

**AON**

**Parametric  
Earthquake  
Insurance –  
ACWA JPIA**



# Why Use Parametric Insurance?



## Speed of Payment

- Because the Index Value can be verified very quickly, the claim can be paid **within days of the event**.
- This allows for very quick post-event liquidity to deal with the immediate aftermath of a disruptive event.



## Breadth of Cover

- Payment can be used for **any financial loss** resulting from the event.
- Expenses and loss that is typically excluded from traditional insurance coverage can be addressed.
- **No financial deductible**.



## Flexibility in Design

- Parametric coverage can be **customized** to solve specific problem(s) that are difficult for traditional insurance to deal with.
- This could include (but is not limited to) contingent business interruption, difficult to insure risks, supply chain exposures, and many others.

# Parametric Solutions: Core Comparison

Key points where parametric insurance differs from conventional

	Traditional	Parametric	Parametric Advantages
<b>Loss Trigger</b>	Physical damage or loss	Event occurs and meets objective thresholds	A set of objective, pre-defined triggers determines the loss event rather than a claims adjustment process
<b>Loss Recovery</b>	Claims adjustment determines payout	Pre-agreed payout based on "payout table"	Pre-determined loss recovery provides a transparent claims payment
<b>Basis Risk</b>	"Manuscripted" into policy – exclusions, deductibles, terms, sub-limits, etc.	Actual Economic Loss > Claims Payout	Form of "basis risk" is different, but either policy type can have greater basis risk
<b>Claims Timeline</b>	Long – months to years to adjust	Short – claims paid within 2-4 weeks	No traditional "loss adjustment" process, claims paid in days
<b>Policy Term</b>	Typically Annual	1-3 Years, more sometimes possible	Longer terms provide for known costs and capacity availability
<b>Exclusions</b>	According to the policy	None	Simple coverage without dollar deductibles, exclusions, sublimits, etc.
<b>Policy Structure</b>	Generally standardized and rigid	Flexible and customized to the client	Aon works with the client and markets to develop the unique solution required

## Key Attributes:

1

**Independence:** Coverage triggered by independent event parameters (based on third-party data)

2

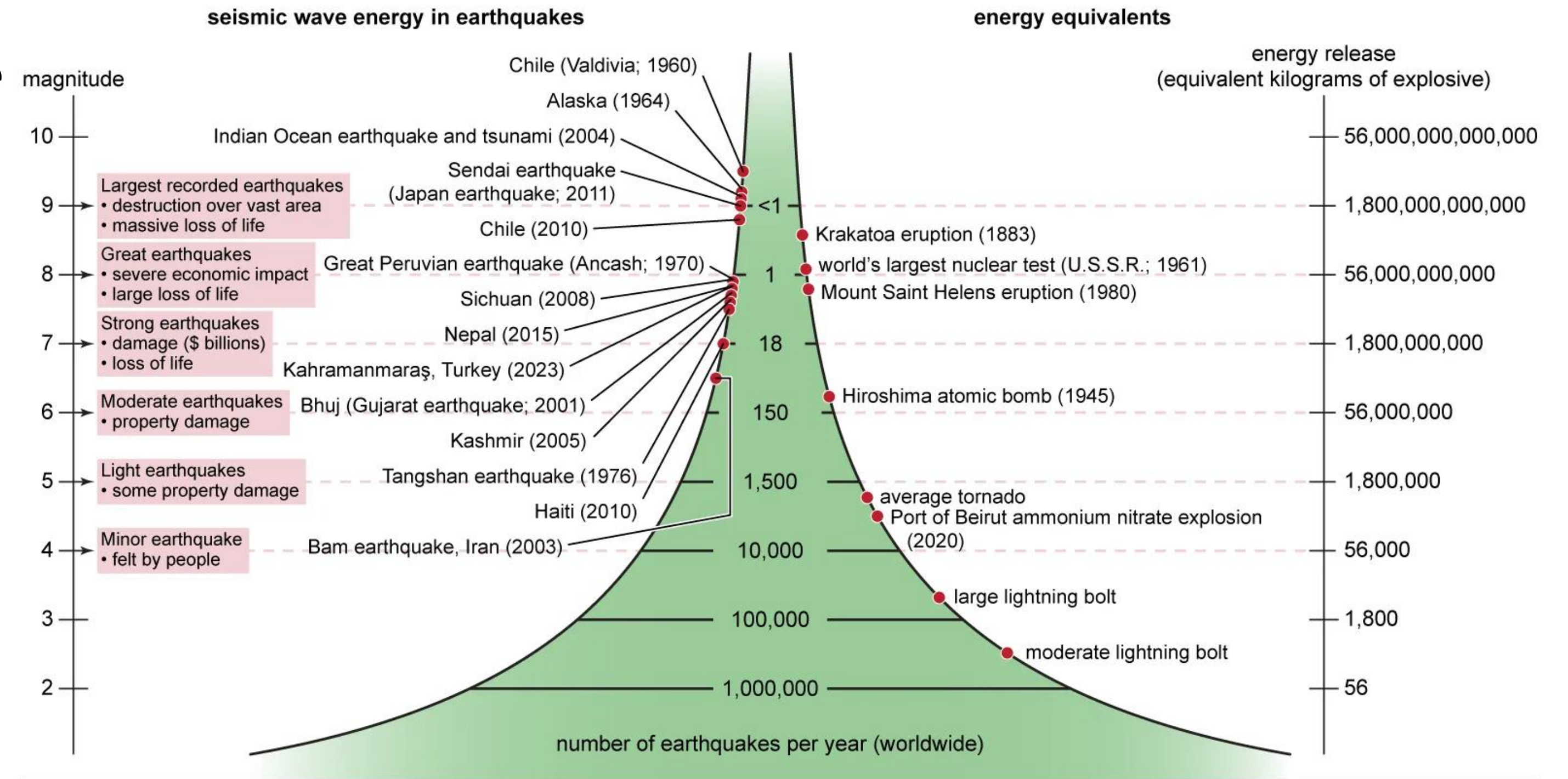
**Fast:** Payout structure formulaic and pre-negotiated (pays fast – within days)

3

**Coverage is broad:** Designed around ex-ante expectation of economic exposures arising out of the event

# Magnitude Explained

- Earthquake magnitude, commonly expressed using the *moment magnitude* ( $M_w$ ), or historically expressed using *Richter Magnitude* ( $M_L$ ) is a logarithmic scale to measure energy released by an earthquake. A single step (e.g. M6 -> M7) in the scale is the equivalent of 32 times more energy released. Two steps (e.g. M6 -> M8) is the equivalent of *one thousand times* more energy being released by an earthquake.
- Magnitude is well-correlated with macroeconomic impacts of earthquakes, including non-damage business interruption, wide area damage, ingress/egress challenges, damage to public infrastructure, etc.



Sources: Incorporated Research Institutes for Seismology (IRIS). Encyclopædia Britannica, Inc.

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# Shake Intensity Explained

- **Magnitude** defines the **relative size of an earthquake**. The most common reported metric is Moment Magnitude (Mw).
- While this provides information as to the severity of the event overall, it doesn't reveal much about the shaking at a particular location in the affected area.
- **Shake Intensity**, also reported by the USGS, **tells us the severity of ground shaking at a specific location**. This metric reveals much more about the potential damage and disruption to a specific site or area.
- There are a number of ways in which Shake Intensity is measured, one of which is *peak spectral acceleration* (PSA03). Also common are *Peak Ground Acceleration* (PGA), and *Peak Ground Velocity* (PGV).

Standard USGS Conversion of MMI to PGA (%g) Values

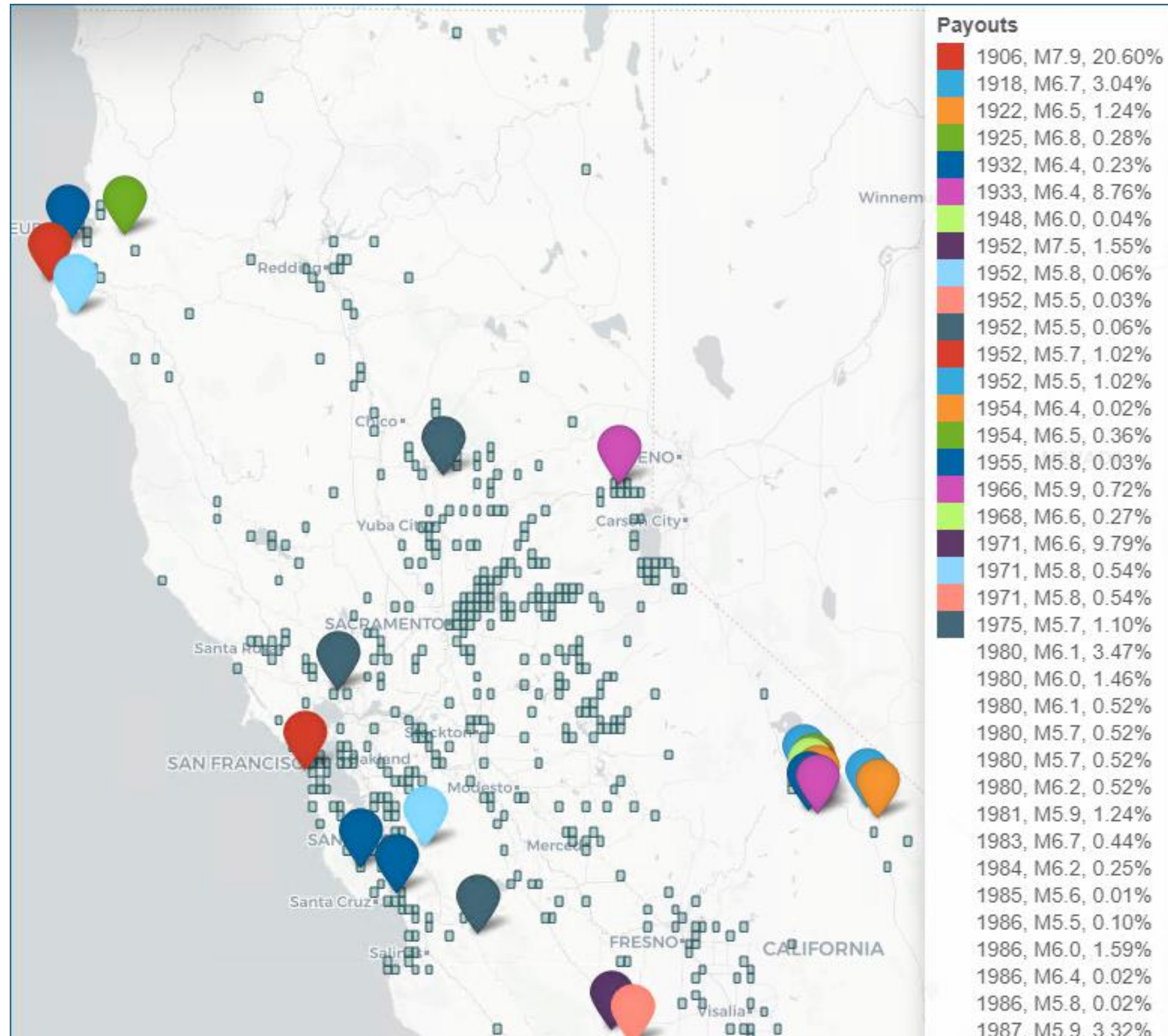
Near-Source Modified Mercalli Intensity (MMI)	I	II-III	IV	V	VI	VII	VIII	IX	X
Maximum Peak Ground Acceleration. (PGA) in %g	< .17	.17 - 1.4	1.4 - 3.9	3.9 - 9.2	9.2 - 18	18 - 34	34 - 65	65 - 124	> 124
Perceived shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
Potential Damage	None	None	None	Very Light	Light	Moderate	Moderate / Heavy	Heavy	Very Heavy

When a trigger event occurs, the USGS reports a grid of maximum PGA readings at all locations impacted by the earthquake; these numbers are used to determine the payout at each impacted location based on the payout table in the parametric policy

For more information, visit USGS website: <https://www.usgs.gov/programs/earthquake-hazards/earthquake-magnitude-energy-release-and-shaking-intensity>

# BHSI Parametric Indication: Shake Intensity

Coverage that triggers based on the amount of shaking from an earthquake



## Terms

**Insured:** Association of California Water Agencies (ACWA)  
**Period of insurance:** 12 months from date to be agreed by BHSI  
**Covered Peril:** Earthquake  
**Maximum Limit(s) (100%):** \$10M per occurrence and in the aggregate  
**Premium (100%, ex taxes):** \$497,143, incl. 12.5% ART Commission, but Excl. Applicable SL Taxes & Fees  
**BHSI Paper:** National Fire & Marine Insurance Company  
**Validity of Indicated terms, until:** December 1, 2025

## Box Definitions, TIV, and Sub-Limits

- There are ~44,000 locations on the SOV and a Total Insured Value of \$13.28Bn
- Coverage uses a 0.05x0.05 degree grid with 932 cells; each grid cell is approximately 9.5sqmi
- The structure covers all cells with TIV >1M within them
- The total TIV covered by this program is \$12.98Bn (~=98% of the TIV)
- Each grid cell is assigned a sub-limit based on the TIV within the cell
- The sum of sub-limits is \$60M = 6.0 x \$10M occ/agg limit. Each cell has a sublimit of 0.4622% of the TIV within the cell. For example, if there is \$100M of TIV in a single grid cell, it is assigned a value of \$462,200.

## Payout Table

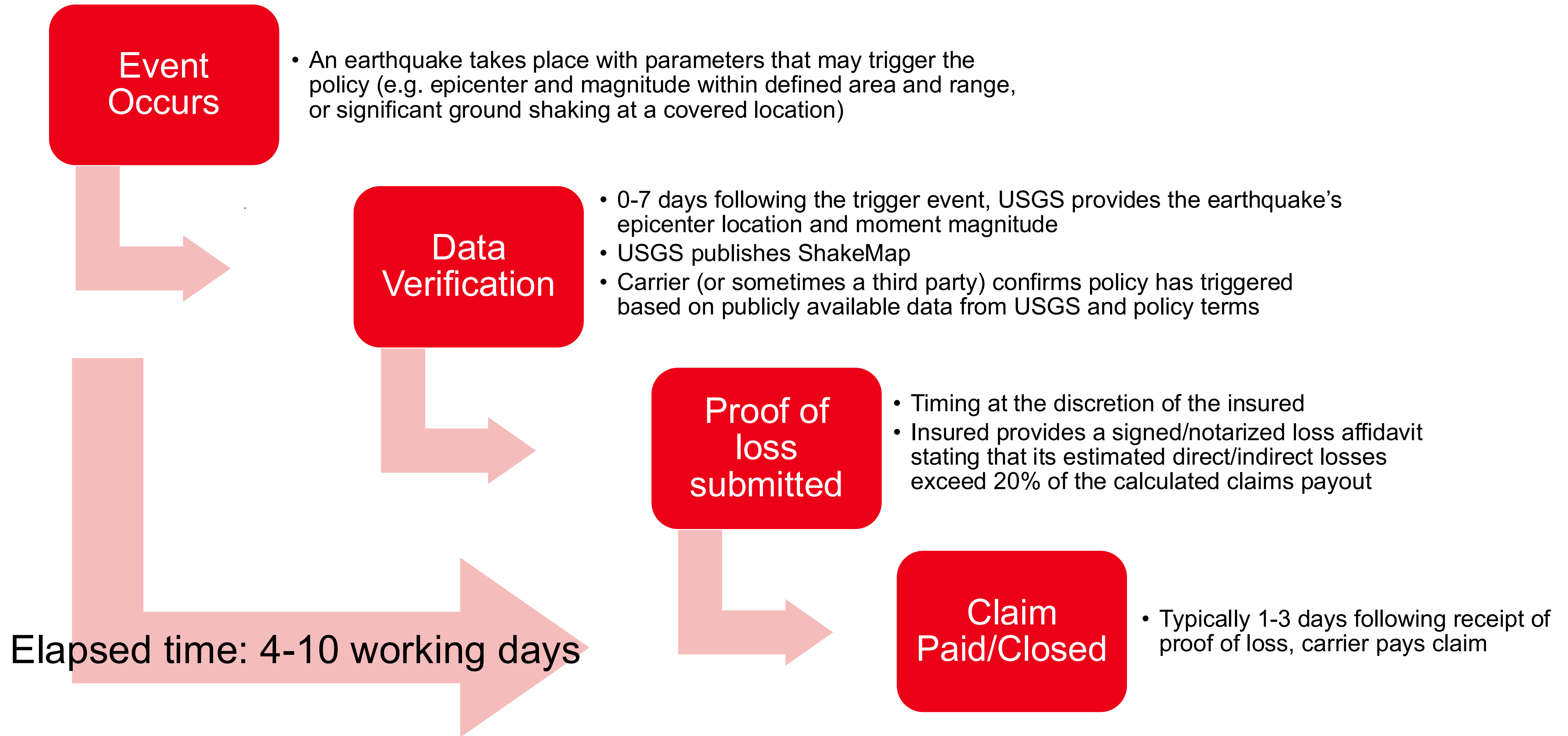
Min PGA [%g]	Option A
20	20%
30	30%
40	40%
50	50%
60	70%
70	90%
80	100%

Payout is based on the **maximum** peak ground acceleration (PGA) within a 0.05-deg box around the location, as provided by the USGS Shakemaps, subject to a minimum magnitude of 5.5Mw.

If a single event triggers payouts across multiple locations, payout will be the **sum** of payouts among the individual locations, subject to individual location, occurrence, and term aggregates.

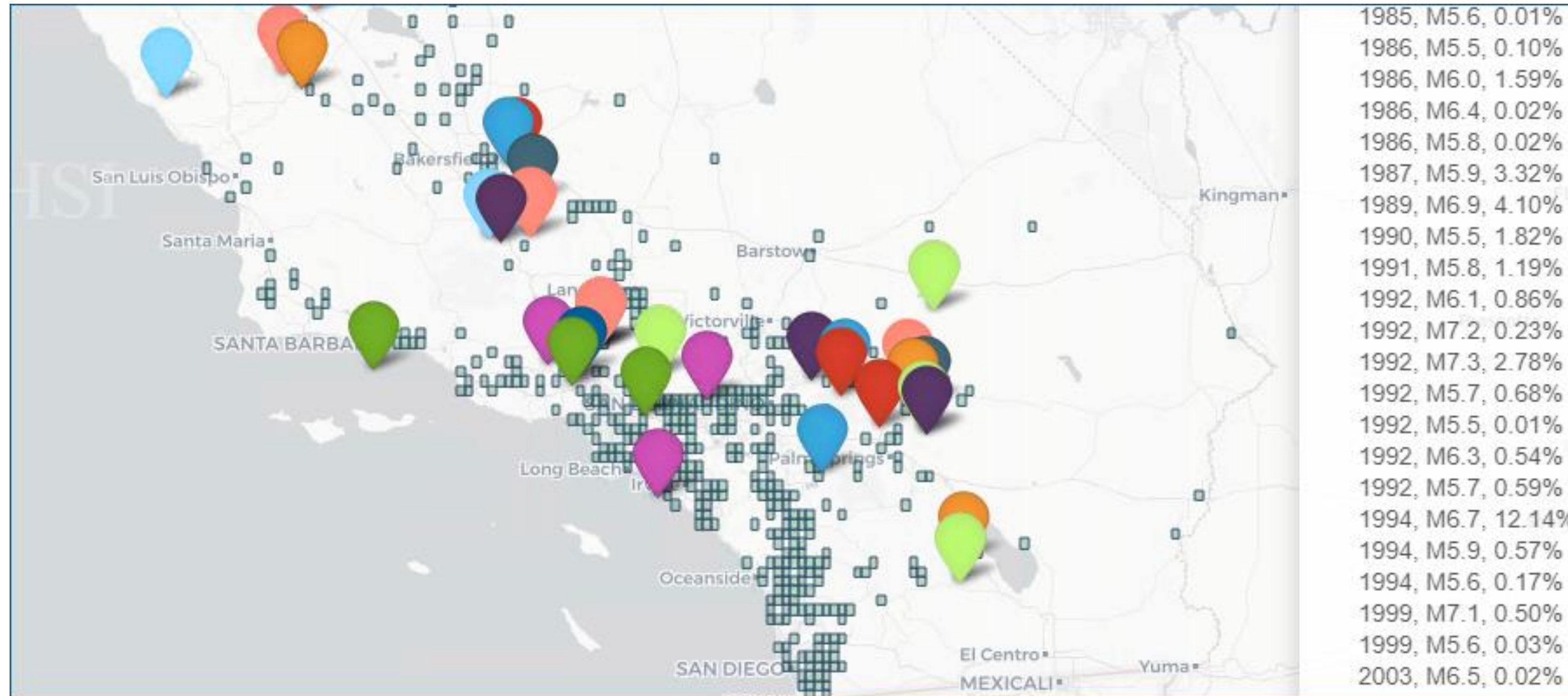
# Understanding the Parametric Claims Process

How will parametric claims be adjudicated



# Hypothetical Earthquake Event

Image shows SoCal grid cells with TIV >\$1M, and historical triggering events



## Hypothetical Event Scenario

The table below shows a hypothetical earthquake event where three grid cells experience shaking.

- Grid Cell 1 experiences 22%g shaking, which equates to a payout of 20% of the assigned value of that grid cell, or \$92,440.
- Grid Cell 2 experiences 36%g shaking, which equates to a payout of 30% of the assigned value of that grid cell, or \$519,975.
- Grid Cell 3 experiences 18%g, which is below the minimum threshold of 20%g, thus does not trigger any payout.

Grid Cell	TIV within Grid Cell	Grid Cell Assigned Value (.4622% of TIV)	Hypothetical PGA	Associated Payout (% of Assigned Value)	Payout Earned
1	100,000,000	\$462,200	22%g	20%	\$92,440
2	375,000,000	\$1,733,250	36%g	30%	\$519,975
3	75,000,000	\$346,650	18%g	0%	\$0
Total	\$550,000,000	\$2,542,100	xxx	xxx	\$612,415

The combined event payout is \$612,415

# Hypothetical Earthquake Event

Translating an event payout to the individual water district level

Grid Cell	TIV within Grid Cell	Grid Cell Assigned Value (.4622% of TIV)	Hypothetical PGA	Associated Payout (% of Assigned Value)	Payout Earned
1	100,000,000	\$462,200	22%g	20%	\$92,440
2	375,000,000	\$1,733,250	36%g	30%	\$519,975
3	75,000,000	\$346,650	18%g	0%	\$0
Total	\$550,000,000	\$2,542,100	xxx	xxx	\$612,415

## Hypothetical Event Scenario

- Imagine Water District "A" has 30% of the TIV in Grid Cell 1 (\$30,000,000), and Water District "B" has 80% (\$70,000,000) of the TIV in Grid Cell 1
- Grid Cell 1 Generates a total payout of \$92,440; 20% (\$27,732) of that would be 'owed' to Water District "A" because 30% of the TIV is owned by "A". 70% of that (\$64,708) would be 'owed' to "B".
- Water District A must Certify *in writing, but without forensic accounting or loss-adjustment requirements* that it suffered at least 20% of its calculated \$27,732 payout, because Berkshire Hathaway's policy form requires certification of *at least 20% of the loss*.
- Water District B must certify *in writing, but without forensic accounting or loss-adjustment requirements* that it suffered at least 20% of its calculated \$64708 payout, because Berkshire Hathaway's policy form requires certification of *at least 20% of the loss*.
- Note: Losses *do not have to be physical in nature, or insured on any other policy form. For example, uninsured underground infrastructure, non-damage business interruption, inspections, etc. are all considered insurable economic loss for the purposes of parametric insurance loss certification.*

# Parametric Loss Certification

The only requirement to receive a parametric payout is completing the *Sworn Proof of Loss* (certifying losses exceed 20% of calculated payout)

**APPENDIX B**  
**SWORN PROOF OF LOSS**

POLICY NUMBER: \_\_\_\_\_

INSURED: \_\_\_\_\_

TO INSURER: \_\_\_\_\_

The above **Insured** hereby swears, certifies, and affirms, under the penalties of perjury, that the following is true:

1. On \_\_\_\_\_, an **Earthquake** (as defined in the policy under which the claim is being made) occurred that resulted in loss for the **Insured**;
2. Said **Earthquake** caused loss for the **Insured** equal to or greater than €\_\_\_\_\_;
3. As a result of said **Earthquake**, there has been a **Parametric Trigger** and a **Qualifying Event** as required by this policy;
4. The undersigned is authorized to execute this completed **Sworn Proof of Loss** for and/or on behalf of the **Insured**; and
5. Claim is made for the applicable Parametric Structure Payout, outlined in Appendix A of this policy, as determined by the **Company**, or the remainder of the **Aggregate Term Limit of Insurance (Specified Sum)**, whichever is less.

The furnishing of this **Sworn Proof of Loss** is not a waiver of any of the **Company's** rights.

**FOR YOUR PROTECTION CALIFORNIA LAW REQUIRES THE FOLLOWING FRAUD PREVENTION WORDING:**

**ANY PERSON WHO KNOWINGLY PRESENTS A FALSE OR FRAUDULENT CLAIM FOR THE PAYMENT OF A LOSS IS GUILTY OF A CRIME AND MAY BE SUBJECT TO FINES AND CONFINEMENT IN STATE PRISON.**

**EXECUTION (BY INSURED)**

Executed this \_\_\_ day of \_\_\_\_\_, 20\_\_

Signature \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**ACKNOWLEDGMENT (BY NOTARY PUBLIC)**

State of \_\_\_\_\_, County of \_\_\_\_\_

Sworn to (or affirmed) and described before me this \_

day of \_\_, 20\_\_\_\_, by \_\_\_\_\_

Personally Known

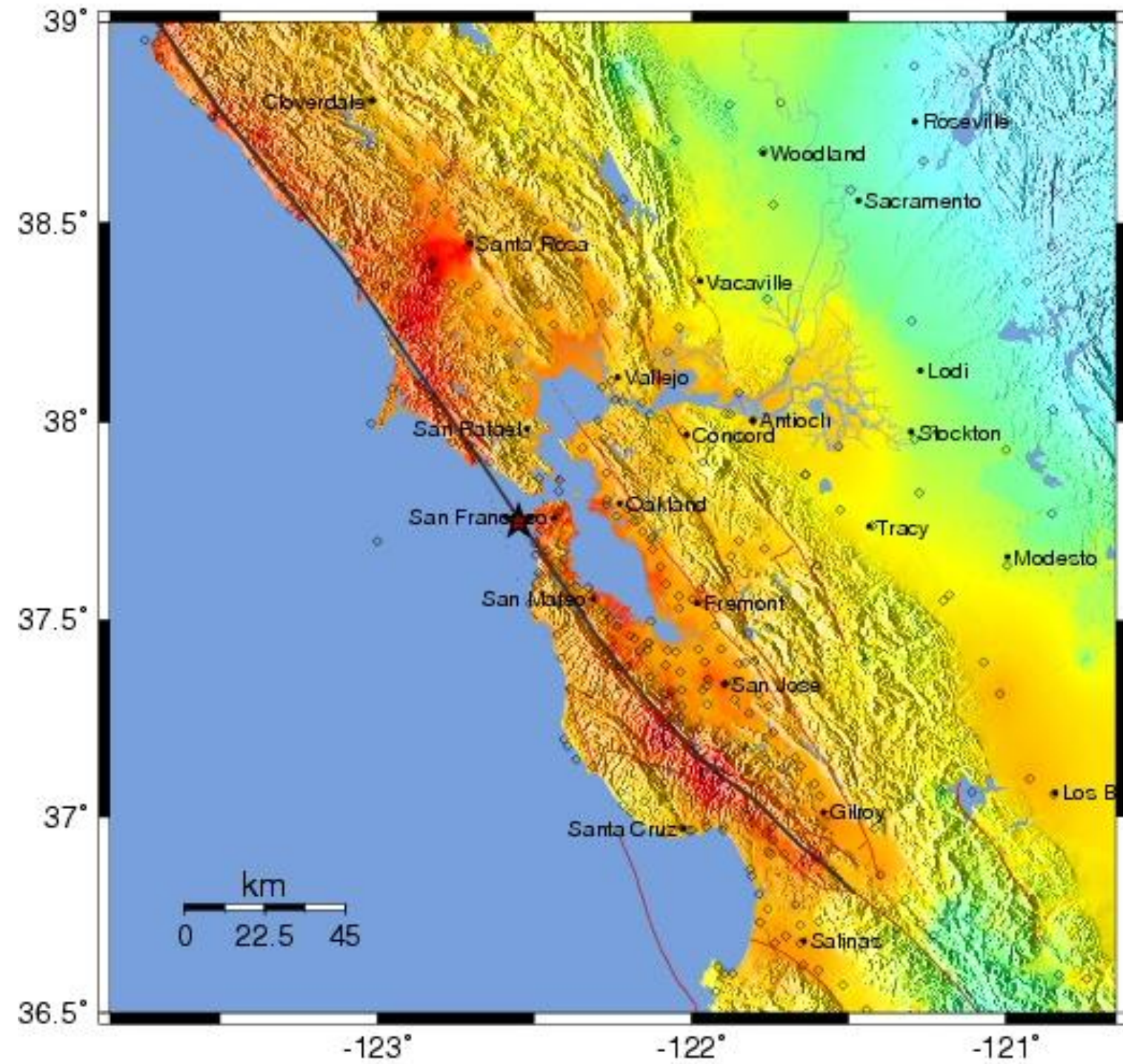
Or Produced Identification

Type of Identification Produced \_\_\_\_\_

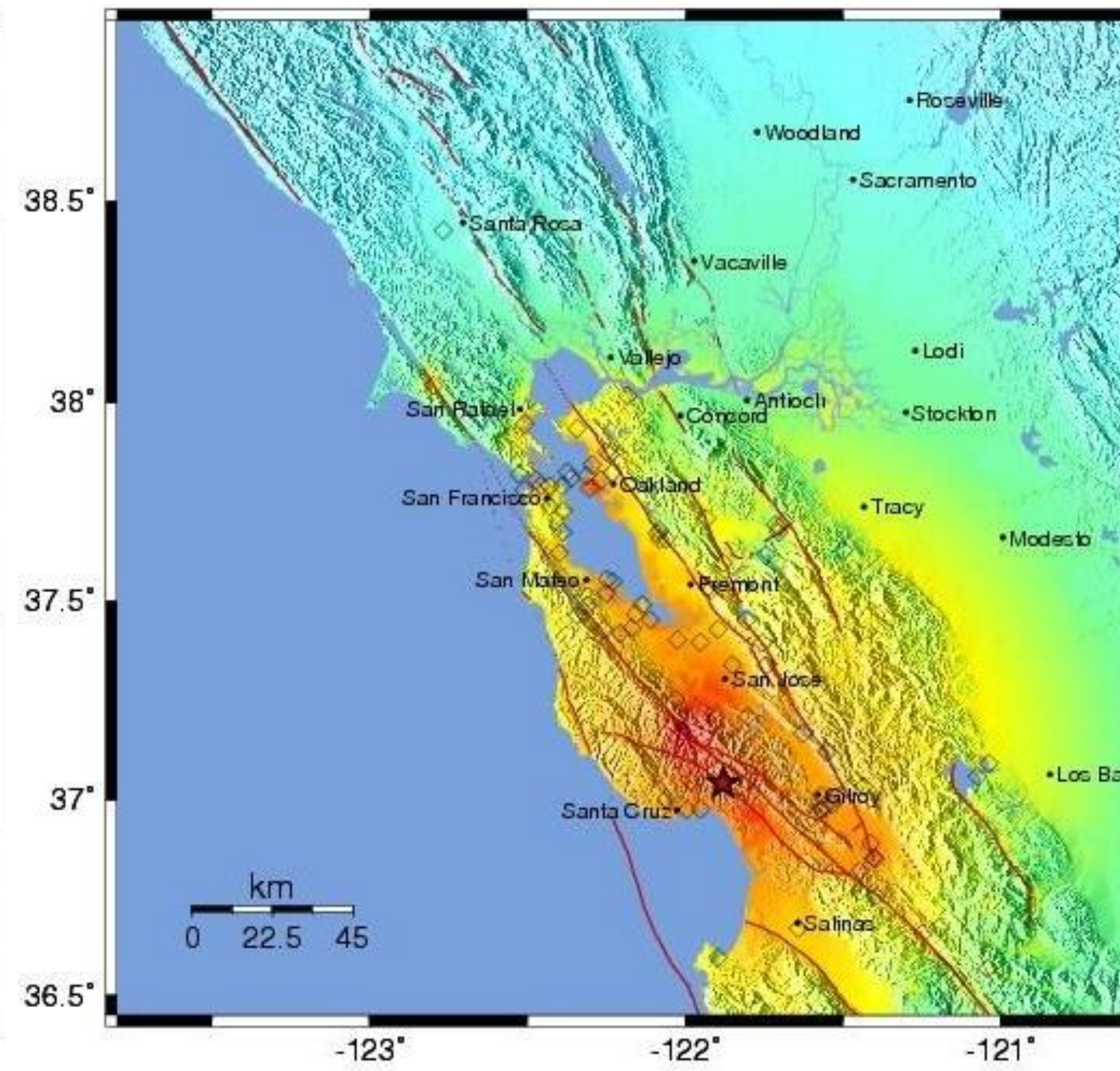
My Commission Expires:

# Selected Historical Events and as-if payouts

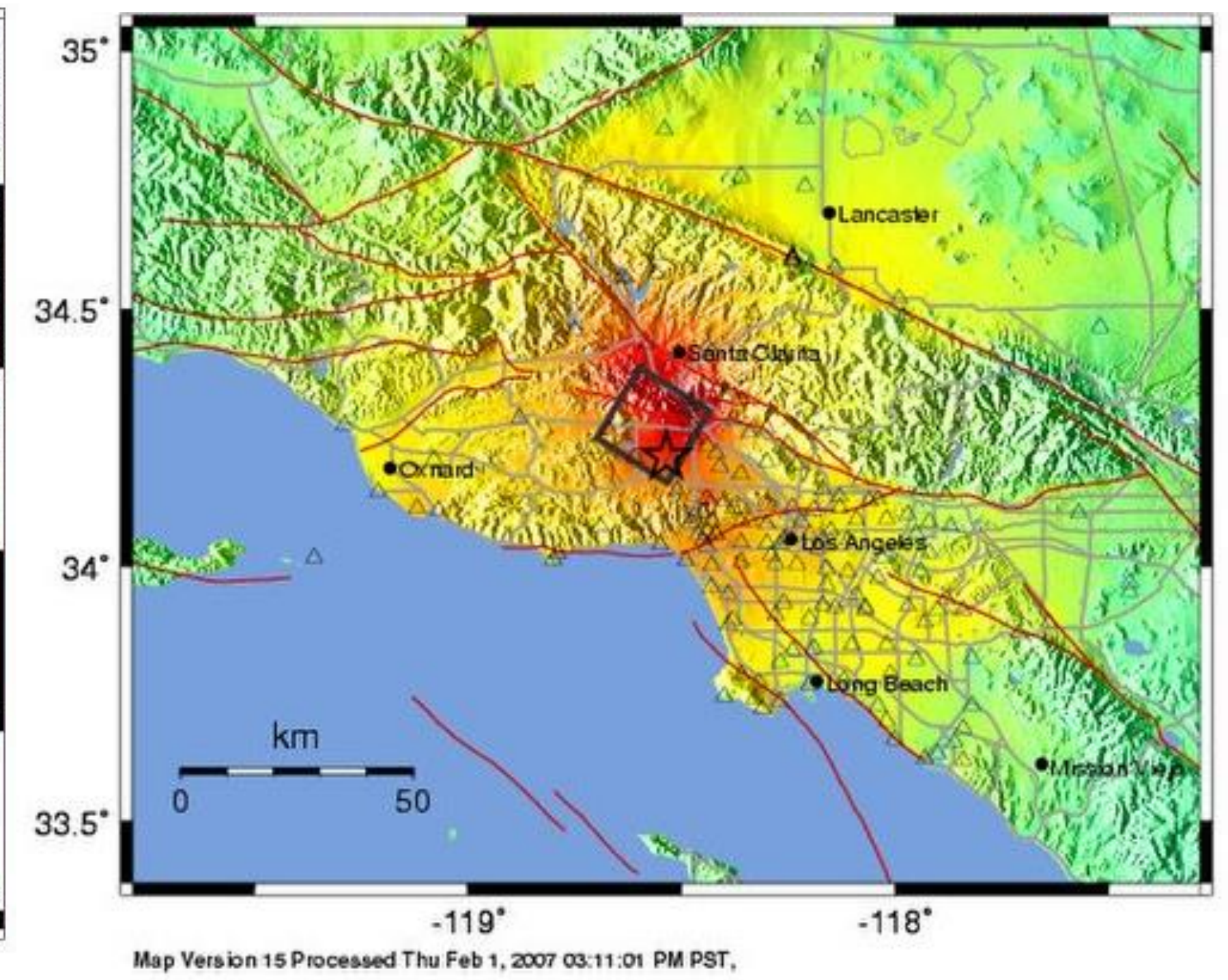
1906 San Francisco Earthquake, M7.8, Depth 10km



1989 Loma Prieta, M6.9, Depth 18km



1994 Northridge, M6.7, Depth 18km



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Parametric Payout: \$2,060,000

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
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INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Parametric Payout: \$410,000

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
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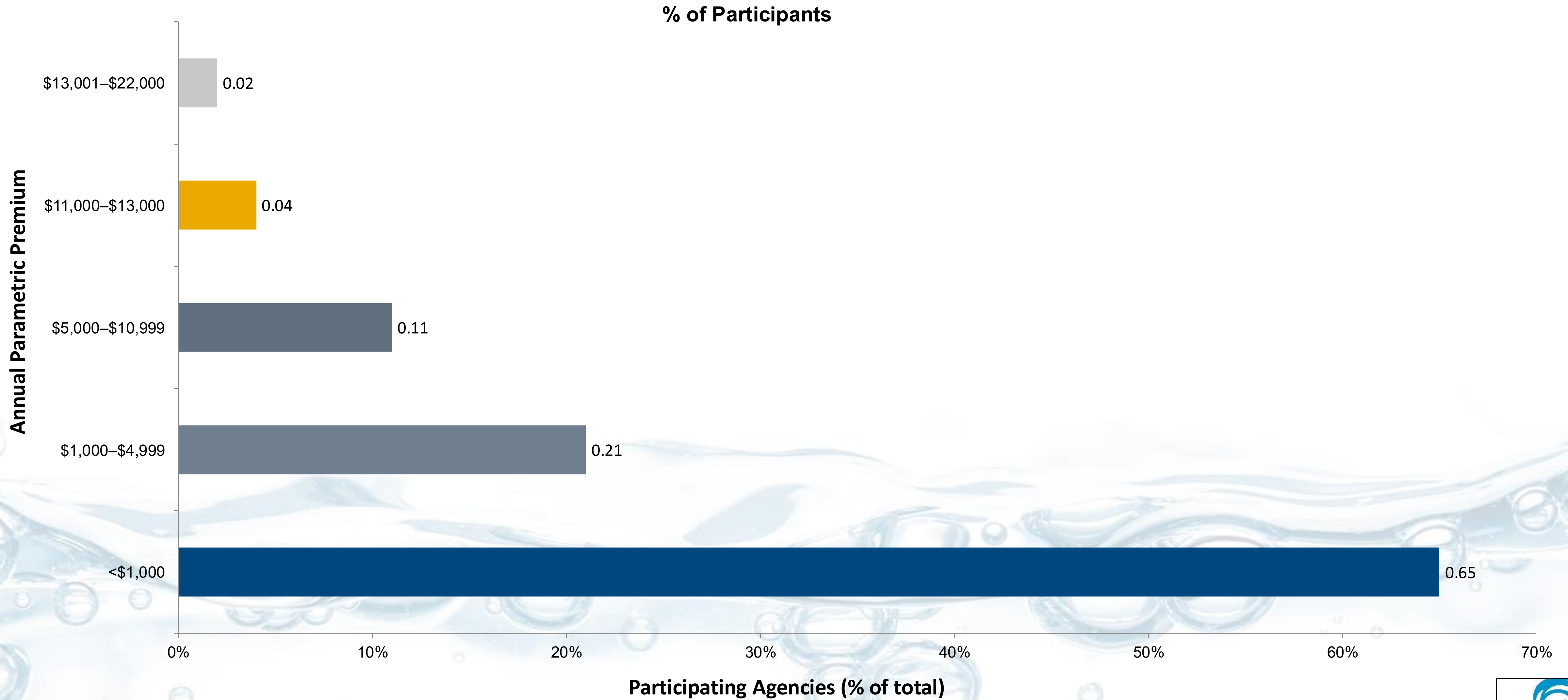
Parametric Payout: \$1,214,000

In total, the proposed policy would have triggered 36 payouts between 1906 and 2025

# FAQ

- I already have some earthquake coverage under the ACWA JPIA program, how does this dovetail with that?
  - Parametric insurance is completely independent of any property earthquake coverage under the existing program. It also does not have an “other insurance” clause, meaning parametric limits can be collected upon irrespective of any claims against the property program.
- Can I buy my own limits/higher limits?
  - Yes – any additional limits would be separate and distinct from this policy, and would be priced based on the *individual member’s exposure, rather than the entire pool’s exposure*
- What if I don’t have physical damage to my assets?
  - Parametric does not have a “source of loss” clause, nor does it name locations specifically. The coverage is provided for *the earthquake event*, which means that any financial or economic impact, whether direct, or indirect, is insurable under the parametric policy?
- What about foreshocks/aftershocks?
  - Any loss, damage, disaster, or casualty, or series of losses, damages, disasters, or casualties, arising out of or attributable directly or indirectly to an Earthquake. All loss arising due to earthquake events occurring during a **continuous period of 168 hours**, will constitute one Occurrence.

# Parametric Protection for a Stronger Property Program – Estimated Premium Distribution



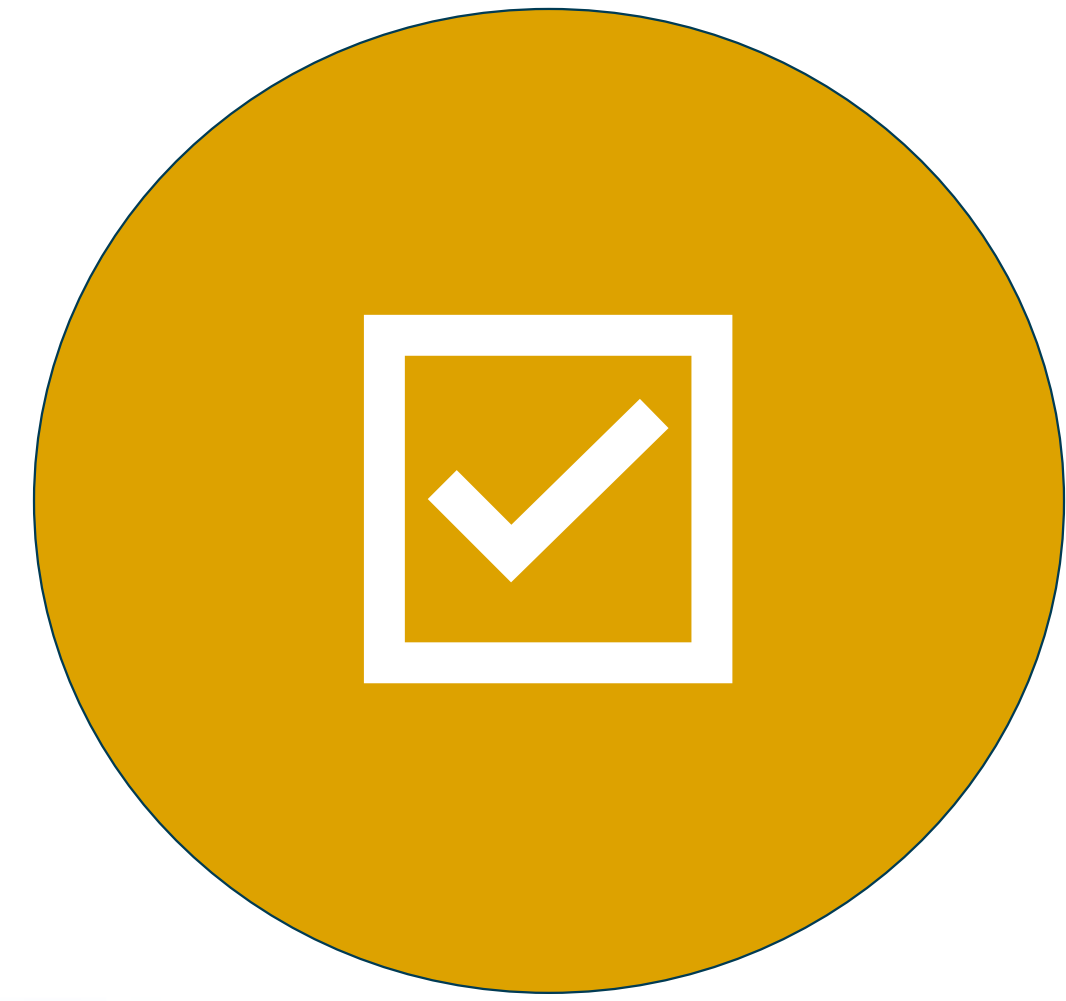
# Parametric Protection for a Stronger Property Program – Next Steps



**Property Program  
Committee Meeting  
@ March 26**



**Executive Committee  
Meeting @ March 27**



**Coverage Effective  
Date @ April 1**