreements for the 43 loans in our statistical sample that did not have sufficient flood insurance at the time of our audit to put nearly $5.2 million to better use. (See appendix A)

1B. Add to FHA databases the information necessary to ensure that the required flood insurance is in place at loan origination, including flood zone, flood insurance type, flood insurance amount, and site value of the property, and include system checks that prevent endorsement of loans without the required flood insurance to put at least $432.6 million to better use by avoiding potential future costs to the FHA insurance fund.

Scope and Methodology

We performed our audit work between April 2019 and August 2020. We did not conduct onsite fieldwork for this audit. Our audit period covered January 1 through December 31, 2019.

To accomplish our objective, we

- reviewed relevant HUD requirements;
- interviewed HUD staff to gain an understanding of relevant monitoring controls;
- selected and reviewed a statistical sample of loans to determine compliance with FHA flood insurance requirements; and
- reviewed records provided by FHA lenders, including standard flood hazard determination forms, property appraisals, and evidence of flood insurance at the time of closing.

We relied in part on data maintained by HUD in its Single Family Data Warehouse (SFDW) system. SFDW is a large and extensive collection of database tables, organized and dedicated to support the analysis, verification, and publication of single-family housing data. Specifically, we relied on the system to identify loans that closed during our audit period and the amount of the loans and used location data, such as property address and latitude-longitude coordinates. We also relied in part on data maintained by FEMA on NFIP flood insurance policies, including property data, borrower names, policy effective dates, and coverage amounts. Although we did not perform a detailed assessment of the reliability of the data, we determined that the computer-processed data were sufficiently reliable for our purposes because we verified the data with documentation provided by lenders in our sample.

Using data from SFDW, we identified an audit universe of 924,344 single-family FHA loans that closed during calendar year 2019. This universe included both forward and reverse loans but excluded streamline refinance loans because the same underwriting requirements do not apply to these loans. We used the Environmental Systems Research Institute's ArcMap desktop tool to overlay the FEMA National Flood Hazard Layer geographic information system data as of October 1, 2018, against the universe of FHA loans to identify properties from the FHA loan universe located in areas that require flood insurance. This process resulted in a universe of 28,105 loans. We compared the loans that require flood insurance based on their geospatial location to flood insurance policy records provided by FEMA to determine whether flood insurance was in place at closing. This process identified 15,483 loans with mortgage amounts totaling $3.5 billion that either appeared not to have the required flood policies or appeared to not meet the minimum coverage amount required by FHA guidance.

To project the results of our review to the audit universe, we selected a statistical sample of 125 loans as described in appendix E. We used FEMA flood maps (including revisions, amendments, and revalidations) to verify that 35 of our 125 sampled loans were not in the SFHA. We contacted 56 lenders that underwrote the remaining 90 loans to obtain documentation related to the special flood hazard determination, property values, and flood insurance in effect at the time of closing. We evaluated the information provided to determine whether the loans met the FHA underwriting requirements related to flood insurance.

We conducted the audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective(s). We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Internal Controls

Internal control is a process adopted by those charged with governance and management, designed to provide reasonable assurance about the achievement of the organization's mission, goals, and objectives with regard to

- effectiveness and efficiency of operations,
- reliability of financial reporting, and
- compliance with applicable laws and regulations.

Internal controls comprise the plans, policies, methods, and procedures used to meet the organization's mission, goals, and objectives. Internal controls include the processes and procedures for planning, organizing, directing, and controlling program operations as well as the systems for measuring, reporting, and monitoring program performance.

Relevant Internal Controls

We determined that the following internal controls were relevant to our audit objective:

- Policies to prevent FHA insurance of properties in flood zones without the required NFIP coverage and systems to monitor program compliance.

We assessed the relevant controls identified above.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, the reasonable opportunity to prevent, detect, or correct (1) impairments to effectiveness or efficiency of operations, (2) misstatements in financial or performance information, or (3) violations of laws and regulations on a timely basis.

Significant Deficiency

Based on our review, we believe that the following item is a significant deficiency:

- FHA did not require underwriters to enter information into HUD systems to show compliance with Federal flood insurance regulations, and FHA did not have a control to prevent endorsement of loans that did not comply with the flood insurance requirement. (See the finding.)

Appendixes

Appendix A

Schedule of Funds To Be Put to Better Use

Recommendation number	Funds to be put to better use 1/
1A	$ 5,198,090
1B	432,637,444
Totals	**437,835,534**

1/ Recommendations that funds be put to better use are estimates of amounts that could be used more efficiently if an Office of Inspector General (OIG) recommendation is implemented. These amounts include reductions in outlays, deobligation of funds, withdrawal of interest, costs not incurred by implementing recommended improvements, avoidance of unnecessary expenditures noted in preaward reviews, and any other savings that are specifically identified. In this case, if HUD implements our recommendations, it will no longer provide FHA insurance for properties in SFHA flood zones without the NFIP flood insurance required by Federal regulations. Requiring corrective action for ineligible loans identified in our sample will reduce the risk of loss to the FHA insurance fund. The amount for 1A reflects that upon sale of the mortgaged property, FHA's average loss experience is about 46 percent, based on statistics provided by HUD ($11,300,196 x .46 = $5,198,090). In addition, improving controls to prevent insuring additional ineligible loans will reduce the risk of loss to the FHA insurance fund. The amount for 1B reflects that upon sale of the mortgaged property, FHA's average loss experience is about 46 percent, based on statistics provided by HUD ($940,516,183 x .46 = $432,637,444). When FHA improves its controls, this will be a recurring benefit. Our estimate reflects only the initial year of this benefit, which we believe will be similar to the 2019 results because FHA activity is stable. These amounts do not include potential offsetting costs to implement our recommendation to revise controls.

Appendix B

Auditee Comments

The Office of Single Family Housing chose not to provide any comments to include in the final report.

Appendix C

Criteria

24 CFR part 203
Single Family Mortgage Insurance Subpart A—Eligibility Requirements and Underwriting Procedures
§203.16a Mortgagor and mortgagee requirement for maintaining flood insurance coverage.

(a) If the mortgage is to cover property improvements (dwelling and related structures/equipment essential to the value of the property and subject to flood damage) that:

(1) Are located in an area designated by the Federal Emergency Management Agency (FEMA) as a floodplain area having special flood hazards, or

(2) Are otherwise determined by the Commissioner to be subject to a flood hazard, and if flood insurance under the National Flood Insurance Program (NFIP) is available with respect to these property improvements, the mortgagor [borrower] and mortgagee [lender] shall be obligated, by a special condition to be included in the mortgage commitment, to obtain and to maintain NFIP flood insurance coverage on the property improvements during such time as the mortgage is insured.

(b) No mortgage may be insured that covers property improvements located in an area that has been identified by FEMA as an area having special flood hazards, unless the community in which the area is situated is participating in the National Flood Insurance Program and such insurance is obtained by the mortgagor. Such requirement for flood insurance shall be effective one year after the date of notification by FEMA to the chief executive officer of a flood prone community that such community has been identified as having special flood hazards.

(c) The flood insurance must be maintained during such time as the mortgage is insured in an amount at least equal to either the outstanding balance of the mortgage, less estimated land costs, or the maximum amount of the NFIP insurance available with respect to the property improvements, whichever is less.

Handbook 4000.1, FHA Single Family Housing Policy Handbook
II. Origination Through Post-Closing/Endorsement
A. Title II Insured Housing Programs Forward Mortgages
1. Origination/Processing iv. Property Eligibility and Acceptability Criteria
(A) General Property Eligibility

(1) Special Flood Hazard Areas
The Mortgagee must determine if a property is located in a Special Flood Hazard Area (SFHA) as designated by the Federal Emergency Management Agency (FEMA). The Mortgagee must obtain flood zone determination services, independent of any assessment made by the Appraiser to cover the Life of the Loan Flood Certification.

A property is not eligible for FHA insurance if:

- A residential building and related improvements to the Property are located within SFHA Zone A, a Special Flood Zone Area, or Zone V, a Coastal Area, and insurance under the National Flood Insurance Program (NFIP) is not available in the community; or

- The improvements are, or are proposed to be located within a Coastal Barrier Resource System (CBRS).

(e) Required Flood Insurance Amount
For Properties located within an SFHA, flood insurance must be maintained for the life of the Mortgage in an amount at least equal to the lessor of:

- the outstanding balance of the Mortgage, less estimated land costs; or
- the maximum amount of the NFIP insurance available with respect to the property improvements.

Handbook 4235.1, Home Equity Conversion Mortgages Handbook
3-4. Eligible Properties
H. Requirements for maintaining flood insurance coverage

1) Flood insurance requirements must be met if the mortgage is to cover property that:
    a. Is located in an area designated by the Federal Emergency Management Agency (FEMA) as a flood plain area having special flood hazards, or
    b. Is otherwise determined by the Commissioner to be subject to a flood hazard.

2) No mortgage may be insured on such a property unless:
    a. The community in which the area is situated is participating in the National Flood Insurance Program (NFIP), and
    b. Such insurance is obtained by the mortgagor.

3) The requirement for flood insurance shall be effective July 1, 1975, or one year after the date of notification by FEMA to the chief executive officer of a flood prone community that such community has been identified as having special flood hazards, whichever is later.

4) The flood insurance shall be maintained during such time as the mortgage is insured, in an amount at least equal to either the outstanding balance of the mortgage, or the maximum amount of NFIP insurance available with respect to the property, whichever is less.

Federal Housing Administration – Frequently Asked Question
https://www.hud.gov/FHAFAQ

Can I purchase private flood insurance instead of an NFIP policy?

No, private flood insurance will not satisfy FHA's National Flood Insurance Program (NFIP) flood insurance coverage requirement. The Department of Treasury published a final rule, effective July 1, 2019, that allows their regulated lending institutions to accept private flood insurance in lieu of an NFIP policy; however, this does not change FHA regulations.

Flood insurance coverage exceeding FHA's NFIP flood insurance coverage requirement can be obtained.

If FHA decides to make any changes to policy in this regard, any proposed or final rulemaking will be published in the Federal Register with an opportunity for public comment.

Appendix D

Exception Summary

Exception number	Case number	Deficiency description	Mortgage amount
1	093-9391XXX	Private policy	$127,546
2	095-4927XXX	Insufficient coverage	250,381
3	352-9597XXX	Insufficient coverage	237,616
4	095-5137XXX	Insufficient coverage	270,019
5	095-4954XXX	Insufficient coverage	338,751
6	095-4992XXX	Insufficient coverage	361,334
7	049-0911XXX	Private policy	482,106
8	251-6393XXX	Private policy	400,610
9	331-1879XXX	Private policy	73,260
10	332-6956XXX	Insufficient coverage	116,758
11	483-6104XXX	Private policy	121,082
12	413-7192XXX	Private policy	129,609
13	138-0306XXX	Private policy	133,536
14	093-9524XXX	Private policy	232,707
15	512-3405XXX	Private policy	211,105
16	352-9558XXX	Private policy	206,552
17	194-0789XXX	Insufficient coverage	325,600
18	095-5143XXX	Private policy	263,125
19	093-9631XXX	Private policy	285,154
20	387-4302XXX	Private policy	289,656
21	352-9413XXX	Private policy	265,109
22	352-9347XXX	Private policy	333,841

Exception number	Case number	Deficiency description	Mortgage amount
23	251-6509XXX	Private policy	297,511
24	566-2851XXX	Private policy	281,084
25	483-6151XXX	Private policy	368,383
26	351-7567XXX	Private policy	397,172
27	431-6977XXX	Private policy	350,000
28	044-5947XXX	Private policy	451,668
29	049-1105XXX	Private policy	466,396
30	251-6520XXX	Private policy	508,373
31	262-2420XXX	No policy at closing	47,135
32	512-3303XXX	Private policy	93,957
33	544-2207XXX	Private policy	79,321
34	093-9609XXX	Private policy	144,337
35	201-6409XXX	Private policy	130,001
36	513-1503XXX	Private policy	113,095
37	372-5249XXX	Private policy	156,593
38	451-1692XXX	Insufficient coverage	185,576
39	095-5157XXX	Insufficient coverage and private policy	243,508
40	045-9322XXX	Private policy	276,760
41	194-0852XXX	Private policy	340,714
42	198-1341XXX	Private policy	363,298
43	374-8271XXX	Private policy	549,857
Total (see appendix A for funds to be put to better use calculation)			**11,300,196**

Appendix E

Sampling and Projections

Our audit sampling objective was to determine whether FHA insured loans on properties in SFHAs that did not have the required flood insurance. Our audit universe contained 15,483 FHA-insured loans valued at just under $3.5 billion, which appeared to lie within a flood plain and were, therefore, at risk of needing flood insurance while failing to meet underwriting requirements. These potentially at-risk loans fell into three areas of risk: (1) 10,778 loans that could not be matched to NFIP flood insurance data, (2) 3,390 loans that appeared to have insufficient NFIP coverage, and (3) 1,315 loans on addresses with prior NFIP insurance but no coverage at the time of the loan. No loans were omitted from the universe as statistical outliers.

To develop this universe, we took data from SFDW for FHA loans closed during calendar year 2019, selected for loans with geocoordinates that appeared to lie within digital maps of flood plains, and merged these data by address with NFIP data.

To control for variance, we stratified on each of the three risk areas as well as the loan amount. Within each area of risk, we sorted and ranked loans by dollar value for a total of 21 strata.

We validated the sample design using replicated sampling (computer simulations) across several audit scenarios. A sample size of 125 was found to be sufficient.[i]

Sample design

Stratum	Lower bound	Universe	Samples	Weights
Insuff_NFIP_0-10pct	0	328	3	109.33
Insuff_NFIP_10-30pct	152,192	689	4	172.25
Insuff_NFIP_30-50pct	219,861	674	3	224.67
Insuff_NFIP_50-70pct	260,200	670	3	223.33
Insuff_NFIP_70-90pct	294,566	662	3	220.67
Insuff_NFIP_90-95pct	343,660	183	3	61.000
Insuff_NFIP_95-100pct	362,738	184	4	46.000
No_NFIP_0-10pct	0	1,075	5	215.00
No_NFIP_10-30pct	99,715	2,158	11	196.18
No_NFIP_30-50pct	151,455	2,154	10	215.40
No_NFIP_50-70pct	196,278	2,157	13	165.92
No_NFIP_70-90pct	253,365	2,153	20	107.65
No_NFIP_90-95pct	345,624	542	3	180.67
No_NFIP_95-100pct	422,694	539	19	28.368
Prev_NFIP_0-10pct	0	126	3	42.000
Prev_NFIP_10-30pct	108,007	268	3	89.333
Prev_NFIP_30-50pct	156,593	263	3	87.667
Prev_NFIP_50-70pct	201,286	262	3	87.333
Prev_NFIP_70-90pct	262,163	264	3	88.000
Prev_NFIP_90-95pct	360,352	66	3	22.000
Prev_NFIP_95-100pct	441,849	66	3	22.000
Totals		15,483	125	

Based on the design, we selected a statistical sample using the surveyselect procedure in SAS®, a widely used statistical software package. Using the selected sample, the audit team acquired records from the relevant loan servicers. The audit team determined whether the NFIP insurance did, in fact, cover the residence or – in some cases – was sufficient to give the required coverage amount. In cases without sufficient NFIP coverage, the sample item was recorded as an exception, and the original amount of the mortgage was recorded as funds leant, which could have been put to better use.

Percentages, counts, and average dollar amounts were estimated and projected to the universe as a whole. Because all randomly selected samples are subject to "luck of the draw," we calculated a margin of error for each type of measure and made a final projection on that basis. This calculation was done by computing the mean and standard error of the percentages and dollar amounts using the counts estimating procedures (surveyfreq) and means estimating procedure (surveymeans) in SAS. Variances were calculated using a Taylor series. We used the traditional formulas (Cochran 1977, Wayne W. Daniel 1983) for estimating the lower bounds (LCL) of counts and dollar amounts as noted below:

$$\mathrm{Count}_{\mathrm{LCL}} = \mathrm{N}\,(\mathrm{pct} - t_{\alpha/2}\,\mathrm{SE}_{\%})$$
$$\mathrm{Amount}_{\mathrm{LCL}} = \mathrm{N}(\mu - t_{\alpha/2}\,\mathrm{SE}_{\$})$$

In auditing the 125 mortgages with a risk of flood insurance deficiencies, we found no allowable policies or insufficient coverage in 43 of the 125 loans in our sample. Applied to the 15,483 loans in our universe, we can say the following things with a one-sided confidence interval of 95 percent:

HUD loaned significant amounts of funds on properties that were not sufficiently insured for their flood risk.

Even after deducting a margin of error, we can say that HUD loaned at least $940 million for mortgages that proved to have a flood risk but were not properly insured with NFIP insurance. These problems affected at least 3,870 loans located within our population of at-risk loans.

Calculations below:

(32.41% - 1.66 X 4.44%) x N = 25% x N ≈ 3,870 insufficiently covered loans
(77944.4 - 1.66 X 10363.3) x N = 60741.3 x N ≈ $940,000,000 in affected loans

Given that our sample period covered an entire year, we can say that these findings represent $940 million per year in FHA loans.

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i This sample size was found to be reliable and unbiased and to avoid false overestimates in conditions in which the audit exception rate found equaled or exceeded 10 percent.