

Clearing the way for regulatory approval of catastrophe models



2020 NAIC Spring Meeting – Catastrophe Working Group

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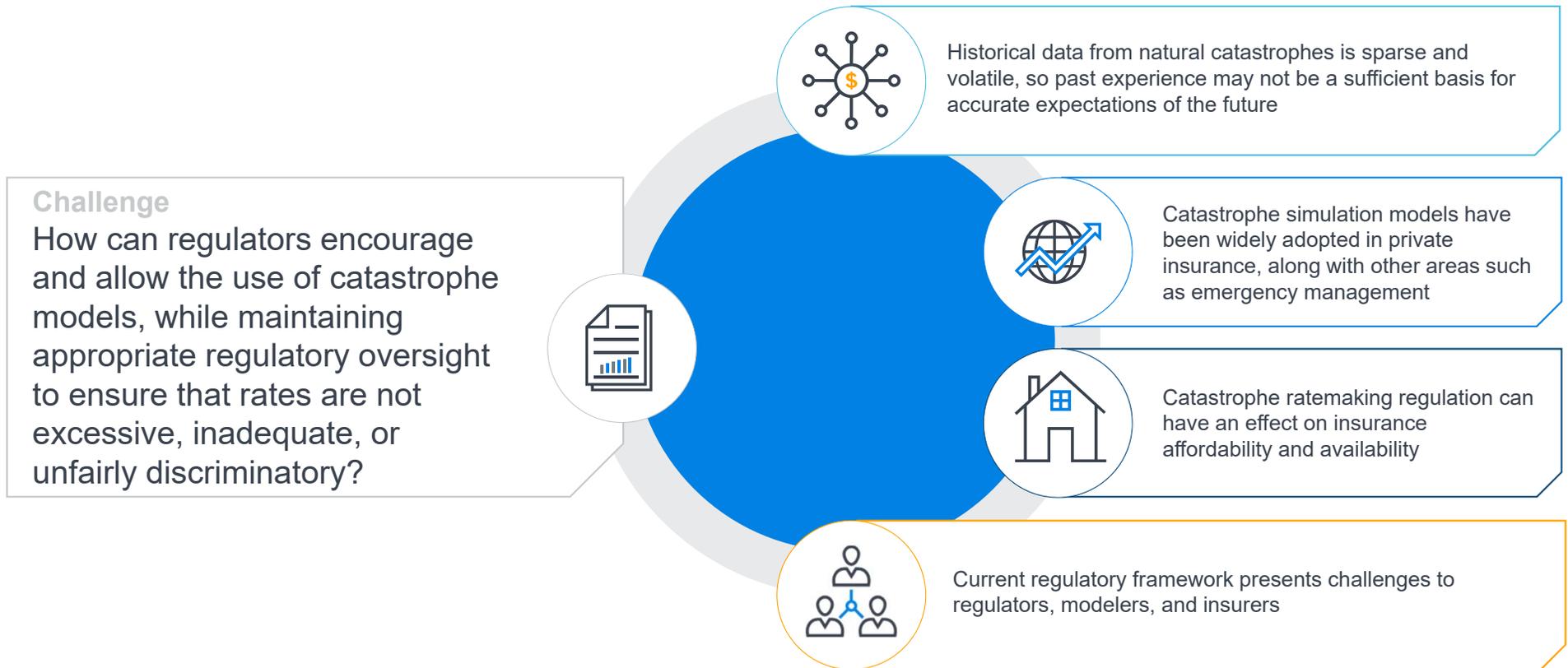


Agenda

- Background
- A tale of two markets
 - Florida
 - California
- Cat model overview and benefits
- Regulatory challenges
- Proposal for catastrophe model clearinghouse

Background

Facilitating the use of catastrophe models in ratemaking to aid insurance availability, affordability



A tale of two markets: Florida

Florida hurricane

Situation	Impact	Response	Results
<ul style="list-style-type: none">▪ Hurricane Andrew (1992) caused over \$27 billion in losses▪ Insurers learned how seriously they had underestimated exposure▪ Losses could have been much higher	<ul style="list-style-type: none">▪ Insurer insolvencies▪ Spike in reinsurance costs▪ Cancellation and nonrenewal of policies▪ Requests for large rate increases▪ Availability and affordability crisis▪ Deterioration in real estate market	<ul style="list-style-type: none">▪ FRPCJUA established in 1992, 1M policies by 1994▪ FCHLPM created in 1995 to review/approve hurricane models▪ Strengthened building codes, mandatory insurance mitigation discounts incentivized home hardening	<ul style="list-style-type: none">▪ Reduction of risk in state▪ Reduced premiums▪ More capital, formation of new domestics▪ More price and product competition▪ Better consumer choices▪ Stabilization of real estate market as insurance availability and affordability improved

Florida flood

Situation	Impact	Response	Results
<ul style="list-style-type: none">▪ NFIP \$18 billion in debt in 2012▪ Biggert Waters (2012) required flood premiums to reflect the true cost of risk▪ Subsidies and discounts on flood insurance premiums would be phased out▪ Significant flood rate increases for many NFIP policyholders	<ul style="list-style-type: none">▪ Rate increases shocked the real estate market▪ Florida particularly impacted, with over 2 million NFIP policies▪ Biggert Waters partially rolled back in 2014▪ Concerns over NFIP affordability remained	<ul style="list-style-type: none">▪ FL SB 542 passed in 2014▪ Provided private flood alternative to the NFIP▪ Allowed additional freedom in flood rating▪ Allowed open use of catastrophe models until FCHLPM developed review standards▪ Freedom to experiment for multiple years, extended to 2025	<ul style="list-style-type: none">▪ Rapid growth in private flood insurance writers, currently:<ul style="list-style-type: none">▪ 32 Primary▪ 6 Excess of NFIP▪ 2 Excess & Surplus▪ Generally underwritten and/or rated based on cat models▪ Increased availability, consumer choice▪ Better coverage options▪ Often more affordable than NFIP▪ Closing protection gap

A tale of two markets: California

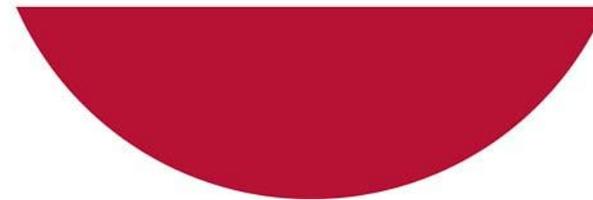
California catastrophe ratemaking

Total premium for wildfire must be based on experience and not catastrophe models

- According to the California Code of Regulations (2644.5):
 - Catastrophe losses are based on a multi-year long-term average of catastrophe claims
 - Minimum 20-year average is required for homeowners multiple peril fire
 - Adjustments for changes in historical and prospective exposure to catastrophes due to mix of business changes are required
- Current ratemaking rules for catastrophe models:
 - Not allowed for setting overall wildfire rate levels (except for Fire Following Earthquake)
 - Allowed for setting rate relativities
 - Allowed for granular territory definitions
 - Allowed for underwriting and tiering



CALIFORNIA REPUBLIC

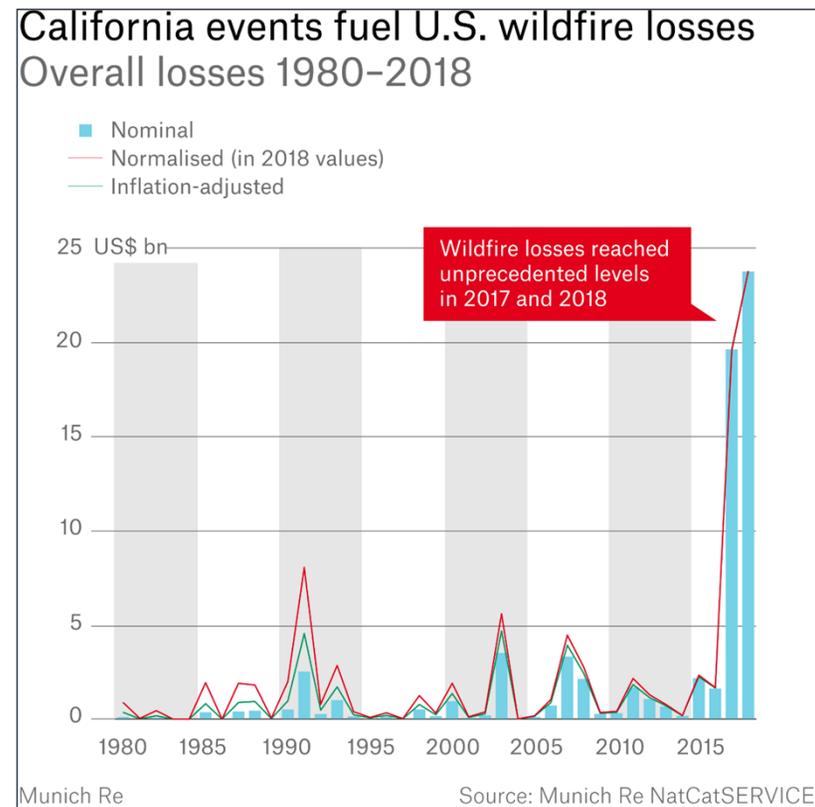


Historical experience is not sufficient for wildfire ratemaking

Recent wildfire losses have not followed historical experience

- Prior to 2017, 1991 Oakland Hills Fire was most destructive event in state history
- Unprecedented losses occurred in 2017, followed consecutively by 2018.
- If past experience is assumed to be the best basis to predict the future, how could this happen?

<https://www.munichre.com/topics-online/en/climate-change-and-natural-disasters/climate-change/climate-change-has-increased-wildfire-risk.html>



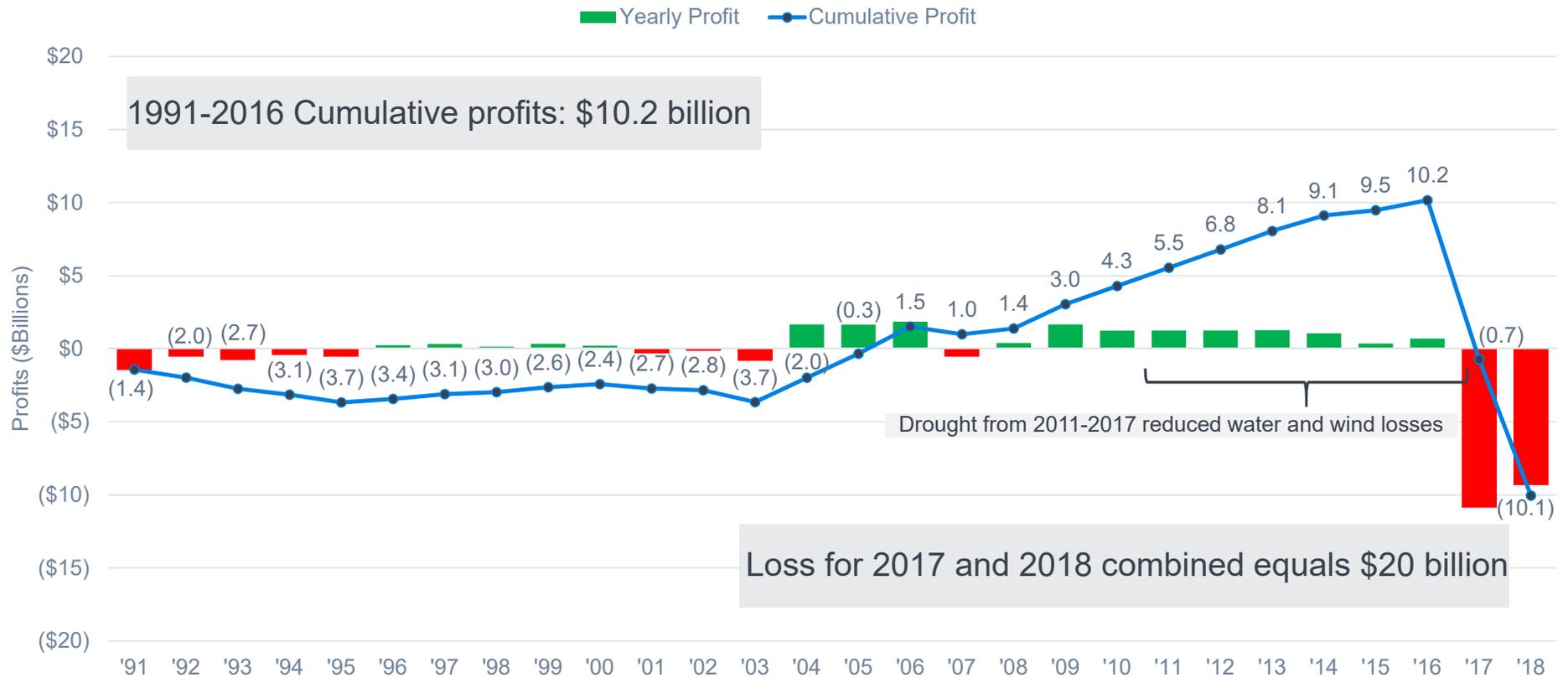
Weaknesses of CA reliance on historical data

Year	Non-CAT Loss	CAT Loss	CAT / Non-CAT Ratio	Selected Catastrophe Load
1997	101	5	5%	1997-2016 CAT Load: 11%
1998	123	14	11%	
1999	131	7	5%	1998-2017 CAT Load: 23%
2000	179	(0)	0%	
2001	216	1	1%	1999-2018 CAT Load: 53%
2002	236	8	3%	
2003	159	78	49%	
2004	183	5	3%	
2005	197	12	6%	
2006	230	7	3%	
2007	251	120	48%	
2008	320	75	23%	
2009	334	3	1%	
2010	332	3	1%	
2011	396	17	4%	
2012	345	2	1%	
2013	386	0	0%	
2014	350	22	6%	
2015	394	145	37%	
2016	403	14	4%	

- Creates huge volatility in catastrophe rates from year to year
- Only supports rate changes once events have been experienced
- Does not necessarily reflect changes in exposure
- Will tend to understate exposure in times of increasing risk, possibly materially

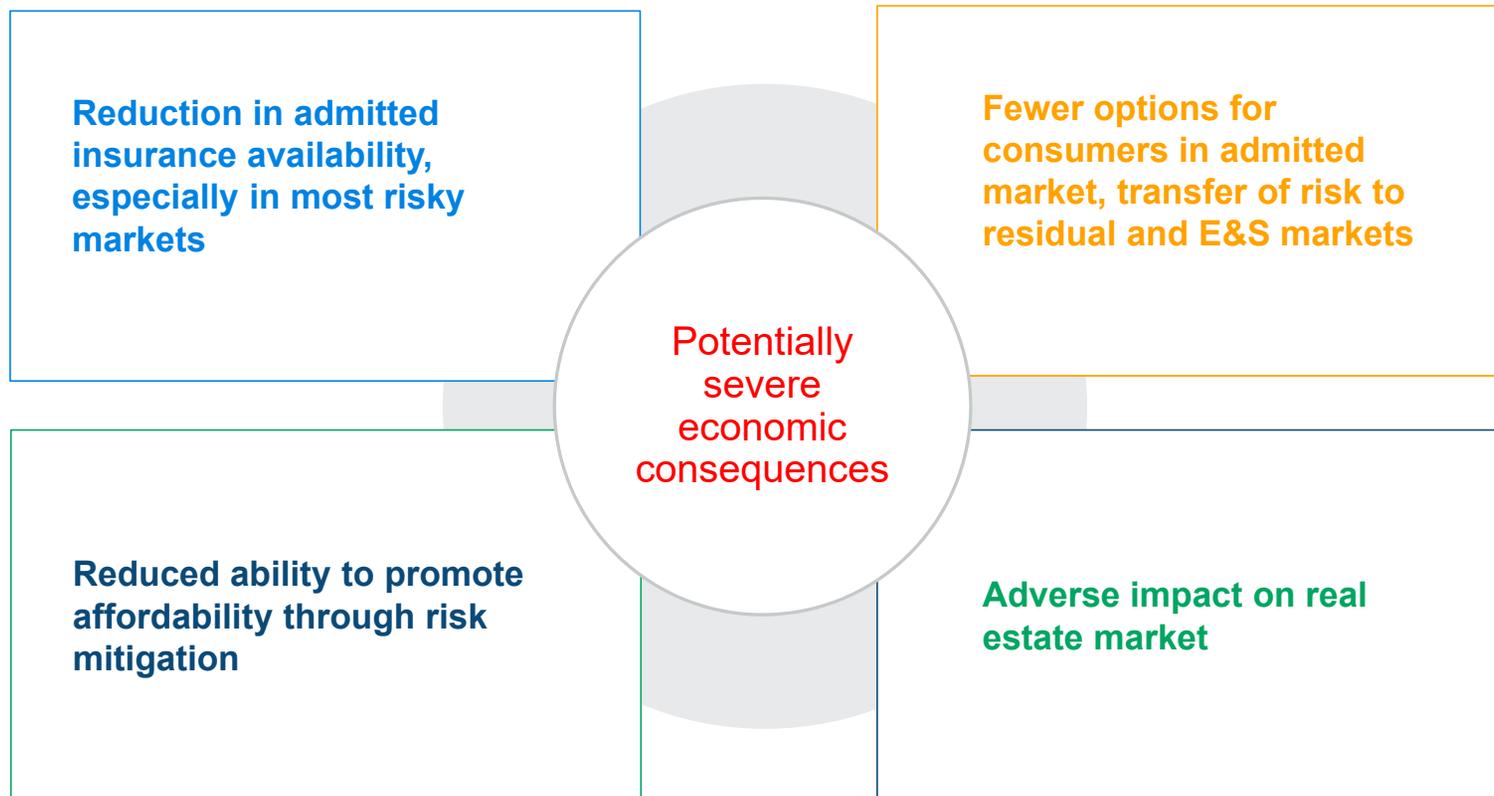
Homeowners insurance profitability

CA Homeowner Estimated Industry Underwriting Profits Since 1991



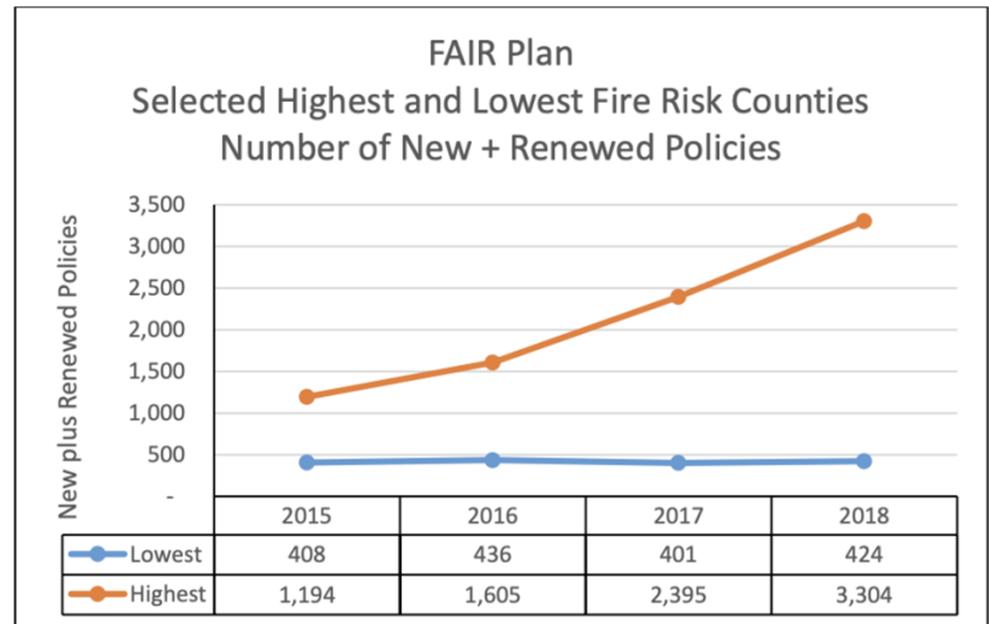
Source: Milliman Estimates, based on P&C Combined Industry Annual Statement data from SNL and data from the California Department of Insurance

Potential prognosis for California under status quo



Disadvantages of E&S and residual market solutions

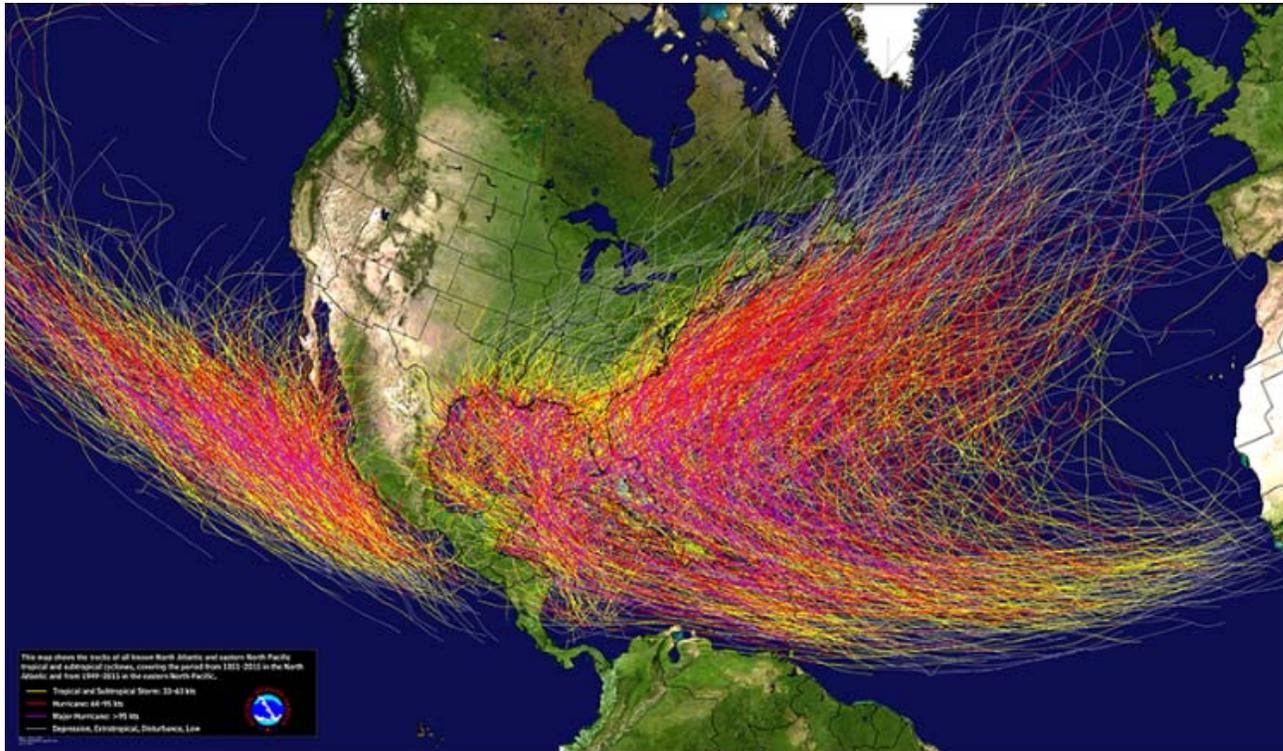
- E&S and residual market (FAIR plan) growing rapidly
- Residual and E&S insurers permitted to use catastrophe models
- Implications for consumers:
 - Higher costs
 - Potentially reduced coverage
 - Less guarantee fund protection
 - Lack of regulatory oversight of rates, market conduct, solvency monitoring



Source: LA Times: <https://www.latimes.com/business/story/2019-08-28/hiltzik-california-fire-insurance-crisis>

Cat model overview and benefits

Models separate catastrophe risk into component parts



Paths of hurricanes from 1851 through 2015 (NOAA)

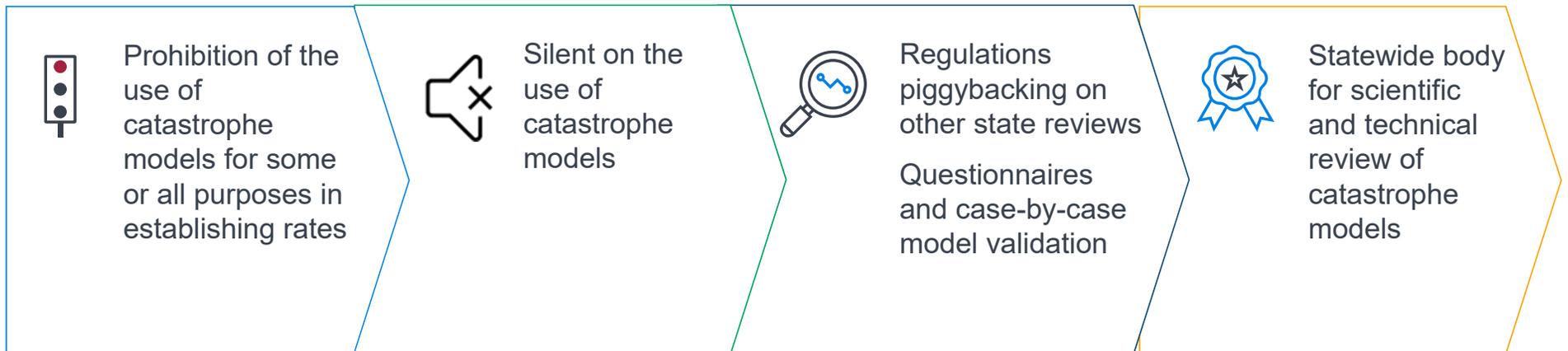
- Individual exposed risks (e.g. homes, businesses)
- Insurance purchased (e.g. limits, deductibles, coverages)
- Range of events (e.g. hurricanes, floods, wildfires)
- Intensity (physical hazard to specific geography at risk)
- Vulnerability (damage to exposed risks)
- Financial (monetary loss from the damage)

Limitations of historical experience vs. catastrophe models

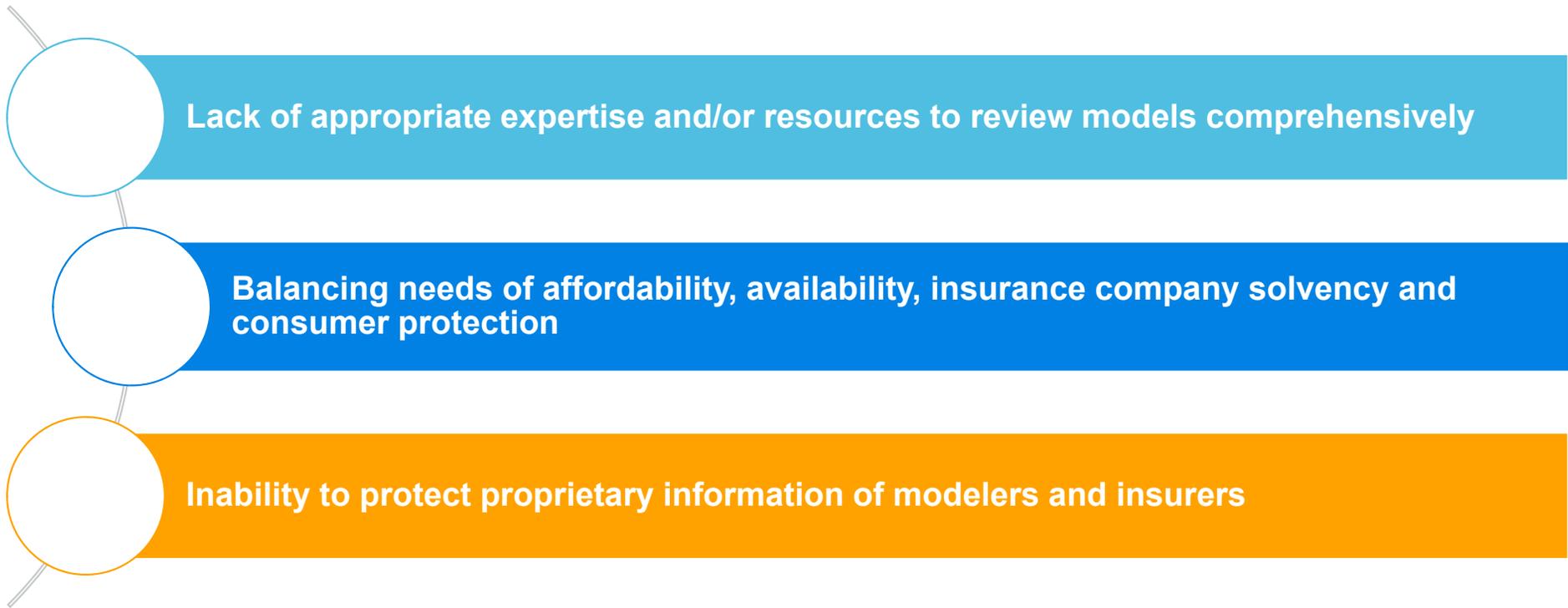
	Historical experience	Catastrophe models
Possible events	Reflects only events that actually occurred	Reflect the range of possible events and their likelihood; calibrated to reproduce historical events
Time horizon	Choice of years to include can result in materially different outcomes	Not sensitive to choice of years
Exposure catalog	Reflect historical exposures (location, home materials, building codes)	Reflect current or prospective exposures as inputs to model
Mitigation	Difficult to adjust data in a meaningful way to show effects of mitigation	Can be built to show change in outcomes under mitigation scenarios
Scenario testing	Difficult to adjust data in a meaningful way to show effects of climate change	Can be built to show range of outcomes under climate change scenarios

Regulatory challenges

Catastrophe model treatment varies widely among states



Challenges for regulators



Proposal for catastrophe model clearinghouse

Proposal for catastrophe model clearinghouse



Multi-disciplinary panel to develop standards, select expert reviewers and manage model review process



Voluntary participation by states who wish to rely on expert model review



Third-party experts chosen by panel to perform confidential reviews

- Consistent professional review team for all models for a given peril
- Expert team would depend on nature of model but could include engineers, scientists, technologists, actuaries, claims experts, other professionals



Potential clearinghouse deliverables

- Standardized modeler disclosures
- Market basket output for state level regulatory analysis, comparison
- Third-party expert reports reviewing model compliance with standards
- Model acceptability for specific purposes

Key considerations

- *Ownership/structure:* What organizational/control structure will be mutually acceptable to regulators, insurers and cat modelers?
 - Needs to be able to administer an independent, centralized, rigorous review process
 - One idea: Insurance Institute for Business & Home Safety (independent, nonprofit, scientific research and communications organization funded by the insurance industry)
- *Funding:* How should costs of the clearinghouse reviews be shared among the parties that benefit (states, insurers, cat modelers, others)?
- *Trade secret protection:* How will the clearinghouse ensure intellectual property and proprietary information of modelers and insurers will be protected?

Vision

- Rigorous, sound framework to evaluate complex and constantly evolving models
- Better information from clearinghouse improving ability of state regulators to fulfill oversight responsibilities without expending significant cost and resources
- Stabilization of rate indications by reducing impact of large events
- Catastrophic risk priced at actuarially sound rates that are not excessive, inadequate or unfairly discriminatory
- Competition and investment in science, data, modeling related to catastrophic risk
- Integration of community and home mitigation impacts allowing better cost-benefit analysis, incentives to reduce risk
- Greater insurance availability improving consumer choice
- Risk reduction and competition leading to more affordable insurance premiums



Thank you!

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