Private Flood Insurance

2018 CAS Annual Meeting

Matt Chamberlain

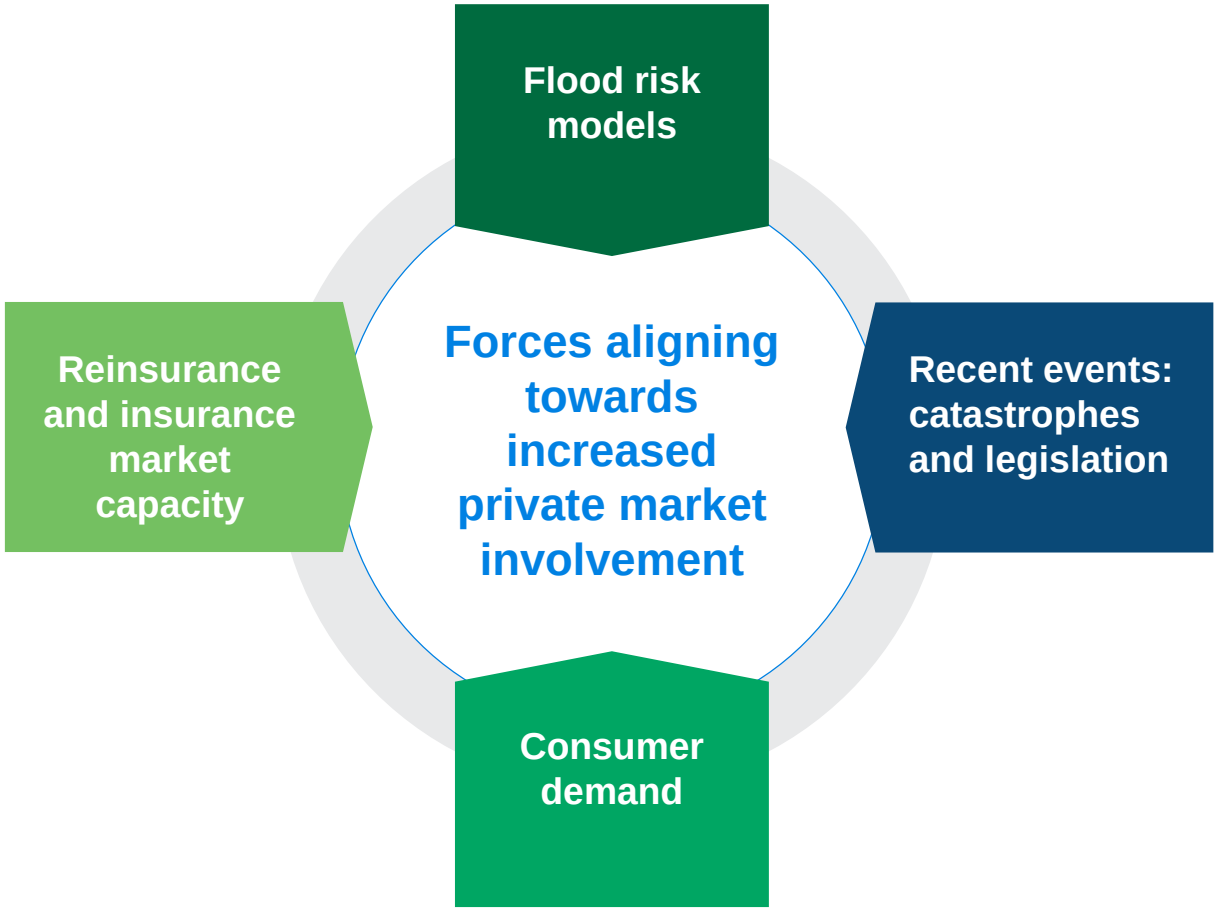
November 13, 2018

Agenda

- Introduction
- Approaches to private flood insurance
- Best practices
  - Catastrophe model evaluation
  - Market feasibility study
  - Rate development

Introduction

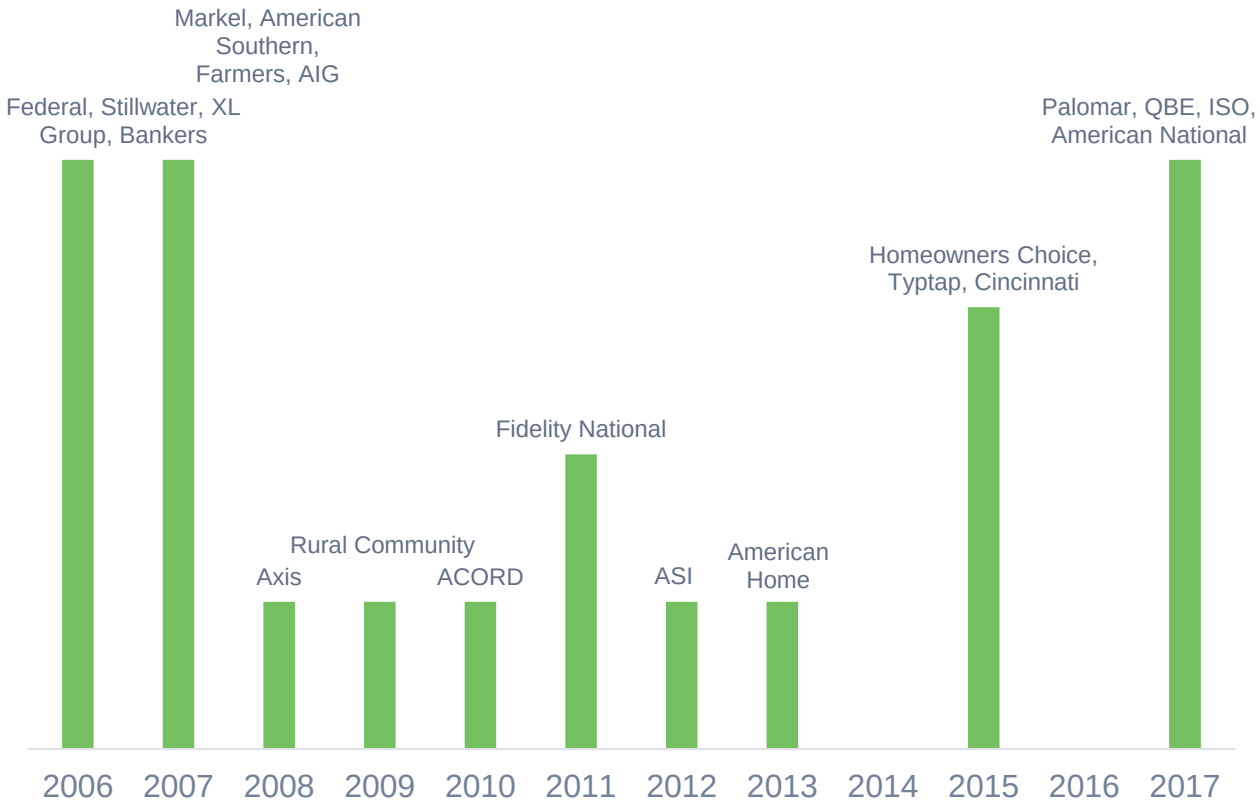
Why would primary insurance companies consider offering flood insurance?



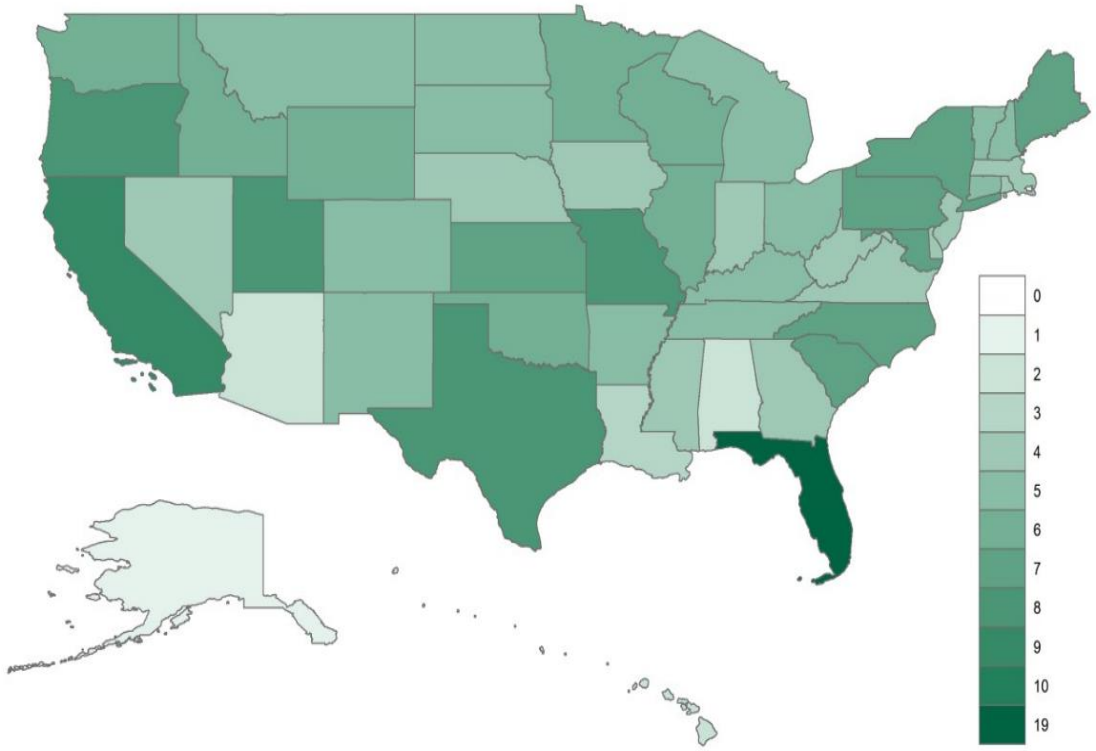
Private flood growth

Entrants to the private flood market have increased in recent years; highest activity in Florida

Private Standalone Flood Program Launches



Number of Private Standalone Flood Programs by State (2017)



Source: SNL.com; excludes non-admitted and endorsement programs

Rapid private flood premium growth in 2017

Private flood written premiums grew over 50% in 2017, up to $624 million

State	Private Written Premiums (Millions)		2016 to 2017	
	2016	2017	% Change	$ Change
Florida	47.8	84.5	77%	36.7
California	48.8	72.0	48%	23.2
Texas	31.8	53.5	68%	21.7
New York	27.4	47.7	74%	20.3
New Jersey	17.0	28.9	70%	11.9
Pennsylvania	13.2	18.8	42%	5.6
Louisiana	11.5	17.9	56%	6.4
Massachusetts	9.0	15.3	70%	6.3
Ohio	5.6	14.2	154%	8.6
Illinois	9.8	14.0	43%	4.2

Source: Insurance Journal. Originally reported by S&P Global

Approaches to private flood insurance

How do companies approach their private flood decisions?

Three common approaches

Stay Out

- Avoids underwriting risk, but
- May be at competitive disadvantage
- May end up paying to adjust non-covered flood claims for no premium

Me-too NFIP

- Relatively fast / low cost to entry, but
- Limited market
- No competitive differentiation
- Will be obsolete when NFIP changes rates

Solution First

- Proprietary solution, but
- May result in commitment to an approach with limited information
- Front loads costs
- May not produce desired results

Best practices – a three step process

Evaluate cat models

- What catastrophe model(s) should we use to manage and measure our results?
- What are the limitations and uncertainties of the cat model(s) we will use?
- What risks are considered in the models vs. covered by flood policies?

Market feasibility study

- Should we offer private flood insurance?
- What states or markets should we prioritize?
- What expense, reinsurance, profit provision and minimum premium should we build into the rates?

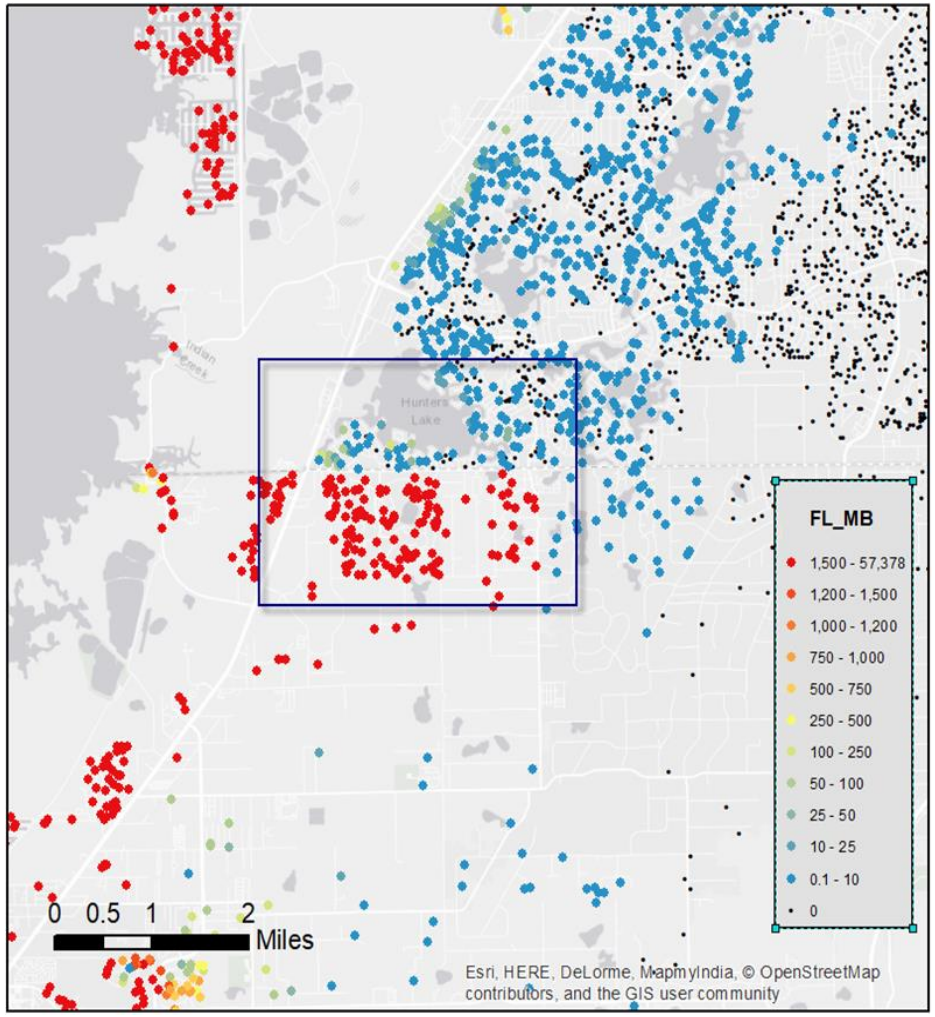
Develop and test rates, rules, and forms

- What policy limits and coverages should we offer?
- What types of risks should be eligible?
- What rating methodology should we use?
- What data elements will we need to quote and underwrite?
- What volume can we expect?

Best practices:
Catastrophe model evaluation

Evaluation of flood models

The flood models are less mature than those for other perils



- There are currently substantial differences among the models available commercially
- Model results should be assessed for reasonability both in aggregate and at the location level
- Does the model you are using
  - Have discontinuities?
  - Have many AALs that are zero (or nearly zero)?
  - Produce results that are illogical (e.g. very low in high risk areas or very high in low risk areas)?
  - Have (or not have) secondary modifiers that reflect important risk characteristics?
  - Include all the sub-perils that you think are important?
- Model comparisons can help identify outliers
- What are reinsurance costs going to be based on?

Evaluation of flood models

Which models are most reasonable?

Beach House

Model X	Model Y	Model Z
$1,000	$30	$20,000

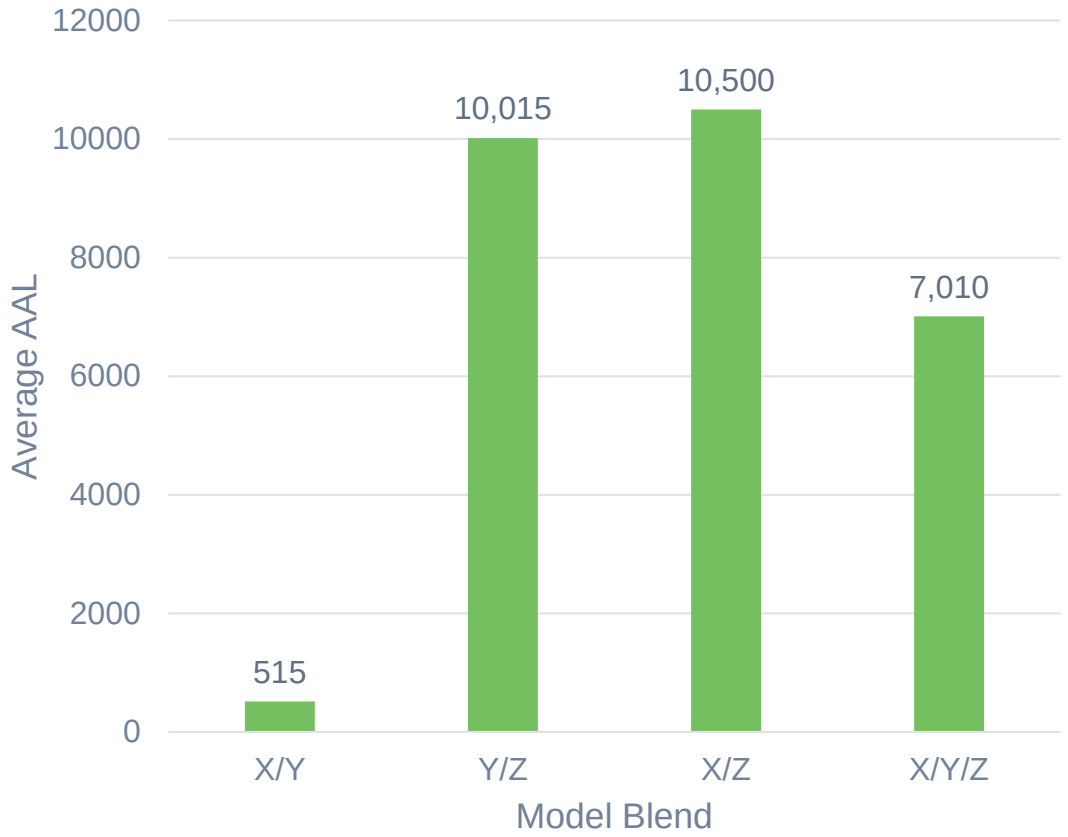
Inland Property

Model X	Model Y	Model Z
$1,500	$3	$30

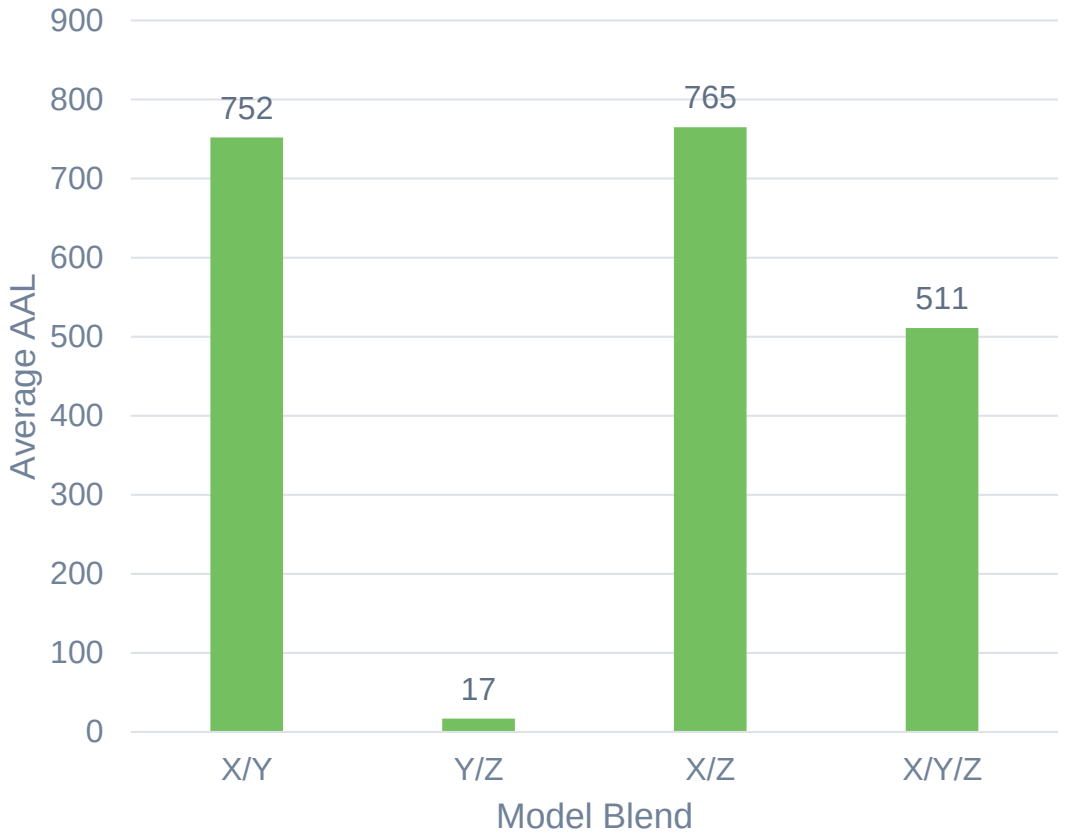
Blending can help, but still has limitations

An outlier has a large impact on the average

Beach House



Inland Property

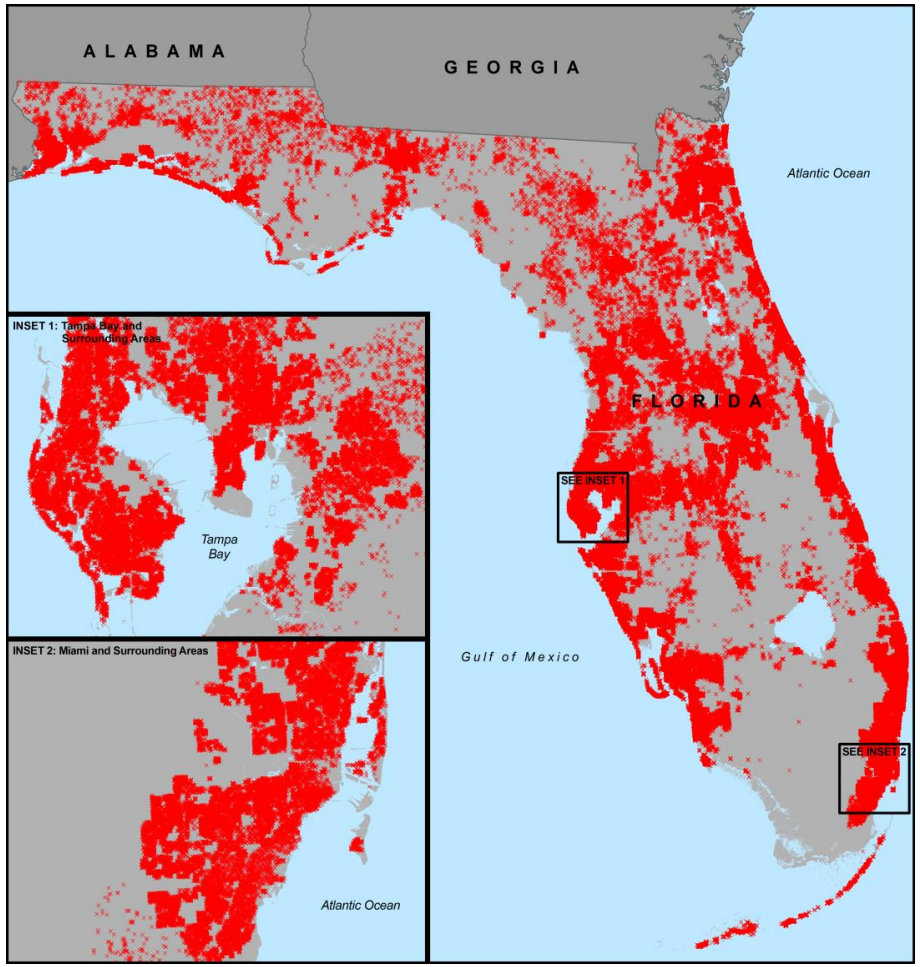


Best practices:
Rate development

Market Baskets are essential tools when data are sparse

A portfolio of hypothetical risks with a realistic distribution of the characteristics used for catastrophe modeling, pricing and underwriting

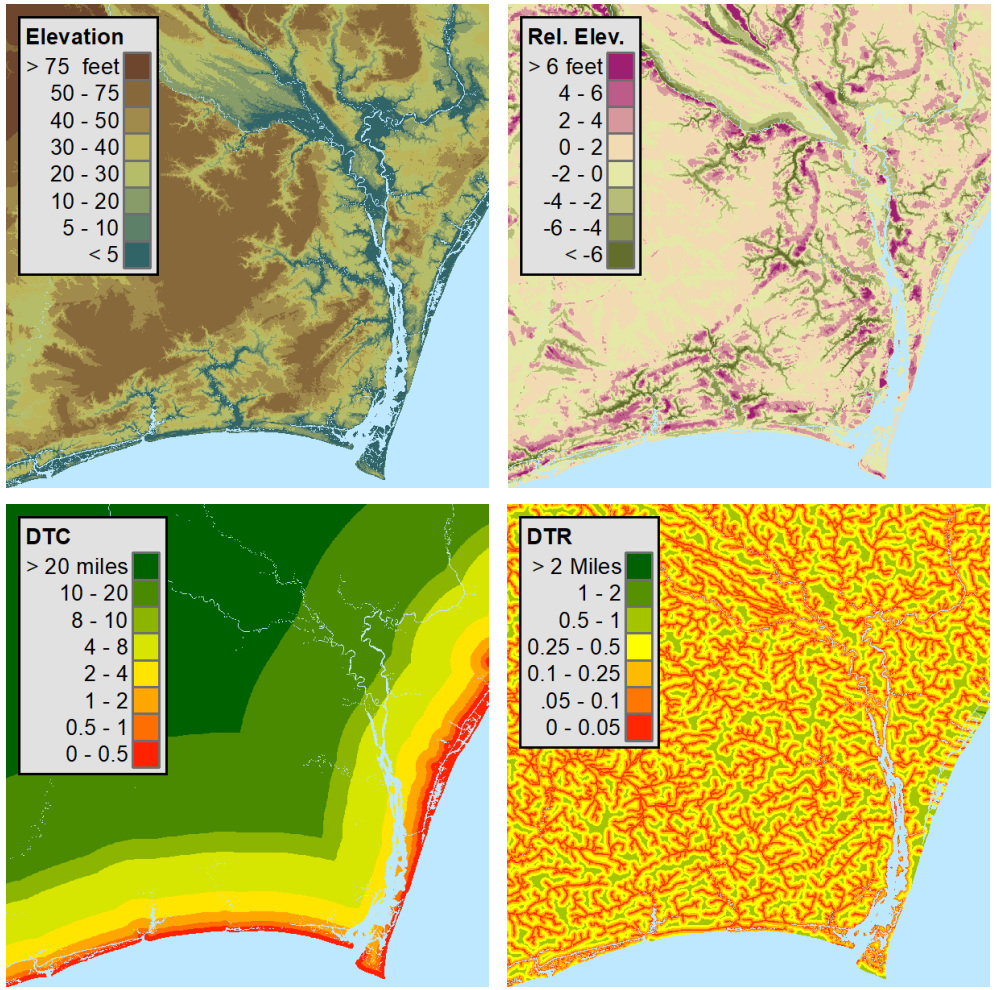
- The locations are the actual locations of real risks in the marketplace, as well as specific characteristics of those risks such as the year built and square footage
- For other characteristics, realistic distributions are derived from industry data sources and are simulated by location
- The final market basket is a deterministic but notional policy roster
- Market Baskets allow analysis of areas where in-force data may be thin or non-existent



Leverage Geographic Information Systems to add value to study and refine results

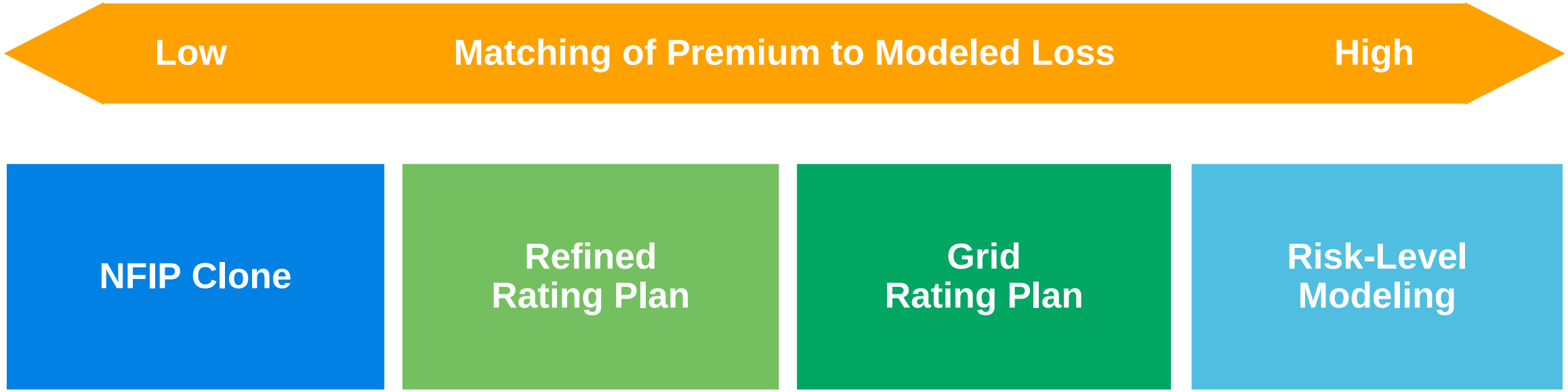
Enrich data with geographic characteristics correlated with flood risk

- Elevation (absolute)
- Relative elevation (local vs. nearby points)
- Distance to coast (or ocean)
- Distance to river or stream
- Size of river or stream
- Hydrological features and watersheds
- Slope
- Flood protection and levees



A spectrum of pricing approaches exists

But there is no clear winner when all practical factors are considered



The NFIP Clone approach is efficient, but limited

- Rates and territories follow existing NFIP
- Underwriting used to avoid unprofitable areas

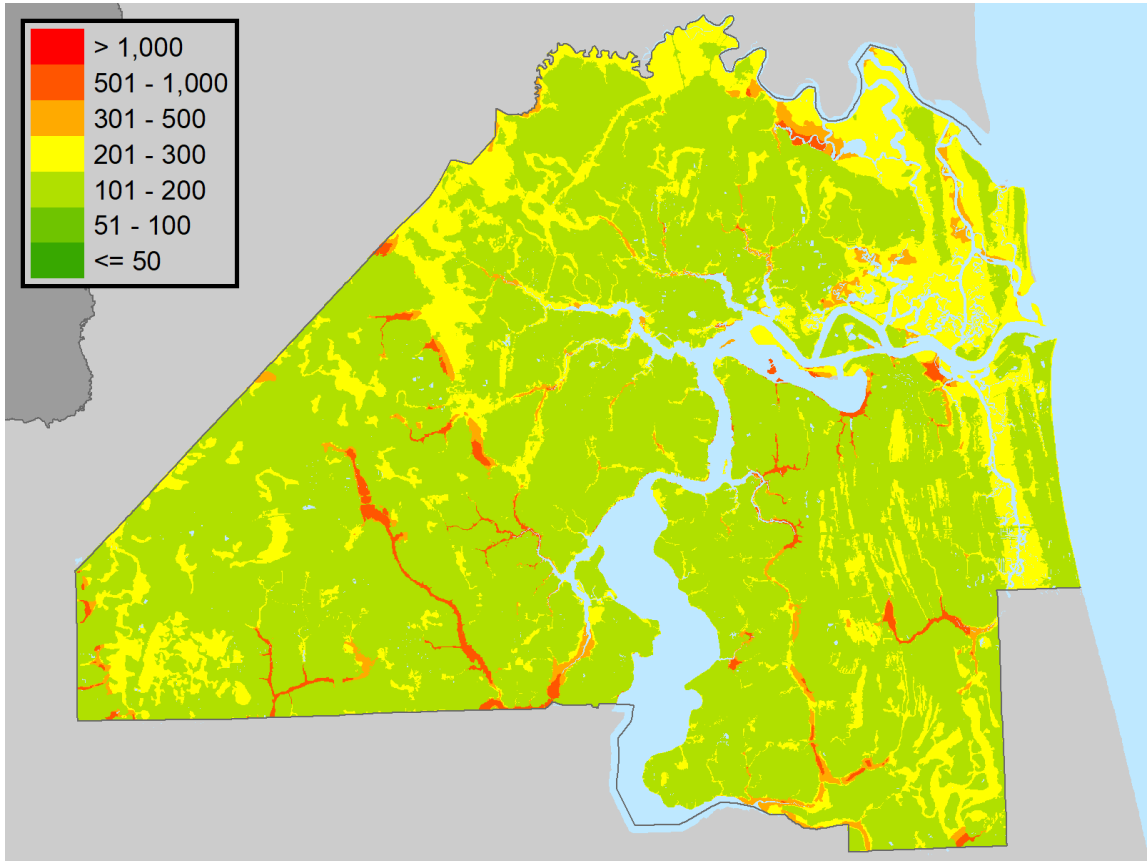
Advantages

- Low requirements and time to develop
- Easy to explain to agents and regulators
- Faster IT implementation time

Disadvantages

- Limited market of profitable risks
- Limited rate differentiation, especially outside of Special Flood Hazard Area
- Underutilization of technology and advanced analytics
- Once NFIP rolls out refined rating plan, existing rates may be obsolete

Duval County Inland Flood Base Rates



Risk-Level Modeling aligns to model results, but may sacrifice stability and transparency

- Catastrophe model is run on every risk to derive annual average loss
- Loss is loaded for reinsurance, expense, and profit to derive premium

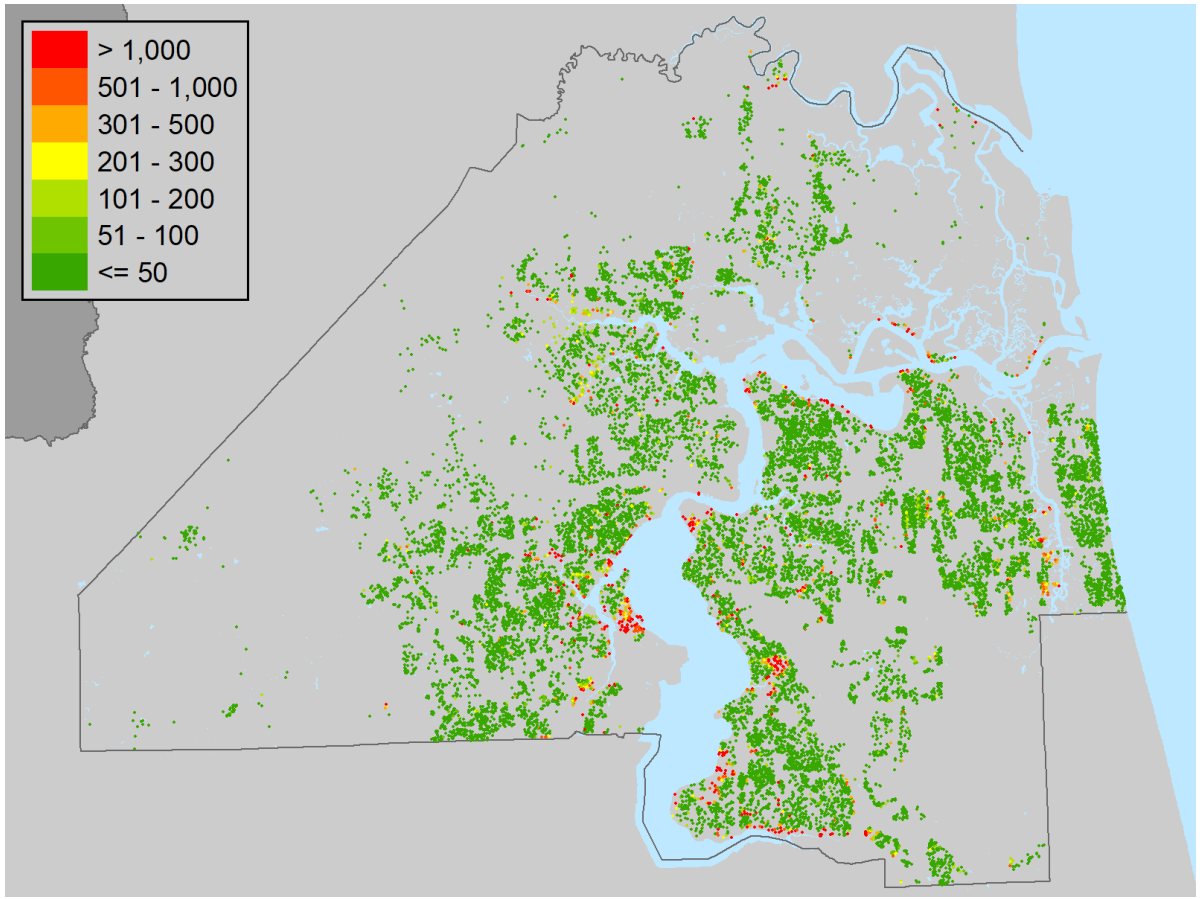
Advantages

- Low requirements and time to develop
- Matches premium to modeled loss
- Larger market of profitable risks
- Using reinsurer models may incent quota shares

Disadvantages

- Requires model call at quote (API)
- Limited transparency for agents, regulators
- Difficult to control pricing strategy
- Handling discontinuities and extreme values
- Reliance on one catastrophe model

Duval County Inland Flood Base Rates



Grid Rating plan: granular and stable, but more effort

- Pre-compiled approach to all geographical characteristics from risk-level modeling
- Grids typically based on latitude and longitude - can achieve size efficiencies by limiting to populated areas
- Additional rating factors for property and policy characteristics, e.g. number of stories, deductible

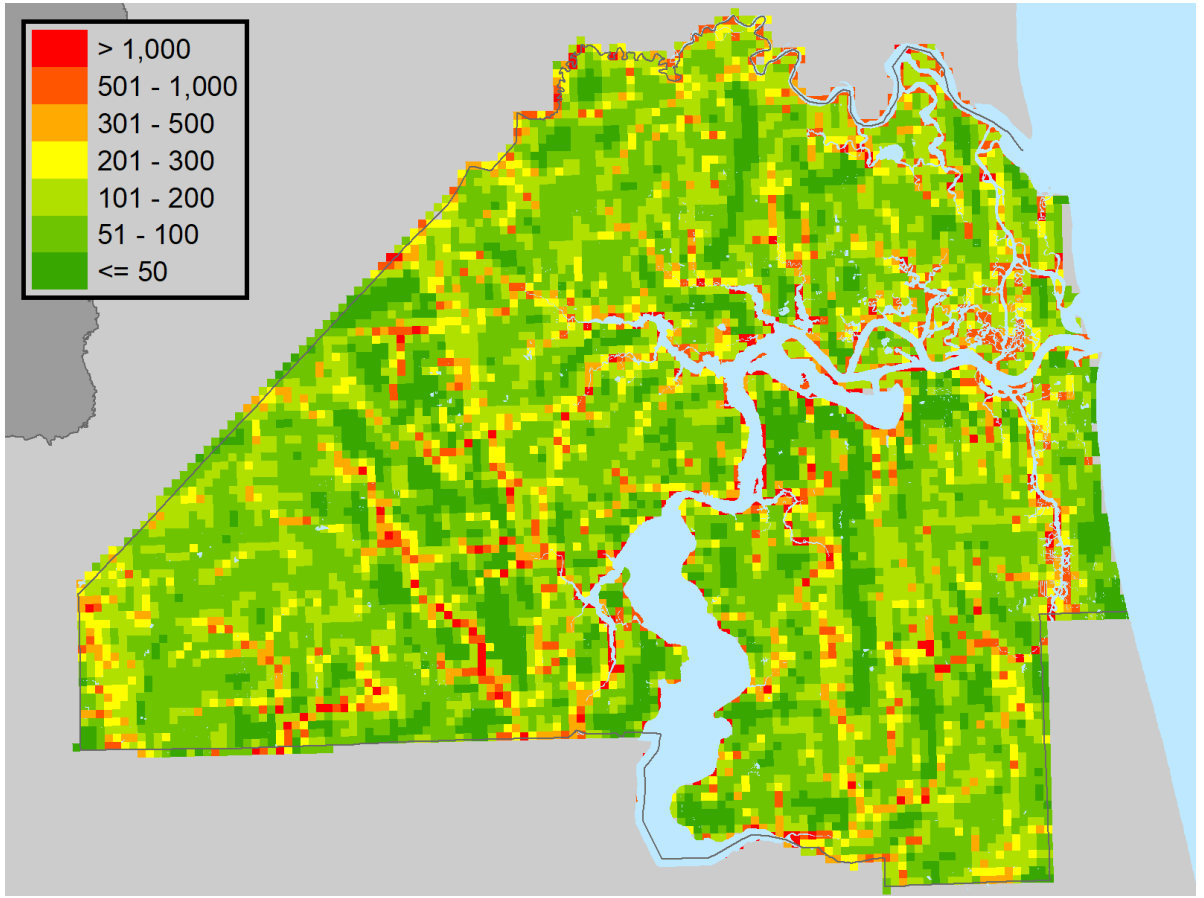
Advantages

- Similar to risk-level modeling without having to call a cat model at quote
- Large market of profitable risks
- Supports model blending
- Easier regulatory approval than risk-level modeling

Disadvantages

- Maintenance of base rates can be difficult & expensive
- Premium will diverge from modeled loss as resolution decreases
- Similar issues to risk-level modeling regarding transparency, discontinuities and extreme values

Duval County Inland Flood Base Rates



Refined Rating plan allows custom territories yet tabular rates, but requires research and buy-in

- Complete rating plan with unique territories, rating factors, and algorithm
- Reflects geographical and building characteristics that relate to flood risk

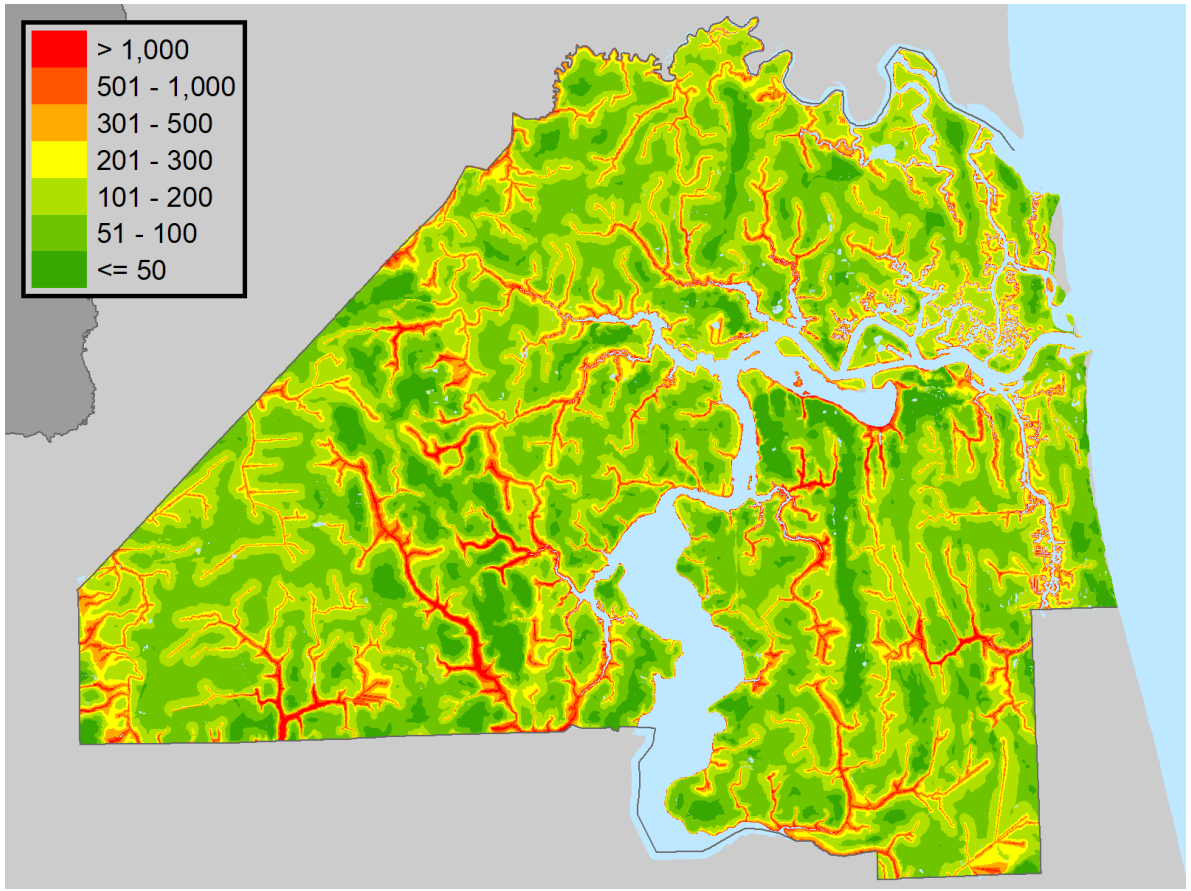
Advantages

- Easy to explain to agents and regulators
- Control of pricing strategy
- Fewer discontinuities and extreme values
- Larger market of profitable risks

Disadvantages

- High development cost, maintenance cost when models change
- Requires significant GIS and modeling expertise

Duval County Inland Flood Base Rates



Thank you

Matt Chamberlain
matt.chamberlain@milliman.com
(415) 394-3785