

Flood Insurance: How Deep is the Risk?

Casualty Loss Reserve Seminar

Tuesday, September 16, 2014: 12:30pm



Flood Insurance: How Deep is the Risk?

- Stuart Mathewson, FCAS, MAAA, CPCU
 - The NFIP, Biggert-Waters and the Future
- Donald Griffin, CPCU, ARC, ARe, ARM, AU
 - The Politics of Flood Insurance
- Matt Chamberlain, FCAS, MAAA
 - Private Flood Insurance



Flood Insurance – How Deep is the Risk?

The NFIP, Biggert–Waters and the Future

CLRS Meeting
September 16, 2014

Stuart Mathewson, FCAS, MAAA, CPCU
Sr. Property Actuary, Swiss Re
Former Chair, AAA Flood Subcommittee

Agenda

- National Flood Insurance Program (NFIP)
 - Reasons for a Federal Solution
 - Congressional Actions since 1968
 - NFIP Rating
 - Key Points of the NFIP
- AAA Involvement
- Biggert–Waters Act of 2012
- Issues From Biggert– Waters
- Questions and Answers



Flood Insurance – National Flood Insurance Program (NFIP)

- Property insurers determined long ago that flood was not insurable
- In 1968, Congress passed act to establish NFIP
- By 1973, most communities were up and running
- Some key points
 - Flood insurance available only in communities that established mandated controls
 - Buildings built before establishment of flood maps were charged subsidized rates
 - Program needs to be re-authorized periodically
 - Later laws mandated insurance for properties with federally insured mortgages

NFIP History

- ▶ Flood Disaster Protection Act of 1973
 - mandatory purchase for property owners in Special Flood Hazard Areas (SFHA's) for some property owners
 - provision for grandfathering of rates for structures built in flood-hazard areas before those areas were defined
 - federally regulated lending institutions cannot make a loan on a property in an SFHA without flood insurance
- ▶ Through the 1970's subsidized rates were lowered several times to encourage participation



NFIP History

- ▶ 1990 – Community Rating System (CRS) created
 - CRS was voluntary program to encourage NFIP communities to implement flood prevention and flood plain management practices beyond NFIP minimums
 - flood insurance rates were adjusted to reflect the reduced flood risk



NFIP History

- ▶ National Flood Insurance Reform Act of 1994
 - expanded requirements for lenders
 - codified the CRS
 - increased maximum amounts available
 - requirement to review and assess every five years the need to update Flood Insurance Rate Maps (FIRM's)
 - required an actuarial study of the effect of charging actuarial rates for pre-FIRM structures
 - prohibited disaster assistance to individuals in an SFHA who had previous assistance, but did not maintain insurance



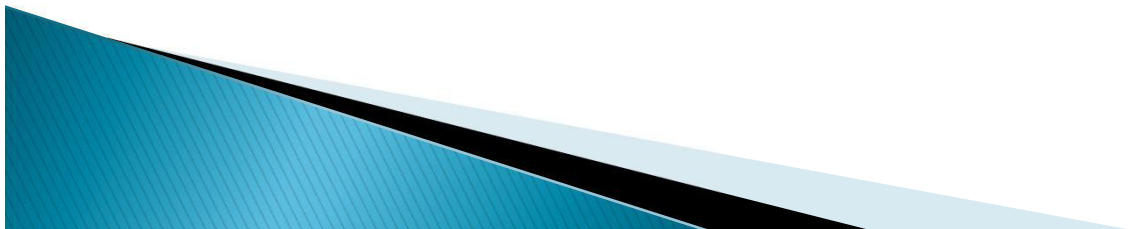
NFIP History

- ▶ Bunning–Bereuter–Blumenauer Flood Insurance Reform Act of 2004
 - addressed repetitive loss properties
 - reauthorized program until September 30, 2008



NFIP Goals and Role

- ▶ Three foundations
 - Flood risk identification
 - Flood plain management
 - Flood insurance
- ▶ Additional long-term goal: reduce demand for and reliance on disaster assistance after floods
- ▶ Partnership with private sector insurers and servicing contractors
- ▶ Encouragement of participation – at times at the expense of rate adequacy



NFIP Structure and Administration

- ▶ Structure

- U. S. Dept of Homeland Security

- FEMA

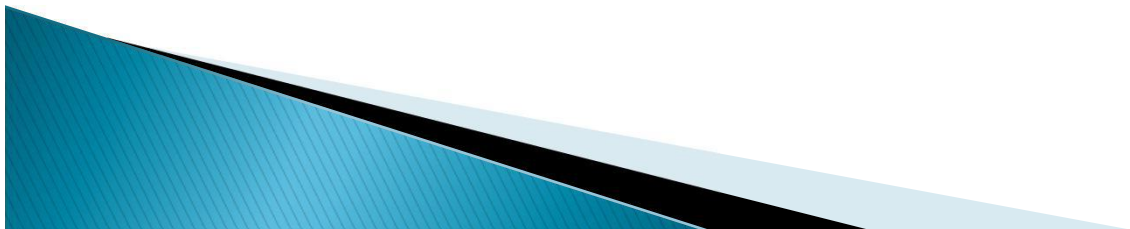
- Federal Insurance & Mitigation Administration

- NFIP

- ▶ Administration issues

- Sunset provisions

- Periodic need to borrow from the U.S. Treasury



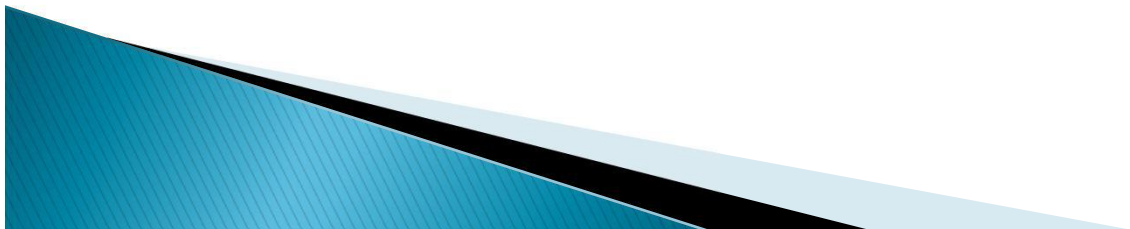
NFIP Structure and Administration

- ▶ Administration issues
 - Write-your-own (WYO) companies
 - Began in 1983
 - Large majority of policies
 - Until fairly recently, almost 90%
 - Goals
 - Increase NFIP policy base
 - Improve service
 - Provide insurance industry direct operating experience



NFIP Structure and Administration

- ▶ Administration issues
 - Write-your-own (WYO) companies
 - WYO company writes on its paper
 - Follows federal rules and regulations for distribution and underwriting, and handles claims
 - Essentially fiscal agents of federal government
 - Expenses are reimbursed – too much or too little?
 - Direct program
 - Through the NFIP Servicing Agent



Flood Insurance – National Flood Insurance Program (NFIP)

- Full-risk ("actuarial") rates vs Subsidized rates
 - Full-risk
 - Loss costs based on hydrological model
 - Loss + LAE = 63.3 % of premium
 - If losses follow historical average of 43.8%, there will be a 10% contribution to Debt/Surplus and 6.7% repayment of interest on debt
 - Expenses
 - WYO Allowance = 27.4%
 - Other operating expenses = 9.1%
 - Target Level Premium – total premiums balanced to long term loss experience
 - 78.5% of policies per 2011 rate review

Flood Insurance – National Flood Insurance Program (NFIP)

- Full-risk ("actuarial") rates vs Subsidized rates (cont.)
 - Subsidized
 - Pre-FIRM structures ~pre 1975
 - Special post-FIRM Classes
 - In zone A99, but structural measures to protect are at least 50% completed
 - Zone AR – structural measures have been decertified, but restoration is scheduled
 - V zones – 1975 – structures built for flood, but not waves
 - Subsidies as much as 50%+
 - 21.5% of policies per 2011 rate review



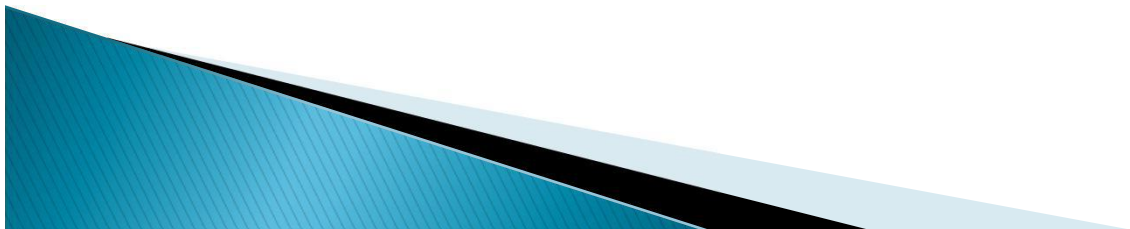
Flood Insurance – National Flood Insurance Program (NFIP)

- Annual Actuarial Rate Review
 - In Support of the Recommended Rate and Rule Changes
 - Very good source for background information on NFIP as well as the details of the rate review
 - Latest on web is October 2011



Flood Insurance – National Flood Insurance Program (NFIP)

- Financial Strength
 - Intent is that program be self sufficient
 - In years that losses and expenses exceed premiums, NFIP can borrow from Treasury
 - Until 2005, borrowing limit was \$1.5b
 - After Katrina, limit was raised to \$21b
 - After Sandy, limit was raised to \$30b
 - Current debt is \$24b
 - Current annual premiums about \$3.5b



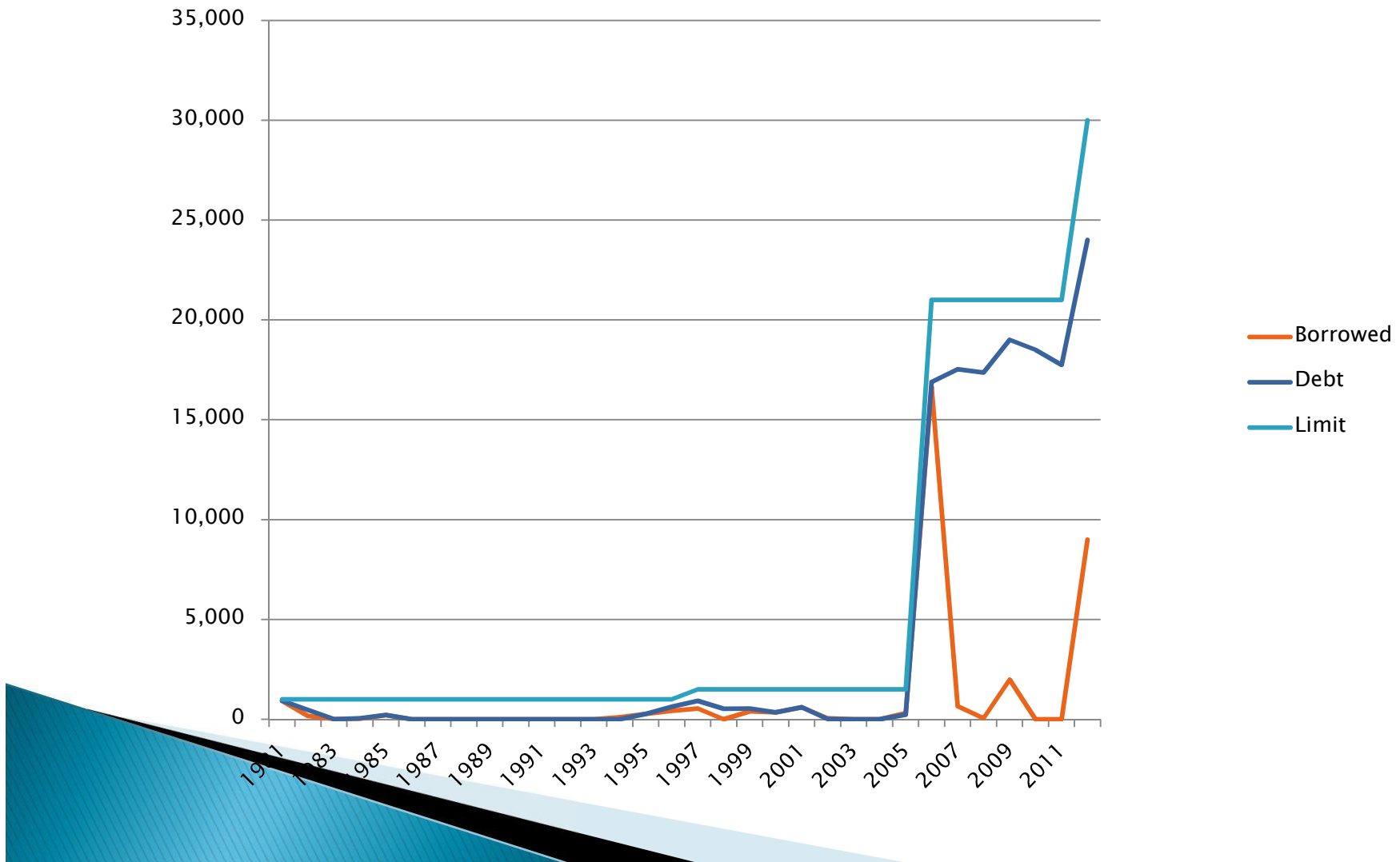
Flood Insurance – National Flood Insurance Program (NFIP)

20 Largest NFIP Losses

Rank	Event	Date	Loss (\$b)
1	Hurricane Katrina	Aug. 2005	16,265
2	Sandy	Oct. 2012	8,000
3	Hurricane Ike	Sept. 2008	2,664
4	Hurricane Ivan	Sept. 2004	590
5	Hurricane Irene	Aug. 2011	1,302
6	Tropical Storm Allison	Jun. 2001	1,104
7	Louisiana Flood	May 1995	585
8	Hurricane Isabel	Sept. 2003	493
9	Hurricane Rita	Sept. 2005	473
10	Hurricane Floyd	Sept. 1999	462
11	Tropical Storm Lee	Sept. 2011	442
12	Hurricane Opal	Oct. 1995	406
13	Tropical Storm Isaac	Aug. 2012	407
14	Hurricane Hugo	Sept. 1989	376
15	Hurricane Wilma	Oct. 2005	365
16	Nor'Easter	Dec. 1992	346
17	Midwest Flood	Jun. 1993	273
18	PA, NJ, NY Floods	Jun. 2006	229
19	Torrential Rain – TN	Apr. 2010	228
20	Nor'Easter	Apr. 2007	226

Flood Insurance - National Flood Insurance Program (NFIP)

Borrowing and Debt

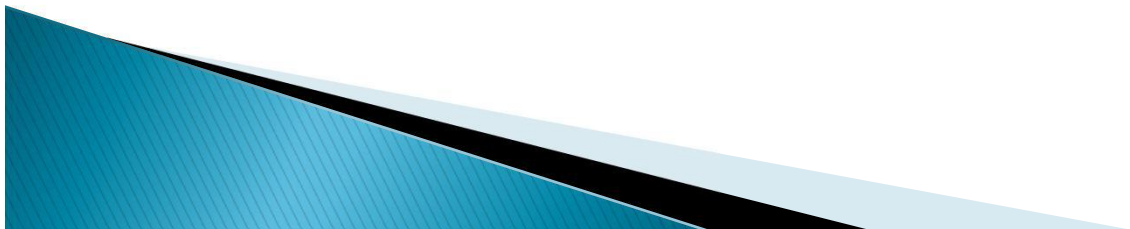


AAA involvement

- ▶ Previous Flood authorization expired in 2008
- ▶ AAA Extreme Events Committee started work on paper to address flood issue
- ▶ Congress took 4 years – and numerous short-term authorizations to pass new law
- ▶ *The National Flood Insurance Program: Past, Present...and Future? – 2011*
 - Purpose was to educate on the Flood program to aid in the public discourse
 - Primary audiences
 - Actuaries
 - Decision makers

AAA involvement

- ▶ Written testimony to Congress (June 2011)
- ▶ Capitol Hill briefing on monograph (July 2011)
- ▶ Comment letters and written testimony to Congress when deliberations were ongoing (e.g., 6/28/12)
- ▶ Presentations to NCOIL and NAIC (2011, 2012, 2014)
- ▶ Discussions with GAO (2013, 2014)
- ▶ Comment letter on Grimm–Waters (1/24/14)



Biggert–Waters Flood Insurance Reform and Modernization Act of 2012

- ▶ Phases out subsidies for second homes, businesses and severe repetitive loss properties (25%/year)
- ▶ Any policy for property not currently covered must pay "actuarial" rates
- ▶ Major increases for properties where mapping has changed the risk
- ▶ Raises cap on annual increases from 10 to 20%
- ▶ Sets up reserve fund
- ▶ Requires NFIP to set up a schedule to repay debt
- ▶ Requires several studies by GAO, Treasury and others

Some Issues from Biggert–Waters

- Privatization
 - Why was flood deemed uninsurable?
 - Only those who would often get flooded were interested in buying it
 - Premium for those properties alone would be prohibitive
 - Small premium base wouldn't support catastrophic potential

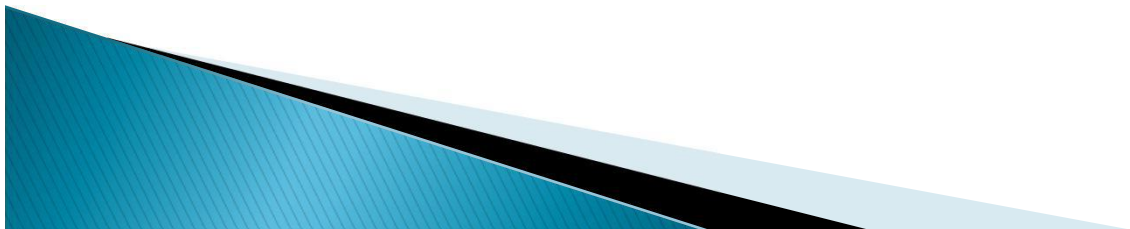


Some Issues from Biggert–Waters

- Privatization
 - Do past issues still exist?
 - Current situation
 - No one stepping in to profit from this niche
 - Some companies offer excess coverage on high valued properties
 - Large commercial properties usually covered in all-risk policies
 - Few buy NFIP insurance unless forced
 - And, enforcement not consistent when mandated
 - Can new technologies help?
 - Wharton/CoreLogic Study
 - *A Methodological Approach for Pricing Flood Insurance & Evaluating Loss Reduction Measures: Application to Texas*

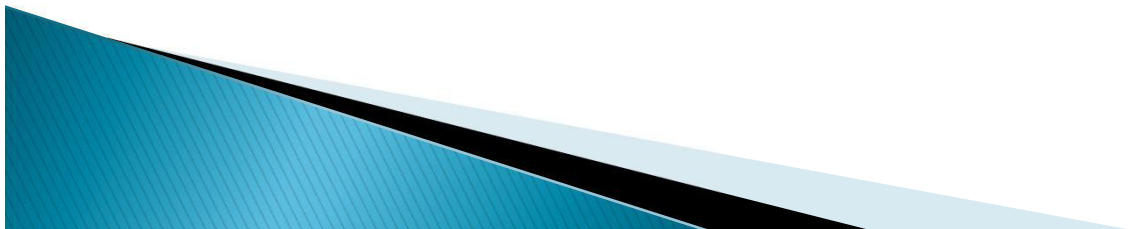
Some Issues from Biggert–Waters

- Privatization
 - Can it be properly rated? And would those rates be sustainable in the market?
 - Expected Losses can be estimated by models
 - Much more granular rating than NFIP
 - NFIP has no capital requirements – therefore, no capital cost load – private companies would need a significant load
 - An estimate has been made that rates would have to be roughly doubled if written privately
 - Can it develop a broad base?
 - Without a mandate, it's hard to foresee increase in take-up rates



Some Issues from Biggert–Waters

- Reinsurance and Capital Markets
 - Can these mechanisms be used to support the NFIP?
 - At current rate levels, there is little premium to cover the cost of private reinsurers
 - Could Federal government act as reinsurer instead of simply a lender?
 - One idea – Federal government pays for private market reinsurance
 - Would provide a stable expense for the government
 - Private/Public partnership in vogue now for some
 - Politically viable?



Some Issues from Biggert–Waters

- Reinsurance and Capital Markets
 - Can these mechanisms be used to support a private market?
 - This could be a key piece of privatization – but requires enough premium to pay for the reinsurance



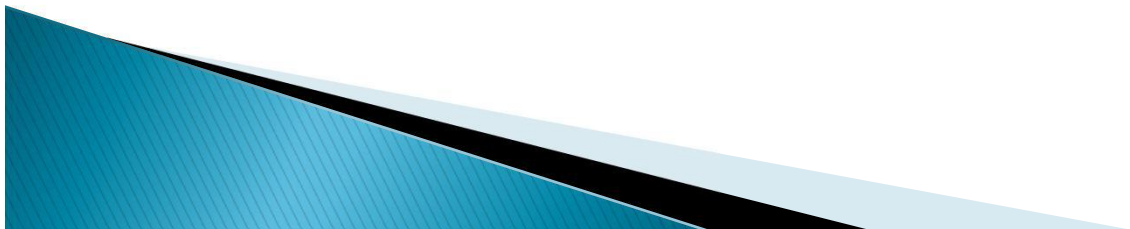
Some Issues from Biggert–Waters

- Should the Debt be Forgiven?
 - At current rate levels, it would take decades to repay debt – even without further major occurrences
 - After Katrina, about \$20B
 - After Sandy, authority up to \$30B
 - Biggert–Waters requires FEMA to create a repayment schedule
 - Must submit to Congress a report on options to eliminate debt in 10 years



Some Issues from Biggert–Waters

- Should the Debt be Forgiven?
 - Reserve
 - Required by Biggert–Waters
 - 1% of "total loss potential" in force
 - Fund at 7.5% of reserve ratio until capitalized
 - If NFIP unable to make the minimum contribution, it must report this to Congress
 - How is this to be paid for?





Flood Insurance: How Deep is the Risk?

The Politics of Flood Insurance
CLRS Meeting – September 16, 2014

Donald L. Griffin, CPCU, ARC, ARe, ARM, AU
Vice President, Personal Lines
Property Casualty Insurers Association of America
donald.griffin@pciaa.net

HFIAA – *aka* Grimm-Waters 14

- Homeowner Flood Insurance Affordability Act
 - Enacted March 21, 2014
 - Scaled back Biggert-Waters (BW-12)
 - PCI chairs WYO Flood Insurance Coalition
 - Negotiated acceptable House bill
 - Under PCI/Congressional pressure, FEMA has actively engaged WYOs & PCI on implementation
 - Implementation much smoother than BW-12

Summary of HFIAA

- Slows flood insurance rate increases
- Installment payments still an issue
- Funded by surcharges on all flood policies
- Creates flood advocate

→ The legislative push/pull on flood reforms and fiscal responsibility will continue



Property Casualty Insurers
Association of America

Advocacy. Leadership. Results.

Implementation Progress

- Top priorities
 - Make reforms workable
 - Limit insurer responsibility for refunds
 - Require FEMA coordination with industry
- HFIAA implementation faster and more accurate because of coordination with WYOs



Property Casualty Insurers
Association of America

Advocacy. Leadership. Results.

Implementation Progress

- Good coordination with industry (esp. PCI)
- WYO's will be issuing the refunds contrary to the negotiated deal*
- Timing was pushed up but still workable
 - Refunds begin October 1 and should be complete by December 31, 2014



Property Casualty Insurers
Association of America

Advocacy. Leadership. Results.

Recent Congressional Activity

- Two Senate hearings in July:
 - Sen. Menendez (D-NJ) – Banking Committee hearing related to Superstorm Sandy payments
 - Sen. Landrieu (D-LA) – Implementation of HFIAA
- PCI coordination of 2015 National Flood Insurance Conference (May 17-20)
- NFIP expires end of Sept. 2017



NATIONAL FLOOD CONFERENCE
MAY 17-20, 2015

WASHINGTON, D.C. | CRYSTAL GATEWAY MARRIOTT



Property Casualty Insurers
Association of America
Advocacy. Leadership. Results.





Property Casualty Insurers
Association of America

Advocacy. Leadership. Results.

2017 Reauthorization

- Main issues - Maps and subsidies / affordability
- Private reinsurance?
- Interest in “all-perils” by consumers / regulators?
- Private policies – adverse selection
- Fed / lender issues?

Private Flood Insurance



Flood Insurance: How Deep is the Risk?
2014 Casualty Loss Reserve Seminar
San Diego, California
September 16, 2014

Matt Chamberlain, FCAS,
MAAA
Consulting Actuary
Milliman, Inc.

Storm Surge

- Storm Surge is not a covered peril under standard Homeowners insurance policies and premiums do not contemplate losses arising from storm surge
- It can be difficult to determine the cause of damage after an event, resulting in some non-covered losses being paid
- This risk can be mitigated through underwriting
- Old-fashioned restrictions: distance to tidal water or elevation
- Newer approaches: Minimum Permissible Elevation based on Zip Code and distance-to-tidal-water
- Another option is to offer flood coverage



Examples of Underwriting Rules for Storm Surge (1/2)

EXAMPLE OF OLD RULE:

INELIGIBLE

Any risk within 2,500 feet of the Gulf of Mexico or Atlantic Ocean. Any risk within 1,000 feet of any other large body of water. Any coastal risk located on land with an elevation less than 14 feet above mean high tide

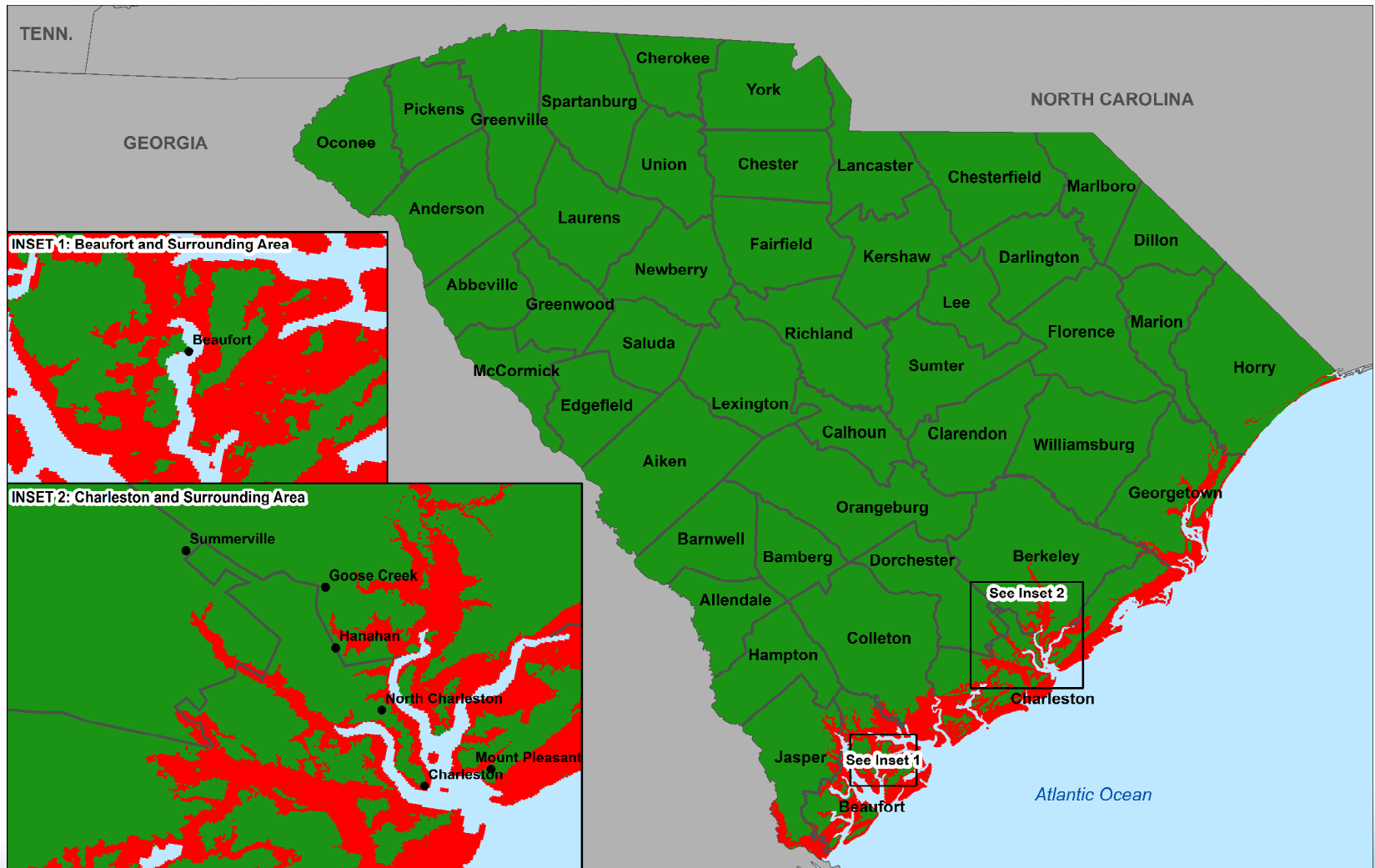
EXAMPLE OF NEW RULE:

Distance to Tidal Water	Minimum Permissible Elevation
Less than 0.05	16
0.05 to 0.06	15
0.06 to 0.08	14
0.08 to 0.12	13
0.12 to 0.16	12
0.16 to 0.22	11
0.22 to 0.30	10
0.30 to 0.40	9
0.40 to 0.55	8
0.55 to 0.76	7
0.76 to 1.04	6

EXAMPLE OF NEW ZIP-CODE BASED RULE:

Zip Code	DISTANCE TO TIDAL WATER									
	<0.025 miles	0.025 to 0.05 miles	0.05 to 0.075 miles	0.075 to 0.1 miles	0.1 to 0.15 miles	0.15 to 0.25 miles	0.25 to 0.5 miles	0.5 to 1 miles	1 to 4 miles	4 to 5 miles
32033	8	7	6	5	4	3	1	0	-1	-2
32034	22	20	19	19	18	16	15	13	12	10
32046	23	21	20	20	18	17	15	14	12	11
32080	19	17	16	16	15	13	12	10	9	7
32081	9	8	7	6	5	4	2	1	0	-1
32082	12	10	9	9	8	6	5	3	2	0
32084	11	9	8	7	6	5	3	2	0	0
32086	10	8	7	7	6	4	3	1	0	-1
32095	12	10	9	8	7	6	4	3	1	0
32118	18	17	16	15	14	13	11	9	8	6
32127	9	8	7	6	5	4	2	0	0	-2

Examples of Underwriting Rules for Storm Surge (2/2)



Managing Storm Surge risk through rating: Flood Insurance

Current Flood Rating:

- Generally subsidized
- Not very granular
- Mostly based on flood zone (VE, A, X, X500...)
- Uses other property characteristics
- Elevation relative to Base Flood Elevation is used in some areas



The other option: pricing for flood

- But is it insurable?
- Coverage already available in some cases
 - Excess
 - Non-admitted
 - Europe
- New opportunity?



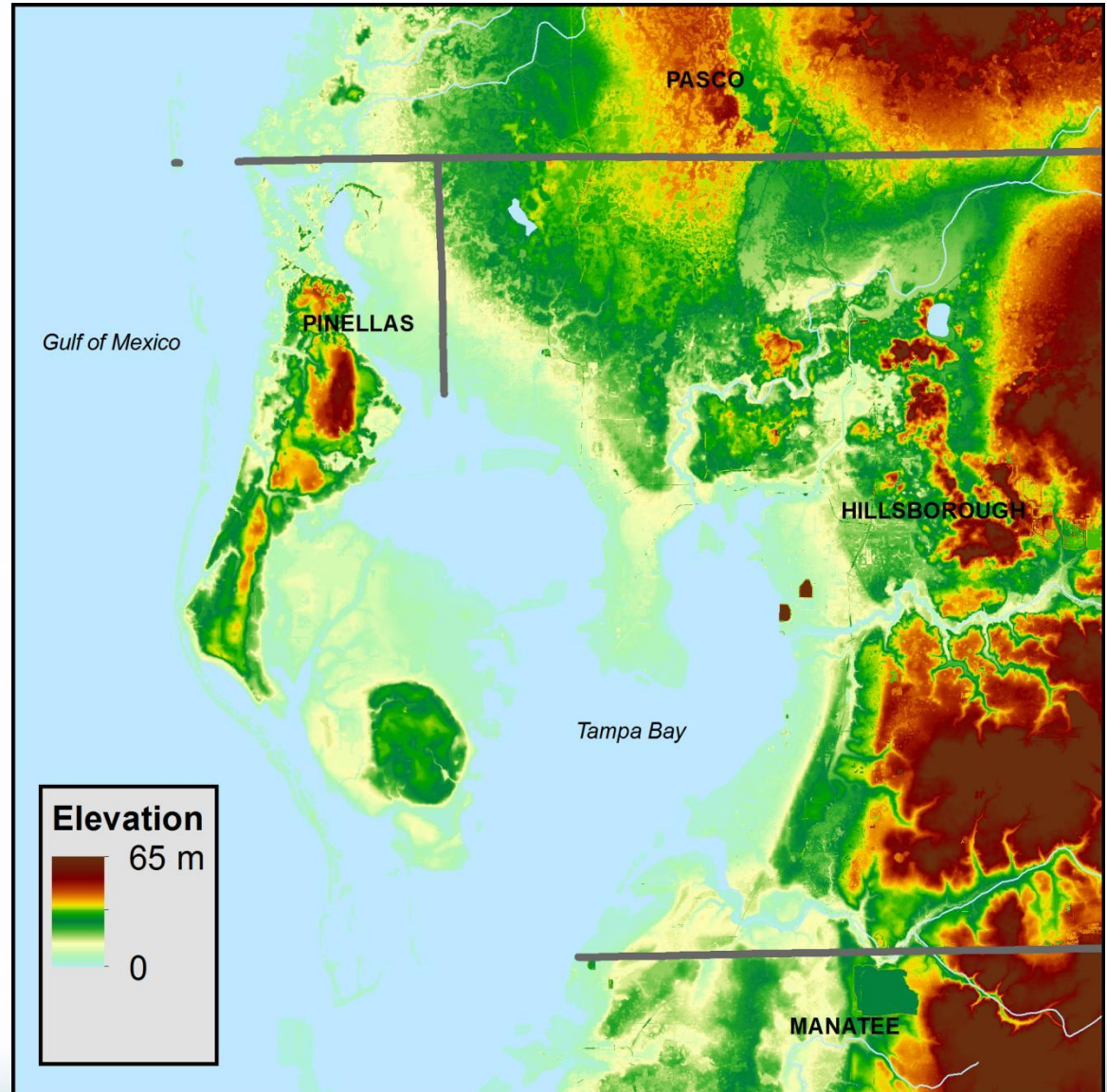
Geographic Rating Variables for Private Flood Insurance

Not just flood zone

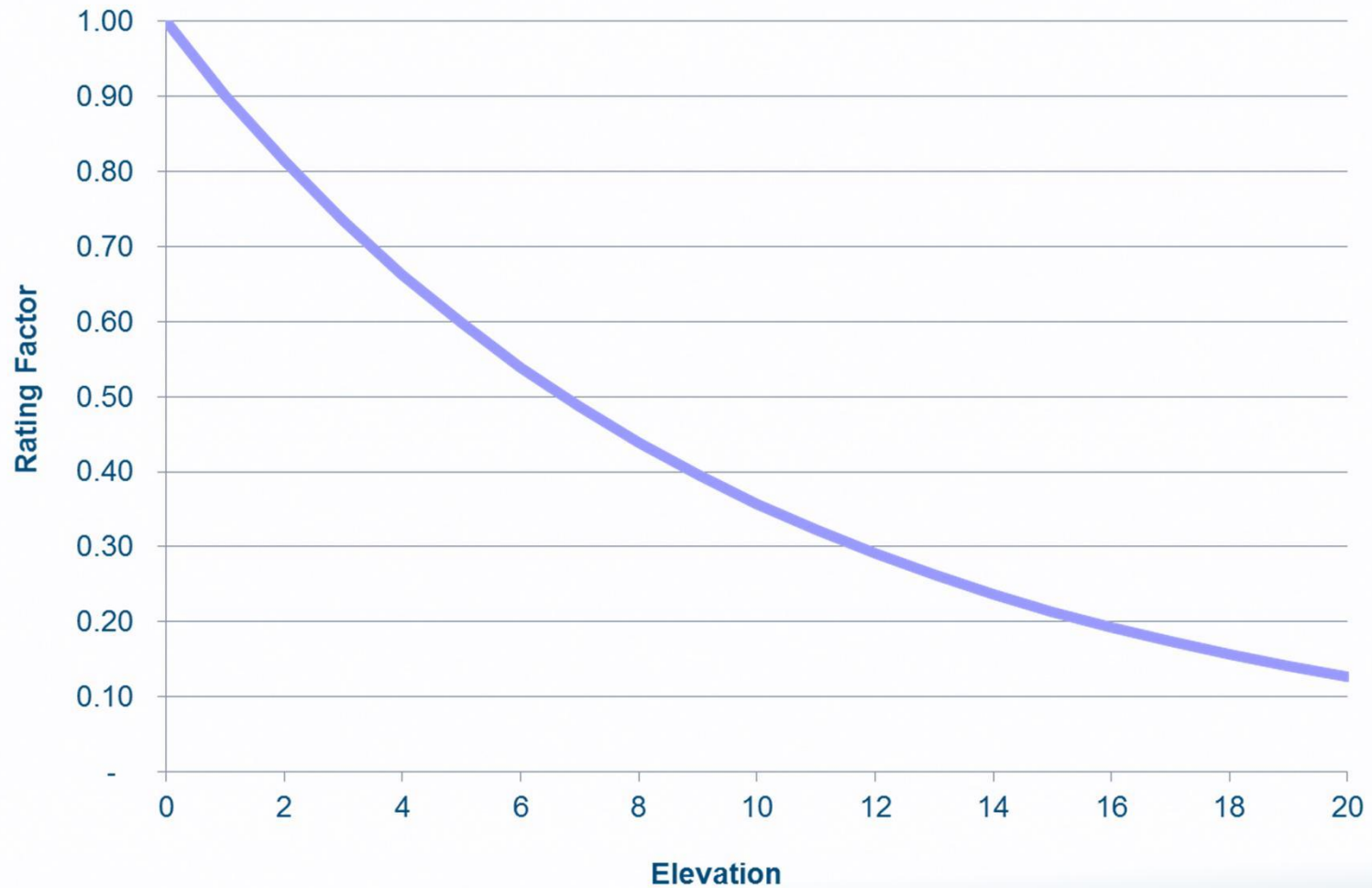
- Relative Elevation
- Distance to Coast
- Distance to River/Stream
- (Grouped) Hydrological Unit



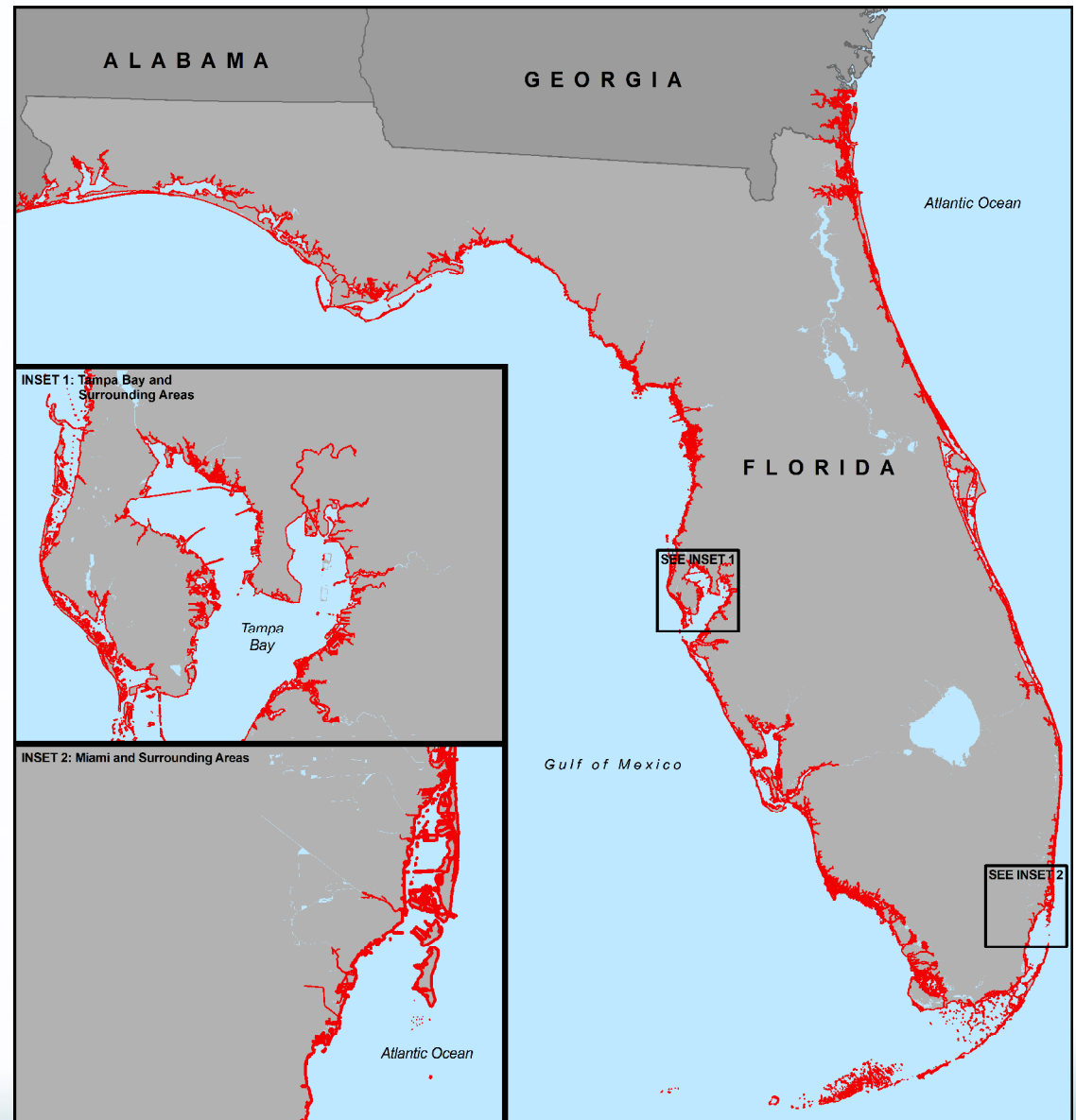
Elevation



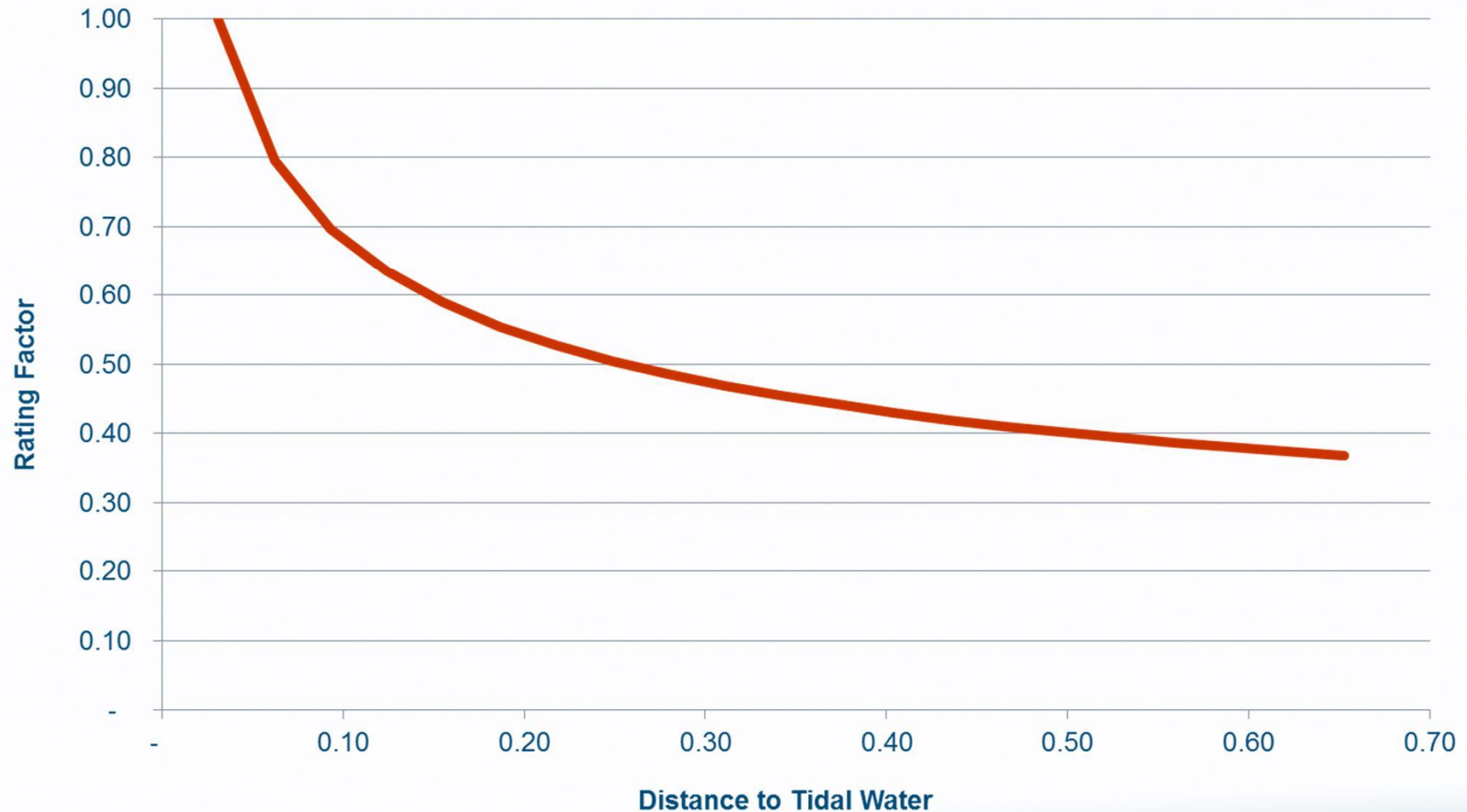
Pricing for elevation



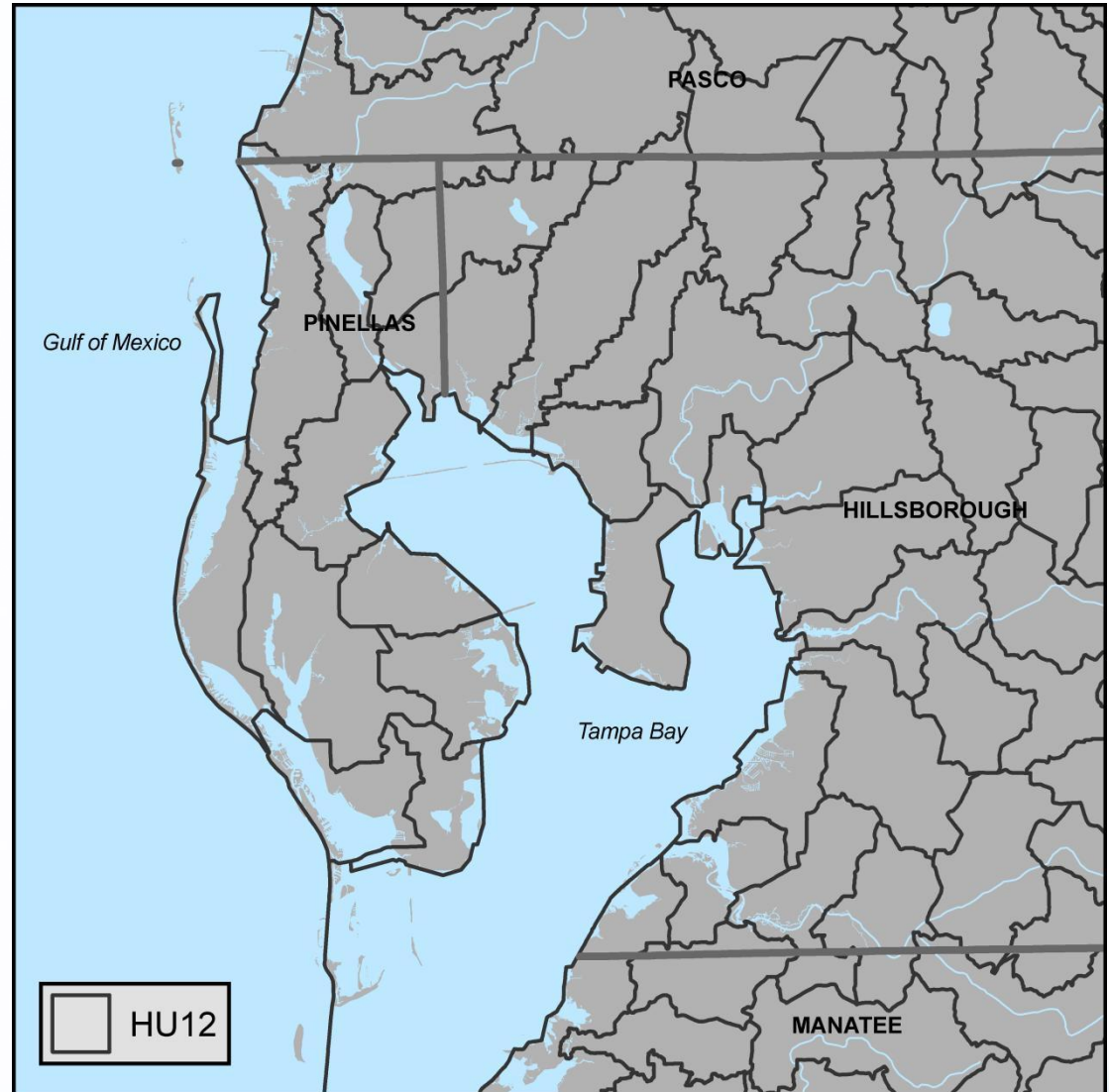
Storm Surge: NOAA Medium Resolution Coastline



Pricing for distance-to-tidal water

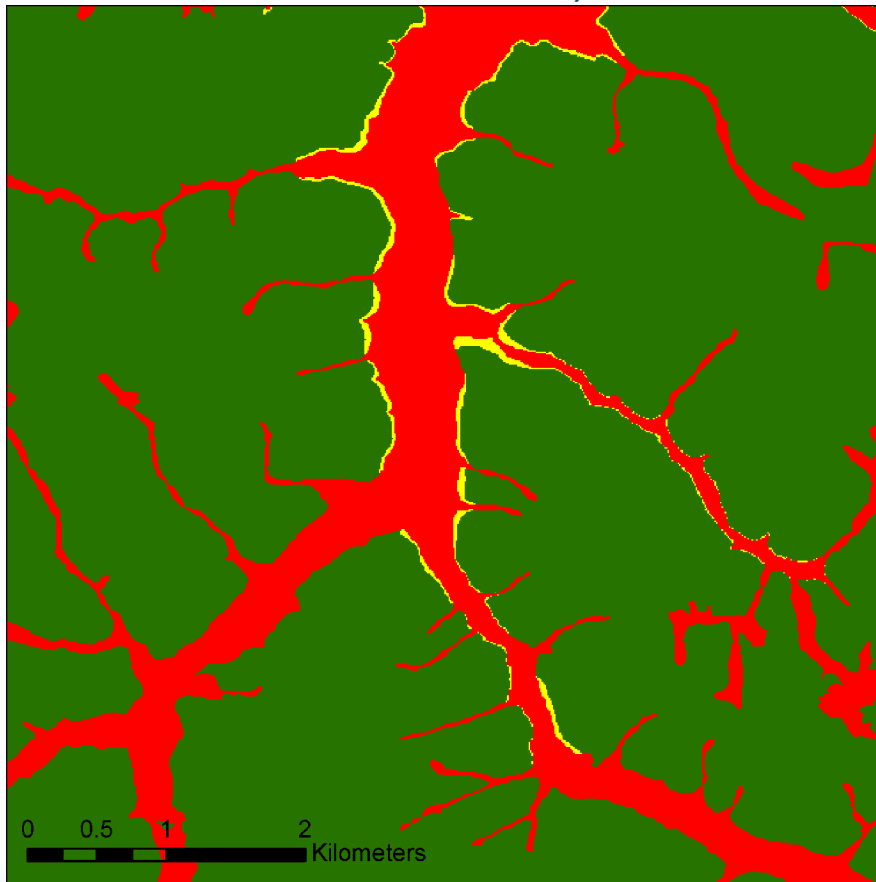


Territories (Hydrological Units)

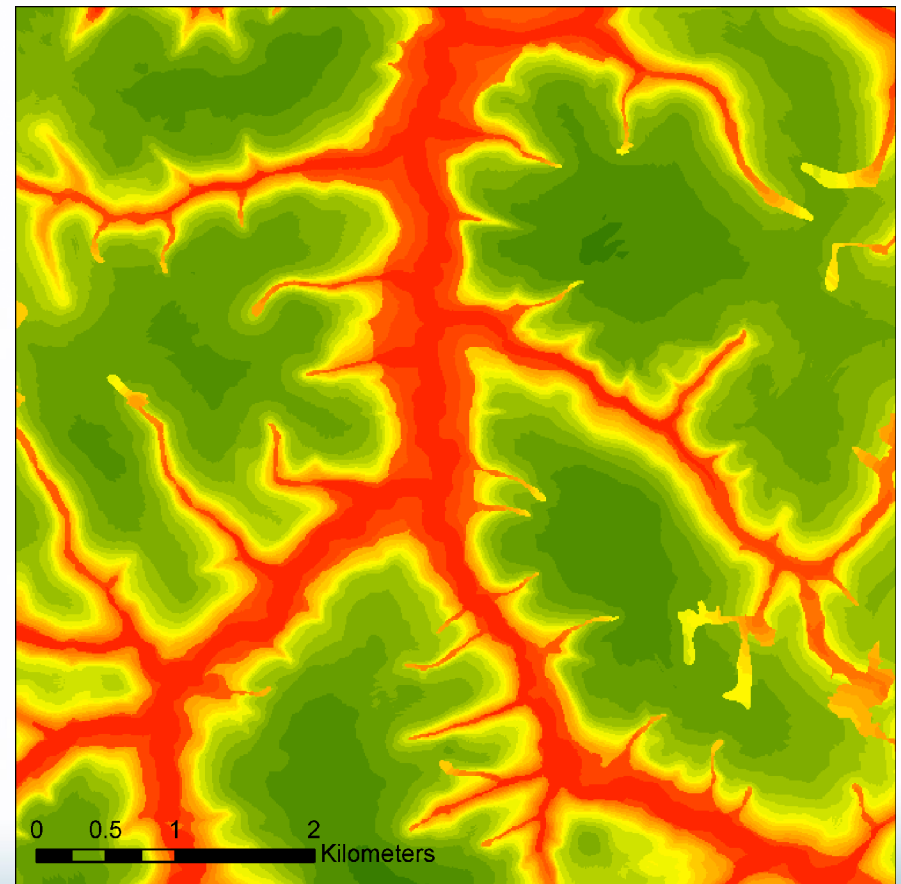


Pricing Flood: the risk is continuous

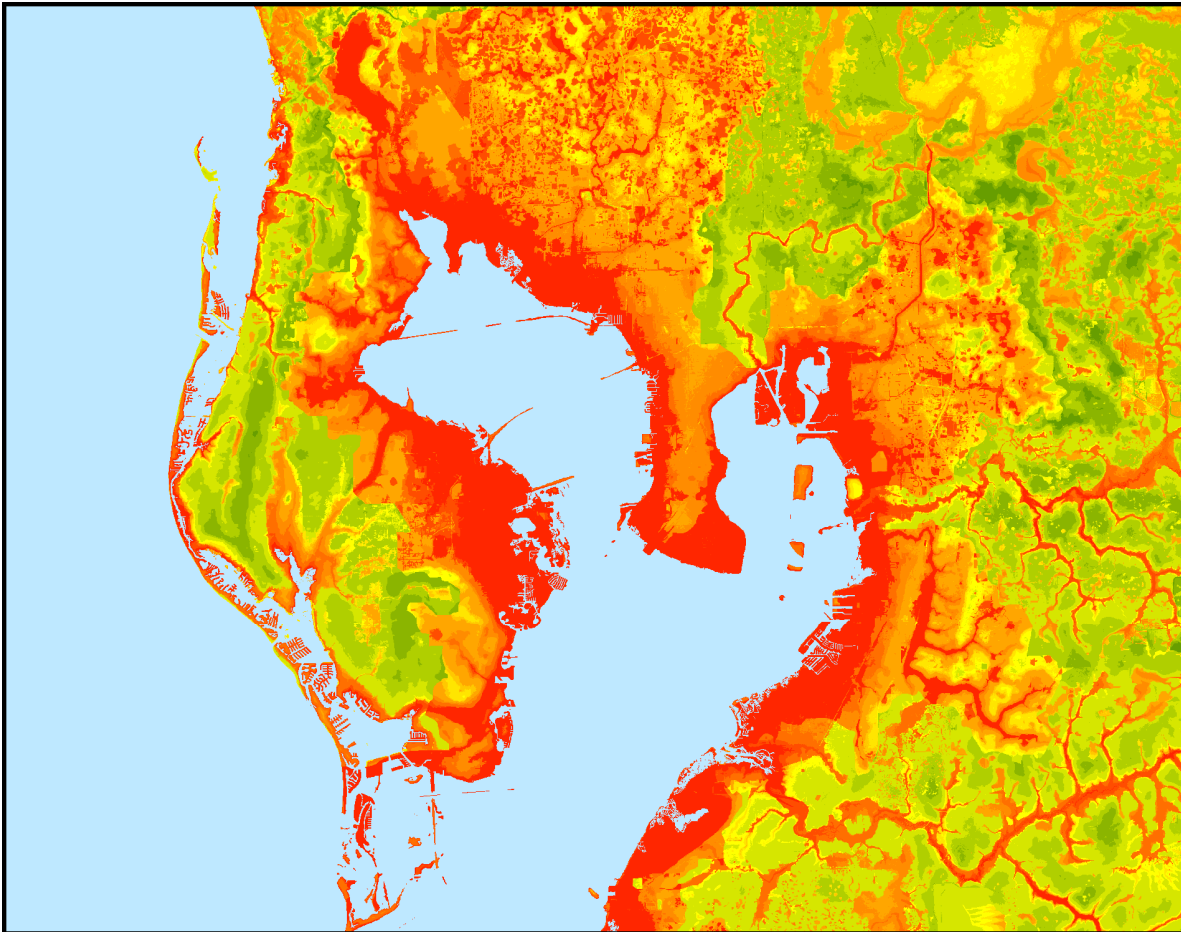
Traditional Flood Zone Rating (NFIP Flood Zones)



Continuous Flood Rating



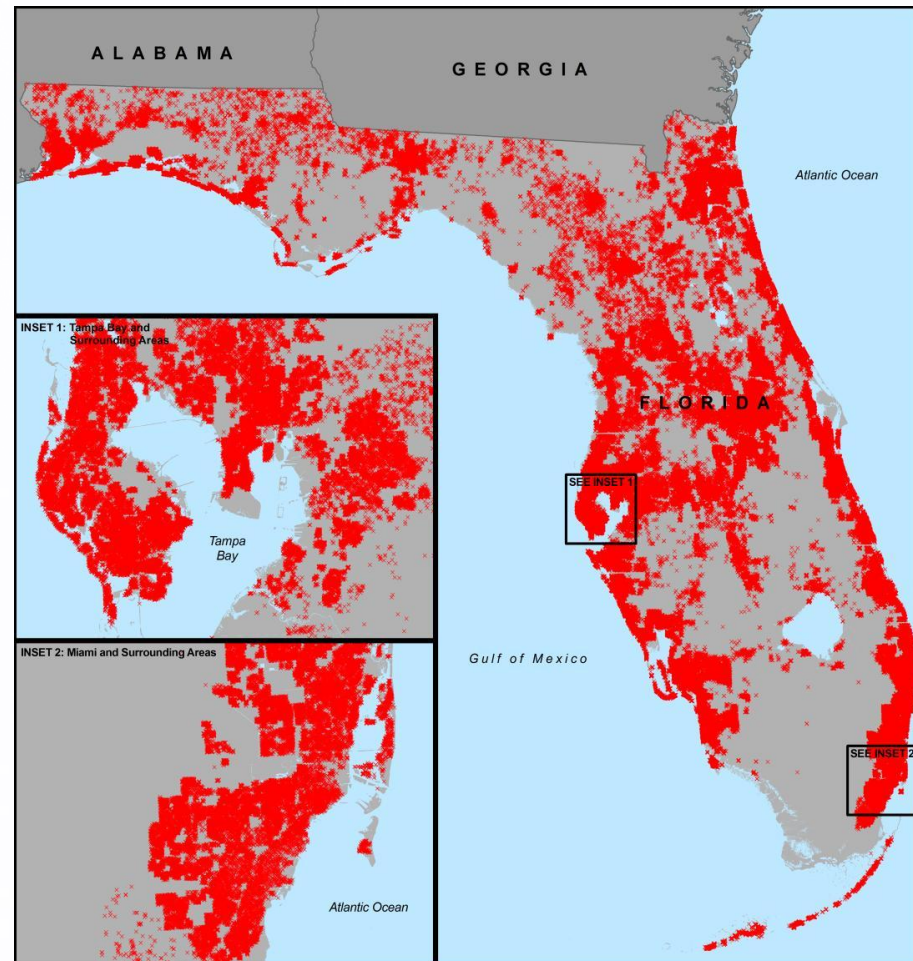
Pricing Flood Risk



- Target variables:
storm surge and
inland flood AAL
- Predictor variables:
 - Relative
Elevation
 - Distance to
Mean High Water
Line
 - Distance to
River/Stream
 - Grouped
Hydrological Unit

Notional Market Portfolio

- Locations are a random sample of parcel data from county records
- Imputation of other property characteristics, such as:
 - Year Built
 - Square Footage
 - Construction Type
 - Number of Stories
 - Wind Mitigation Features

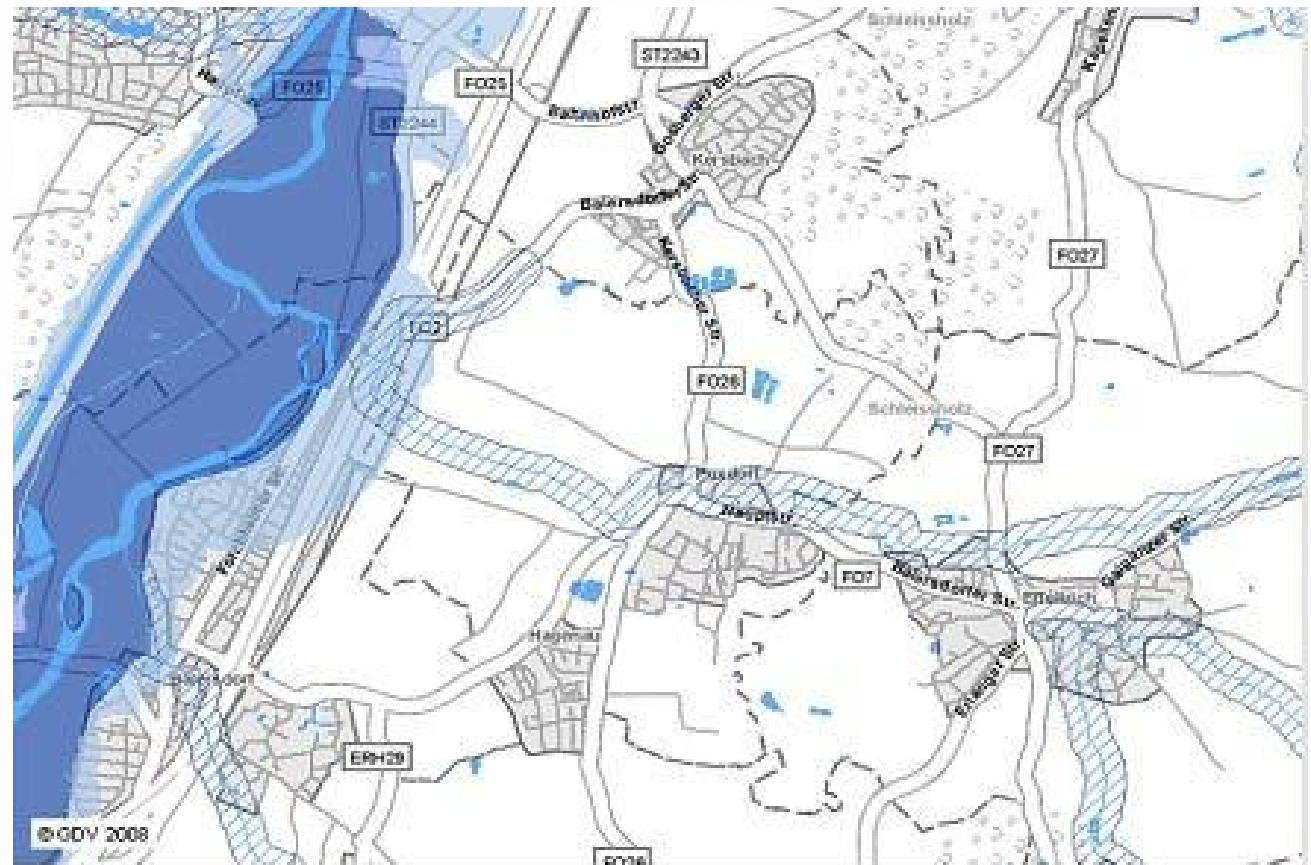


Steps to build a Private Flood Program

- Calculate Average Annual Loss (AAL) for Notional Market Portfolio and Company Portfolio using Storm Surge Model and Inland Flood model
- Use AALs to develop rate plan and underwriting rules that reflect most critical rating characteristics based on property characteristics (foundation type, number of stories) and Geographic Information Systems data (relative elevation, distance to coast/river, etc.)
- Load AALs for expenses and initial reinsurance cost to get indicated flood premiums
- Calculate indicated flood premiums for Notional Market Portfolio and company exposures
- Compare AALs to indicated flood premium to test profitability of rate plan
- Run NFIP premiums for company exposures and notional portfolio using NFIP rating model
- Compare company flood premium to NFIP premium to test competitiveness of rate plan
- Use profitability and competitiveness results to tweak rates and develop pro-forma projections

Private Flood Insurance in Europe

- Private flood is already offered in the UK and Germany
- However, there are only four flood zones (Zürs zones) in Germany.
- Opportunity for improved pricing using similar techniques



<http://www.elementar-versichern.bayern.de/versicherbar.html>

Questions?

