
America on Fire: Climate Change, Wildfires & Insuring Natural Catastrophes

Christopher C. French*

America is on fire. The damage, destruction, and loss of life caused by wildfires have exploded over the past few decades. Nine of the ten worst fire seasons have occurred in the past fifteen years, with 2017 and 2018 being the worst years ever. Despite spending approximately \$3.7 billion annually on fire suppression, more than 35,000 structures were lost to wildfires in 2017 and 2018, approximately \$32 billion in property losses occurred, and more than 100 people were killed. More than forty million homes worth approximately \$187 billion in the U.S. are currently at a high risk of destruction due to wildfires. In response to this crisis, the insurance industry has been dropping customers and refusing to insure homes that are considered at high risk for wildfires, while also excluding coverage under homeowners policies for other natural catastrophes such as floods and earth movement. As a result, natural catastrophes are largely uninsured in America today.

This Article discusses the causes of the wildfire crisis, including climate change, and ways to mitigate the crisis. It also analyzes the current insurance market for wildfires and other natural catastrophes in America. In doing so, it explores how other developed countries, such as Australia, Belgium, France, New Zealand, Norway, Spain, and Switzerland, insure natural catastrophes. It concludes by seeking to transform the insurance

* Copyright © 2020 Christopher C. French. Christopher C. French is a Professor of Practice at Penn State Law; J.D., Harvard Law School; B.A., Columbia University. The author gratefully acknowledges the legal research contributions of Amber Morris and Taylor Stark to this Article. The author also thanks Lara Fowler, Max Helveston, Rachel Herder, Ben Johnson, Jud Mathews, Adam Muchmore, Anya Prince, Dara Purvis, Victor Romero, Dan Schwarcz, Steve Ross, Jeff Stempel, Mark Storslee, Sam Thompson, and Jeff Thomas, as well as the participants in the Insurance Law section of the 2020 annual AALS conference, for providing thoughtful comments on earlier drafts of the Article. The author is also grateful to Penn State Law for hosting a workshop in which a draft of the article was discussed.

market in America for natural catastrophes by proposing the creation of a governmental insurance program that “bundles” coverages for natural catastrophes together in a single policy. Bundling the coverages would solve the correlated risk, adverse selection, and moral hazard problems that have driven private insurers from the insurance market for natural catastrophes and plague insurance programs that cover only a single catastrophic peril, such as the National Flood Insurance Program.

TABLE OF CONTENTS

INTRODUCTION	819
I. CLIMATE CHANGE AND THE CAUSES OF THE WILDFIRE CRISIS IN AMERICA	826
A. <i>Climate Change</i>	826
B. <i>The Other Causes of the Wildfire Crisis in America</i>	828
II. THE INSURANCE INDUSTRY’S RESPONSE TO THE WILDFIRE CRISIS	831
A. <i>Wildfires and Correlated Risks</i>	831
B. <i>Insurers’ Reaction to the 2017 and 2018 Wildfires</i>	834
C. <i>Reinsurance and Catastrophe Bonds as Alternative Risk Transfer Mechanisms</i>	839
III. WAYS TO MINIMIZE WILDFIRE DAMAGE	841
A. <i>Reverse Climate Change</i>	841
B. <i>Reduce Wildfire Fuels</i>	843
C. <i>Reduce or Eliminate Construction in the Wildland Urban Interface</i>	844
D. <i>Reduce the Risk of Homes Burning Through Building Codes</i>	845
IV. INSURING WILDFIRE LOSSES AND OTHER NATURAL CATASTROPHES	846
A. <i>The Importance of Insurance</i>	846
B. <i>The Case for a Governmental Insurance Program to Cover Natural Catastrophes</i>	847
C. <i>The Case for “Bundled” Insurance Instead of Standalone Insurance for Specific Natural Catastrophes</i>	854
D. <i>The Case Against a Governmental Insurance Program for Natural Catastrophes</i>	858
E. <i>Insurance for Natural Catastrophes in Other Countries</i>	869
1. <i>Australia</i>	869
2. <i>Belgium</i>	872
3. <i>France</i>	874
4. <i>New Zealand</i>	877
5. <i>Norway</i>	879

2020]	<i>America on Fire</i>	819
	6. Spain	880
	7. Switzerland	882
	CONCLUSION.....	885

INTRODUCTION

America is on fire. The damage, destruction, and loss of life caused by wildfires have exploded over the past few decades. Nine of the ten worst fire seasons have occurred in the past fifteen years with 2017 and 2018 being the worst years ever.¹ Despite spending approximately \$3.7 billion annually on fire suppression, more than 35,000 structures were lost to wildfires in 2017 and 2018, approximately \$32 billion in property losses occurred and more than 100 people were killed.² Over nine million acres of land burned in 2017 alone.³ Experts estimate that more than forty million homes in the U.S., worth approximately \$187

¹ See Leigh Barton, Note, *Let It Burn: An Argument for an Adaptive Resilience Approach to Federal Wildfire Management in the Western United States*, 30 GEO. ENVTL. L. REV. 695, 697 (2018); see also WILDFIRES AND CLIMATE CHANGE: CALIFORNIA’S ENERGY FUTURE, A REPORT FROM GOVERNOR NEWSOM’S STRIKE FORCE 1 (2019), <https://www.gov.ca.gov/wp-content/uploads/2019/04/Wildfires-and-Climate-Change-California%E2%80%99s-Energy-Future.pdf> [https://perma.cc/EM9C-MC2V] [hereinafter STRIKE FORCE REPORT] (“Fifteen of the 20 most destructive wildfires in the state’s history have occurred since 2000; ten of the most destructive fires have occurred since 2015.”).

² See STEPHEN L. QUARLES & KELLY POHL, HEADWATERS ECON., BUILDING A WILDFIRE-RESISTANT HOME: CODES AND COSTS 7 (2018), <https://headwaterseconomics.org/wp-content/uploads/building-costs-codes-report.pdf> [https://perma.cc/2F25-YCXM]; AM. PROP. CAS. INS. ASS’N, THE RISK OF WILDFIRES IS GROWING 2 (2019), http://www.pciaa.net/docs/default-source/industry-issues/8_wildfires.pdf [https://perma.cc/YG4W-5SLQ]; STRIKE FORCE REPORT, *supra* note 1, at 5; Katherine Blunt & Russell Gold, *PG&E Delayed Safety Work on Power Line that Is Prime Suspect in California Wildfire*, WALL ST. J. (Feb. 27, 2019, 1:42 PM), <https://www.wsj.com/articles/pg-e-delayed-safety-work-on-power-line-that-is-prime-suspect-in-california-wildfire-11551292977> [https://perma.cc/KKZ5-KT4T] [hereinafter *PG&E Delayed Safety Work*]; Russell Gold & Katherine Blunt, *Wildfires Drove PG&E to Bankruptcy, Where Utility Must Change to Survive*, WALL ST. J. (Jan. 29, 2019, 7:11 PM), <https://www.wsj.com/articles/wildfires-drove-pg-e-to-bankruptcy-where-utility-must-change-to-survive-11548807084> [https://perma.cc/JQ6L-MR95] [hereinafter *Wildfires Drove PG&E to Bankruptcy*]; Mary W. Walsh, *How Wildfires Are Making Some California Homes Uninsurable*, N.Y. TIMES (Nov. 20, 2018), <https://www.nytimes.com/2018/11/20/business/california-fires-insurance.html> [https://perma.cc/YL8T-33JN]; *Facts + Statistics: Wildfires*, INS. INFO. INST., <https://www.iii.org/fact-statistic/facts-statistics-wildfires> (last visited Sept. 2, 2020) [https://perma.cc/XL6L-TH4L].

³ See Paige Blankenbuehler & Brooke Warren, *Why Western Wildfires Are Getting More Expensive*, HIGH COUNTRY NEWS (Dec. 11, 2017), <https://www.hcn.org/issues/49.21/infographic-why-western-wildfires-are-getting-more-expensive> [https://perma.cc/Q4QK-JC2W].

billion, are currently at high risk of loss due to wildfires.⁴ Those figures do not even include the loss of business and tax revenues caused by wildfires. Nor do they consider the costs associated with the diminished air quality that accompanies wildfires.⁵

The insurance industry's response to the wildfire crisis has been to refuse to renew policies for homeowners who are at high risk for wildfire losses and to refuse to sell policies to new customers who are at high risk.⁶ The number of homeowners being dropped by their insurers has reached "tens of thousands of homeowners across the state [of California], and regulators expect more nonrenewals in the coming months."⁷ Insurers already exclude coverage in homeowners policies for other natural catastrophes such as floods, earthquakes, and landslides.⁸ By adding wildfires to the list of natural catastrophes that

⁴ See Sarah Kaplan & Frances Stead Sellers, *How They Survived: Owners of the Few Homes Left Standing Around Paradise, Calif., Took Critical Steps to Ward off Wildfires*, WASH. POST (Nov. 30, 2018, 3:15 PM), https://www.washingtonpost.com/national/how-they-survived-owners-of-the-few-homes-left-standing-around-paradise-calif-took-critical-steps-to-ward-off-wildfires/2018/11/30/db323782-f34b-11e8-80d0-f7e1948d55f4_story.html [https://perma.cc/LR2D-G2VZ]; *Facts + Statistics: Wildfires*, *supra* note 2.

⁵ See STRIKE FORCE REPORT, *supra* note 1, at 5.

⁶ See Christopher Flavelle, *As Wildfires Get Worse, Insurers Pull Back from Riskiest Areas*, N.Y. TIMES (Aug. 20, 2019), <https://www.nytimes.com/2019/08/20/climate/fire-insurance-renewal.html> [https://perma.cc/M8WF-4F8A] ("Insurers are quietly reducing their exposure to fire-prone regions across the Western United States . . ."); Nicole Friedman, *California Homeowners Face Higher Prices for a Scarce Commodity: Wildfire Insurance*, WALL ST. J. (Feb. 10, 2019, 8:00 AM), <https://www.wsj.com/articles/california-homeowners-face-higher-prices-for-a-scarce-commodity-wildfire-insurance-11549803600> [https://perma.cc/JRJ6-SP4H] [hereinafter *Wildfire Insurance*] (noting insurers are refusing to sell insurance to some homeowners or asking for substantial premium rate increases); Thomas Fuller & Ivan Penn, *California, Wary of More Wildfires, Is Paying for Them Already*, N.Y. TIMES (July 22, 2019), <https://www.nytimes.com/2019/07/22/us/california-wildfires-costs.html> [https://perma.cc/8TAT-Y5HE] (noting that a homeowner whose house was near a recent wildfire area was dropped by his insurer and other "insurance companies want five times the \$1,800 a year he currently pays"); Walsh, *supra* note 2 ("[S]ome [insurers] . . . have been declining to renew homeowners' policies in fire-prone areas.").

⁷ Nicole Friedman, *High Cost of Wildfire Insurance Hurts California Home Sales*, WALL ST. J. (Jan. 5, 2020, 5:30 AM), <https://www.wsj.com/articles/high-cost-of-wildfire-insurance-hurts-california-home-sales-11578220200> [https://perma.cc/7ULH-CT85] [hereinafter *High Cost*].

⁸ See, e.g., *Columbia Ins. Co. of Alexandria v. Lawrence*, 35 U.S. 507, 518 (1836) (noting the exclusion of coverage for earthquakes under a fire policy); *Peters Twp. Sch. Dist. v. Hartford Accident & Indem. Co.*, 833 F.2d 32, 35 (3d Cir. 1987) ("[T]he reason for the insertion of the exclusionary clause . . . in all risk insurance policies is to relieve the insurer from occasional major disasters which are almost impossible to predict and thus to insure against. There are earthquakes or floods which cause a major catastrophe and wreak damage to everyone in a large area rather than on individual policyholder.")

private insurers refuse to insure, many types of natural catastrophes losses are simply uninsured in America. In fact, Americans suffered approximately \$33 billion in uninsured natural catastrophe losses in 2018.⁹

Much of the legal scholarship regarding the relationship between climate change and insurance has focused on using insurance to influence policyholders' behavior to act to promote climate mitigation or adaptation on their insured properties rather than addressing the lack of insurance to cover natural catastrophe losses caused, in part, by climate change.¹⁰ This Article embraces many of the arguments made in the existing scholarship regarding behavior modification, but it also proposes a new approach to insuring natural catastrophes in America at a time when the damage caused by natural catastrophes is dramatically increasing.

Specifically, this Article proposes that coverage for natural catastrophe perils, including wildfires, floods, landslides and hurricanes, be "bundled" together in a single property insurance policy sold by the government.¹¹ Such a program would provide a solution to

(quoting *Wyatt v. Nw. Mut. Ins. Co.*, 304 F. Supp. 781, 782-83 (D. Minn. 1969)); *Powell v. Liberty Mut. Fire Ins. Co.*, 127 Nev. 156, 162-63 (2011) ("Earth movement exclusions were historically included in insurance policies to protect insurance companies from having to pay out on policies when a catastrophic event caused damage to numerous policyholders."); Warren Kriesel & Craig Landry, *Participation in the National Flood Insurance Program: An Empirical Analysis for Coastal Properties*, 71 J. RISK & INS. 405, 405 (2004) (discussing how insurers have historically not provided insurance for floods); Brian Mattis, *Earth Movement Claims Under All Risk Insurance: The Rules Have Changed in California*, 31 SANTA CLARA L. REV. 29, 36 (1990) (citing State Farm Fire & Cas. Co.'s Homeowners Policy Special Form 3, p. 7, Form FP-7103) (discussing the history behind earthquake insurance).

⁹ See *Facts + Statistics: U.S. Catastrophes*, INS. INFO. INST., <https://www.iii.org/fact-statistic/facts-statistics-us-catastrophes> (last visited Sept. 5, 2020) [<https://perma.cc/7RG6-5Q9G>].

¹⁰ See, e.g., Sean B. Hecht, *Climate Change and the Transformation of Risk: Insurance Matters*, 55 UCLA L. REV. 1559, 1585 (2008) (discussing how insurance can influence policyholders' responses to climate change); Howard C. Kunreuther & Erwann O. Michel-Kerjan, *Climate Change, Insurability of Large-Scale Disasters, and the Emerging Liability Challenge*, 155 U. PA. L. REV. 1795, 1836-40 (2007) (suggesting that insurers can mitigate climate change injuries by providing incentives to change policyholders' negative behaviors that are causing climate change).

¹¹ Bundling insurance coverage for numerous risks together in a single insurance policy is not new. For example, the Commercial General Liability (formerly known as the Comprehensive General Liability) policy combines various liability coverages in a single policy and has been sold in America since the 1940s. See, e.g., Jeffrey W. Stempel, *Rediscovering the Sawyer Solution: Bundling Risk for Protection and Profit*, 11 RUTGERS J.L. & PUB. POL'Y 170, 182-87 (2013) (explaining the reasoning behind the development of the CGL policy).

the problem of insuring natural catastrophes in America because it would address the correlated risk, adverse selection, and moral hazard problems associated with insuring natural catastrophes that have resulted in private insurers simply refusing to insure them. Indeed, as will be discussed in Part IV.E, many developed countries around the world already insure natural catastrophe losses through some type of governmental program. Bundling coverages for numerous types of natural catastrophe perils together in a single policy sold by the government would also solve the numerous problems that plague insurance programs that cover only a single catastrophic peril (e.g., flooding), such as the National Flood Insurance Program.

So, what caused the wildfire crisis in America? The wildfire crisis was created, in part, by a federal governmental policy in place between 1905 and the 1970s that treated all wildfires as bad and, thus, sought to suppress them as quickly as possible.¹² The consequence of that policy was the accumulation of wildfire fuel in the form of excess trees, shrubs, and brush in forests across the country.¹³ Returning forests to their natural equilibrium will take time, but many of the ways to do it are

¹² See, e.g., ROSS W. GORTE, CONG. RESEARCH SERV., RL33990, FEDERAL FUNDING FOR WILDFIRE CONTROL AND MANAGEMENT 1 (2011) (discussing previous land management policy); STEPHEN J. PYNE, PATRICIA L. ANDREWS & RICHARD D. LAVEN, INTRODUCTION TO WILDLAND FIRE 248 (2d ed. 1996) (discussing the history of forest management and wildfire suppression in America); Barton, *supra* note 1, at 698-99 (explaining how “U.S. federal wildfire management was founded on the belief that fast, aggressive control was the best, most effective management strategy”); Jamison E. Colburn, *Retreat Alternatives in NEPA: A Tool for the Perplexed*, 33 J. ENVTL. L. & LITIG. 3, 6 (2018) [hereinafter *Retreat Alternatives*] (citing STEPHEN J. PYNE, FIRE IN AMERICA: A CULTURAL HISTORY OF WILDLAND AND RURAL FIRE 275-87 (1982)) (“For much of the twentieth century, the Forest Service and Department of Interior land managers implemented what was known as the ‘10 A.M.’ policy: attacking any discovered wildfire on the lands they administer with the goal of extinguishing it by mid-morning the next day.”); Garrett D. Trego, *We Didn’t Start the Fire . . . And We Won’t Pay to Stop It: Financing Wildfire Management in America’s Wildland-Urban Interface*, 36 WM. & MARY ENVTL. L. & POL’Y REV. 595, 598-99 (2012) (discussing how the suppression policy was created “[o]ut of necessity and a sense of obligation and pride”).

¹³ See, e.g., Barton, *supra* note 1, at 698-99 (“[F]ire suppression activities had created a buildup of hazardous fuels and had changed the composition and arrangement of these fuels.”); Jamison Colburn, *The Fire Next Time: Land Use Planning in the Wildland/Urban Interface*, 28 J. LAND RESOURCES & ENVTL. L. 223, 225-26 (2008) [hereinafter *Fire Next Time*] (explaining how the longer fire is suppressed, “the more likely it will return with a vengeance”); Debra L. Donahue, *Agriculture and Forestry*, in THE LAW OF ADAPTATION TO CLIMATE CHANGE: U.S. AND INTERNATIONAL ASPECTS 351, 390 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012) (discussing the sources of wildfire fuels); Trego, *supra* note 12, at 599-602 (discussing how the fire suppression policy “created fuel buildup partially responsible for the recent increase in wildfire activity”).

known. Controlled burns and the reduction of wildfire fuels from forests are two ways of doing so.¹⁴ The federal government has been attempting to implement both techniques for a few decades now, but most of its time and money until recently had been spent fighting fires instead of addressing the root causes of the fires.¹⁵

Another cause of the wildfire crisis is climate change. Climate change has resulted in a longer and drier wildfire season.¹⁶ Addressing climate change is a worldwide collective action problem that will require a significant amount of time, effort, and worldwide cooperation.¹⁷ Consequently, because climate change needs to be addressed on a worldwide basis, as a practical matter, that means that the solution to

¹⁴ See Kimiko Barrett, *Reducing Wildfire Risk in the Wildland-Urban Interface: Policy, Trends, and Solutions*, 55 IDAHO L. REV. 3, 6 (2019); Barton, *supra* note 1, at 711; Allan Kanner & Caitrin Reilly, *Like a Phoenix Rising from the Ashes: Melding Wildfire Law into a Comprehensive Statute*, 33 J. ENVTL. L. & LITIG. 47, 60 (2018); Kathryn Young, *Chapter 638: Uniting to Fight Fire with Fire by Addressing California Forest Health in a Time of Catastrophic Wildfire*, 50 U. PAC. L. REV. 301, 305-07 (2019).

¹⁵ For example, in 2003, Congress passed the Healthy Forests Restoration Act (“HFRA”), which sought to restore the ecological benefits of wildfires by establishing programs of aggressive thinning, prescribed burning, and replanting to create open conditions in forests. See Healthy Forests Restoration Act of 2003, Pub. L. No. 108-48, § 2, 117 Stat. 1887, 1888. In 2009, Congress enacted the Federal Land Assistance, Management and Enhancement Act (“FLAME”), which sought “[t]o safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.” U.S. DEP’T OF THE INTERIOR & U.S. DEP’T OF AGRIC., *Building a Cohesive Strategy*, FORESTS & RANGELANDS, <https://www.forestsandrangelands.gov/strategy/building.shtml> (last visited Oct. 18, 2020) [<https://perma.cc/Z6TD-A4V7>]; see 43 U.S.C. § 1748b (2018); Brian Bona, *The Wildfire Crisis: How the Federal Government Has Tried to Stop the Burn*, 6 ARIZ. J. ENVTL. L. & POL’Y 1081, 1084 (2016) (“The agencies cannot adequately minimize the wildfires using fuel reduction techniques because all their funds go to emergency firefighting. Since the agencies are unable to fully engage in preventative measures, the wildfires become increasingly worse in subsequent years, which drives up the cost of fighting the fires and forces the agencies to rely further on ‘fire-borrowing.’”). See generally U.S. DEP’T OF THE INTERIOR & U.S. DEP’T OF AGRIC., *supra* (describing the National Cohesive Wildland Fire Management Strategy that was designed “to allow for inclusiveness and understanding of the complexities of managing wildfire risks across the country”).

¹⁶ See, e.g., QUARLES & POHL, *supra* note 2, at 7 (describing how “the average wildfire season is nearly three months longer”); Barton, *supra* note 1, at 697 (noting how “climate change is only worsening the threat of wildfires”); Trego, *supra* note 12, at 602 (noting “climate change in the United States has created longer fire seasons”).

¹⁷ See, e.g., Paul G. Harris, *Collective Action on Climate Change: The Logic of Regime Failure*, 47 NAT. RESOURCES J. 195, 196 (2007) (“Climate change is a collective action problem *par excellence*.”); Jonathan B. Wiener, *Think Globally, Act Globally: The Limits of Local Climate Policies*, 155 U. PA. L. REV. 101, 102 (2007) (“[L]ocal action is not well suited to regulating mobile global conduct yielding a global externality.”).

the immediate wildfire crisis in America cannot depend upon the effects of climate change being reversed in the short term.

The third cause of the wildfire crisis is urban sprawl — the development of homes and neighborhoods on the edges of forests that are prone to wildfires.¹⁸ This phenomenon has been exacerbated by the fact that many of the homes located in wildfire areas were not built to resist wildfires.¹⁹ Addressing this aspect of the problem is within the power of Americans. Where and how people build can be regulated through zoning ordinances and building codes.²⁰

The fourth cause of the wildfire crisis, which is the focus of the primary scholarly contribution of this Article, is insurers' recent refusal to insure homes at high risk for wildfire losses. Fire is and was the original peril that was covered by property insurance.²¹ Unlike other natural catastrophes, such as earthquakes and floods, fire losses traditionally have not been viewed as correlated risks, so insurers historically have covered them with little question. Correlated risks are perils that cause numerous losses in the same area at approximately the same time.²² Because many types of natural catastrophes are considered correlated risks, private insurers generally refuse to insure them. Private insurers avoid insuring correlated risks because of insurers' alleged inability to accurately predict when and where losses associated with correlated risks will occur, which in turn makes it difficult to establish

¹⁸ See, e.g., QUARLES & POHL, *supra* note 2, at 1 (describing how communities are considering adopting new building codes due to wildfires and “the wildland-urban interface”); Faith Berry, Lucian Deaton & Michele Steinberg, *Firewise: The Value of Voluntary Action and Standard Approaches to Reducing Wildfire Risk*, 48 ARIZ. ST. L.J. 181, 183 (2016) (identifying the risk “of homes in or near areas where the nature vegetation is prone to burning from wildfire”); Colburn, *Fire Next Time*, *supra* note 13, at 240-42 (noting the consequences of “human migration toward forests”); Trego, *supra* note 12, at 605-06 (articulating how urban sprawl has impacted “the frequency, intensity, and cost of wildfire suppression in the United States”).

¹⁹ See Kaplan & Sellers, *supra* note 4.

²⁰ See generally SONIA A. HIRT, *ZONED IN THE USA: THE ORIGINS AND IMPLICATIONS OF AMERICAN LAND-USE REGULATION* (2014) (providing an overview of zoning and land use planning).

²¹ See PETER J. KALIS, THOMAS M. REITER & JAMES R. SEGERDAHL, *POLICYHOLDER'S GUIDE TO THE LAW OF INSURANCE COVERAGE* § 13.02[A][1] (1st ed. 1997 & Supp. 2019) (citing RANDOLPH FIELDS, *FINDING LOST TREASURE — HISTORICAL REVIEW OF FIRST PARTY PROPERTY POLICIES* 3 (1991)).

²² See Véronique Bruggeman, Michael Faure & Tobias Heldt, *Insurance Against Catastrophe: Government Stimulation of Insurance Markets for Catastrophic Events*, 23 DUKE ENVTL. L. & POL'Y F. 185, 187 (2012); J. David Cummins, *Should the Government Provide Insurance for Catastrophes?*, 88 FED. RES. BANK ST. LOUIS REV. 337, 342-43 (2006); Adam F. Scales, *A Nation of Policyholders: Governmental and Market Failure in Flood Insurance*, 26 MISS. C. L. REV. 3, 10-11 (2006).

actuarially sound premiums and spread the risk across a large enough pool of insureds with diverse risk profiles.²³ Consequently, many losses due to natural catastrophes are either uninsured or underinsured in America.²⁴

Unlike random house fires, the wildfires that now are occurring in the West look and act like correlated risks. For example, the Camp Fire that wiped out the entire town of Paradise, California in 2018 was a correlated risk — there were numerous losses from the same peril in the same geographic area at approximately the same time.²⁵

Property policies, such as homeowners insurance, however, do not make a distinction between “regular” fires and wildfires. So, a house that is burned to the ground by a fire is covered regardless of whether the fire was caused by defective electrical wiring, an uncorrelated risk, or a wildfire, a correlated risk. Instead of redrafting homeowners policies to distinguish between correlated and uncorrelated risks of fire loss, however, insurers simply have been refusing to renew policies for homeowners in wildfire areas in recent years or attempting to increase their premiums by dramatic amounts.²⁶

This Article addresses the wildfire crisis in four parts. Part One provides a discussion regarding climate change and the other causes of the wildfire crisis in America today. Part Two discusses the insurance industry’s response to the current wildfire crisis. Part Three discusses ways to mitigate the wildfire crisis. Part Four addresses insuring wildfire and other natural catastrophe losses moving forward. In doing so, it includes an analysis regarding how other developed countries, such as Australia, Belgium, France, New Zealand, Norway, Spain, and Switzerland, insure natural catastrophe losses. Part Four also discusses the numerous problems with insuring natural catastrophes on a peril by

²³ See Bruggeman et al., *supra* note 22, at 187.

²⁴ See *Facts + Statistics: U.S. Catastrophes*, *supra* note 9 (noting that in 2018, there were approximately \$33 billion in uninsured losses caused by natural catastrophes).

²⁵ See Katherine Blunt & Russell Gold, *PG&E Says Its Equipment Was Probable ‘Ignition Point’ of Camp Fire, Takes \$11.5 Billion in Charges*, WALL ST. J. (Feb. 28, 2019, 6:24 PM), <https://www.wsj.com/articles/pg-e-records-10-5-billion-charge-related-to-camp-fire-11551363969> [https://perma.cc/V65R-WHVB] [hereinafter *Ignition Point*]; Michael Brice-Saddler, *PG&E Power Lines to Blame for California’s Deadliest Wildfire Ever, Officials Say*, WASH. POST (May 15, 2019, 6:25 PM), <https://www.washingtonpost.com/nation/2019/05/15/camp-fire-caused-by-electrical-lines-owned-operated-by-pge-authorities-say/> [https://perma.cc/3QKP-Y46X]; Nicole Friedman, *The Bond That Could Be Wiped Out by California’s Wildfires*, WALL ST. J. (Dec. 5, 2018, 5:30 AM), <https://www.wsj.com/articles/the-bond-that-could-be-wiped-out-by-californias-wildfires-1544005801> [https://perma.cc/6CF9-YMBR] [hereinafter *Fire-Bond*].

²⁶ See sources cited *supra* note 6.

peril basis, using the National Flood Insurance Program as an example of an insurance program for a single peril that is failing. Ultimately, the Article concludes by offering the solution of covering natural catastrophe risks, including wildfires, floods, landslides, and hurricanes, under a bundled property insurance policy sold by a governmental entity.

I. CLIMATE CHANGE AND THE CAUSES OF THE WILDFIRE CRISIS IN AMERICA

A. *Climate Change*

Climate change is playing a significant role in the increased intensity of wildfires in America. Prior to the industrial revolution, atmospheric carbon dioxide (“CO₂”) ranged between 180 and 280 parts per million (“ppm”) for the prior several hundred thousand years.²⁷ In recent years, the CO₂ level has been measured at greater than 400 ppm.²⁸ Humans are contributing to the increase in atmospheric CO₂ through the burning of fossil fuels and deforestation.²⁹ The average air temperature in western America has increased by approximately 2.34 degrees Fahrenheit since 1895 with most of that increase occurring since the 1970s.³⁰ Seventeen of the eighteen warmest years on record have occurred since 2000.³¹ Western America is projected to warm by another seven to twelve degrees Fahrenheit by 2100 if no global climate policy is adopted.³²

The problem of global climate change is not a recent discovery. Scientists have been warning the world about climate change since the mid-1960s with increasingly dire messages each decade.³³ By 1990, the Intergovernmental Panel on Climate Change (“IPCC”) had issued a

²⁷ See F. Joos, *The Atmospheric Carbon Dioxide Perturbation*, 27 EUROPHYSICS NEWS 213, 217 (1996).

²⁸ See C. Le Quéré et al., *Global Carbon Budget 2015*, 7 EARTH SYS. SCI. DATA 349, 351 (2015).

²⁹ See *id.* at 377-79.

³⁰ See John T. Abatzoglou & Lauren E. Parker, *Climate Change and the American West*, 54 IDAHO L. REV. 265, 270-71 (2018).

³¹ See DONALD J. WUEBBLES, DAVID W. FAHEY & KATHY A. HIBBARD, U.S. GLOB. CHANGE RESEARCH PROGRAM, CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT 13 (2017), <https://science2017.globalchange.gov> [<https://perma.cc/8B9L-5PMU>] (“Sixteen of the warmest years on record for the globe occurred in the last 17 years.”); A. Sánchez-Lugo, C. Morice, P. Berrisford & A. Argüez, *Global Surface Temperatures*, in STATE OF THE CLIMATE IN 2016, at 11, 11 (2017).

³² See Abatzoglou & Parker, *supra* note 30, at 273.

³³ See Cale Jaffe, *Melting the Polarization Around Climate Change Politics*, 30 GEO. ENVTL. L. REV. 455, 459-60 (2018).

report that stated a scientific consensus had concluded that “emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth’s surface.”³⁴

Since that initial report in 1990, each of the subsequent IPCC reports has concluded that the problem is only getting worse. For example, in 2014, the IPCC’s fifth report stated:

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased Each of the last three decades has been successively warmer at the Earth’s surface than any preceding decade since 1850.³⁵

The consequences of climate change are alarming:

Thousands of studies conducted by researchers around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; diminishing snow cover; shrinking sea ice; rising sea levels; ocean acidification; and increasing atmospheric water vapor [G]lobal average sea level has risen by about 7–8 inches since 1900, with almost half (about 3 inches) of that rise occurring since 1993 [T]he incidence of daily tidal flooding is accelerating in more than 25 Atlantic and Gulf Coast cities. Global average sea levels are expected to continue to rise . . . [and a] rise of as much as 8 feet by 2100 cannot be ruled out Heavy rainfall is increasing in intensity and frequency across the United States Heatwaves have become more frequent in the United States since the 1960s Annual trends toward earlier spring melt and reduced snowpack are already affecting water resources in the western United States and these trends are expected to continue [C]hronic, long-duration hydrological drought is increasingly possible before the end of this century The

³⁴ *Id.* at 462 (quoting CLIMATE CHANGE: THE IPCC SCIENTIFIC ASSESSMENT, at xi (J.T. Houghton et al. eds., 1990)).

³⁵ Cinnamon Carlarne, *Delinking International Environmental Law & Climate Change*, 4 MICH. J. ENVTL. & ADMIN. L. 1, 7 (2014) (quoting INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014 SYNTHESIS REPORT 2 (2015)).

incidence of large forest fires in the western United States and Alaska has increased since the early 1980s and is projected to further increase in those regions³⁶

The rising temperatures have shortened the snow cover season and created a much longer fire season with drier conditions.³⁷ In western America, the fire season has increased from 200 days in 1980 to 300 days in 2013, while Texas's and Oklahoma's fire season increased from less than 100 days to 300 days.³⁸ This longer, drier fire season due to climate change has contributed to an increase in the number and severity of wildfires. As discussed in the next part, however, climate change is only one of the causes of the wildfire crisis in America.

B. *The Other Causes of the Wildfire Crisis in America*

In addition to climate change contributing to the problem, wildfires are more common and catastrophic today than they were in the past because of forest management practices over the past century and the encroachment of civilization into wildlands over the past three decades.³⁹

By the early 1900s, wildfires were considered a bane to civilization, in part, because forests were viewed as a timber resource.⁴⁰ Consequently, the Bureau of Forestry, the predecessor to the U.S. Forest

³⁶ See WUEBBLES ET AL., *supra* note 31, at 10-11.

³⁷ See sources cited *supra* note 16.

³⁸ U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-17-357, WILDLAND FIRE RISK REDUCTION: MULTIPLE FACTORS AFFECT FEDERAL-NONFEDERAL COLLABORATION, BUT ACTION COULD BE TAKEN TO BETTER MEASURE PROGRESS 8 (2017), <https://www.gao.gov/assets/690/684545.pdf> [<https://perma.cc/7MML-G46T>] [hereinafter GAO-17-357 REPORT].

³⁹ See, e.g., LLOYD DIXON, FLAVIA TSANG & GARY FITTS, CALIFORNIA NAT. RES. AGENCY, THE IMPACT OF CHANGING WILDFIRE RISK ON CALIFORNIA'S RESIDENTIAL INSURANCE MARKET 69 (2018), https://www.energy.ca.gov/sites/default/files/2019-12/Forests_CCCA4-CNRA-2018-008_ada.pdf [<https://perma.cc/7YCT-ZNHW>] [hereinafter THE IMPACT OF CHANGING WILDFIRE RISK] (noting the importance of fuel control to wildfire risk management); GAO-17-357 REPORT, *supra* note 38, at 8 (noting specific forest management practices that have led to more severe wildfires); Berry et al., *supra* note 18, at 183-84 (describing the way urban sprawl has led to "the potential for more damaging wildfires than in past decades"); Donahue, *supra* note 13, at 388 (describing the ways human activity has contributed to catastrophic wildfires); Trego, *supra* note 12, at 602, 605 (describing the way urban sprawl and the wildfire/urban interface has contributed to the catastrophic risk associated with wildfires).

⁴⁰ See Barrett, *supra* note 14, at 7; Colburn, *Retreat Alternatives*, *supra* note 12, at 30 ("Before it was the WUI locking the federal and state governments into an assault on fire, timber and taxes did so.").

Service, was created in 1905 to fight wildfires.⁴¹ Over the next seventy years, the U.S. Forest Service spent a lot of time and money fighting fires, and it was very effective in suppressing fires.⁴²

By the 1970s, however, the U. S. Forest Service had learned that fire suppression was unnatural because certain aspects of the environment depend on fires, and fire suppression actually has some previously unrecognized negative environmental consequences.⁴³ These negative consequences include the overgrowth of forests with thick, dead underbrush that is easy to ignite and, in turn, cause more intense fires when fires inevitably occur.⁴⁴

Wildfires occur naturally and are part of a healthy ecosystem. In fact, some species of trees need fire to regenerate, as fire is needed to trigger seedling regeneration.⁴⁵ Other species need the heat from fire to crack the seed's coating to allow for germination.⁴⁶ Wildfires also restore minerals to the soil, which aids future vegetation growth.⁴⁷

⁴¹ See PYNE ET AL., *supra* note 12, at 246-47 (describing the history of forest management in America); Trego, *supra* note 12, at 598 (describing the origins of the Bureau of Forestry and the agency's purpose).

⁴² See, e.g., GORTE, *supra* note 12, at 1 ("Efforts to control wildfires were founded on a belief that fast, aggressive control was efficient."); PYNE ET AL., *supra* note 12, at 248 (describing the history of forest management in America); Barton, *supra* note 1, at 698-99 (describing a U.S. Forest Service policy that aimed "to control fires exceeding ten acres in size before 10:00 a.m. the next day"); Colburn, *Retreat Alternatives*, *supra* note 12, at 6 (citing STEPHEN J. PYNE, FIRE IN AMERICA: A CULTURAL HISTORY OF WILDLAND AND RURAL FIRE 275-87 (1982)) ("For much of the twentieth century, the Forest Service and Department of Interior land managers implemented what was known as the '10 A.M.' policy: attacking any discovered wildfire on the lands they administer with the goal of extinguishing it by mid-morning the next day."); Trego, *supra* note 12, at 599 ("With an overwhelming amount of resources, the Forest Service was extremely successful in suppressing fire for many years.").

⁴³ See, e.g., Barton, *supra* note 1, at 698-99 (describing how fire suppression led to "catastrophic and extremely difficult (and expensive) [fires] to control"); Colburn, *Fire Next Time*, *supra* note 13, at 226-27 (noting "most professionals knew that the policy of wide scale fire suppression had been a serious mistake"); Donahue, *supra* note 13, at 390 (describing the consequences of wildfire suppression); Trego, *supra* note 12, at 599-602 ("A change in policy came in the 1970s.").

⁴⁴ See sources cited *supra* note 43.

⁴⁵ See GAO-17-357 REPORT, *supra* note 38, at 8.

⁴⁶ See Trego, *supra* note 12, at 600.

⁴⁷ *Id.* at 600-01.

The immediate triggering cause of a wildfire is either lightning or humans.⁴⁸ In recent years, the vast majority of wildfires have been caused by humans.⁴⁹

Controlled fires are one means of attempting to address the buildup of fire fuels in forests that historically was used by Native Americans and early European settlers.⁵⁰ Such fires, however, sometimes get out of control and the smoke from the fires lowers air quality.⁵¹ Controlled fires also can impact the natural habitats of certain types of wildlife.⁵² Because of these negative side effects, controlled burns have not been used widely enough in western America to mimic naturally occurring wildfires.

Encroachment by civilization on the wilderness also has played a significant role in increasing the costs and damages associated with wildfires.⁵³ Most new houses today are being built in an area known as the Wildland Urban Interface (“WUI”).⁵⁴ Indeed, since 1960, there has

⁴⁸ See, e.g., Berry et al., *supra* note 18, at 185 (noting “[o]n average, 57% of the wildfires were human caused, while 43% were lightning caused”); Trego, *supra* note 12, at 600 (“Historically, wildfires in the United States occurred naturally by lightning strike, but as our population has grown, the number of human-caused wildfires has increased extraordinarily.”).

⁴⁹ See, e.g., GAO-17-357 REPORT, *supra* note 38, at 15 (“From 2001 through 2011, approximately 85 percent of wildfires in the United States were human-caused, according to the National Interagency Fire Center.”); Colburn, *Retreat Alternatives*, *supra* note 12, at 13 (citing Jennifer Balch et al., *Human-Started Wildfires Expand the Fire Niche Across the United States*, 114 PROC. NAT’L ACAD. SCI. 2946, 2946 (2017)) (“An exhaustive study of records from 1992 to 2012 by Balch and her colleagues found that about 84% of all wildfires and almost half of the total area burned stemmed from human ignitions, adding an average of 40,000 more wildfires per year.”).

⁵⁰ See Barrett, *supra* note 14, at 6-7; Barton, *supra* note 1, at 711; Kanner & Reilly, *supra* note 14, at 60.

⁵¹ See sources cited *supra* note 50.

⁵² See Kanner & Reilly, *supra* note 14, at 60; Young, *supra* note 14, at 306-07.

⁵³ See, e.g., QUARLES & POHL, *supra* note 2, at 1 (noting the number of homes lost to wildfires in the last decade); Berry et al., *supra* note 18, at 182-83 (explaining the growth of the “wildland/urban interface (WUI)”); Colburn, *Fire Next Time*, *supra* note 13, at 240-41 (describing human migration toward forests); Trego, *supra* note 12, at 605 (describing the WUI as the area “where combustible homes meet combustible vegetation”).

⁵⁴ See, e.g., GAO-17-357 REPORT, *supra* note 38, at 11 (“According to the 2014 Quadrennial Fire Review, 60 percent of new homes built in the United States since 1990 were built in the WUI, which contains 46 million single-family homes, representing about 40 percent of single-family homes in the United States.”); Berry et al., *supra* note 18, at 182-83 (noting how “new development has taken place and continues to flourish in areas of historic fire occurrence and within ecosystems in which plant and animal species are fire-adapted or fire-dependent”); Colburn, *Fire Next Time*, *supra* note 13, at 240-41 (describing the “fastest growing category of real estate in America”); Donahue,

been a 720 percent increase in the number of people living in the WUI.⁵⁵ People like to live on the edge of the wilderness because of the natural scenery, access to public lands, privacy, and a rural lifestyle.⁵⁶ In some parts of the country, such as California, the lack of affordable housing in urban areas has also been driving people to move to the WUI.⁵⁷ Yet, with more homes being built on the edge of dry, combustible forests comes a greater risk of catastrophic wildfires because more homes are located in high-risk danger areas.

II. THE INSURANCE INDUSTRY'S RESPONSE TO THE WILDFIRE CRISIS

The insurance industry's response to the wildfire crisis has been both similar and dissimilar to its historical responses to insuring other natural catastrophes. This is because wildfire losses now appear to be correlated risks, yet historically insurers have always covered fire losses under property insurance.

A. Wildfires and Correlated Risks

Insurers historically have avoided insuring natural catastrophe losses that are viewed as correlated risks, and wildfires now appear to be correlated risks.⁵⁸ Correlated risks are situations where numerous people in concentrated areas have essentially the same risk of the same type of loss occurring at approximately the same time.⁵⁹ Correlated risk concerns are greatest when an insurer sells insurance only in a limited geographic area because the pool of insureds is limited, and all of the insureds in the same area are likely to face the same natural hazards at the same time. For example, people who live in the same neighborhood generally face similar risks of natural catastrophes such as flooding and earthquakes, which are classic examples of correlated risks.⁶⁰ Insurers generally attempt to avoid insuring correlated risks due to actuarial and capitalization concerns. They contend they cannot accurately predict the frequency or severity of such losses or collect enough premiums to spread the risk of loss across a large enough pool of insureds to cover

supra note 13, at 391 (discussing development in the WUI); Trego, *supra* note 12, at 605 (“The WUI is ‘the fastest growing category of real estate in America.’”).

⁵⁵ Barton, *supra* note 1, at 709.

⁵⁶ See, e.g., QUARLES & POHL, *supra* note 2, at 7.

⁵⁷ See STRIKE FORCE REPORT, *supra* note 1, at 14.

⁵⁸ See *supra* notes 22, 25 and accompanying text.

⁵⁹ See *supra* note 22 and accompanying text.

⁶⁰ See *Correlated Risks*, WORLD FIN. (June 30, 2010), <http://www.worldfinance.com/home/risk-encyclopaedia/correlated-risks> [<https://perma.cc/CQ3D-865A>].

the losses when they occur.⁶¹ Consequently, natural catastrophes that are viewed as correlated risks typically are excluded from coverage under “all risk”⁶² homeowners and “all risk” commercial property insurance policies.⁶³ In 2018, for example, there were approximately \$225 billion in losses associated with natural catastrophes worldwide, but insurance only covered \$90 billion, which means sixty percent of the losses were uninsured.⁶⁴

Wildfires appear to be correlated risks because property owners in the same geographic areas would appear to have similar risks of losing their homes to wildfires. Yet, insurers historically have not excluded wildfires from coverage under all risk homeowners and commercial property policies. There are a couple of explanations for this.

First, one person’s risk of losing her home to a wildfire is not completely correlated to a neighbor’s risk of losing her home to a wildfire because, as is discussed in Part III, a homeowner can take steps to dramatically lower the risk of wildfire damage even if a neighboring property owner does not take similar preventative steps. Consequently, fire resistant homes located in a neighborhood engulfed by a wildfire may suffer little or no damage.

Second, fire is the oldest and original peril covered by property policies, with the first fire insurance policies being sold in England in the 1660s.⁶⁵ So, instead of attempting to distinguish between regular fire losses and wildfires losses and then attempting to exclude coverage for the latter, some insurers are now simply refusing to sell property insurance to people at high risk of wildfires or dropping existing high-risk customers.⁶⁶

Insurers’ conduct in this regard is an example of a phenomenon known as “reverse adverse selection.” Adverse selection is “the disproportionate tendency of those who are more likely to suffer losses to seek insurance against those losses.”⁶⁷ The individual mandate under

⁶¹ See Bruggeman et al., *supra* note 22, at 187; Cummins, *supra* note 22, at 342-44.

⁶² “All risk” property insurance covers all risks of loss except for perils specifically excluded. See KALIS ET AL., *supra* note 21, § 13.02[B].

⁶³ See sources cited *supra* note 8.

⁶⁴ See *Insurance Covered \$90B of Natural Disaster Losses in 2018, Leaving 60% Protection Gap*, INS. J. (Jan. 22, 2019), <https://www.insurancejournal.com/news/international/2019/01/22/515420.htm> [<https://perma.cc/Z5XL-88AJ>] (citing AON, WEATHER, CLIMATE & CATASTROPHE INSIGHT – 2018 INSIGHT REPORT 2 (2018)).

⁶⁵ See ROBERT H. JERRY, II & DOUGLAS R. RICHMOND, *UNDERSTANDING INSURANCE LAW* 17 (5th ed. 2012).

⁶⁶ See *supra* notes 6, 7.

⁶⁷ Kenneth S. Abraham & Lance Liebman, *Private Insurance, Social Insurance, and Tort Reform: Toward a New Vision of Compensation for Illness and Injury*, 93 COLUM. L.

the Affordable Care Act that required everyone to have health insurance or pay a penalty is an example of adverse selection at work.⁶⁸ Insurers were concerned that only old and sick people would buy health insurance if buying health insurance were not required.⁶⁹

Reverse adverse selection, on the other hand, arises when insurers use claims and risk data to create a risk profile for each prospective insured and then charge much higher premiums to high-risk insureds or refuse to insure them entirely.⁷⁰ Indeed, if not for laws prohibiting it, insurers would refuse, for example, to sell life, health, and disability insurance to victims of domestic abuse because they are more likely to suffer injuries or death and thus, they are viewed as unprofitable, bad risks from an insurance underwriting perspective.⁷¹ Insurers also would use genetic profiling to avoid insuring certain people deemed to be at unacceptably high risks of disease or death if it were not prohibited by law.⁷² As things currently stand, in most states, insurers are allowed to drop a policyholder as a customer for many risks and lines of insurance if the policyholder is viewed as a high-risk customer.⁷³ And, as discussed in the next part, until the recent passage of a new law

REV. 75, 102 n.82 (1993); see also Tom Baker, *Containing the Promise of Insurance: Adverse Selection and Risk Classification*, 9 CONN. INS. L.J. 371, 373-75 (2003).

⁶⁸ See, e.g., 42 U.S.C. § 18091(2)(1) (2018) (intending to “broaden the health insurance risk pool to include healthy individuals, which will lower health insurance premiums”); Nat’l Fed’n of Indep. Bus. v. Sebelius, 567 U.S. 519, 548 (2012) (“[T]he mandate forces into the insurance risk pool more healthy individuals, whose premiums on average will be higher than their health care expenses. This allows insurers to subsidize the costs of covering the unhealthy individuals the reforms require them to accept.”); KENNETH S. ABRAHAM & DANIEL SCHWARCZ, *INSURANCE LAW AND REGULATION* 360 (6th ed. 2015).

⁶⁹ See source cited *supra* note 68.

⁷⁰ See, e.g., JAY M. FEINMAN, *DELAY, DENY, DEFEND: WHY INSURANCE COMPANIES DON’T PAY CLAIMS AND WHAT YOU CAN DO ABOUT IT* 14 (2010) (explaining how insurers use claims data); Baker, *supra* note 67, at 380-81 (describing an alternative approach where risk-based pricing and underwriting would be limited or prohibited and the purchase of insurance would not be required); Omri Ben-Shahar & Kyle D. Logue, *Outsourcing Regulation: How Insurance Reduces Moral Hazard*, 111 MICH. L. REV. 197, 206, 209-11 (2012) [hereinafter *Outsourcing Regulation*] (examining how insurers gain information during the underwriting process and insurers’ informational advantages); Peter Siegelman, *Adverse Selection in Insurance Markets: An Exaggerated Threat*, 113 YALE L.J. 1223, 1245, 1248-49, 1251-52, 1263 (2004) (discussing the sources of informational asymmetry between insurers and insureds).

⁷¹ See Baker, *supra* note 67, at 392.

⁷² See *id.* at 394 n.53.

⁷³ In some states, such as California, however, insurers are not allowed to drop a policyholder as a customer for two years after the policyholder has suffered a fire loss. See Walsh, *supra* note 2.

temporarily prohibiting it, insurers in California had been dropping their customers in areas at high risk for wildfires in increasing numbers in response to the wildfire crisis.⁷⁴

B. Insurers' Reaction to the 2017 and 2018 Wildfires

Insurers' refusal to sell insurance for correlated risks and the use of reverse adverse selection to avoid insuring high-risk customers is not irrational. Indeed, if an insurance company is not well capitalized and is exposed to correlated risks because its pool of insureds is located in a non-diverse geographic footprint, then the insurer is at risk for insolvency in the event of a natural catastrophe. Following Hurricane Andrew in Florida in 1992, for example, numerous insurers became insolvent.⁷⁵ And, at least one California insurer already has become insolvent due to the 2018 Camp Fire because it primarily insured property owners in Paradise, California, which lost over 90 percent of its houses as a result of the wildfire.⁷⁶

Some states, such as California, have laws designed to counter insurers' attempts to dramatically raise premium rates or refuse to renew policies for homeowners whose properties have been damaged by wildfires. Under one law, premium rates must be based on the prior twenty years of claims data, as opposed to future loss projections; thus, insurers cannot dramatically raise premium rates the year after catastrophic wildfires strike like the ones that occurred in 2017 and 2018.⁷⁷ California uses historical loss data rather than risk models to

⁷⁴ See Christopher Flavelle & Brad Plumer, *California Bans Insurers from Dropping Policies Made Riskier by Climate Change*, N.Y. TIMES (Dec. 5, 2019), <https://www.nytimes.com/2019/12/05/climate/california-fire-insurance-climate.html> [<https://perma.cc/Z7XJ-B39V>].

⁷⁵ See LYNNE MCCHRISTIAN, INS. INFO. INST., HURRICANE ANDREW AND INSURANCE: THE ENDURING IMPACT OF AN HISTORIC STORM 4-5 (2012), https://www.iii.org/sites/default/files/paper_HurricaneAndrew_final.pdf [<https://perma.cc/ET3K-ET7C>]; Cassandra R. Cole, David A. Macpherson, Patrick F. Maroney, Kathleen A. McCullough, James W. Newman, Jr. & Charles Nyce, *The Use of Postloss Financing of Catastrophic Risk*, 14 RISK MGMT. & INS. REV. 265, 266 (2011).

⁷⁶ See Dale Kasler & Michael Finch II, *Insurer Goes Bust from Camp Fire with Millions in Claims Unpaid. How Will It Affect Paradise Homeowners?*, SACRAMENTO BEE (Dec. 3, 2018, 12:00 PM), <https://www.sacbee.com/news/state/california/fires/article222563185.html> [<https://perma.cc/7K58-3B9B>]; Kristin Lam, *Northern California Town of Paradise Lost 90% of Its Population After Camp Fire, Data Shows*, USA TODAY (July 11, 2019, 11:14 PM), <https://www.usatoday.com/story/news/nation/2019/07/11/paradise-california-population-camp-fire-california-wildfire-fund/1710525001/> [<https://perma.cc/KHU5-G77G>].

⁷⁷ See CAL. CODE REGS. tit. 10, § 2644.5 (2020) ("In those insurance lines and coverages where catastrophes occur, the catastrophic losses of any one accident year in the recorded period are replaced by a loading based on a multi-year, long-term average

establish premium rates because insurance regulators are skeptical of the accuracy of forecast models and insurers tend to err on the side of requesting unnecessarily high premium rates when making loss forecasts.⁷⁸ Nonetheless, many major insurers have sought to raise premium rates since they incurred catastrophic wildfire losses of approximately \$24 billion in 2017 and 2018.⁷⁹

Under another law, insurers are not permitted to drop policyholders as insureds for two years after a “covered disaster.”⁸⁰ That law does not, however, protect many policyholders who live in high-risk areas but were lucky enough not to be hit by the wildfires in 2017 or 2018, because insurers have been dropping them as customers in an attempt to avoid future losses by continuing to insure homes in high-risk areas.⁸¹ Indeed, Allstate Insurance Company has reduced the number of homeowners policies it sells in California by 50 percent over the past decade due to wildfire risk concerns.⁸² The difficulty of obtaining homeowners insurance in some parts of California is so great that it is also impacting homeowners’ ability to sell their houses because buyers do not think they can obtain insurance for the houses at an affordable price.⁸³

If a homeowner is unable to purchase property insurance from an insurer that is licensed and “admitted” to do business in the state, then the homeowner can seek insurance from a “surplus” insurer.⁸⁴ Surplus insurers are not regulated with the same rigor as admitted insurers.⁸⁵ For example, surplus insurers are not subject to state premium rate

of catastrophe claims. The number of years over which the average shall be calculated shall be at least 20 years for homeowners multiple peril fire . . .”).

⁷⁸ See Flavelle & Plumer, *supra* note 74.

⁷⁹ See Friedman, *High Cost*, *supra* note 7.

⁸⁰ Walsh, *supra* note 2.

⁸¹ See Flavelle, *supra* note 6; Friedman, *High Cost*, *supra* note 7.

⁸² See Flavelle, *supra* note 6; Friedman, *Wildfire Insurance*, *supra* note 6.

⁸³ See Friedman, *High Cost*, *supra* note 7.

⁸⁴ See DIXON ET AL., THE IMPACT OF CHANGING WILDFIRE RISK, *supra* note 39, at 32.

⁸⁵ See, e.g., JOHN F. DOBBYN & CHRISTOPHER C. FRENCH, INSURANCE LAW IN A NUTSHELL 517 (5th ed. 2016) (“[S]urplus line’ insurers . . . are not licensed in the state [T]he premium rates charged by surplus line insurers are unregulated, the policy provisions are not reviewed and approved by state regulators, insolvency assurances are not provided, and guaranty fund protections are unavailable.”); RAYMOND A. GUENTER & ELISABETH DITOMASSI, FUNDAMENTALS OF INSURANCE REGULATION: THE RULES AND THE RATIONALE 295 (2017) (“The activities of non-admitted insurers take place outside the jurisdiction in which the insured resides. They are shielded to a significant degree from the application of the state’s insurance laws by Constitutional due process restrictions.”).

regulation, so they generally charge higher premium rates.⁸⁶ Surplus insurers also are not covered by the state's insurance guarantee program in the event the insurer becomes insolvent, so policyholders bear the full risk of insurer insolvency.⁸⁷ Between 2018 and 2019, the number of homeowners in California being forced to purchase insurance from surplus insurers nearly doubled.⁸⁸

If a homeowner cannot purchase insurance from either an admitted or a surplus insurer in California, for example, then the homeowner can get insurance from the Fair Access to Insurance Requirements ("FAIR") Plan, which is a fire insurance pool comprised of all of the admitted insurers in the state.⁸⁹ A FAIR Plan policy provides much more limited coverage than a standard homeowners insurance policy because it does not include liability coverage or coverage for other common perils typically covered, such as water damage and theft.⁹⁰ Since 2015, the number of homeowners procuring FAIR Plan policies in California has increased by 177 percent in high-risk areas.⁹¹ And, in 2019, the FAIR Plan increased its premium rates by twenty percent.⁹²

Despite the existence of the FAIR Plan and surplus insurers, the number of admitted insurers that are dropping existing customers and refusing to enroll new customers in high-risk areas has been so significant that California recently passed a statute that prevents insurers, for one year, from dropping any customers who live in or alongside ZIP codes struck by recent wildfires.⁹³ This response by legislators to insurers' refusal to sell insurance in areas recently devastated by a natural catastrophe is not unprecedented. Following Hurricane Andrew in 1992, insurers similarly attempted to exit

⁸⁶ See DIXON ET AL., *THE IMPACT OF CHANGING WILDFIRE RISK*, *supra* note 39, at 33.

⁸⁷ *Id.* at 32.

⁸⁸ See *California's Homeowners' Insurance Market: A Report by the FAIR Plan, Informational Hearing Before the Assembly Comm. on Ins.*, 2019-20 Leg. Sess. 2 (Cal. 2019) (testimony of Clifton Brown, Vice President of Comms. & Gov't Relations, Surplus Line Ass'n of Cal.), https://ains.assembly.ca.gov/sites/ains.assembly.ca.gov/files/hearings/Hearing%20Materials_082119.pdf [<https://perma.cc/J59W-3GY7>] [hereinafter *FAIR Plan Report*].

⁸⁹ See DIXON ET AL., *THE IMPACT OF CHANGING WILDFIRE RISK*, *supra* note 39, at 33; Friedman, *Wildfire Insurance*, *supra* note 6.

⁹⁰ See DIXON ET AL., *THE IMPACT OF CHANGING WILDFIRE RISK*, *supra* note 39, at 33.

⁹¹ See Flavelle, *supra* note 6; Natalie Orenstein, *Insurance Firms Drop Berkeley Hills Homeowners, Citing Wildfire Risk*, BERKELEYSIDE (Sept. 9, 2019, 7:00 AM), <https://www.berkeleyside.com/2019/09/09/insurance-companies-give-the-boot-to-berkeley-hills-homeowners-citing-fire-risk> [<https://perma.cc/265D-GHPB>].

⁹² See *FAIR Plan Report*, *supra* note 88, at 6.

⁹³ See Flavelle & Plumer, *supra* note 74.

Florida's homeowners insurance market and the Florida state legislators similarly passed a law temporarily prohibiting them from doing so.⁹⁴

Unfortunately, for homeowners who are fortunate enough to have insurance to cover wildfire losses, most of them are grossly underinsured such that their insurance is not adequate to replace their lost homes.⁹⁵ Indeed, it is estimated that at least two thirds of insured homeowners suffering wildfire losses are underinsured.⁹⁶ This is primarily because homeowners policies do not provide "guaranteed replacement coverage" and consumers are uninformed regarding the cost to replace their homes if their homes are completely destroyed by a wildfire or another natural catastrophe. Consequently, most homeowners purchase an inadequate amount of coverage.⁹⁷

Homeowners, however, are not the only entities uninsured or underinsured with respect to wildfires. Consider, for example, Pacific Gas & Electric Corporation's ("PG&E") current plight. PG&E provides gas and electricity to sixteen million customers across a 70,000 square-mile territory.⁹⁸ Fire investigators have determined that PG&E was responsible for starting at least eighteen wildfires in California in 2017 that killed twenty-two people.⁹⁹ PG&E also has admitted that its equipment started the most devastating wildfire in California's history in 2018 — the Camp Fire — that destroyed more than 18,800 structures and killed at least eighty-five people.¹⁰⁰ California is one of two states

⁹⁴ See 1993 Fla. Laws, ch. 93-401; Jonathan Brennan Butler, *Insurers Under Fire: Assessing the Constitutionality of Florida's Residential Property Insurance Moratorium After Hurricane Andrew*, 22 FLA. ST. U. L. REV. 731, 734-35 (1995); Dwight M. Jaffee & Thomas Russell, *Catastrophe Insurance, Capital Markets, and Uninsurable Risks*, 64 J. RISK & INS. 205, 206 (1997).

⁹⁵ See Liam Denning, *Wildfire Took Your Home? Don't Count on Insurance Rebuilding It*, BLOOMBERG NEWS (Apr. 11, 2019), <https://www.bnnbloomberg.ca/wildfire-took-your-home-don-t-count-on-insurance-rebuilding-it-1.1242941> [<https://perma.cc/8WXG-55CY>].

⁹⁶ *Id.*

⁹⁷ *Id.* See generally Kenneth S. Klein, *Minding the Protection Gap: Resolving Unintended, Pervasive, Profound Homeowner Underinsurance*, 25 CONN. INS. L.J. 34 (2018) (discussing the problem of homeowner underinsurance and the legal protections for insurers).

⁹⁸ Ivan Penn, Thomas Fuller & Lisa Friedman, *PG&E Bankruptcy Tests Who Will Pay for California Wildfires*, N.Y. TIMES (Jan. 14, 2019), <https://www.nytimes.com/2019/01/14/business/energy-environment/pge-bankruptcy-california.html> [<https://perma.cc/JTH4-DPC6>] [hereinafter *Who Will Pay*]; see also Blunt & Gold, *PG&E Delayed Safety Work*, *supra* note 2.

⁹⁹ See Gold & Blunt, *Wildfires Drove PG&E to Bankruptcy*, *supra* note 2.

¹⁰⁰ See Blunt & Gold, *PG&E Delayed Safety Work*, *supra* note 2; Brice-Saddler, *supra* note 25; Friedman, *Fire-Bond*, *supra* note 25.

that hold utilities strictly liable for fires started by their equipment, so PG&E has little in the way of defenses to liability.¹⁰¹ PG&E estimates that it only has approximately \$1.4 billion in insurance to cover its liabilities.¹⁰² Yet, PG&E's wildfire liabilities were estimated at more than \$30 billion when PG&E filed for bankruptcy on January 29, 2019, and it recorded a \$10.5 billion charge for its potential Camp Fire liabilities.¹⁰³ PG&E's attorneys estimate "there are between 70,000 and 100,000 people [who are] eligible to file wildfire claims against the company."¹⁰⁴

Because PG&E provides gas and electricity to sixteen million customers, it is too big and important to simply allow it to fail as a going concern.¹⁰⁵ Consequently, on July 12, 2019, California enacted a law that creates a \$21 billion fund to pay for *future* wildfire damage caused by utilities such as PG&E.¹⁰⁶ Also, beginning in the fall of 2019, PG&E began cutting power to millions of its customers on windy days in an attempt to prevent its equipment from causing additional wildfires.¹⁰⁷ In December 2019, PG&E settled with its past victims for a total of \$13.5 billion, with some of that money going to government agencies and attorneys.¹⁰⁸ Of course, only paying \$13.5 billion on a \$30 billion liability means a lot of people will not be made whole.

¹⁰¹ Taylor Telford & Steven Mufson, *PG&E, The Nation's Biggest Utility Company, Files for Bankruptcy After California Wildfires*, WASH. POST (Jan. 29, 2019, 4:56 AM), <https://www.washingtonpost.com/business/2019/01/29/pge-nations-biggest-utility-company-files-bankruptcy-after-california-wildfires/> [https://perma.cc/L3NQ-AA8N].

¹⁰² See Friedman, *Fire-Bond*, *supra* note 25.

¹⁰³ See Blunt & Gold, *Ignition Point*, *supra* note 25; Penn et al., *Who Will Pay*, *supra* note 98.

¹⁰⁴ Peg Brickley & Gretchen Morgenson, *Fire Victims Confront PG&E Bankruptcy: Chapter 11 Rules Essentially Put a Lid on Compensation to California Wildfire Payouts*, WALL ST. J. (Nov. 9, 2019), <https://www.wsj.com/articles/pg-e-bankruptcy-protections-could-mean-less-money-for-wildfire-victims-11573252033> [https://perma.cc/KN89-3B4T].

¹⁰⁵ See Blunt & Gold, *PG&E Delayed Safety Work*, *supra* note 2; Penn et al., *Who Will Pay*, *supra* note 98.

¹⁰⁶ See Lam, *supra* note 76; Alejandro Lazo & Katherine Blunt, *California Legislature Approves Multibillion-Dollar Wildfire Fund*, WALL ST. J. (July 11, 2019), <https://www.wsj.com/articles/california-legislature-approves-multibillion-dollar-wildfire-fund-11562870591> [https://perma.cc/NG5E-8LJB].

¹⁰⁷ See Russell Gold & Katherine Blunt, *PG&E Had Systemic Problems with Power Line Maintenance, California Probe Finds*, WALL ST. J. (Dec. 3, 2019), <https://www.wsj.com/articles/pg-e-had-systemic-problems-with-power-line-maintenance-california-probe-finds-11575338873> [https://perma.cc/C2CG-CAF9].

¹⁰⁸ Ivan Penn, Lauren Hepler & Peter Eavis, *PG&E Reaches \$13.5 Billion Deal with Wildfire Victims*, N.Y. TIMES (Dec. 6, 2019), <https://www.nytimes.com/2019/12/>

C. *Reinsurance and Catastrophe Bonds as Alternative Risk Transfer Mechanisms*

There are a couple of risk transferring tools that undermine insurers' claims that they cannot insure correlated risks and thus, they should be permitted to exclude coverage for natural catastrophes or drop high-risk customers — reinsurance and catastrophe bonds. These two risk transfer mechanisms diminish the financial impact of catastrophic losses on individual insurers and therefore, they belie insurers' claims that they cannot insure high-risk people or correlated risks.

Reinsurance is a worldwide business wherein global reinsurers insure all of or portions of another insurer's portfolio of business.¹⁰⁹ Most reinsurance is sold by European and Bermuda companies.¹¹⁰ Two of the three largest reinsurers in the world, Swiss Re and Munich Re, for example, are European companies.¹¹¹ In fact, reinsurance paid sixty percent of the insured losses related to the 9/11 terrorist attacks, sixty-

06/business/energy-environment/pge-wildfire-victims-deal.html [https://perma.cc/XL6Q-EXVE].

¹⁰⁹ Christopher C. French, *The Role of the Profit Imperative in Risk Management*, 17 U. PA. J. BUS. L. 1081, 1109 (2015). See generally BARRY R. OSTRAGER & THOMAS R. NEWMAN, HANDBOOK ON INSURANCE COVERAGE DISPUTES § 15.01[a], [b] (Elisa Alcabes & Karen Cestari eds., 19th ed. 2019) (discussing reinsurance).

¹¹⁰ See, e.g., GUENTER & DITOMASSI, *supra* note 85, at 10 (“[Reinsurance] is also an international business dominated by non-U.S. companies.”); FED. INS. OFFICE, THE BREADTH AND SCOPE OF THE GLOBAL REINSURANCE MARKET AND THE CRITICAL ROLE SUCH MARKET PLAYS IN SUPPORTING INSURANCE IN THE UNITED STATES 5 (2014) (“[I]n 2013 approximately \$46 billion in total (P/C) reinsurance premiums were ceded by U.S.-based insurers to unaffiliated reinsurers; of this amount, approximately \$28.4 billion of premiums were ceded to non-U.S. reinsurers and approximately \$17.6 billion of premiums were ceded to U.S. professional reinsurers.”); U.S. GOV'T ACCOUNTABILITY OFFICE, GAO/GDD-90-82, INSURANCE REGULATION: STATE REINSURANCE OVERSIGHT INCREASED, BUT PROBLEMS REMAIN 3 (1990) (“An individual state has no direct authority to regulate reinsurers in other states or countries who are not licensed in that state.”); Daniel Schwarcz & Steven L. Schwarcz, *Regulating Systemic Risk in Insurance*, 81 U. CHI. L. REV. 1569, 1615 (2014) [hereinafter *Regulating Systemic Risk*] (“[R]einsurance is an international business—the largest companies are located in Europe and Bermuda.”); Sebastian von Dahlen & Goetz von Peter, *Natural Catastrophes and Global Reinsurance – Exploring Linkages*, CTR. FOR INS. POL'Y & RES. NEWSL., Jan. 2013, at 20, 22 n.2, http://www.naic.org/cipr_newsletter_archive/vol6_nat_cat_global_re.pdf [https://perma.cc/8XQ8-H8TF] (“US insurers cede (transfer) nearly twice as much in premium volume to European reinsurers than European insurers cede to US reinsurers.”); *Top 25 Non-Life Reinsurers: Swiss Re Leads, Berkshire Drops in A.M. Best's 2016 Ranking*, INS. J. (Sept. 12, 2016), <https://www.insurancejournal.com/news/international/2016/09/12/426023.htm> [https://perma.cc/R9Z7-SPRP] (showing that most of the world's largest reinsurers are European companies).

¹¹¹ See Schwarcz & Schwarcz, *Regulating Systemic Risk*, *supra* note 110.

five percent of the insured Hurricanes Katrina, Rita, and Wilma losses, and forty percent of the insured Hurricane Sandy losses.¹¹²

By transferring some of the risk of losses to reinsurers, insurers can spread the risk of wildfires losses in, for example, California throughout the world. Thus, by purchasing reinsurance, wildfire losses in western America are not correlated with the risk of losses of the entire pool of insureds because the pool of insureds is worldwide instead of geographically isolated.

Catastrophe bonds are bonds that are issued for specific types of catastrophes, such as wildfires, and sold to institutional investors.¹¹³ Catastrophe bonds emerged in the 1990s as a new way to diversify insurers' risks with respect to catastrophic events following Hurricane Andrew in Florida and the Northridge Earthquake in California.¹¹⁴ Typically, the investors receive interest payments on the bonds and the return of their principal at the end of the bond term unless the specified catastrophe occurs, in which case the investors forfeit their rights to the return of the principal and any additional interest payments.¹¹⁵ The retained money is then available to pay the insured losses, which means the true risk of loss is transferred from the insurer to the institutional bond holders. As of 2020, approximately \$41 billion in catastrophe bonds covering a variety of perils were outstanding.¹¹⁶

Purchasers of California wildfire catastrophe bonds likely took huge losses for the 2017 and 2018 wildfires. For example, in August 2018, PG&E sold \$200 million in catastrophe bonds.¹¹⁷ Three months later the devastating Camp Fire occurred, for which PG&E booked a \$10.5 billion loss.¹¹⁸ In total, it has been estimated that approximately \$4.6 billion in outstanding catastrophe bonds have exposure to California wildfire risks.¹¹⁹ Of course, with the massive wildfire losses in recent years, one would expect that investors' appetites for wildfire catastrophe bonds may be somewhat sated. Nonetheless, catastrophe bonds are another way that insurers can continue to cover high-risk homeowners

¹¹² See FED. INS. OFFICE, *supra* note 110, at 15.

¹¹³ See Friedman, *Fire-Bond*, *supra* note 25.

¹¹⁴ U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-02-941, CATASTROPHE INSURANCE RISKS: THE ROLE OF RISK-LINKED SECURITIES AND FACTORS AFFECTING THEIR USE 15-16 (2002).

¹¹⁵ See Scales *supra* note 22, at 46.

¹¹⁶ See *Catastrophe Bonds & ILS Risk Capital Issued & Outstanding by Year*, ARTEMIS, <https://www.artemis.bm/dashboard/catastrophe-bonds-ils-issued-and-outstanding-by-year/> (last visited Aug. 26, 2020) [<https://perma.cc/7UCF-39YF>].

¹¹⁷ See Friedman, *Fire-Bond*, *supra* note 25.

¹¹⁸ See Blunt & Gold, *Ignition Point*, *supra* note 25 (describing PG&E's economic losses following major California fires such as the 2018 Camp Fire).

¹¹⁹ See Friedman, *Fire-Bond*, *supra* note 25.

while spreading the risk of loss, rather than simply refusing to insure people who live in high-risk areas.

III. WAYS TO MINIMIZE WILDFIRE DAMAGE

Wildfires currently present a \$187 billion property risk problem, annually cause billions in unquantified business interruption losses, and cause the deaths of numerous people each year. Until the past few years, the insurance industry generally had stayed the course by continuing to cover wildfire losses, but that has changed as insurers have been refusing to renew policies for high-risk properties and are seeking premium hikes in dramatic amounts.¹²⁰ One can expect that trend to continue because the wildfire crisis is only getting worse due to climate change, past fire suppression measures, and increased property development in the WUI. Because private insurers are in the business of making money, they will not voluntarily continue to insure wildfire losses if the losses in 2017 and 2018 portend the future. Consequently, in this Part of the Article, some ways to reduce and mitigate wildfire risks are discussed.

A. Reverse Climate Change

Reversing climate change would help address the wildfire crisis. As the U.S. Global Change Research Program has stated:

The magnitude of climate change beyond the next few decades will depend primarily on the amount of greenhouse gases (especially carbon dioxide) emitted globally. Without major reductions in emissions, the increase in annual average global temperature relative to preindustrial times could reach 9°F (5°C) or more by the end of this century. With significant reductions in emissions, the increase in annual average global temperature could be limited to 3.6°F (2°C) or less.¹²¹

Thus, with the limited technologies that currently are available to capture and eliminate atmospheric CO₂, reducing global CO₂ emissions appears to be the primary means of reversing climate change.¹²²

¹²⁰ See *supra* Part II.B.

¹²¹ WUEBBLES ET AL., *supra* note 31, at 11.

¹²² See, e.g., SCI. ADVICE FOR POLICY BY EUROPEAN ACADS. CONSORTIUM, NOVEL CARBON CAPTURE AND UTILISATION TECHNOLOGIES: RESEARCH AND CLIMATE ASPECTS 8 (2018), <https://www.sapea.info/wp-content/uploads/CCU-report-proof3-for-23-May.pdf> [<https://perma.cc/4R9N-BLWM>] (indicating that new technologies, such as carbon capture and sequestration and direct air capture, are being developed and used to

Reducing global emissions, however, presents a classic collective action problem on a global scale because reducing emissions in only a single state or country will not address this global problem.¹²³ Although it is in all countries' collective interest to reduce global emissions due to climate change, it would be in each country's individual self-interest to have other countries reduce their emissions to accomplish this goal without having to reduce their own emissions because of the perceived negative economic consequences associated with reducing emissions.¹²⁴ Indeed, the free rider effect associated with collective action problems arguably is the biggest impediment to achieving a global solution to climate change. Thus, addressing climate change currently is more of a political issue than a scientific one.

At the center of the debate are concerns that emission reductions means energy cost hikes, negative economic growth, job losses, bureaucratic bloat, and governmental involvement in picking winners and losers among energy technologies.¹²⁵ Of course, these economic arguments against reducing CO₂ emissions ignore the economic costs of failing to do so — the price tag associated with increasing flood damage, violent storms, droughts, wildfires, etc.¹²⁶ These short term economic concerns, however, have resulted in the United States balking since 1990 at formally entering any of the global treaties designed to address climate change — the United Nations Framework Convention of Climate Change (“UNFCCC”), the Kyoto Protocol, and even the Paris Agreement.¹²⁷ The primary American argument against entering the Paris Agreement (which President Obama agreed to enter without Congressional ratification and from which President Trump withdrew) is that it required emission reductions from the United States while simultaneously allowing China, the United States' largest economic competitor and the world's largest CO₂ emitter, to continue increasing the amount of its CO₂ emissions until 2030.¹²⁸

remove CO₂ from the atmosphere, but they currently are not removing the amounts of CO₂ necessary to reverse climate change).

¹²³ See *supra* note 17 and accompanying text.

¹²⁴ See, e.g., Andreas Duit, *Patterns of Environmental Collective Action: Some Cross-National Findings*, 59 POL. STUD. 900 (2010) (investigating the effect of institutional structures and social capital on large-scale environmental collective action).

¹²⁵ See, e.g., Robert Sussman, *Designing the New Green Deal: Where's the Sweet Spot?*, 49 ENVTL. L. REP. 10428, 10430, 10437-40 (2019) (describing the various obstacles to durable consensus-based climate policies).

¹²⁶ See *id.* at 10438.

¹²⁷ See *id.* at 10435-36.

¹²⁸ *Id.* at 10440.

When and if there is enough political will for all of the world's primary CO₂ emitters to agree to reduce emissions, there are numerous ways a country can do so depending upon the source of the emissions at issue. In America, the primary sources of CO₂ emissions are coal fired electrical power plants, vehicles, manufacturing operations, residential and commercial buildings, and the agricultural industry.¹²⁹ The best way to deal with each of these sources is different. For example, cap and trade, where a specific amount of emissions is permitted for an industry as a whole, is an efficient means of reducing emissions associated with power plants.¹³⁰ Carbon based power plants using coal and natural gas also can be, and have been, replaced with renewable energy sources such as wind, solar, and hydro.¹³¹ To encourage the use of renewable energy for emission sources such as vehicles, on the other hand, tailpipe emission standards and tax credits toward the purchase of emission free vehicles successfully reduces vehicle emissions.¹³² These are only examples of ways to reduce emissions, and it is beyond the scope of this Article to attempt to suggest a comprehensive solution to climate change for each of the various sources of emissions.

The focus of this Article is on the wildfire crisis in America and climate change is only one aspect of that crisis. Indeed, once there is a global will to do so, it will still take decades for climate change to be halted or reversed.¹³³ The American wildfire crisis, however, is occurring now. Consequently, America cannot wait for climate change solutions or global commitments from other countries in order to respond to the wildfire crisis. It must be addressed now and by American means.

B. Reduce Wildfire Fuels

One way of reducing the risk that catastrophic wildfires present is by reducing the chances of catastrophic wildfires occurring. Reducing fire fuel sources reduces the risk of catastrophic wildfires occurring. Fire

¹²⁹ *Id.* at 10441-43.

¹³⁰ *Id.* at 10445, 10449.

¹³¹ *See id.* at 10441.

¹³² *See id.* at 10445.

¹³³ *E.g., Is It Too Late to Prevent Climate Change?*, NASA, <https://climate.nasa.gov/faq/16/is-it-too-late-to-prevent-climate-change/> (last visited Oct. 18, 2020) [<https://perma.cc/2BBZ-7TVU>] (“Even if we stopped emitting greenhouse gases today, global warming would continue to happen for at least several more decades, if not centuries. That’s because it takes a while for the planet (for example, the oceans) to respond, and because carbon dioxide — the predominant heat-trapping gas — lingers in the atmosphere for hundreds of years.”).

fuel sources used to be reduced naturally by recurring low intensity fires.¹³⁴ For example, in the California Sierra Forest, about 500,000 acres of the forest used to burn annually due to lightning strike fires two hundred years ago, but under U.S. Forestry control since the early 1900s, only about 33,000 acres have been burned annually.¹³⁵ That needs to change. In recognition of this, reducing fire fuels has become a focus of the U.S. Forest Service and Congress in recent years.¹³⁶ The U.S. Forest Services has been instructed to increase by threefold the amount of fire fuel it clears annually through controlled burns and selectively cutting down trees, as well as increasing timber production.¹³⁷ In the past, the U.S. Forest Services had been forced to spend a lot of its budgetary money fighting wildfires instead of reducing the risk of wildfires.¹³⁸

C. *Reduce or Eliminate Construction in the Wildland Urban Interface*

One of the reasons the property losses caused by wildfires in recent years have been catastrophic is because millions of people have been building and buying homes in the WUI where the risk of wildfire damage is the highest.¹³⁹ So, another way of reducing property losses caused by wildfires is to reduce the number of homes being built in the WUI. State laws or local zoning ordinances can be used to address this issue. Such laws could prohibit people from building homes in areas at high risk for wildfires. Alternatively, as discussed in the next part, if that solution is not politically feasible due to the high cost of property in urban areas and the highly valued principle of individual freedom of choice regarding where to live, then state or local building codes could require that homes built in the WUI be fire resistant.¹⁴⁰

¹³⁴ See, e.g., Donahue, *supra* note 13, at 388.

¹³⁵ See STRIKE FORCE REPORT, *supra* note 1, at 8; Scott Wilson, *Wet California Winter Is a Boon for Skiers and Water Supply. But It Brings a Threat: Wildfires.*, WASH. POST (June 17, 2019, 10:02 AM), https://www.washingtonpost.com/national/wet-california-winter-is-a-boon-for-skiers-and-water-supply-but-it-brings-a-threat-wildfires/2019/06/17/444acaa6-8bb6-11e9-b08e-cfd89bd36d4e_story.html [https://perma.cc/4JJF-JABG].

¹³⁶ See *supra* note 15.

¹³⁷ See *supra* note 15.

¹³⁸ See Bona, *supra* note 15, at 1084.

¹³⁹ See Barton, *supra* note 1, at 708-09 and accompanying text.

¹⁴⁰ See, e.g., GAO-17-357 REPORT, *supra* note 38, at 45 (“A 2013 Forest Service study found that 91 percent of WUI residents interviewed in California, where defensible space ordinances are in place, have lowered fire risk by removing flammable vegetation from their properties.”).

D. *Reduce the Risk of Homes Burning Through Building Codes*

The risk of homes burning in high-risk areas can be dramatically reduced if the homes are built to fire resistant standards.¹⁴¹ Fire resistant homes do not have flammable roofs or siding.¹⁴² They also have perimeters of 100 feet or more of non-flammable landscaping and outdoor spaces, which means no wooden fences, wooden decks, or other fire sources near the homes. In the dry and windy conditions often associated with wildfires, burning embers can travel long distances through the air, so vents also need to be covered to prevent burning embers from entering homes.¹⁴³ Indeed, two-thirds of home losses are due to flying embers or low-intensity fires, as opposed to conflagrations overtaking the homes.¹⁴⁴ Consequently, houses need a lengthy perimeter of fire resistant materials. So, for example, instead of using mulch around a house for landscaping, rock placed on top of landscape fabric can be used.

In addition to being fire resistant, rock lasts longer than mulch and thus, it also would reduce maintenance costs and efforts. Indeed, studies have shown that the cost of building a “firewise” house is actually slightly lower than the cost of building a typical house.¹⁴⁵ For homes already built, the cost of retrofitting the homes to firewise standards can be prohibitive for many homeowners,¹⁴⁶ but homeowners can still reduce the risk of wildfires destroying their homes by removing as many flammable materials as possible from the perimeter of their homes.

Numerous communities, such as San Diego, California and Flagstaff, Arizona, have recognized that making homes fire resistant is part of the solution to the wildfire crisis by adopting building codes that require the use of fire resistant materials on homes.¹⁴⁷ And, since 2008,

¹⁴¹ See, e.g., *id.* at 33 (“Firewise, which encourages homeowners to take responsibility for their own properties by using fire resistant building materials and establishing defensible space, has helped reduce risk through community education.”).

¹⁴² See Barrett, *supra* note 14, at 21-22.

¹⁴³ See QUARLES & POHL, *supra* note 2, at 8, 17, 21; GAO-17-357 REPORT, *supra* note 38, at 12 (“Even structures not immediately adjacent to wildland vegetation can be vulnerable because wind can transport embers and ignite homes more than a mile from a fire.”).

¹⁴⁴ QUARLES & POHL, *supra* note 2, at 8.

¹⁴⁵ See *id.* at 2; see also Kaplan & Sellers, *supra* note 4.

¹⁴⁶ See Kaplan & Sellers, *supra* note 4.

¹⁴⁷ See Barrett, *supra* note 14, at 22-23.

California is one of only a few states to adopt laws mandating the use of fire resistant building materials in the WUI on a statewide basis.¹⁴⁸

Using building codes to require homeowners to build homes to resist natural disasters that impact the community has been proven to work in other contexts as well. For example, since Hurricane Andrew in 1992, Florida's revised building codes have reduced losses from hurricanes by seventy-two percent.¹⁴⁹

IV. INSURING WILDFIRE LOSSES AND OTHER NATURAL CATASTROPHES

A. *The Importance of Insurance*

Private insurers should not be allowed to refuse to insure existing high-risk properties in the absence of an alternative insurance option because insurance plays a socially and financially critical role in developed countries such as America. Due to its critical social function of protecting the limited assets of individuals by spreading the risk of losses of individuals to large groups of people, insurance can be viewed as something more akin to a public financial instrument than a traditional contract between private parties.¹⁵⁰

¹⁴⁸ See QUARLES & POHL, *supra* note 2, at 7 (“Most states have not adopted a building code on a state-wide level, but rather have left local jurisdictions to decide whether and how to adopt such model codes as regulations. California is a notable exception, having adopted *Materials and Construction Methods for Exterior Wildfire Exposure* as Chapter 7A of the state building code in 2008.”); STRIKE FORCE REPORT, *supra* note 1, at 14; Donahue, *supra* note 13, at 392 (“Only California, Colorado, and Oregon have statewide wildland-urban fire regulatory codes.”).

¹⁴⁹ QUARLES & POHL, *supra* note 2, at 11.

¹⁵⁰ See, e.g., Kenneth S. Abraham, *Four Conceptions of Insurance*, 161 U. PA. L. REV. 653, 657 (2013) (describing the four conceptions of insurance, including the concept of insurance as a public utility/regulated industry); Christopher C. French, *Understanding Insurance Policies as Non-Contracts: An Alternative Approach to Drafting and Construing These Unique Financial Instruments*, 89 TEMP. L. REV. 535, 567-68 (2017) [hereinafter *Understanding Insurance Policies*] (arguing that the public policies insurance advances in ensuring compensation to victims and in transferring the risk of devastating losses from individuals to insurers are two of several reasons why insurance policies should not be treated as just contracts); Jeffrey W. Stempel, *The Insurance Policy as Social Instrument and Social Institution*, 51 WM. & MARY L. REV. 1489, 1495-1513 (2010) [hereinafter *Social Instrument*] (emphasizing the socially important role that insurance plays); Deborah A. Stone, *Beyond Moral Hazard: Insurance As Moral Opportunity*, 6 CONN. INS. L.J. 11, 26-29 (1999) (“Because virtually every adult citizen participates in various forms of mandatory insurance, from automobile liability insurance to unemployment insurance, old-age pensions and disability insurance, everyone is exposed to two of the moral assumptions of these programs: collective responsibility for the well-being of individuals and individual responsibility for the well-being of others.”).

Homeowners insurance's critical function today in developed countries is even more pronounced when one considers that homeowners insurance is effectively mandatory for most homeowners because anyone who needs to borrow money from a bank to purchase a house is required to have homeowners insurance as a prerequisite to obtaining a mortgage.¹⁵¹ Thus, because the majority of homeowners need to borrow money in order to purchase a house, homeowners insurance is effectively mandatory for most homeowners. If it is mandatory, then it needs to be available at an affordable cost because homeownership is a significant aspect of the American Dream.¹⁵² Yet, when left to the private insurance market, homeowners insurance is not available at an affordable price, or any price, for many natural catastrophes, including wildfires.¹⁵³

B. The Case for a Governmental Insurance Program to Cover Natural Catastrophes

Through the risk-transferring mechanisms of reinsurance and catastrophe bonds, as well as the risk reduction techniques that homeowners and towns can take to minimize the chances of wildfires destroying homes and towns, one can argue that wildfires losses are not really correlated risks in the way that earthquakes and floods are such that private insurers cannot insure wildfire losses. Indeed, since property insurance first became available in America over 250 years ago for the very purpose of covering fire losses, private insurers have covered fire losses — whether caused by regular fires or wildfires.¹⁵⁴

Yet, wildfires do share many of the correlated risk characteristics that are associated with other natural catastrophes. If wildfires losses are treated as correlated risks and insurers do not have adequate insurance pool risk diversity, reinsurance, or catastrophe bond cover, then this

¹⁵¹ See MARTIN F. GRACE, ROBERT W. KLEIN, PAUL R. KLEINDORFER & MICHAEL R. MURRAY, CATASTROPHE INSURANCE: CONSUMER DEMAND, MARKETS AND REGULATION 83 (2003) (“[H]omeowners insurance . . . is essentially mandatory”); Stempel, *Social Instrument*, *supra* note 150, at 1497.

¹⁵² Alcynda Lloyd, *NAR: American Dream of Homeownership Is Still Alive*, HOUSING WIRE (Jan. 14, 2019, 1:30 PM), <https://www.housingwire.com/articles/47907-nar-american-dream-of-homeownership-is-still-alive/> [<https://perma.cc/QEG7-6PGW>] (“[A]pproximately 75% of non-homeowners and 90% of current homeowners said homeownership was essential to the American Dream.”).

¹⁵³ See *supra* Part II.B.

¹⁵⁴ See, e.g., FEINMAN, *supra* note 70, at 21 (describing how the oldest extant insurance company in the United States was used to compensate fire destruction losses); JERRY & RICHMOND, *supra* note 65, at 18 (describing the first development of accident and life insurance in early America).

raises the specter of insurer insolvencies when wildfires occur such as the insurer insolvency that recently occurred in connection with the Camp Fire.¹⁵⁵ This weighs against private insurers covering the risk of wildfires.

Another factor that weighs against the current regime of private insurers covering wildfires is the fact that there generally has been market failure when it comes to private companies insuring natural catastrophes. Natural catastrophes currently are significantly underinsured in America. In 2018, for example, there were approximately \$82 billion in losses caused by natural catastrophes, including \$25.4 billion attributed to wildfires, heat waves and drought, but approximately 40 percent of those losses were not covered by insurance.¹⁵⁶ That means there is a significant underinsurance problem in America for natural catastrophes. This is unsurprising when one considers that flood damage is excluded under homeowners insurance sold by private insurers and only approximately five million of the seventy two million homeowners in America have purchased standalone flood insurance that is underwritten by the federal government.¹⁵⁷ It also is unsurprising when one consider the prevalence of underinsured homes in wildfire risk areas.¹⁵⁸ One solution to the market failure problem associated with insuring natural catastrophes would be for the federal government or state governments to assume the primary role of insuring natural catastrophe losses, including wildfire losses.¹⁵⁹

¹⁵⁵ See *supra* note 76 and accompanying text.

¹⁵⁶ See *Facts + Statistics: U.S. Catastrophes*, *supra* note 9.

¹⁵⁷ See, e.g., CONG. BUDGET OFFICE, THE NATIONAL FLOOD INSURANCE PROGRAM: FINANCIAL SOUNDNESS AND AFFORDABILITY 1 (2017), <https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/53028-nfipreport2.pdf> [<https://perma.cc/A592-NR8S>] (analyzing the five million insurance policies that cover flooding); *Sample Homeowners Policy, Section I — Exclusions, § A.3*, in KENNETH S. ABRAHAM, INSURANCE LAW AND REGULATION 206 (5th ed. 2010) (reproducing the policy containing the flood exclusion); Christopher C. French, *Insuring Floods: The Most Common and Devastating Natural Catastrophes in America*, 60 VILL. L. REV. 53, 71 (2015) [hereinafter *Insuring Floods*] (explaining that only 5.5 million of the seventy-two million homeowners in America in 2012 had flood insurance).

¹⁵⁸ See *supra* Part II.B.

¹⁵⁹ Ideally, the federal government would sponsor the natural catastrophe insurance program contemplated in this Article because it would allow for the pool of insureds to span the entire country. This would allow for the largest pool of insureds possible in America with the most diverse risk profiles. Although some states, such as Texas, are large enough and face a variety of natural catastrophe perils, such as flooding, hurricanes and wildfires, to allow for a robust pool of insureds with diverse risk profiles, in many states that would not be the case. Consequently, the risk of substantial

A governmental entity arguably is better able to insure natural catastrophes than private insurance companies. First, the managers of private insurance companies often cannot take a long-term view regarding profitability because they are owned by shareholders who demand quarterly and annual profits. This can be a problem when it comes to insuring correlated natural catastrophe risks because private insurers almost inevitably incur short term losses following a natural catastrophe.¹⁶⁰ Second, the tax laws effectively discourage private insurance companies from accumulating the large amounts of cash necessary to pay catastrophic losses in the future because the income generated by cash that is set aside to pay future losses is taxed.¹⁶¹ Third, companies with large amounts of accumulated cash, which an insurer must have in order to pay losses associated with correlated natural catastrophe losses, become attractive takeover targets for investors because many people believe that idle cash can and should be deployed for more financially rewarding purposes.¹⁶² Fourth, insurers ironically are not permitted under the current accounting rules to create reserves for the payment of future claims if the events giving rise to the claims (e.g., the actual wildfires) have not yet occurred.¹⁶³ Consequently, these laws collectively discourage private insurance companies from retaining the large amounts of cash necessary to cover correlated natural catastrophe losses that occur infrequently, but require large cash outlays when they do occur.¹⁶⁴

premium subsidization by low-risk insureds of high-risk insureds could be a problem if the state sponsored a natural catastrophe program in such states. See, e.g., Omri Ben-Shahar & Kyle D. Logue, *The Perverse Effects of Subsidized Weather Insurance*, 68 STAN. L. REV. 571, 596 (2016) [hereinafter *Subsidized Weather Insurance*] (finding that the premiums charged to coastal properties are subsidized by inland properties).

¹⁶⁰ See, e.g., *FAIR Plan Report*, *supra* note 88, at 10 (“The underwriting experience between 2001 and 2017 illustrates that an extended period of underwriting profits can be wiped out by a very large wildfire or other catastrophic event (a fire following an earthquake, for example). Underwriting profits in the Homeowners Multiple Peril and Fire lines totaled \$12.1 billion from 2001 through 2016 combined, and were almost completely wiped out by the results for 2017.” (quoting DIXON ET AL., *THE IMPACT OF CHANGING WILDFIRE RISK*, *supra* note 39, at 55)).

¹⁶¹ See Cummins, *supra* note 22, at 371-72; Jaffee & Russell, *supra* note 94, at 212.

¹⁶² See Jaffee & Russell, *supra* note 94, at 212-13.

¹⁶³ Cummins, *supra* note 22, at 371-72; Jaffee & Russell, *supra* note 94, at 209 (discussing Financial Accounting Standards Board (“FASB”) Statement No. 5 Accounting for Contingencies, which precludes an insurance company from earmarking capital surplus to pay for future catastrophic losses that have not yet occurred).

¹⁶⁴ See Jaffee & Russell, *supra* note 94, at 212.

A governmental insurance program, on the other hand, would not be incentivized to be undercapitalized. First, it would not be required to be subject to the same tax and accounting laws as private companies, so it would be in a better position to hold the large amount of idle cash needed to cover infrequent natural catastrophe losses.¹⁶⁵ Second, a governmental insurance program would not have shareholders demanding a return on their investments in the form of dividends or stock repurchases every quarter. Third, a governmental insurance program would not be a takeover target for private investors because, as a government program, it would not be available for purchase. Fourth, unlike private companies that would need to sell more shares of stock or issue bonds if it becomes necessary to raise additional capital to pay losses related to correlated natural catastrophe losses, the government has access to additional capital post-loss through its taxing power.¹⁶⁶ In short, many of the reasons that private insurers currently are poorly suited to insuring natural catastrophe risks would not apply to a governmental insurance program.

Another option for addressing the market failure that currently exists regarding insuring natural catastrophes would be for the government to act as a reinsurer for private insurers for losses that exceed a certain stated amount for any individual insurer. An advantage to that approach would be that it keeps private insurers as participants in the insurance market and it would allow for a competitive market for natural catastrophe insurance.

Of course, for the government as reinsurer approach to work, coverage for natural catastrophes would either need to be mandatory under property policies or the reinsurance attachment point would need to be low enough to induce private insurers to offer the coverage. This is exactly what the federal government has done with respect to coverage for terrorism losses. Since insurers attempted to exclude coverage for terrorism losses following 9/11, the federal government stepped into the void and has been providing reinsurance to private insurers for terrorism losses and requiring insurers to at least offer

¹⁶⁵ Government insurance programs are subject to whatever accounting rules and laws the legislators creating the programs designate. As an example of a government insurance program that is not subject to the same tax laws as private insurance companies, the Florida Hurricane Catastrophe Fund is exempt from federal income tax. Cole et al., *supra* note 75, at 268 n.3.

¹⁶⁶ See *id.* at 267-68.

coverage for such losses.¹⁶⁷ The federal government, or state governments, could do so for natural catastrophe losses as well. Of course, with respect to the risk of wildfire losses, the devil would be in the details with respect to defining the difference between a wildfire loss that would be covered by natural catastrophe insurance and a regular fire loss that would be covered by traditional homeowners insurance.

A governmental insurance program that covers natural catastrophes also would be a logical extension of the government's current role with respect to insurance. The insurance industry already is highly regulated because of public policy and social concerns regarding the protection of powerless consumers and to ensure that innocent victims are compensated for their injuries. For example, insurers currently are regulated by the states with respect to the policy language contained in their policy forms, the premium rates they can charge, and the amounts of capital surplus they must maintain.¹⁶⁸ States also already manage guarantee associations that cover insurance claims submitted to insolvent insurers, and states already have residual risk insurance programs for automobile drivers who private insurers refuse to accept as customers.¹⁶⁹ Some states, such as California, also have similar residual risk insurance plans — e.g., the FAIR Plan — for property owners who cannot obtain homeowners insurance from private insurers.¹⁷⁰

There are numerous reasons the insurance industry is already heavily regulated. One, the purchase of some lines of insurance, such as automobile and homeowners, are essentially mandatory, yet insureds play no role in the creation of the terms and conditions of insurance policies. To the contrary, insurance policies are complex, incomprehensible documents created by insurers and then sold on a take it or leave it basis to consumers who are required to purchase the

¹⁶⁷ See Terrorism Risk Insurance Act of 2002, Pub. L. No. 107-297, 116 Stat. 2322 (codified as amended in scattered sections of 15 U.S.C.); see also Michelle E. Boardman, *Known Unknowns: The Illusion of Terrorism Insurance*, 93 GEO. L.J. 783, 787-89 (2005).

¹⁶⁸ See ABRAHAM & SCHWARCZ, *supra* note 68, at 119, 126-28, 142-46; JERRY & RICHMOND, *supra* note 65, at 89-94.

¹⁶⁹ See ABRAHAM, *supra* note 157, at 771; ABRAHAM & SCHWARCZ, *supra* note 68, at 122-23; see also Spencer L. Kimball & Noreen J. Parrett, *Creation of the Guaranty Association System*, 19 J. INS. REG. 259, 262 (2000).

¹⁷⁰ See *supra* Part II.

product.¹⁷¹ Consequently, states need to provide regulatory oversight to prevent insurers from abusing their dominant position.¹⁷²

Two, insurers also commonly use the same policy forms, so there is an anticompetitive aspect to the insurance industry.¹⁷³ Yet, the industry is exempted from federal antitrust laws.¹⁷⁴ Consequently, the government needs to police the language in the policy forms to ensure that it is not unreasonably one-sided in favor of insurers.¹⁷⁵

Three, when a person buys an insurance policy, in exchange for the payment of a premium, the purchaser receives nothing except a promise by the insurer to pay in the future in the event of a loss. Consumers need some governmental assurance that an insurer that takes their money today in exchange for a promise to pay in the distant future will be solvent when the time comes for the insurer to make good on its promise.¹⁷⁶

Four, public policy and social concerns regarding the compensation of innocent victims are also significant factors with respect to insurance matters. In the liability context, for example, most injuries caused by other people would go uncompensated in the absence of insurance

¹⁷¹ See, e.g., 1 JEFFREY W. STEMPEL & ERIK S. KNUITSEN, *STEMPEL AND KNUITSEN ON INSURANCE COVERAGE* § 4.06[b] (Wolters Kluwer 4th ed. 2020); Michelle Boardman, *Insuring Understanding: The Tested Language Defense*, 95 IOWA L. REV. 1075, 1091 (2010) (describing the “hyperstandardization” of insurance policies); James M. Fischer, *Why Are Insurance Contracts Subject to Special Rules of Interpretation?: Text Versus Context*, 24 ARIZ. ST. L.J. 995, 996 (1992) (“[T]here is little, if any, freedom to negotiate the standardized language of the insurance contract that determines the scope of coverage.”); Susan Randall, *Freedom of Contract in Insurance*, 14 CONN. INS. L.J. 107, 125 (2007) (“[I]n some lines of insurance, all insurance companies provide identical coverage on the same take-it-or-leave-it basis.”); Daniel Schwarcz, *Reevaluating Standardized Insurance Policies*, 78 U. CHI. L. REV. 1263, 1270-73 (2011) (discussing the history of standardized insurance policies); Kent D. Syverud, *The Duty to Settle*, 76 VA. L. REV. 1113, 1153 (1990) (“[P]roperty owner’s liability insurance contracts are standardized across insurers in a form few insureds have the power or experience to bargain around.”).

¹⁷² See French, *Understanding Insurance Policies*, *supra* note 150, at 552.

¹⁷³ See, e.g., Randall, *supra* note 171, at 125 (“[I]n some lines of insurance, all insurance companies provide identical coverage on the same take-it-or-leave-it basis.”).

¹⁷⁴ E.g., Abraham, *supra* note 150, at 669; Eugene R. Anderson & James J. Fournier, *Why Courts Enforce Insurance Policyholders’ Objectively Reasonable Expectations of Insurance Coverage*, 5 CONN. INS. L.J. 335, 401 (1998); see 15 U.S.C. §§ 1011-1015 (2018); Fischer, *supra* note 171, at 1054-55; Jeffrey W. Stempel, *Reassessing the “Sophisticated” Policyholder Defense in Insurance Coverage Litigation*, 42 DRAKE L. REV. 807, 826 (1993).

¹⁷⁵ See, e.g., French, *Understanding Insurance Policies*, *supra* note 150, at 552.

¹⁷⁶ See *id.*

because most people in America are judgment proof.¹⁷⁷ That, of course, means that, in the absence of insurance, many injured people would not be able to pay their medical bills or recover lost wages. These are the primary reasons that automobile insurance is mandatory — to ensure that automobile accident victims' losses are paid.¹⁷⁸ These same concerns apply with respect to catastrophic property losses that private insurers refuse to insure. In the absence of a governmental insurance program or a government bailout, most homeowners are financially devastated when an uninsured natural catastrophe destroys their homes.¹⁷⁹

Having a governmental insurance program for natural catastrophes also would be a more transparent, less *ad hoc* system for government payments to individuals for natural catastrophe losses. Currently, without any established rules or policy terms, the federal government *de facto* plays the role of insurer of last resort with respect to natural catastrophes for some people due to government bailouts. For example, through *ad hoc* legislation, the federal government has paid approximately \$300 billion for the natural catastrophe losses associated with Hurricanes Katrina, Sandy, and Harvey.¹⁸⁰ Creating a formal

¹⁷⁷ See, e.g., Stephen G. Gilles, *The Judgment-Proof Society*, 63 WASH. & LEE L. REV. 603, 606 (2006) (discussing the reasons why judgments against most people are uncollectible); Kyle D. Logue, *Solving the Judgment-Proof Problem*, 72 TEX. L. REV. 1375, 1375-76 (1994) (discussing the impact insurance has on the judgment-proof problem); S. Shavell, *The Judgment Proof Problem*, 6 INT'L REV. L. & ECON. 45, 47-52, 55 n.1 (1986) (analyzing the problems that result from judgment-proof individuals).

¹⁷⁸ See, e.g., JERRY & RICHMOND, *supra* note 65, at 924-25 (stating that the obvious purpose of mandatory auto insurance is to provide victims of automobile accidents with access to funds to cover their losses); Stempel, *Social Instrument*, *supra* note 150, at 1497-98 (noting that every state effectively requires auto insurance in order to license a car).

¹⁷⁹ See, e.g., Sanjay Bhatt, *Slide Erased Their Homes, but Maybe Not Their Loans*, SEATTLE TIMES (Apr. 1, 2014, 9:29 PM), http://seattletimes.com/html/latestnews/2023278858_mudsliddefinancialxml.html [<https://perma.cc/XR8Z-546R>] (“If [the Oso Landslide victims] can’t get adequate relief on their mortgages . . . they may pursue bankruptcy to get rid of the debt.”); Becky Johnson, *Landslide Hazard Maps Axed by State: Risky Slopes in Jackson, Haywood to Remain a Mystery for Now*, SMOKY MOUNTAIN NEWS (June 29, 2011), <http://www.smokymountainnews.com/news/item/4292-landslide-hazard-maps-axed-by-state-risky-slopes-in-jackson-haywood-to-remain-a-mystery-for-now> [<https://perma.cc/9ZHT-CUJX>] (“Regular homeowners insurance doesn’t cover landslides. Homeowners are out of luck — whether a home is totally flattened or the foundation destabilized due to shifting soil. They can’t sell their home, nor will insurance compensate them. Meanwhile, they have to keep paying the mortgage on a house they can’t live in. Often, bankruptcy and foreclosure become the only option.”).

¹⁸⁰ See Sami Sparber, *Trump Signs Off on Nearly \$90 Billion of Disaster Funding that Will Help Harvey Victims*, DAILY TEXAN (Feb. 16, 2018, 12:15 AM),

governmental insurance program would make the process regarding how natural catastrophe losses are funded and paid more transparent. For the victims of natural catastrophes, such a program also would make it more predictable whether their losses will be paid and would require less political maneuvering regarding the passage of bailout bills when natural catastrophes occur.

Finally, although the creation of a governmental insurance program for natural catastrophes may sound revolutionary, it really is just evolutionary. There already are numerous other governmental insurance programs in America, including social security disability insurance, unemployment insurance, and Medicare/Medicaid. The natural catastrophe insurance contemplated in this Article would simply be another governmental line of insurance that would be sold separate from traditional homeowners policies and it is not intended to replace traditional homeowners policies or to cover the non-correlated risks that currently are covered by homeowners insurance.

C. The Case for “Bundled” Insurance Instead of Standalone Insurance for Specific Natural Catastrophes

Although a governmental insurance program to cover wildfires conceptually may be sound, how such a program is structured could be the difference between a successful program and an unsuccessful one. Creating a governmental insurance program that sells a standalone policy that covers just wildfire losses would be a mistake. A better approach would be to insure wildfires as part of bundled coverage because of the numerous problems associated with standalone insurance that only covers a single natural catastrophe peril.

Three of the biggest problems with standalone insurance programs that cover only a single natural catastrophe peril are: (1) adverse selection, (2) high premiums, and (3) low take up rates. The first two problems are closely related, and all three problems can be addressed by bundling the perils covered by the insurance into a single policy.

Adverse selection theory posits that a person who thinks his house may be damaged by a wildfire because he lives near a dry forest in California, Washington, Oregon, or Colorado is more likely to want to

<https://www.dailytexanonline.com/2018/02/16/trump-signs-off-on-nearly-90-billion-of-disaster-funding-that-will-help-harvey-victims> [https://perma.cc/EX92-RWCQ]; Ryan Sruyk, *What Past Federal Hurricane Aid Tells Us About Money for Harvey Recovery*, CNN POL. (Sept. 7, 2017, 11:13 AM), <https://www.cnn.com/2017/08/31/politics/hurricane-harvey-recovery-money/index.html> [https://perma.cc/XZ6E-QEJR] (noting that more than \$200 billion in federal aid was paid for recovery from Hurricanes Katrina and Sandy).

purchase wildfire insurance than someone who lives in Pittsburgh, Pennsylvania, which gets some type of precipitation at least twice a week year round.¹⁸¹ Consequently, adverse selection is a serious concern with respect to standalone insurance. Only the people at the highest risk will likely buy it.

The risk of adverse selection diminishes, however, if coverage for all the most common types of natural catastrophes are bundled together in the same policy. For example, if policies for natural catastrophes were to cover losses for the various natural catastrophes such as wildfires, flooding, hurricanes, and landslides, then a person who lives in California, Washington, Oregon, or Colorado and is concerned about wildfires would not have a greater incentive to purchase the policy than a person who lives in Pittsburgh and is more concerned about flooding and landslides. Thus, if the policyholder wants to, or is required to, have insurance to cover any of the potential losses covered under a bundled natural catastrophe policy, then she would buy the policy regardless of whether she thinks she needs coverage for all of the perils covered by the policy. This, in turn, means the program would have a diverse pool of insureds who are not all exposed to the same types and level of risk (i.e., the insureds' risks would not be correlated).

The second problem with standalone insurance — high premium prices — is also due to adverse selection. Because the people most likely to buy standalone insurance are also the people most likely to suffer losses, the premiums charged to those people necessarily need to be higher than for an average risk person in order for the premium rates for the program to be actuarially sound. Consequently, if only the highest risk people buy the insurance, then high premiums must be charged.

To illustrate the problems with standalone insurance for a single natural catastrophe peril, consider the National Flood Insurance Program (“NFIP”). It is as an example of a failing insurance program. The NFIP is a federally backed insurance program that was created in the 1960s when private insurers generally began excluding coverage in property policies for flood losses because flood losses are viewed as correlated risks.¹⁸²

¹⁸¹ See, e.g., *Pittsburgh, Pennsylvania*, BESTPLACES, <https://www.bestplaces.net/climate/city/pennsylvania/pittsburgh> (last visited Sept. 5, 2019) [<https://perma.cc/YR2S-DCNC>] (providing information on rain weather patterns in Pittsburgh, Pennsylvania).

¹⁸² See, e.g., French, *Insuring Floods*, *supra* note 157, at 61 (explaining how insurers decided they did not want to cover flood losses); Kriesel & Landry, *supra* note 8, at 405 (providing further explanation about the National Flood Insurance Program).

NFIP policies are expensive even though many of them are sold at subsidized premium rates. As of August 31, 2016, the high end of the median premium range for an NFIP policy that covers only flood losses was \$1,330.¹⁸³ The insurance industry, however, has projected that the premium rates would be twice that amount if the NFIP were actuarially sound and the insurance were sold by private insurers.¹⁸⁴ The premium rates need to be high in order for the program to be actuarially sound because many of the properties being insured are the ones at the highest risk for flood losses.¹⁸⁵ In 2012, in an attempt to make the program fiscally sound, the program was amended under the Biggert-Waters Flood Insurance Reform Act to require property owners to pay actuarially sound premium rates, but the amendments were never fully implemented due to the subsequent political resistance from states frequently impacted by flooding because the actuarially sound premium rates were viewed as unaffordable for many people.¹⁸⁶ Consequently, subsidized, but high, premium rates have continued and the NFIP has been bankrupt for many years with periodic capital infusions from taxpayers to keep it going.¹⁸⁷ The program currently is running a deficit of more than \$20 billion.¹⁸⁸

And, in exchange for an expensive but still subsidized premium, little insurance coverage is provided by a NFIP policy. Personal property is covered at “actual cash” value instead of replacement cost, which means property owners receive pennies on the dollar for destroyed personal property.¹⁸⁹ Further, most items in a house’s basement are not covered, and the maximum coverage provided for the entire house is capped at

¹⁸³ CONG. BUDGET OFFICE, *supra* note 157, at 2.

¹⁸⁴ See Vivien Lee & David Wessel, *The Hutchins Center Explains: National Flood Insurance Program*, BROOKINGS (Oct. 10, 2017), <https://www.brookings.edu/blog/up-front/2017/10/10/the-hutchins-center-explains-national-flood-insurance-program/> [<https://perma.cc/79C2-UTBH>].

¹⁸⁵ See *id.*

¹⁸⁶ See *id.*; John McAneney, Delphine McAneney, Rade Musulin, George Walker & Ryan Crompton, *Government-Sponsored Natural Disaster Insurance Pools: A View from Down-Under*, 15 INT’L J. DISASTER RISK REDUCTION 1, 6 (2016).

¹⁸⁷ See U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-19-157SP, HIGH-RISK SERIES: SUBSTANTIAL EFFORTS NEEDED TO ACHIEVE GREATER PROGRESS ON HIGH-RISK AREAS 272 (2019), <https://www.gao.gov/assets/700/697245.pdf> [<https://perma.cc/8854-UF77>] (“As of September 2018, FEMA’s debt stood at \$20.5 billion despite Congress having canceled \$16 billion in debt in October 2017. Without reforms, the financial condition of NFIP could continue to worsen.”).

¹⁸⁸ See *id.*

¹⁸⁹ See 42 U.S.C. § 4013(b)(2)-(3) (2018); see also U.S. DEP’T OF HOMELAND SEC., FEMA F-679, NATIONAL FLOOD INSURANCE PROGRAM: SUMMARY OF COVERAGE 3 (2012).

\$250,000, which does not cover the cost to replace many homes in America.¹⁹⁰

The third problem with standalone policies, such as NFIP policies, is that very few people actually buy them, either due to ignorance regarding the risk they are facing or because the premium rates are unaffordable.¹⁹¹ Only about ten percent of the victims of Hurricane Katrina and a little over fifty percent of Hurricane Sandy victims had flood insurance even though people who live in areas surrounded by water, like New Orleans and New York City, are people who obviously should be concerned about flooding.¹⁹² In fact, of the approximately seventy-two million homeowners in America, only about five million have flood insurance.¹⁹³ If they are not required by their banks to purchase flood insurance, very few people purchase it.¹⁹⁴ So, offering standalone insurance for specific natural catastrophes simply does not work very well on a nationwide basis.

In contrast, by including coverage for natural catastrophes in a bundled policy, the pool of insureds would be much more diverse with different risk levels for each of the various perils they face. This, in turn, could allow for more affordable premium rates because the rates would be based upon the risk for all the covered perils, not just the single peril the homeowner is at the highest risk of facing.

In addition, the take up rates by homeowners would be much higher (e.g., much closer to seventy million than five million) because homeowners insurance already is effectively mandatory for most people due to the banking requirements previously discussed.¹⁹⁵ Thus, the number of uninsured people who would need a government bailout following a natural catastrophe should be dramatically reduced. And, instead of simply receiving a government handout after a loss, homeowners affected by natural catastrophes would be paying premiums to at least partially offset their loss payments, as insureds do under all other types of insurance programs.

¹⁹⁰ See 42 U.S.C. § 4013(b)(2)-(3); U.S. DEP'T OF HOMELAND SEC., *supra* note 189, at 3; U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-297R, OVERVIEW OF GAO'S PAST WORK ON THE NATIONAL FLOOD INSURANCE PROGRAM 3 (2014) [hereinafter GAO-14-297R REPORT]; French, *Insuring Floods*, *supra* note 157, at 67.

¹⁹¹ See, e.g., French, *Insuring Floods*, *supra* note 157, at 70-71.

¹⁹² *Id.* at 53.

¹⁹³ E.g., *id.* at 71; see, e.g., CONG. BUDGET OFFICE, *supra* note 157, at 3.

¹⁹⁴ See, e.g., Ben-Shahar & Logue, *Subsidized Weather Insurance*, *supra* note 159, at 619 (“[O]nly twenty-one percent of homeowners in high-flood-risk areas in New York City who are not subject to a flood insurance mandate under their mortgage contract actually purchase flood insurance, even at subsidized rates.”).

¹⁹⁵ See *supra* Part IV.A.

D. *The Case Against a Governmental Insurance Program for Natural Catastrophes*

Although there are many arguments in favor of governmental insurance programs for natural catastrophes, there are, of course, also several arguments against governmental insurance programs. One problem with a government insurance program is that some lower risk insureds inevitably will subsidize higher risk insureds unless each insured is charged an actuarially sound premium.¹⁹⁶ And, if everyone is charged an actuarially sound premium, then some, or even many, high-risk insureds might not be able to afford the insurance, which is one of the problems the NFIP faces. The response to that criticism is that all insurance programs, including “private insurance pools[,] involve some cross-subsidization from the less risky to the more risky.”¹⁹⁷ Some subsidization of premium rates is simply an aspect of insurance pools because risks can only be measured with approximate levels of accuracy. Moreover, when it comes to insuring natural catastrophe losses in developed countries, a certain amount of solidarity among citizens is simply an aspect of citizenship. With that said, the intention is that the insurance program as a whole would be actuarially sound so taxpayers would no longer need to fund natural catastrophe losses for the uninsured or underinsured in the form of government bailouts. Government bailouts are financed by all taxpayers, not just homeowners, so bailouts result in some people who pay taxes, but cannot afford to own a home, subsidizing wealthier homeowners’ losses.

Consequently, under a natural catastrophe insurance program, because the premium-paying pool of insureds would be limited to homeowners, poorer non-homeowners would not be subsidizing wealthier homeowners. And, the amount of premium subsidization of high-risk insureds by lower risk insureds should be quite modest because the amounts are being spread across such a large number of insureds with diverse risk profiles spread across the country.¹⁹⁸ Further,

¹⁹⁶ Many people may not realize that they already are subsidizing flood losses even though they do not have flood insurance. The NFIP currently is receiving billions of dollars of taxpayer subsidies even though most people do not have flood insurance. See *Extreme Weather Events: Limiting Federal Fiscal Exposure and Increasing the Nation’s Resilience: Hearing Before the S. Comm. on Homeland Sec. & Governmental Affairs*, 113th Cong. 3-4 (2014) (statement of Mark Gaffigan, Managing Director, Nat Res. & Env’t), <https://www.gao.gov/assets/670/660860.pdf> [<https://perma.cc/TVY7-Q8QE>]. Further, each government bailout of property owners in areas devastated by natural catastrophes such as Hurricanes Katrina, Sandy and Harvey are another form of public subsidization of individuals’ losses.

¹⁹⁷ Ben-Shahar & Logue, *Subsidized Weather Insurance*, *supra* note 159, at 593.

¹⁹⁸ See *supra* Part IV.

the premium rates largely would be based upon home values, so wealthier people would pay higher premium rates.

In 2018, for example, there were approximately \$82 billion in natural catastrophe losses in America.¹⁹⁹ If that loss were spread equally across seventy million homeowners without taking into account home values, then the loss per home would be approximately \$1171. If home values were factored into the premium rates, then the owners of more expensive homes effectively would bear much more of the losses than the owners of average or low-priced homes because the wealthier homeowners would be paying higher premium rates based upon the higher values of their homes.

Another problem with a government insurance program is that there inevitably would be political opposition by certain segments of society to the creation of such a program because government sponsored insurance could be characterized as a form of socialism by anyone who is paying more than an actuarially sound premium rate. The reality, of course, is that America already has several governmental insurance programs that have socialist aspects to them. For example, Social Security Disability Insurance has been a federal insurance program since 1956.²⁰⁰ The program provides financial assistance to people who are unable to work due to a long-term mental or physical disability, and over ten million Americans annually receive benefits under the program regardless of whether they paid actuarially sound amounts into the program.²⁰¹ The program primarily is funded through payroll and self-employment taxes.²⁰²

Another example of an existing governmental insurance program where lower risk insureds subsidize higher risk insureds' insurance premium rates can be found in Florida. A significant provider of homeowners insurance in Florida is Citizens Property Insurance Corporation ("Citizens"), a state-sponsored program.²⁰³ Under the program, the premium rates charged to coastal residents are subsidized by inland residents to some extent.²⁰⁴ Citizens historically also has sold

¹⁹⁹ See *Facts + Statistics: U.S. Catastrophes*, *supra* note 9.

²⁰⁰ See 42 U.S.C. § 423 (2018).

²⁰¹ See Damian Paletta & Dionne Searcey, *Jobless Tap Disability Fund*, WALL ST. J. (Dec. 28, 2011), <https://www.wsj.com/articles/SB10001424052970204296804577121392750460030> [<https://perma.cc/P9UK-GHK9>].

²⁰² See 42 U.S.C. § 401 (2018).

²⁰³ See Cole et al., *supra* note 75, at 269.

²⁰⁴ See *id.* at 280. Ben-Shahar and Logue are critical of Citizens because the premium subsidization is a regressive redistribution of wealth in that affluent homeowners' premium rates for coastal homes are being subsidized by less affluent inland homeowners' premium rates. See Ben-Shahar & Logue, *Subsidized Weather Insurance*,

property insurance to many homeowners in Florida to cover hurricane damage at premium rates significantly lower than private insurers.²⁰⁵ It has been able to do so for many of the reasons discussed in Part IV.B of this Article: (1) it does not need to provide adequate quarterly and annual returns to investors; (2) it is tax exempt; (3) it does not need to raise excessive capital to pre-fund losses because it has the ability to do post-loss assessments; and (4) it is reinsured by a state-sponsored reinsurer, the Florida Hurricane Catastrophe Fund.²⁰⁶ Although some scholars are critical of Citizens due to the subsidized premium rates for coastal properties,²⁰⁷ because of the existence of Citizens, homeowners in Florida have been able to procure property insurance and remain homeowners despite private insurers fleeing the state after devastating hurricanes caused insurer losses.²⁰⁸

With that said, under the nationwide bundled natural catastrophe insurance program that is being proposed in this Article, the cross subsidization of higher risk insureds, such as coastal properties, by lower risk insureds should be far less than what has occurred in Florida because of the much larger, more diverse risk pool of insureds and the premium rates primarily would be based upon home values. Thus, expensive homes would be charged higher premium rates than less expensive homes. Moreover, even if there were a minor free rider effect by affluent homeowners, that negative consequence would not outweigh the positive effect of providing homeowners insurance for natural catastrophes to millions of homeowners who otherwise would be uninsured, as they currently are, due to the unavailability of insurance — either private or government-sponsored — for natural catastrophes.

supra note 159, at 596, 608. Regressive redistribution of wealth through premium subsidization should not be a significant problem under the natural catastrophe insurance program proposed in this Article because the insurance pool would include a larger number of insureds with diverse risk profiles and premiums would be primarily based upon the insured homes' values. Consequently, affluent homeowners would be charged much higher premium rates than poorer people.

²⁰⁵ See Cole et al., *supra* note 75, at 269.

²⁰⁶ See *id.* at 267-71.

²⁰⁷ See, e.g., Ben-Shahar & Logue, *Subsidized Weather Insurance*, *supra* note 159, at 608 (stating that people who live in wealthier zip codes receive larger subsidies); Martin Grace & Robert Klein, *The Perfect Storm: Hurricanes, Insurance, and Regulation*, 12 RISK MGMT. & INS. REV. 81, 113 (2009) (noting that the shortfalls are covered by assessments on insurance consumers and state general funds).

²⁰⁸ See 1993 Fla. Laws 2881 (law temporarily barred insurers from exiting the Florida property insurance market following Hurricane Andrew in 1992); Butler, *supra* note 94, at 769-70 (discussing Florida's statute banning private insurers from the property insurance market).

Other people will also argue that America needs less governmental involvement with private industries, not more. That argument, however, is not very strong when it comes to the insurance industry. The insurance industry already is heavily regulated for the public policy and social reasons discussed in Parts IV.A and IV.B.²⁰⁹ The insurance industry needs to be regulated due to the nature of its business and the critical importance it plays.

Other people will argue that covering natural catastrophe losses under a governmental insurance program would create a moral hazard problem for homeowners. Moral hazard theory posits that: (1) a person who has insurance may be incentivized to destroy the insured property in order to collect the insurance proceeds, and/or (2) a person will take less care to avoid losses if the losses are insured.²¹⁰ Applied in the context of wildfires, the theory hypothesizes that the existence of insurance would encourage people to build homes and live in areas prone to wildfires. And, because they have insurance, homeowners

²⁰⁹ See *supra* Parts IV.A, IV.B; see also NAT'L ASS'N OF INS. COMM'RS, STATE INSURANCE REGULATION 2 (2011), https://www.naic.org/documents/topics_white_paper_hist_ins_reg.pdf [<https://perma.cc/6EKT-T88K>] ("Insurance is more heavily regulated than other types of business because of the complexity of the insurance contracts, the lack of sufficient information for insurance consumers to adequately shop for prices and adequacy of coverage and because insurance contracts are generally contracts of adhesion.").

²¹⁰ See, e.g., *W. Cas. & Sur. Co. v. W. World Ins. Co.*, 769 F.2d 381, 385 (7th Cir. 1985) ("Once a person has insurance, he will take more risks than before because he bears less of the cost of his conduct."); MARK S. DORFMAN, INTRODUCTION TO RISK MANAGEMENT AND INSURANCE 480 (8th ed. 2005) (The term "moral hazard" also generally encompasses situations where "[a] person . . . deliberately causes a loss . . . [or] exaggerates the size of a claim to defraud an insurer."); JERRY & RICHMOND, *supra* note 65, at 12 ("[T]he existence of insurance can have the perverse effect of increasing the probability of loss. . . . This phenomenon is called *moral hazard*."); Scott E. Harrington, *Prices and Profits in the Liability Insurance Market*, in FOUNDATIONS OF INSURANCE ECONOMICS: READINGS IN ECONOMICS AND FINANCE 626, 631 (George Dionne & Scott Harrington eds., 1992) ("Moral hazard is the tendency for the presence and characteristics of insurance coverage to produce inefficient changes in buyers' loss prevention activities, including carelessness and fraud . . ."); George L. Priest, *The Current Insurance Crisis and Modern Tort Law*, 96 YALE L.J. 1521, 1547 (1987) ("Moral hazard refers to the effect of the existence of insurance itself on the level of insurance claims made by the insured. . . . *Ex ante* moral hazard is the reduction in precautions taken by the insured to prevent the loss, because of the existence of insurance."); Adam F. Scales, *The Chicken and the Egg: Kenneth S. Abraham's "The Liability Century"*, 94 VA. L. REV. 1259, 1263 (2008) (Moral hazard is the term used to describe the phenomenon that a person will have a "tendency to take fewer precautions in the presence of insurance."); Gary T. Schwartz, *The Ethics and the Economics of Tort Liability Insurance*, 75 CORNELL L. REV. 313, 338 n.117 (1990) ("'Moral hazard' is sometimes distinguished from 'morale hazard,' the former referring to deliberate acts like arson, the latter to the mere relaxation of the defendant's discipline of carefulness.").

would not bother to take steps, such as creating a fire-resistant zone around their houses, to minimize the risk of their homes being burned to the ground. Some scholars have made this same argument in the context of hurricanes, arguing that the existence of homeowners insurance at subsidized premium rates encourages people to build in dangerous coastal areas largely to the benefit of the affluent at the expense of poorer people.²¹¹

These moral hazard arguments have theoretical appeal and may impact buying decisions of homeowners on the margins if the premium prices are unaffordable or insurance is completely unavailable, but moral hazard arguments are counterintuitive in the context of wildfires. Such arguments also have been proven to be empirically false in other natural catastrophe contexts as well.²¹²

Intuition suggests that most people would prefer to avoid the inconvenience of becoming homeless and having all their worldly possessions destroyed in a fire even if an insurer ultimately will pay for most of the loss months later. Insurance proceeds also cannot replace sentimental items, such as family heirlooms and old photos.

Further, the moral hazard argument is based upon the false premise that affluent people build in beautiful areas prone to natural catastrophes because of the availability of subsidized insurance and that the availability of this insurance benefits the affluent more than poorer people. The people who would most benefit from natural catastrophe insurance are the less affluent regardless of whether some affluent homeowners also would receive some nominal premium subsidization from lower risk insureds. There at least three reasons for this: (1) natural catastrophes impact many more poor people than affluent people because poorer people tend to live in areas more prone to natural catastrophes and their homes are not built as well to withstand damage,²¹³ (2) poorer people cannot move away from dangerous areas

²¹¹ See, e.g., Ben-Shahar & Logue, *Subsidized Weather Insurance*, *supra* note 159, at 616 (arguing homeowners have been attracted to live in high-risk coastal areas due, in part, to subsidized premium rates under the NFIP). The article does not cite any empirical evidence to support this argument beyond the fact that population growth and development along the coast has continued since the NFIP was created in the 1960s. This is a classic example of mistaking correlation for causation. Population growth and development has occurred across the country, in flood risk areas and in non-flood risk areas. How many fewer, if any, properties would have been built along the coast in the absence of NFIP insurance is unknown.

²¹² See *infra* note 221 and accompanying text.

²¹³ See Eleanor Krause & Richard V. Reeves, *Hurricanes Hit the Poor the Hardest*, BROOKINGS (Sept. 18, 2017), <https://www.brookings.edu/blog/social-mobility-memos/2017/09/18/hurricanes-hit-the-poor-the-hardest/> [<https://perma.cc/MJ56-S5PJ>] (“Low-income

as easily as wealthier people,²¹⁴ and (3) most poor people currently are completely uninsured for natural catastrophes.²¹⁵ So, the benefit to poorer people of having insurance, as opposed to being uninsured, when a natural catastrophe strikes is obvious regardless of whether the affluent also would be aided by the insurance or receive some nominal premium subsidization from less risky homeowners.

People have been living in areas that are now prone to natural catastrophes long before the areas became prone to natural catastrophes and without regard to whether the areas would be considered attractive areas to live by the affluent. That is one of the consequences of climate change — the areas impacted by natural catastrophes have increased and the severity of the natural catastrophes has increased regardless of whether the areas are considered beautiful or how affluent the homeowners living there are.²¹⁶

and minority communities are more vulnerable to the risks of natural disasters, and they also struggle most to recover. . . . [L]ower income Americans are more likely to live in neighborhoods or buildings more susceptible to storm shocks.”); Annie Lowrey, *What the Camp Fire Revealed*, ATLANTIC (Jan. 21, 2019), <https://www.theatlantic.com/ideas/archive/2019/01/why-natural-disasters-are-worse-poor/580846/> [https://perma.cc/Z9KE-YSE2] (“In California, the extremely high cost of housing has encouraged building in and migration to certain fire-prone areas. This is to say: The country’s built landscape means that lower-income families are often the most vulnerable to disasters.”); Susan Milligan, *The Forecast for Recovery*, U.S. NEWS & WORLD REP. (Sept. 21, 2018, 6:00 AM), <https://www.usnews.com/news/the-report/articles/2018-09-21/hurricanes-hit-everyone-but-the-poor-have-the-hardest-time-recovering?context=amp> [https://perma.cc/WS6M-YMPR] (“[W]hen it comes to escaping, surviving and recovering from a natural disaster, it’s the poor who suffer the most, experts say. . . . Cheaper houses are also less safe, without the strong foundations or reinforcements that can make the difference between a blown-away home and one with some window damage. . . . In the Carolinas, where 39 people have died already from Florence, the damage is disproportionately affecting the poor and will continue to do so during the recovery . . .”).

²¹⁴ Leah Platt Boustan, Maria Lucia Yanguas, Matthew Kahn & Paul W. Rhode, *Natural Disasters by Location: Rich Leave and Poor Get Poorer*, SCI. AM. (July 2, 2017), <https://www.scientificamerican.com/article/natural-disasters-by-location-rich-leave-and-poor-get-poorer/> [https://perma.cc/EZE8-4G5A] (“[T]he rich move away from disaster-prone areas, while the poor are left behind.”); Krause & Reeves, *supra* note 213 (“[M]ore affluent people can more easily relocate to safer areas, as a recent NBER working paper by Leah Platt Boustan, Matthew E. Kahn, Paul W. Rhode and Maria Lucia Yanguas shows.”).

²¹⁵ See Krause & Reeves, *supra* note 213 (“In the eight counties most severely-affected by Hurricane Harvey, only 17 percent of homeowners held flood insurance policies . . .”); *supra* Part IV.B.

²¹⁶ See, e.g., AON, WEATHER, CLIMATE & CATASTROPHE INSIGHT, 2018 ANNUAL REPORT 3 (2018), <http://thoughtleadership.aonbenfield.com/Documents/20190122-ab-if-annual-weather-climate-report-2018.pdf> [https://perma.cc/58ZU-P2MA] (showing an increase in natural catastrophe damages since 2000).

Consider, for example, the town of Paradise, California that was wiped out by the Camp Fire in 2018 and resulted in eighty-five people being killed.²¹⁷ According to the 2010 Census, it was a small town with a population of approximately 26,000 people in the middle of California — not on the coast or some other area with particularly attractive geographic features.²¹⁸ The average income was approximately \$26,000.²¹⁹ The mean home price in 2017 was \$232,000.²²⁰ Thus, Paradise was not a refuge of affluent people who were attracted to a bucolic area due to underpriced homeowners insurance.

The moral hazard argument is also intuitively weak because wildfires place people's lives at risk. Most people would take steps to avoid being burned to death while sleeping if they knew how to avoid it even if their estates would recover insurance proceeds following their deaths. Consequently, some empirical studies done in America and Europe have proven that people who are insured against natural catastrophes take more, not less, precautions to avoid losses, so the moral hazard argument is unpersuasive in this context.²²¹

Nonetheless, even if one were to accept that moral hazard is a legitimate concern, there are numerous ways to address it. For example, the premium amount can be tied to whether the homeowner takes specific risk reduction steps, such as removing flammable materials near the house, and the policies can include deductibles so the homeowner

²¹⁷ See *supra* note 100 and accompanying text.

²¹⁸ 2010 Census Interactive Population Search, CA - Paradise Town, U.S. CENSUS BUREAU, <https://archive.vn/20140715040220/http://www.census.gov/2010census/popmap/ipmtext.php?fl=06:0655520> (last visited Sept. 28, 2020) [<https://perma.cc/PA5E-7F3R>].

²¹⁹ Zip 95969 (Paradise, CA), BESTPLACES, <https://www.bestplaces.net/economy/zip-code/california/paradise/95969> (last visited Sept. 14, 2020) [<https://perma.cc/SA7T-S77U>].

²²⁰ Paradise, California, CITY-DATA.COM, <http://www.city-data.com/city/Paradise-California.html> (last visited Sept. 14, 2020) [<https://perma.cc/G7VM-CNK8>].

²²¹ See, e.g., Qihao He & Michael Faure, *Regulation by Catastrophe Insurance: A Comparative Study*, 24 CONN. INS. L.J. 189, 198-99 (2018) (noting that in America, homeowners “who are more likely to have flood insurance and homeowners policies that cover wind damage, engage in more ex ante property risk reduction behavior on hurricane preparedness”); Paul Hudson, W.J. Wouter Botzen, Jeffrey Czajkowski & Heidi Kreibich, *Moral Hazard in Natural Disaster Insurance Markets: Empirical Evidence from Germany and the United States*, 93 LAND ECON. 179, 181 (2017) (“Our analysis found that households with flood insurance suffer larger losses than uninsured households due to their higher hazard level rather than due to moral hazard, which to the best of our knowledge has not been shown before.”); Gebhard Kirchgässner, *On the Efficiency of a Public Insurance Monopoly: The Case of Housing Insurance in Switzerland*, in PUBLIC ECONOMICS AND PUBLIC CHOICE 221, 236-37 (Pio Baake & Rainald Borck eds., 2007) (noting that mandatory participation in Switzerland’s insurance program incentivizes risk reduction).

will not be made completely whole in the event of a loss.²²² These are simple ways to incentivize insureds to avoid losses.

Indeed, property insurance policies already contain these types of provisions and others that are designed to address moral hazard concerns. Such provisions also could be included in a governmental insurance program. For example, homeowners policies currently require the homeowner to take preventative measures intended to avoid or minimize a loss and they cover the costs the homeowner incurs in doing so under the “reasonable repairs” and “property protection” provisions of the policies.²²³ Similarly, commercial property policies contain “sue and labor” provisions under which the insurer agrees to reimburse the insured for the costs associated with minimizing damage caused by covered perils.²²⁴

In addition, as discussed in Part III, not only are there a number of risk reduction steps a homeowner can take in the context of wildfires, but state or local zoning laws and building codes also can address moral hazard concerns by precluding the development of houses in high-risk areas and by requiring the use of fire-resistant building materials. Similar laws could and should be enacted related to building structures in areas that are susceptible to other types of natural catastrophes, such as flooding and hurricane winds.

The final argument against governmental insurance programs to cover natural catastrophe losses is that private markets generally are better than the government in allocating resources and efficiently

²²² See, e.g., Ben-Shahar & Logue, *Outsourcing Regulation*, *supra* note 70, at 209 (“[I]nsurers do, in fact, commonly share losses with insureds in various ways, including through deductibles and copayments.”); Haitao Yin, Howard Kunreuther & Matthew W. White, *Risk-Based Pricing and Risk-Reducing Effort: Does the Private Insurance Market Reduce Environmental Accidents?*, 54 *J.L. & ECON.* 325, 326 (2011) (discussing the reduction of premium prices for risk avoidance activities in the context of environmental liability policies); cf. Tom Baker & Rick Swedloff, *Regulation by Liability Insurance: From Auto to Lawyers Professional Liability*, 60 *UCLA L. REV.* 1412, 1429-30 (2013) (“The deductible for the driver’s first-party property damage coverage in the auto policy should control the moral hazard of insurance in these instances.”).

²²³ See, e.g., Sample Homeowners Policy, Additional Coverages, § 2.a and Conditions, § C.4, *reprinted in* CHRISTOPHER C. FRENCH & ROBERT H. JERRY, II, *INSURANCE LAW AND PRACTICE* 602, 610 (2018) (requiring homeowner to protect damaged property against further damage with the insurer agreeing to pay the costs incurred to do so).

²²⁴ E.g., *John S. Clark Co. v. United Nat’l Ins. Co.*, 304 F. Supp. 2d 758, 767-68 (M.D.N.C. 2004) (“To be covered as reimbursable sue and labor expenses [under a commercial property policy], those expenditures must be made for the benefit of the insurer in mitigating or preventing a covered loss.” (quoting *Swire Pac. Holdings, Inc. v. Zurich Ins. Co.*, 139 F. Supp. 2d 1374, 1385 (S.D. Fla. 2001))).

delivering products and services.²²⁵ To support this argument, one need only say “NFIP.”

As discussed in Part IV.C., the NFIP is an example of a poorly structured and administered governmental insurance program. The NFIP historically has used outdated floodplain maps due to a lack of funds necessary to create accurate ones, so in many instances the wrong homes have been insured or were uninsured.²²⁶ In fact, the flood maps in place at the time of Hurricane Sandy were thirty years old and the area in New York City considered at high risk on the maps has been doubled since Hurricane Sandy.²²⁷ Information regarding flood risks is also poorly understood by homeowners. For example, most people do not appreciate that a house in a 100-year flood zone has more than a twenty-five percent chance of being flooded over the course of a thirty-year mortgage.²²⁸ Indeed, people generally have a poor understanding of how likely it is that a natural catastrophe will directly impact them at some point in the future. Many people are poor judges of risk; they think natural catastrophes are problems that impact other people and they do not believe natural catastrophes are likely to impact them until one becomes imminent.²²⁹

Consequently, the take up rate for standalone flood insurance nationwide (i.e., the number of homeowners who buy the insurance) is low — approximately six percent of homeowners.²³⁰ Even in obviously

²²⁵ See generally David Brooks, Opinion, *I Was Once a Socialist. Then I Saw How It Worked.*, N.Y. TIMES, Dec. 6, 2019, at A31 (“Socialist planned economies — the common ownership of the means of production — interfere with price and other market signals in a million ways. They suppress or eliminate profit motives that drive people to learn and improve.”).

²²⁶ See GAO-14-297R REPORT, *supra* note 190, at 37; Beth A. Dickhaus & Darrin N. Sacks, *Recent Developments in Insurance Regulation*, 42 TORT TRIAL & INS. PRAC. L.J. 571, 582 (2007); see also Kriesel & Landry, *supra* note 8, at 405-06.

²²⁷ LLOYD DIXON, NOREEN CLANCY, BRUCE BENDER, AARON KOFNER, DAVID MANHEIM & LAURA ZAKARAS, FLOOD INSURANCE IN NEW YORK CITY FOLLOWING HURRICANE SANDY 1-2 (2013), https://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR328/RAND_RR328.pdf [<https://perma.cc/7TW9-V4ER>] [hereinafter FLOOD INSURANCE].

²²⁸ See Lee & Wessel, *supra* note 184.

²²⁹ See Laura Bliss, *Why You Don't Really Care About the Next 'Big One,'* CITYLAB (July 21, 2015, 5:00 AM), <https://www.citylab.com/environment/2015/07/why-you-dont-really-care-about-the-next-big-one/398969/> [<https://perma.cc/7HHJ-AQNV>] (“Turns out most of us just aren’t that good at calculating risk, especially when it comes to huge natural events like earthquakes. . . . [W]e have trouble connecting emotionally to something scary if the odds of it happening today or tomorrow aren’t particularly high. So, if an earthquake, flood, tornado or hurricane isn’t immediately imminent, people are unlikely to act.”).

²³⁰ See U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-14-127, FLOOD INSURANCE: STRATEGIES FOR INCREASING PRIVATE SECTOR INVOLVEMENT 2 (2014),

high-risk areas, few people voluntarily purchase standalone flood policies. As mentioned, in New Orleans only ten percent of the homes flooded by Hurricane Katrina had flood insurance even though the city sits below sea level and is surrounded by water.²³¹ In the New York City area, a little more than fifty percent of the homes flooded had flood insurance even though Manhattan and Staten Island are *islands* and the Hurricane Katrina victims' lack of flood insurance had been widely reported.²³² These surprisingly low numbers are despite the fact that the premiums charged by the NFIP have been estimated to be much lower than what the private insurance market would charge for standalone flood insurance.²³³ And, as noted, because the policy covers only a single peril — flood losses — adverse selection is a problem for the NFIP, with almost fifty percent of the policies being sold to properties in high-risk areas and five coastal states accounting for the sale of two thirds of all NFIP policies.²³⁴

All told, the NFIP does a poor job of fulfilling its purpose — reimbursing Americans for their flood losses. Although Americans have suffered hundreds of billions of dollars in flood losses over the past three decades, the NFIP has only paid about eighteen percent of the total amount of the losses.²³⁵ Consequently, if the primary purpose of selling insurance for natural catastrophes were to run a profitable business in the most efficient manner possible, then the case for private insurers selling natural catastrophe insurance instead of the government could be made simply by saying “NFIP.”

Yet, when given a choice, private insurers generally refuse to cover natural catastrophes due to the correlated risk problem and adverse

<http://www.gao.gov/assets/670/660309.pdf> [<https://perma.cc/S93D-EB56>] (noting that there are currently 5.5 million NFIP policyholders); Rachel Lisotta, Comment, *In over Our Heads: The Inefficiencies of the National Flood Insurance Program and the Institution of Federal Tax Incentives*, 10 LOY. MAR. L.J. 511, 518 (2012) (“[A] study in 2005 indicated ‘84 percent of residents in flood-prone areas had not purchased flood insurance’”); Quynh T. Pham, Note, *The Future of the National Flood Insurance Program in the Aftermath of Hurricane Katrina*, 12 CONN. INS. L.J. 629, 652 (2006) (noting that, as of 2006, “of the estimated 72 million owner-occupied structures, only 4.7 million property-owners purchased flood insurance through the NFIP”).

²³¹ See Christine A. Klein & Sandra B. Zellmer, *Mississippi River Stories: Lessons from a Century of Unnatural Disasters*, 60 SMU L. REV. 1471, 1502 (2007); Scales, *supra* note 22, at 15; Pham, *supra* note 230, at 639.

²³² DIXON ET AL., FLOOD INSURANCE, *supra* note 227, at xiii.

²³³ Lee & Wessel, *supra* note 184.

²³⁴ See *id.*

²³⁵ See French, *Insuring Floods*, *supra* note 157, at 69 (“[T]hrough March 31, 2014, of the approximately \$274 billion of flood losses caused since 1978, the NFIP has paid a total of \$50.6 billion, or about 18%.”).

selection discussed in Part II.A. Thus, a market failure for those coverages has occurred, and the question remains whether a governmental insurance program can fill the void. As discussed in Part IV.B., the answer is “yes,” despite the fact that the NFIP suggests the answer is “no.” How can these inconsistent answers be reconciled?

Despite the numerous problems with the NFIP, all of its deficiencies would be eliminated if flood coverage were bundled together with coverages for other natural catastrophes in a single governmental insurance program. The adverse selection problem that arises when only single peril coverage is offered would disappear under a bundled policy because numerous perils would be covered (e.g., hurricane winds, flooding, landslides, wildfires, etc.). Thus, because most people are at risk for one or more of these perils, most people would recognize a need for the policy. Further, because homeowners insurance is effectively mandatory for most homeowners due to bank requirements for a mortgage, the adverse selection problem largely would be moot because most people would be required by their banks to buy the coverage.

The program also could be actuarially sound at a reasonable cost for most homeowners because the purchasers of the insurance would not be limited to just homeowners with the highest risk. Increasing the pool of insureds to approximately tens of millions of homeowners with diverse risk profiles also would have the additional benefit of reducing correlated risk concerns.

Another way of potentially getting to that same outcome without creating a governmental insurance program would be to allow private insurers to sell insurance across state lines and to change some of the existing tax and accounting rules discussed in Part IV.B that discourage the accumulation of capital by private insurers.²³⁶ Eliminating the prohibition against insurers selling insurance nationwide instead of

²³⁶ Pursuant to the McCarran-Ferguson Act, 15 U.S.C. §§ 1011-1015 (2018), the regulation of the business of insurance is reserved to the states. States only have authority to regulate within their state borders, however, so insurance companies have been created to do business in specific states. *See, e.g.,* State Farm Mut. Auto. Ins. Co. v. Campbell, 538 U.S. 408, 422 (2003) (stating that states only have jurisdiction over activities that occur within their borders); Daniel Schwarcz, *A Critical Take on Group Regulation of Insurers in the United States*, 5 U.C. IRVINE L. REV. 537, 543-44 (2015) (“Historically, many large insurance holding companies adapted to the mismatch between state-based insurance regulation and the national and international scope of their operations by incorporating individual insurance entities within multiple different states.”); Schwarcz & Schwarcz, *Regulating Systemic Risk*, *supra* note 110, at 1633 (“[I]nsurance holding companies operate in numerous jurisdictions through many different subsidiaries . . .”).

state by state potentially would address the correlated risk problem associated with natural catastrophes because private insurers could create a nationwide pool of insureds with diverse risk profiles. When an insurer is restricted to selling insurance only to homeowners in a single state, then the likelihood the insurer will have a non-diverse pool of insureds increases. That, in turn, creates the correlated risk problem associated with natural catastrophes. With those changes to the laws, then perhaps private insurers would agree to insure natural catastrophes. A more certain way to create a nationwide pool of insureds for natural catastrophe coverage, however, would be to create a nationwide governmental insurance program.

E. Insurance for Natural Catastrophes in Other Countries

In considering whether wildfires and other natural catastrophes should be covered in America by private insurers versus a governmental insurance program, one should consider the ways in which other developed countries handle insurance for natural catastrophes. Wildfires are not as big a problem in Europe as they are in America, so they generally are treated like any other type of fire claim, as opposed to categorized and analyzed as natural catastrophes.²³⁷ Unlike in America, however, other natural catastrophes that are of significant concern, such as flooding, earthquakes, and landslides, typically are covered by government-sponsored insurance programs in other developed countries. To illustrate this point, the natural catastrophe insurance programs in Australia, Belgium, France, New Zealand, Norway, Spain, and Switzerland are considered.

1. Australia

In Australia, a number of “all-hazard” contingency plans have been developed, complemented by a range of sub-plans developed by each State and Territory.²³⁸ Natural catastrophe coverage is generally included in both personal and commercial property insurance.²³⁹ All Australian insurers generally offer coverage for a variety of natural

²³⁷ In 2018, for example, wildfires caused approximately \$20 billion in damages worldwide, with wildfires in the United States accounting for more than \$18 billion of that total. See AON, *supra* note 216, at 22.

²³⁸ ORG. FOR ECON. CO-OPERATION & DEV., FINANCIAL MANAGEMENT OF LARGE-SCALE CATASTROPHES 20 (2008) [hereinafter OECD].

²³⁹ *Id.* at 43-44.

catastrophes, including fire.²⁴⁰ Natural disaster insurance is not, however, compulsory and there are no fiscal or alternative incentives to insure against these disasters.²⁴¹ The State and Territory governments, along with help from the Australian government, protect citizens from natural disasters.²⁴² In Australia, the Disaster Recovery Funding Arrangements (“DRFA”) assists in providing partial reimbursement or advance payment²⁴³ for certain natural disaster expenditures, specifically covering bushfires.²⁴⁴ The DRFA is a joint Commonwealth-State disaster recovery arrangement.²⁴⁵ Once a natural disaster has occurred, the State or Territory Government seeks reimbursement from the Australian government after computing the financial assistance needed, and affected individuals contact their respective State/Territory emergency response agency for direct assistance.²⁴⁶ A State is partially reimbursed for eligible expenditures on catastrophe relief and recovery

²⁴⁰ NEIL WEEKS, FINANCIAL MANAGEMENT OF CATASTROPHES IN AUSTRALIA 4, <http://www.oecd.org/dataoecd/51/33/38120102.pdf> (last visited Sept. 14, 2020) [<https://perma.cc/8VZS-UVPE>] (providing a simplified breakdown of NDRRA procedures).

²⁴¹ OECD, *supra* note 238, at 44.

²⁴² *Id.* at 42-43.

²⁴³ See AUSTRALIAN GOV'T DEPT OF HOME AFFAIRS, DISASTER RECOVERY FUNDING ARRANGEMENTS 2018, at 2 (2018), <https://www.disasterassist.gov.au/Documents/Natural-Disaster-Relief-and-Recovery-Arrangements/drfa-factsheet.PDF> [<https://perma.cc/RMX3-Z4WX>] [hereinafter DRFA OVERVIEW] (“Advance payments are generally only made in response to significant and extremely damaging natural disasters where the cost is likely to be greater than the state can manage in the immediate to short-term.”).

²⁴⁴ See *id.* The DRFA covers disaster events that occurred on or after November 1, 2018, whereas the Natural Disaster Relief and Recovery Arrangements (“NDRRA”) covers disaster events that occurred before November 1, 2018. *What is DRFA and NDRRA?*, HINCHINBROOK SHIRE COUNCIL, <https://www.hinchinbrook.qld.gov.au/community-environment/disaster-and-emergency-information/what-is-ndrra/> (last visited Sept. 14, 2020) [<https://perma.cc/G2SJ-4ZJK>]. The DRFA replaced the NDRRA in an attempt to reform disaster funding in Australia. See Michael Kelly, *QRA Ready for Disaster Funding Reform*, LOCAL GOV'T ASS'N QUEENSL. (July 30, 2018), https://www.lgaq.digital/web/guest/notice-board/-/asset_publisher/AHDhMHixBm3z/content/id/9104547 [<https://perma.cc/Y2AE-EV69>]. Reforms to Australia's disaster funding included “improved autonomy for states and territories in how they deliver works, the ability for local governments to use their own labour, plant and equipment, and the ability to allocate efficiencies realised in delivery of reconstruction programs to resilience and mitigation projects.” *Id.*

²⁴⁵ *Disaster Recovery Funding Arrangements (DRFA)*, QUEENSL. RECONSTRUCTION AUTHORITY, <https://www.qra.qld.gov.au/funding/drfa> (last visited Sept. 14, 2020) [<https://perma.cc/U6HZ-TMFV>]. Australia also institutes State Disaster Relief Arrangements (SDRAs), which are wholly state-funded programs that assists in alleviating “personal hardship and distress.” *Id.*

²⁴⁶ See OECD, *supra* note 238, at 43.

once its expenditures exceed a specific threshold.²⁴⁷ The amount of financial assistance the Australian government provides to States depends upon the type of assistance provided and can reach up to seventy-five percent of the States' expenditures.²⁴⁸ Eligible reimbursements include grants for relief of "personal hardship and distress," such as the provision of emergency food, clothing and accommodation, essential housing repairs, or the replacement of essential household goods.²⁴⁹

In addition to the DFRA, Australia implements both a Australian Government Disaster Recovery Payment ("AGDRP") and Disaster Recovery Allowance ("DRA") to provide financial assistance to individuals.²⁵⁰ The AGDRP is a one-time payment of \$1000 for eligible adult residents and \$400 for eligible children residents of Australia who have been affected by a major disaster in Australia or elsewhere.²⁵¹ The Disaster Recovery Allowance is intended to assist "employees, small business persons and farmers who experience a loss of income as a direct result of a major disaster."²⁵² Under the Disaster Recovery Allowance, the Australian government provides eligible individuals with up to thirteen weeks of short-term income relief.²⁵³ In light of the recent wildfire crisis that occurred in Australia, Australia's approach to

²⁴⁷ WEEKS, *supra* note 240, at 6.

²⁴⁸ DRFA OVERVIEW, *supra* note 243, at 2-3.

²⁴⁹ WEEKS, *supra* note 240, at 6.

²⁵⁰ See Helen Portillo-Castro, *Emergency Management and Disaster Resilience: A Quick Guide*, PARLIAMENT OF AUSTL. (July 16, 2019), https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/rp1920/Quick_Guides/EmergencyManagementDisasterResilience#_ftn12 [<https://perma.cc/J7F8-9JUX>]. Both programs are available to individuals through Australia's Department of Social Services. *Id.*

²⁵¹ See *Disaster Recovery Payment*, AUSTL. GOV'T DEP'T HOME AFF., <https://www.disasterassist.gov.au/Pages/disaster-recovery-payment.aspx> (last updated Apr. 16, 2020) [<https://perma.cc/3553-URB2>]. Whether a natural disaster is considered "major" is determined by the Minister for Water Resources, Drought, Rural Finance, Natural Disaster and Emergency Management. 1.2.6.20 *Australian Government Disaster Recovery Payment (AGDRP) – Description, Social Security Guide*, AUSTL. GOV'T, <https://guides.dss.gov.au/guide-social-security-law/1/2/6/20> (last updated July 1, 2019) [<https://perma.cc/8VLR-EXFT>].

²⁵² *Disaster Recovery Allowance*, AUSTL. GOV'T DEP'T HOME AFF., <https://www.disasterassist.gov.au/Pages/disaster-recovery-allowance.aspx> (last updated Apr. 16, 2020) [<https://perma.cc/9PFA-J9Y8>].

²⁵³ *Id.* Payments under the Disaster Recovery Allowance vary per year and are determined by the Minister for Agriculture, Drought and Emergency Management. See 1.2.6.40 *Australian Government Disaster Recovery Payment (AGDRP) – Description, Social Security Guide*, AUSTL. GOV'T, <https://guides.dss.gov.au/guide-social-security-law/1/2/6/40> (last updated Mar. 20, 2020) [<https://perma.cc/6HYV-WXK5>].

insuring natural catastrophes undoubtedly was tested, and how it performed will provide lessons for America in the coming months.²⁵⁴

2. Belgium

Although the types of natural catastrophes that Belgium experiences is limited compared to those in other countries, it nonetheless suffers from some natural catastrophes — namely, storms, flooding, and earthquakes.²⁵⁵ The Intergovernmental Panel on Climate Change has projected that Belgium could be exposed to more significant natural catastrophes as a result of climate change in the future.²⁵⁶

The Belgian system for insuring natural catastrophes is modeled after the French and Spanish natural catastrophe insurance programs.²⁵⁷ All three systems focus on risk-spreading across the country, thereby creating a system of solidarity among the citizens of each respective country.²⁵⁸ In Belgium, fire insurance policies that cover “simple risks”²⁵⁹ are also required to cover natural catastrophes.²⁶⁰ As such, because approximately ninety to ninety-five percent of the Belgian

²⁵⁴ See Jon Emont, James Glynn & David Winning, *If We Stayed Outside We Would Have Died: Australia's Fires Devour Farms and Forests*, WALL ST. J. (Jan. 12, 2020, 4:18 PM ET), <https://www.wsj.com/articles/if-we-stayed-outside-we-would-have-died-australias-fires-devour-farms-and-forests-11578863913> [<https://perma.cc/WU3X-GAQW>]; Isabella Kwai, *Apocalyptic Scenes in Australia as Fires Turn Skies Blood Red*, N.Y. TIMES (Jan. 23, 2020), <https://www.nytimes.com/2019/12/31/world/australia/fires-red-skies-Mallacoota.html> [<https://perma.cc/C7EX-G3AT>].

²⁵⁵ See Véronique Bruggeman & Michael Faure, *The Compensation for Victims of Disasters in Belgium, France, Germany, and the Netherlands*, 31 LOY. CONSUMER L. REV. 259, 268 (2019); see also OECD, *supra* note 238, at 48.

²⁵⁶ Bruggeman & Faure, *supra* note 255, at 268. See generally INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007 SYNTHESIS REPORT (Rajendra K. Pachauri & Andy Reisinger eds., 2007), https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf [<https://perma.cc/59G3-CMQ4>] (discussing the future global effects of climate change).

²⁵⁷ See Youbaraj Paudel, *A Comparative Study of Public — Private Catastrophe Insurance Systems: Lessons from Current Practices*, 37 GENEVA PAPERS ON RISK & INS. 257, 271 (2012), <https://link.springer.com/content/pdf/10.1057/gpp.2012.16.pdf> [<https://perma.cc/YR2X-TZTP>].

²⁵⁸ *Id.*; see also Michael Faure & Véronique Bruggeman, *Catastrophic Risks and First-Party Insurance*, 15 CONN. INS. L.J. 1, 46 (2008).

²⁵⁹ Simple risks are “any property or collection of goods where the insurance value is not greater than EUR 1,445,715.” *Insurance of Simple Risks Against Natural Catastrophe in Belgium*, LLOYD'S (Dec. 28, 2014), <https://www.lloyds.com/market-resources/market-communications/regulatory-communications/regulatory-communications/regulatory-news-articles/2014/12/insurance-of-simple-risks-against-natural-catastrophe-in-belgium> [<https://perma.cc/T4GB-GZP9>].

²⁶⁰ See Bruggeman & Faure, *supra* note 255, at 273.

population has fire insurance for simple risks,²⁶¹ the vast majority of the population is also insured for natural catastrophes. Coverage for natural catastrophes is divided into four types: flooding, earthquakes, overflow or impoundment of public sewers, and landslide or subsidence.²⁶²

Under Belgium's mandatory natural catastrophe coverage, insurers compensate victims for "all direct damage to the insured property caused by a natural catastrophe or by an insured peril that results directly from it (notably fire, explosion, or implosion)" ²⁶³ Insurers also provide coverage for damage to the insured property that arise from "measures taken by a legally constituted authority to safeguard and protect goods and persons as well as the clearance and demolition expenses associated with reconstruction of the property" ²⁶⁴

Premium rates for mandatory natural catastrophe coverage are calculated based upon two separate approaches.²⁶⁵ Approximately fifty percent of insurers price the insurance based upon only the value of the property.²⁶⁶ The other half of insurers take a traditional approach of basing premiums upon the risk of loss presented by the individual properties.²⁶⁷ Regardless of an individual insurer's approach, the maximum deductible for natural catastrophe coverage is 610 Euros per claim.²⁶⁸

Because natural catastrophes can result in enormous damage and losses, each individual insurer's risk of loss is limited.²⁶⁹ This limit is calculated based on a formula for each event and for each individual insurer based on the insurer's premium income for fire coverage concerning simple risks.²⁷⁰ Once the insurer reaches the imposed limit, the state-sponsored National Cash Registry for Disaster Damage ("Disaster Fund") covers losses above the insurer's limit.²⁷¹ The *Caisse Nationale Des Calamites* ("CNC") administers the Disaster Fund and deals directly with the insurance companies; individual consumers do

²⁶¹ See Faure & Bruggeman, *supra* note 258, at 46.

²⁶² See Bruggeman & Faure, *supra* note 255, at 273.

²⁶³ *Id.* at 274.

²⁶⁴ *Id.*

²⁶⁵ See Faure & Bruggeman, *supra* note 258, at 46.

²⁶⁶ See *id.*

²⁶⁷ See *id.* Premiums can be based upon, *inter alia*, the location of the property and past damage to the property caused by a natural catastrophe. See *id.*

²⁶⁸ *Id.*

²⁶⁹ *Id.*

²⁷⁰ *Id.*

²⁷¹ See Bruggeman & Faure, *supra* note 255, at 275.

not need to interact with the CNC.²⁷² This type of coverage scheme represents a loss-sharing arrangement between the private and public insurance sectors. The overlapping arrangement applies only to catastrophic risks and does not apply to other, non-mandatory coverages.²⁷³ The Disaster Fund's exposure is, however, limited.²⁷⁴ The Disaster Fund will generally cover up to 700 million Euros for earthquakes and up to 280 million Euros for other qualifying natural catastrophes per event.²⁷⁵ Scholars have found these upper limits suitable, considering that the most devastating natural catastrophes to hit Belgium between 1976 and 2005 ranged from 38 million to 74.7 million Euros.²⁷⁶

Although the Disaster Fund historically has adequately compensated victims of natural catastrophes, scholars nonetheless have criticized some of its shortcomings. For example, scholars have criticized the Disaster Fund because it imposes long wait times for financial compensation and presents a complex application procedure.²⁷⁷ Additionally, for policyholders to receive compensation for a particular event, the Belgian government must label the event a natural disaster.²⁷⁸ Specifically, an event must meet the following criteria: (1) the total damage resulting from the event must be at least 1,239,467.60 Euros, and (2) the average damage per family must be at least 5,577.60 Euros.²⁷⁹ Notably, the Belgian system for catastrophic coverage largely mirrors the French system, which is discussed next.

3. France

France is considered a leader for natural catastrophe insurance in Europe.²⁸⁰ France's Natural Disaster Compensation Scheme ("CAT NAT") mandates comprehensive coverage for natural catastrophes through first-party property insurance.²⁸¹ The purchase of property insurance is voluntary, but approximately eighty-five percent of citizens opt to purchase it.²⁸² Thus, although there is no requirement to procure

²⁷² See OECD, *supra* note 238, at 49.

²⁷³ *Id.*

²⁷⁴ See *id.* at 49-50; Bruggeman & Faure, *supra* note 255, at 269-70.

²⁷⁵ See Bruggeman & Faure, *supra* note 255, at 274.

²⁷⁶ See *id.* at 274-75.

²⁷⁷ See, e.g., *id.* at 270.

²⁷⁸ *Id.*

²⁷⁹ *Id.* at 270 n.29.

²⁸⁰ *Id.* at 361 tbl.4.

²⁸¹ See *id.* at 299.

²⁸² *Id.* at 298-99.

natural catastrophe insurance, if an individual purchases property insurance, then the individual receives coverage for natural catastrophes.²⁸³

Policyholders, however, retain part of the risk via compulsory deductibles.²⁸⁴ These deductibles are required regardless of the terms and conditions of the policy.²⁸⁵ Deductible and premiums amounts are updated periodically and can vary on a sliding scale.²⁸⁶ The purpose of the sliding scale is to encourage loss prevention measures in areas that have not adopted loss prevention plans.²⁸⁷ Policyholders who live in municipalities that have adopted a loss prevention plan generally receive premium discounts.²⁸⁸

Coverage for a natural catastrophe is only triggered if the French government considers the event a natural disaster.²⁸⁹ In France, a natural disaster is typically defined as “an accident that causes damage which is unusual, unavoidable, and normally not insurable.”²⁹⁰ Additionally, a causal link must be established between that natural disaster declared and the damage suffered in order for the property to be covered by the policy.²⁹¹ Unlike the Belgian system, which has been criticized for its untimely compensation,²⁹² the French system requires policyholders to file a claim with their insurer within ten days of the French government declaring an event a natural disaster.²⁹³ Further, the insurer is required to make an advance payment to the insured within two months of the claim and must make an offer of financial compensation within three months of the claim being submitted.²⁹⁴

In France, natural catastrophe insurance is backstopped by government reinsurance through *Caisse Centrale de Réassurance*

²⁸³ *Id.* at 299; see also OECD, *supra* note 238, at 61-62.

²⁸⁴ OECD, *supra* note 238, at 62.

²⁸⁵ *Id.* Notably, aside from premiums and deductibles, coverage for catastrophic risks follow the terms and conditions of the underlying policy. *Id.*

²⁸⁶ *Id.*

²⁸⁷ *Id.*

²⁸⁸ See Faure & Bruggeman, *supra* note 258, at 44.

²⁸⁹ Bruggeman & Faure, *supra* note 255, at 300. France mandates coverage for natural catastrophes regardless of an insured's vulnerability to natural disasters or exposure to risk. *Id.*

²⁹⁰ *Id.* at 299; see also Michael Cannarsa, Fabien Lafay & Olivier Moréteau, *France*, in FINANCIAL COMPENSATION FOR VICTIMS OF CATASTROPHES: A COMPARATIVE LEGAL APPROACH 81, 86 (Michael G. Faure & Ton Hartlief eds., 2006).

²⁹¹ OECD, *supra* note 238, at 62.

²⁹² See *supra* Part IV.E.2.

²⁹³ Bruggeman & Faure, *supra* note 255, at 300.

²⁹⁴ *Id.* This general rule excludes agricultural damage. *Id.*

(“CCR”).²⁹⁵ The law allows private insurers to transfer the risk of natural catastrophe losses to the CCR.²⁹⁶ The CCR, in turn, pays an annual premium to the government to obtain a governmental guarantee.²⁹⁷

One benefit of reinsuring with the CCR is the entity’s unlimited cover and two different ways to reinsure with it — “quota share” and “stop-loss.”²⁹⁸ Under the quota-share scheme, the primary insurer shares a proportion of premiums with the CCR in exchange for the CCR covering a share of any losses.²⁹⁹ Under the quota share approach, the CCR typically provides fifty percent of the coverage, with private insurers retaining fifty percent of the risk themselves.³⁰⁰ Under the stop-loss approach, the CCR covers losses above a primary insurer’s retained risk amount. In other words, stop-loss reinsurance is only triggered if the total amount of the insurer’s losses exceed an agreed-upon amount, and the reinsurance treaties typically limit indemnity to a specific amount.³⁰¹ On the other hand, the CCR’s stop-loss treaty with the

²⁹⁵ See OECD, *supra* note 238, at 63; Lorilee Medders, Kathleen McCullough & Verena Jäger, *Tale of Two Regions: Natural Catastrophe Insurance and Regulation in the United States and the European Union*, 30 J. INS. REG. 171, 184 (2011). CCR is a private reinsurance company based in France that provides both public- and private-sector reinsurance. See *The Group*, CCR, <https://www.ccr.fr/en/l-entreprise-ccr> (last visited Sept. 5, 2020) [<https://perma.cc/NZE9-RJWM>]. For a comprehensive flow chart describing the compensation scheme for natural catastrophes in France, see *Natural Disasters Compensation Scheme*, CCR (Mar. 2, 2015), <https://www.ccr.fr/en/-/indemnisation-des-catastrophes-naturelles-en-france?> [<https://perma.cc/8XPW-88YE>].

²⁹⁶ See Décret 82-706 du 10 août 1982 relatif aux opérations de réassurance des risques de catastrophes naturelles par la caisse centrale de réassurance application de l’article 4 de la loi 82-600 du 13 juillet 1982 [Decree 82-706 of August 10, 1982 on the Reinsurance Operations for the Natural Catastrophe Risks by the *Caisse Centrale de Réassurance* Application of Article 4 of the Act 82-600 of July 13, 1982], JOURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE [J.O.] [OFFICIAL GAZETTE OF FRANCE], Aug. 11, 1982, p. 2562; see also McAneney et al., *supra* note 186, at 4.

²⁹⁷ See Suzanne Vallet, *Insuring the Uninsurable: The French Natural Catastrophe Insurance System*, in CATASTROPHE RISK AND REINSURANCE: A COUNTRY RISK MANAGEMENT PERSPECTIVE 199, 206 (Eugene N. Gurenko ed., 2004).

²⁹⁸ See *id.* at 205-06.

²⁹⁹ *Id.* at 205; see also Julia Kagan, *Quota Share Treaty*, INVESTOPEDIA, <https://www.investopedia.com/terms/q/quota-share-treaty.asp> (last updated Apr. 27, 2020) [<https://perma.cc/ZR88-A22B>] (“Quota share reinsurance allows an insurer to retain some risk and premium while sharing the rest with an insurer up to a predetermined maximum coverage.”).

³⁰⁰ McAneney et al., *supra* note 186, at 4; see He & Faure, *supra* note 221, at 220; Medders et al., *supra* note 295, at 184.

³⁰¹ Medders et al., *supra* note 295, at 184 n.24.

government provides an unlimited governmental guarantee.³⁰² The CCR's premium for such coverage is a fixed amount regardless of the number of losses in any given year.³⁰³

4. New Zealand

Since the Insurance Council of New Zealand began tracking national catastrophes in 1968, New Zealand has been subject to over 150 natural catastrophes, costing citizens significant amounts of money due to the resulting property damage.³⁰⁴ New Zealand is particularly susceptible to storms, volcanic events, earthquakes, and landslides.³⁰⁵ The Earthquake Commission ("EQC") is the primary source for natural catastrophe insurance for residential properties.³⁰⁶ Introduced in 1993 under the Earthquake Commission Act, it covers natural catastrophe losses for residential properties.³⁰⁷ It is owned by the government and it administers the Natural Disaster Fund.³⁰⁸ Residential property owners who voluntarily buy fire insurance from private insurance companies automatically get EQC coverage, with the premium added to the fire insurance cost.³⁰⁹ The policies include coverage for fires of catastrophic consequences that are not man-made.³¹⁰ EQC coverage is compulsory and collected on EQC's behalf by the fire insurer if the property owner insures the dwelling or its contents against fire damage.³¹¹ The EQC administers the natural disaster insurance, including processing claims

³⁰² See He & Faure, *supra* note 221, at 220; McAneney et al., *supra* note 186, at 4; Medders et al., *supra* note 295, at 184.

³⁰³ See Faure & Bruggeman, *supra* note 258, at 44; see also OECD, *supra* note 238, at 63.

³⁰⁴ See *Cost of Natural Disasters*, INS. COUNCIL OF N.Z., <https://www.icnz.org.nz/natural-disasters/cost-of-natural-disasters/> (last visited Sept. 7, 2020) [<https://perma.cc/N954-VRMC>].

³⁰⁵ OECD, *supra* note 238, at 83.

³⁰⁶ *Id.* at 85; see McAneney et al., *supra* note 186, at 3.

³⁰⁷ See Anastasia Telesetsky, *Insurance as a Mitigation Mechanism: Managing International Greenhouse Gas Emissions Through Nationwide Mandatory Climate Change Catastrophe Insurance*, 27 PACE ENVTL. L. REV. 691, 700 (2010) (first citing Earthquake Commission Act 1993, Public Act 84, s 13 (N.Z.), <http://www.legislation.govt.nz/act/public/1993/0084/latest/DLM305968.html> [<https://perma.cc/8UEX-ZK57>]; and then citing *EQC Insurance*, EQC, <http://www.eqc.govt.nz/insurance.aspx> (last visited Aug. 18, 2010) [<https://perma.cc/NGQ5-FF8R>]).

³⁰⁸ OECD, *supra* note 238, at 85.

³⁰⁹ *Id.*

³¹⁰ *Id.*

³¹¹ *Id.*

and acquiring reinsurance.³¹² If, however, a homeowner is unable to obtain coverage through a private insurer, then the homeowner may apply for direct coverage from the EQC.³¹³ The EQC reviews applications for direct coverage on a case-by-case basis, and the applying homeowner must prove that it was unable to obtain coverage through the private market.³¹⁴ If an insured procures insurance from the EQC, then the policyholder pays premiums directly to the EQC, as opposed to paying a private insurer that transfers the payment to EQC.³¹⁵ The remainder of the program is unchanged for those that contract directly with the EQC.³¹⁶

The premiums paid to the EQC are not actuarially calculated.³¹⁷ Instead, the premiums are based upon a percentage of the policyholder's fire insurance premium regardless of the policyholder's risk of a natural catastrophe loss because it is considered too difficult and costly to attempt to create actuarially sound premiums regarding individual policyholders' risks of natural catastrophe losses.³¹⁸ For example, EQC premiums cost twenty cents for every NZD 100, plus the goods and services tax,³¹⁹ of homeowners' insurance purchased by the policyholder.³²⁰ After a natural catastrophe triggers EQC coverage, a policyholder has two years to notify the EQC of any damages from the peril.³²¹

³¹² See Earthquake Commission Act 1993, pt 1, s 5 (N.Z.).

³¹³ EQC Insurance Overview, EQC, <https://www.eqc.govt.nz/what-we-do/insurance-overview> (last updated Mar. 2, 2020) [<https://perma.cc/B67H-R875>].

³¹⁴ See *id.*

³¹⁵ *Id.*

³¹⁶ See *id.*

³¹⁷ See Rob Risley, Comment, *Landslide Peril and Homeowners' Insurance in California*, 40 UCLA L. Rev. 1145, 1170 (1993).

³¹⁸ *Id.* at 1169-70.

³¹⁹ See Jim Chappelow, *Goods and Services Tax (GST)*, INVESTOPEDIA, <https://www.investopedia.com/terms/g/gst.asp> (last updated Apr. 6, 2020) [<https://perma.cc/W9YU-CBAS>] ("The goods and services tax (GST) is a value-added tax levied on most goods and services sold for domestic consumption. The GST is paid by consumers, but it is remitted to the government by the businesses selling the goods and services.").

³²⁰ See EQC Insurance Overview, *supra* note 313.

³²¹ EARTHQUAKE COMM'N, A GUIDE TO YOUR CLAIM WITH EQC 3 (2019), https://www.eqc.govt.nz/sites/public_files/documents/EQCover/A%20guide%20to%20your%20claim%20with%20EQC%20DL-July2019.pdf [<https://perma.cc/QRT3-DBE4>]. The EQC, however, advises homeowners to report a claim as soon as possible for the EQC to most accurately assess the claim. See *id.*

5. Norway

Each year, policyholders in Norway submit between 1000 and 1500 claims arising from natural catastrophes.³²² Most damage is due to flooding, but Norway also experiences landslides, avalanches, and rock falls.³²³

Mandatory homeowners insurance covers natural catastrophes in Norway.³²⁴ The government establishes the aggregate limit of liability for insurers for any natural disaster.³²⁵ If someone who is impacted by a natural catastrophe does not have insurance, then a state-sponsored program — the National Scheme for Natural Damage Assistance (“the Scheme”) — covers the loss.³²⁶ Norway established the Scheme in order to “compensat[e] damage caused by natural perils and promot[e] the adoption of preventive measures against such perils.”³²⁷ The Scheme is not available if a loss is covered by insurance.³²⁸

In 1980, Norway established the Norwegian Natural Perils Pool (“NP”).³²⁹ The purpose of the NP is to bridge the divide between the NP’s participants and the Scheme.³³⁰ All non-life insurance companies that provide fire insurance coverage in Norway are required to participate in the NP.³³¹ The NP reinsures its participants for natural catastrophes in proportion to a participant’s contribution to the NP.³³² This contribution equates to the participant’s market share of fire insurance in Norway.³³³ Private insurers settle individual claims by the

³²² See NORWEGIAN NAT. DISASTER FUND, A HISTORY OF THE NATURAL DISASTER REGIME 23 (2011), https://www.landbruksdirektoratet.no/no/dokumenter/publikasjoner/_attachment/16927?_ts=134cd12b350 [<https://perma.cc/T69V-2HNW>].

³²³ *Id.*

³²⁴ See Rules of Norwegian Natural Perils Pool, 21 Dec. 1979, Act on Natural Damage Insurance, 16 June 1989, No. 70, § 1.

³²⁵ See *id.* § 3.

³²⁶ See *id.* § 1.

³²⁷ OECD, *supra* note 238, at 86; see also *The Norwegian Natural Perils Pool*, NORWEGIAN NAT. PERILS POOL, <https://www.naturskade.no/en/the-norwegian-natural-perils-pool/> (last visited Sept. 6, 2020) [<https://perma.cc/A8GC-Q3YE>].

³²⁸ *The Norwegian Natural Perils Pool*, *supra* note 327.

³²⁹ See *id.*; see also OECD, *supra* note 238, at 87.

³³⁰ *The Norwegian Natural Perils Pool*, GREEN FIN. PLATFORM, <https://greenfinanceplatform.org/financial-measures-database/norwegian-natural-perils-pool> (last visited Sept. 6, 2020) [<https://perma.cc/9979-MDR9>].

³³¹ OECD, *supra* note 238, at 87; see also *The Norwegian Natural Perils Pool*, *supra* note 327. As of 2008, approximately eighty insurance companies were members of the NP. See OECD, *supra* note 238, at 87.

³³² See *The Norwegian Natural Perils Pool*, *supra* note 327.

³³³ *Id.*

terms of the relevant policy and are reinsured proportionally through the NP.³³⁴ Premiums for natural disasters are set by the NP and are based on the individual consumer's total fire coverage.³³⁵ The consumer pays premiums for natural catastrophes directly to the primary insurer under their fire insurance policy.³³⁶ If the premiums collected by the insurer exceed the insurer's pooled share of the NP, the insurer retains the remaining sum to use for future natural perils claims.³³⁷

6. Spain

In Spain, floods, earthquakes, and tsunamis are the most frequent natural catastrophes.³³⁸ Like the natural catastrophe coverage regime in France, insurance is generally optional in Spain, but some specific lines of insurance require mandatory extraordinary risk coverage.³³⁹ These lines of insurance include fire and natural events, land vehicles, railway vehicles, business interruption, and life.³⁴⁰

Spain's public funding for natural catastrophes operates on three basic principles: compensation, solidarity, and cooperation.³⁴¹ The principle of compensation comprises compensation based on risks and geographic location, and it seeks to compensate constituents swiftly.³⁴² Like France, Spain's natural catastrophe insurance regime also focuses on solidarity between citizens.³⁴³ The solidarity principle requires that all insureds "contribute, in proportion to their respective insured capital, to the endowment of a common fund available to those of the insured[s] who may be affected by the natural hazards covered."³⁴⁴ Lastly, the principle of cooperation encourages proper communication

³³⁴ See *id.*

³³⁵ *Id.*

³³⁶ *Id.*

³³⁷ *Id.*

³³⁸ See OECD, *supra* note 238, at 91.

³³⁹ See *id.* at 93.

³⁴⁰ *Id.*

³⁴¹ CONSORCIO DE COMPENSACION DE SEGUROS, NATURAL CATASTROPHES INSURANCE COVER. A DIVERSITY OF SYSTEMS 140 (2008), https://www.conorseguros.es/web/documents/10184/48069/CCS_Natural_Catastrophes_Insurance_Cover.pdf/d7cf67cc-9591-476b-87d9-728e6a57ca60 [<https://perma.cc/7NPQ-PC2G>] [hereinafter NATURAL CATASTROPHES INSURANCE COVER].

³⁴² See *id.*

³⁴³ See Paudel, *supra* note 257, at 271; see also NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 140.

³⁴⁴ NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 140.

between the private market and public funding for the purpose of appropriately insuring citizens.³⁴⁵

Against the backdrop of these three principles, Spain operates a state-sponsored insurance program known as the *Consortio de Compensación de Seguros* (“CCS”).³⁴⁶ The CCS is a public business organization that covers both natural catastrophes and unnatural catastrophes (e.g., terrorism).³⁴⁷ If an extraordinary risk is not specifically covered by another insurance policy or the other insurer cannot pay the claim, then the CCS pays the claim. In 2009, the CCS paid 541 million Euros for losses stemming from Storm Klaus, and in 2016, the CCS paid 120 million Euros for flood damage.³⁴⁸

The CCS collects premiums as compulsory contributions known as “Consortio charges.”³⁴⁹ Consortio charges are collected from private insurers that charge premiums on the underlying insurance policies.³⁵⁰ The private insurers are able to retain a five percent collection fee for any collected Consortio charges.³⁵¹ The charges apply nationally and are fixed rates that depend upon the type of coverage.³⁵² For example, the CCS will generally charge 0.08-0.09 percent per thousand insured for homes.³⁵³ For personal injury lines, the CCS will generally charge 0.005 percent per thousand insured.³⁵⁴ The CCS places the accumulated funds in a stabilization reserve, and it assumes the role of insurer for the extraordinary risks associated with natural catastrophes. The CCS is not

³⁴⁵ See *id.*

³⁴⁶ McAneney et al., *supra* note 186, at 3; see also THOMAS VON UNGERN-STERNBERG, THE BENEFITS OF INTRODUCING A MANDATORY STATE HURRICANE INSURANCE SCHEME IN FLORIDA 4 (2009), <http://www.unil.ch/de/files/live/sites/de/files/working-papers/09.10.pdf> [<https://perma.cc/85TU-4NL2>].

³⁴⁷ See VON UNGERN-STERNBERG, *supra* note 346, at 4; see also OECD, *supra* note 238, at 92; McAneney et al., *supra* note 186, at 3.

³⁴⁸ Spain: *Consortio Charges*, LLOYD’S (Jan. 25, 2017), <https://www.lloyds.com/market-resources/tax/tax-news/2017/spain-consorcio-charges> [<https://perma.cc/5SKW-RVPY>].

³⁴⁹ *Id.*

³⁵⁰ *Id.*

³⁵¹ Paudel, *supra* note 257, at 266; see also Belén Soriano Clavero, *The New Rate for Extraordinary Risks with the Consortio de Compensación de Seguros from 01/07/2018*, CONSORSEGUROS, <http://www.conorsegurosdigital.com/en/numero-08/front-page/the-new-rate-for-extraordinary-risks-with-the-consorcio-de-compensacion-de-seguros-from-01-07-2018> (last visited Oct. 17, 2020) [<https://perma.cc/KN4E-4NEF>].

³⁵² OECD, *supra* note 238, at 94.

³⁵³ NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 143; Clavero, *supra* note 351.

³⁵⁴ NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 143.

reinsured, but the program is backed by an unlimited governmental guarantee even though the guarantee has never been used.³⁵⁵

The payment of losses by the CCS does not depend upon a declaration of an official disaster by the state.³⁵⁶ Further, coverage under the CCS is not determined by a minimum or maximum amount of quantitative damage.³⁵⁷ Instead, coverage is triggered whenever an event is deemed an “extraordinary risk.”³⁵⁸ Extraordinary risks include “extraordinary floods, earthquakes, tsunamis, volcanic eruptions, atypical cyclonic storms and fall of meteorites.”³⁵⁹ Because the Spanish government need not determine whether an event is considered a disaster, any policyholder who suffers damage from an extraordinary risk may recover its losses, subject to any applicable exclusions.³⁶⁰

7. Switzerland

In Switzerland, the most common natural catastrophes are avalanches, floods, and landslides.³⁶¹ Coverage for natural catastrophes is mandatorily included in fire insurance policies.³⁶² Consequently, over ninety percent of Swiss citizens are insured for natural catastrophes.³⁶³ This mandatory coverage includes protection against numerous natural catastrophes.³⁶⁴ Notably, however, the mandatory coverage does not include coverage for damage caused by earthquakes.³⁶⁵ The insurance schemes vary, however, among the twenty-six cantons in the country, thereby creating two main systems of coverage.³⁶⁶

³⁵⁵ OECD, *supra* note 238, at 92-93; *see also* McAneney et al., *supra* note 186, at 5 (noting that the Consorcio “has a large and growing surplus and its Government guarantee has not been called upon”).

³⁵⁶ *See* NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 141; Telesetsky, *supra* note 307, at 699.

³⁵⁷ OECD, *supra* note 238, at 93; *see also* NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 141.

³⁵⁸ *See* OECD, *supra* note 238, at 93.

³⁵⁹ NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 141.

³⁶⁰ *See id.* at 141-42.

³⁶¹ *Id.* at 147; *see also* OECD, *supra* note 238, at 94.

³⁶² OECD, *supra* note 238, at 94.

³⁶³ *See* Paudel, *supra* note 257, at 265.

³⁶⁴ *See* OECD, *supra* note 238, at 94 (“Under Swiss federal law, the coverage of flood, inundation, windstorm, hail, avalanche, snow pressure, rock and stone fall, and landslide (but not earthquake) is mandatorily included in the scope of fire insurance for buildings and chattels.”).

³⁶⁵ *Id.*; *see also* NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 148.

³⁶⁶ *See* OECD, *supra* note 238, at 94.

In seven of the cantons,³⁶⁷ the insurance is sold by competing private insurance companies.³⁶⁸ In these cantons, private insurers thereby compete for consumers in an open market. Nonetheless, private insurers have formed the Natural Perils Pool (“the Pool”) in those cantons.³⁶⁹ The Pool operates as a typical risk-sharing model with participants pooling funds to cover damage arising from natural catastrophes.³⁷⁰

In the other nineteen cantons, cantonal building insurance companies, which are institutions governed by public law that hold a monopoly in their respective cantons, sell the insurance.³⁷¹ Like the other seven cantons, cantonal companies participate in a collective reinsurance pool, the Intercantonal Reinsurance Union (“IRV”),³⁷² thereby pooling their funds to share the risk of any losses arising out of natural catastrophes.³⁷³ For especially disastrous catastrophes, the IRV and cantonal insurers trigger the Intercantonal Community for Risks from Natural Elements (“IRG”).³⁷⁴ The IRG is another risk-sharing method by which each cantonal insurer contributes to the fund, which provides supplementary coverage for natural disasters.³⁷⁵ The IRG is triggered when a cantonal insurer exceeds its loss limit.³⁷⁶ Each insurer’s loss limit is fixed depending on the insurer’s capital.³⁷⁷ When triggered, the IRG provides supplementary coverage up to 750 million Swiss Francs.³⁷⁸ For events that require assistance from the IRG, the payment mechanism is typically broken into three layers.³⁷⁹ The IRV will pay the first twenty-five million Swiss Francs.³⁸⁰ Cantonal insurers

³⁶⁷ The seven cantons include Geneva, Uri, Schwyz, Ticino, Appenzell Inner Rhodes, Valais, and Obwalden. *Id.*

³⁶⁸ *See id.*

³⁶⁹ *Id.*

³⁷⁰ *Id.* The Pool is reinsured by the private Swiss Natural Hazard Pool (“SVV”). *See* Paudel, *supra* note 257, at 266. The SVV reinsures natural risks under a stop-loss agreement. *See* NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 152.

³⁷¹ *See* OECD, *supra* note 238, at 94-95.

³⁷² Like the SVV, the IRV reinsures natural risks under a stop-loss agreement. NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 150.

³⁷³ *See* OECD, *supra* note 238, at 95; *see also* Paudel, *supra* note 257, at 266.

³⁷⁴ *See* NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 150.

³⁷⁵ *Id.* at 151.

³⁷⁶ *Id.*

³⁷⁷ *Id.*

³⁷⁸ *Id.*

³⁷⁹ *See id.*

³⁸⁰ *Id.*

pay next 500 million Swiss Francs.³⁸¹ External reinsurers pay the remaining 225 million Swiss Francs, with the IRV paying the premiums for such reinsurance.³⁸²

Of the nineteen cantons insured through cantonal building insurers, only Nidwald is covered under a State guarantee.³⁸³ In Glarus, coverage may be provided by both private insurers and cantonal insurers.³⁸⁴ Premiums are charged at a uniform rate determined by the Federal Office of Private Insurance.³⁸⁵ Deductibles for damage to homes range from ten to fifteen percent of the damage.³⁸⁶

Additionally, cantonal insurers separately cover damage arising from earthquakes of at least a level VIII intensity based on the MSK intensity scale.³⁸⁷ Notably, coverage for earthquakes in Switzerland is not insurance or indemnification in their colloquial understandings. Rather, cantonal insurers contribute voluntary funds to the Schweizerischer Pool für Erdbebendeckung (“SPE”).³⁸⁸ The cantonal insurers do not pay additional premiums on these voluntary funds. The SPE serves the sole purpose of charitable coverage for policyholders who are subject to damage from earthquakes and would otherwise be uninsured.³⁸⁹ The SPE reinsures with the IRV and other private insurance companies.³⁹⁰ The deductibles in earthquake claims are ten percent of the insured value, and the SPE will pay a minimum of 50,000 Swiss Francs.³⁹¹

In sum, natural catastrophes are covered by many governmental insurance programs throughout the developed world and some governmental insurance programs have been proven to work in America (e.g., Florida’s Citizens’ homeowners insurance program), so such programs are demonstrably feasible. With Americans facing various natural catastrophes exacerbated by climate change, such as wildfires in the West, tornadoes in the South, Midwest, and East,

³⁸¹ *Id.*

³⁸² *Id.*

³⁸³ *Id.* at 149.

³⁸⁴ *Id.*

³⁸⁵ See *Special Requirements for Insurance Class B8: “Fire and Natural Forces,”* SWISS FED. DEPT FIN. (Jan. 1, 2006), https://www.finma.ch/FinmaArchiv/bpv/download/e/Spez_Merkblatt_ES_E.pdf [<https://perma.cc/4RES-HMN4>].

³⁸⁶ NATURAL CATASTROPHES INSURANCE COVER, *supra* note 341, at 149.

³⁸⁷ *Id.* at 150.

³⁸⁸ *Id.* Unlike the other eighteen cantons, Zurich covers earthquakes independent of the SPE. *Id.* There, the canton insurer provides earthquake coverage up to one billion Swiss Francs. *Id.*

³⁸⁹ See *id.*

³⁹⁰ *Id.*

³⁹¹ *Id.*

hurricanes in the South and East, and flooding throughout the country, it may be time for America to consider following other developed countries' leads by covering natural catastrophes under a governmental insurance program.

CONCLUSION

America is on fire. In recent years, due to past forestry management practice, climate change, and urban encroachment into wildlands, wildfires in the West have reached unprecedented levels of frequency and damage. Private insurers are fleeing the market. This wildfire crisis should be addressed on multiple fronts: reducing the chances of wildfires occurring, making homes in the paths of wildfires fire resistant, and filling the insurance void being created by private insurers' unwillingness to insure homes in the paths of wildfires.

To fill the insurance void, a governmental insurance program that covers wildfires, as well as other natural catastrophes, is an option whose time may have arrived. Many developed countries around the world cover natural catastrophes through governmental insurance programs. The government can raise the capital needed to cover the correlated risks that natural catastrophes present — both pre- and post-loss — which private insurers contend they are unable to do when they attempt to justify their refusals to cover such risks. Bundling coverage for the various natural catastrophes (hurricanes, flooding, landslides, wildfires, etc.) in a property policy sponsored by the federal government also would eliminate the adverse selection and correlated risk concerns presented by standalone policies that cover only a single peril. Such a program also would address the underinsured and uninsured problem in America currently presented by natural catastrophes because most homeowners would be required by their banks to have such coverage.