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**Adapting to the Deluge:  
Legal Issues from Recent Hurricane Seasons and  
Increasing Risks of Flooding**

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Columbia Law School

Marine Law Symposium

Legal Strategies for Climate Adaptation in Coastal New England

Roger Williams University School of Law

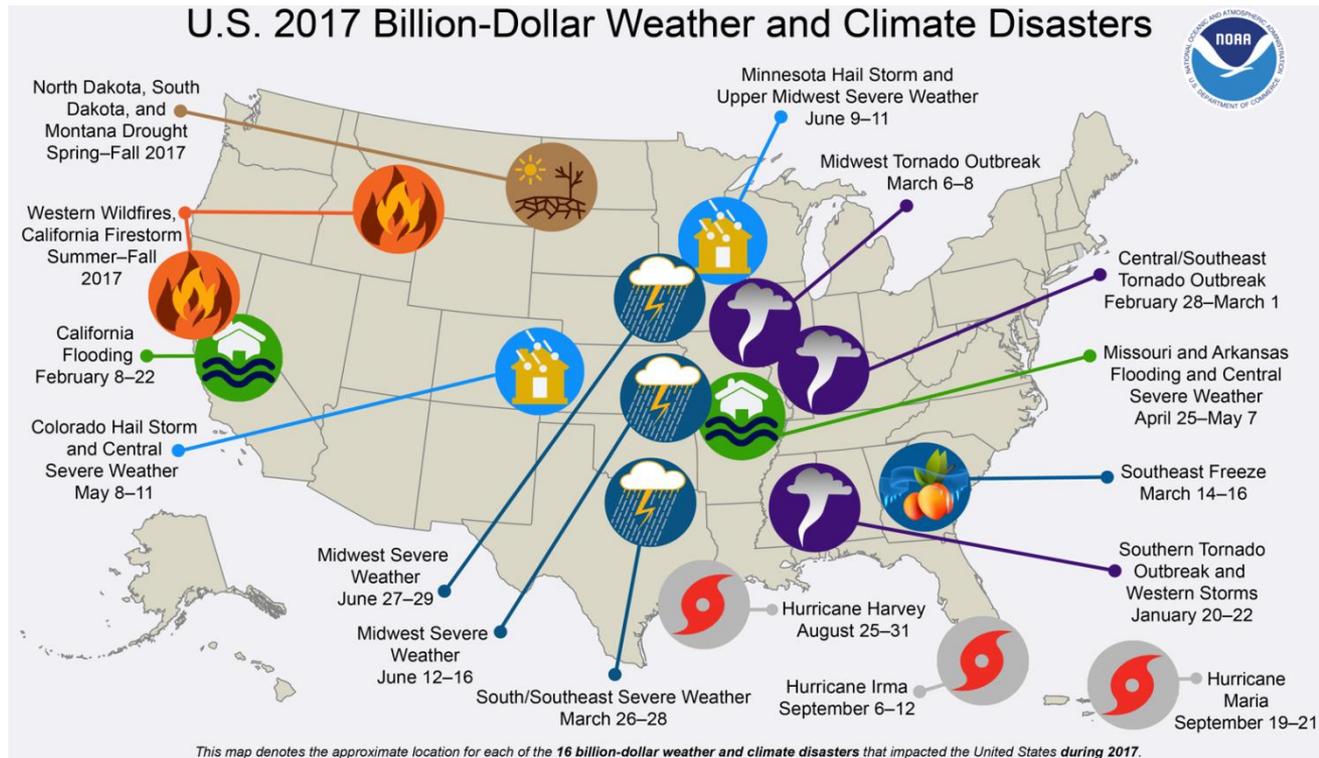
November 16, 2018



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# High Costs of Extreme Weather

During 2017, the U.S. experienced a historic year of 16 weather and climate disasters that each cost over \$1 billion. Their cumulative costs totaled over **\$300 billion in 2017** — a new U.S. annual record.



NOAA (2017), available at <https://www.ncdc.noaa.gov/billions/>

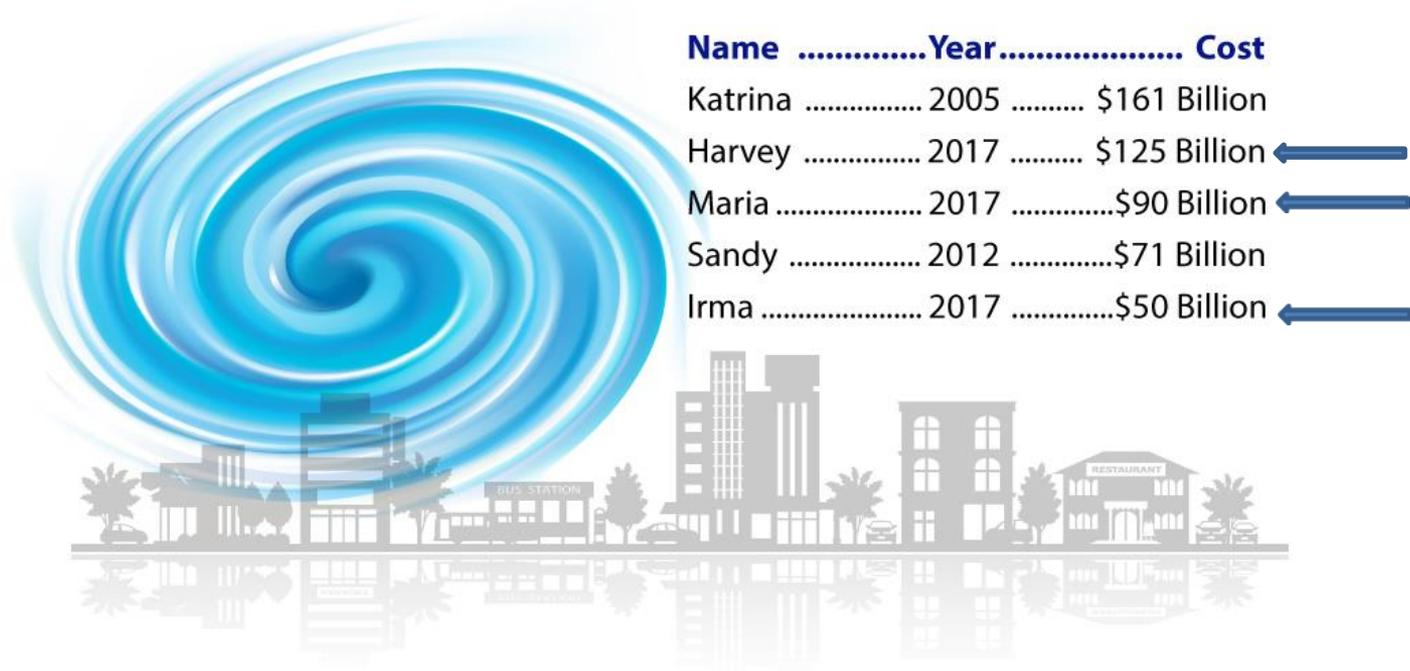


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# High Costs of Extreme Weather



## The Top Five Costliest U.S. Hurricanes on Record



NOAA: <https://coast.noaa.gov/states/fast-facts/hurricane-costs.html>



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# High Costs of Extreme Weather: Hurricane Harvey Examples



Clockwise:  
Flooding in NW  
Houston (Adrees  
Latif / Reuters),  
Rescue in  
Houston (U.S.  
Air Force photo  
by/1st Lt.  
Zachary West),  
Superfund Site  
Flooding  
(DigitalGlobe),  
Arkema  
Chemical Plant





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# Climate Change & Growing Flooding Risks

## **USGCRP's 4<sup>th</sup> National Climate Assessment Climate Science Special Report (2017):**

- Tropical Storms: Expected increase in intensity of Tropical Cyclones (Hurricanes and Typhoons) in a warmer world
- Sea Level Rise: Global average sea levels will rise by 1-4 feet by 2100 and that a rise of as much as 8 feet by 2100 is possible
- Heavy Precipitation Events: The frequency and intensity of heavy precipitation events are projected to continue to increase over the 21st century



4<sup>th</sup> NCA Special  
Report:  
<https://science2017.globalchange.gov/>



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# Road Map: Two Buckets of Solutions

1. Emerging and Potential Litigation Against Private Actors (Focus on Energy-Related Infrastructure)
2. Updating the National Flood Insurance Program (NFIP) for Climate Change & Opportunities for Local and State-Level Actions





# Bucket 1

## **Emerging and Potential Litigation Against Private Actors (Focus on Energy-Related Infrastructure)**

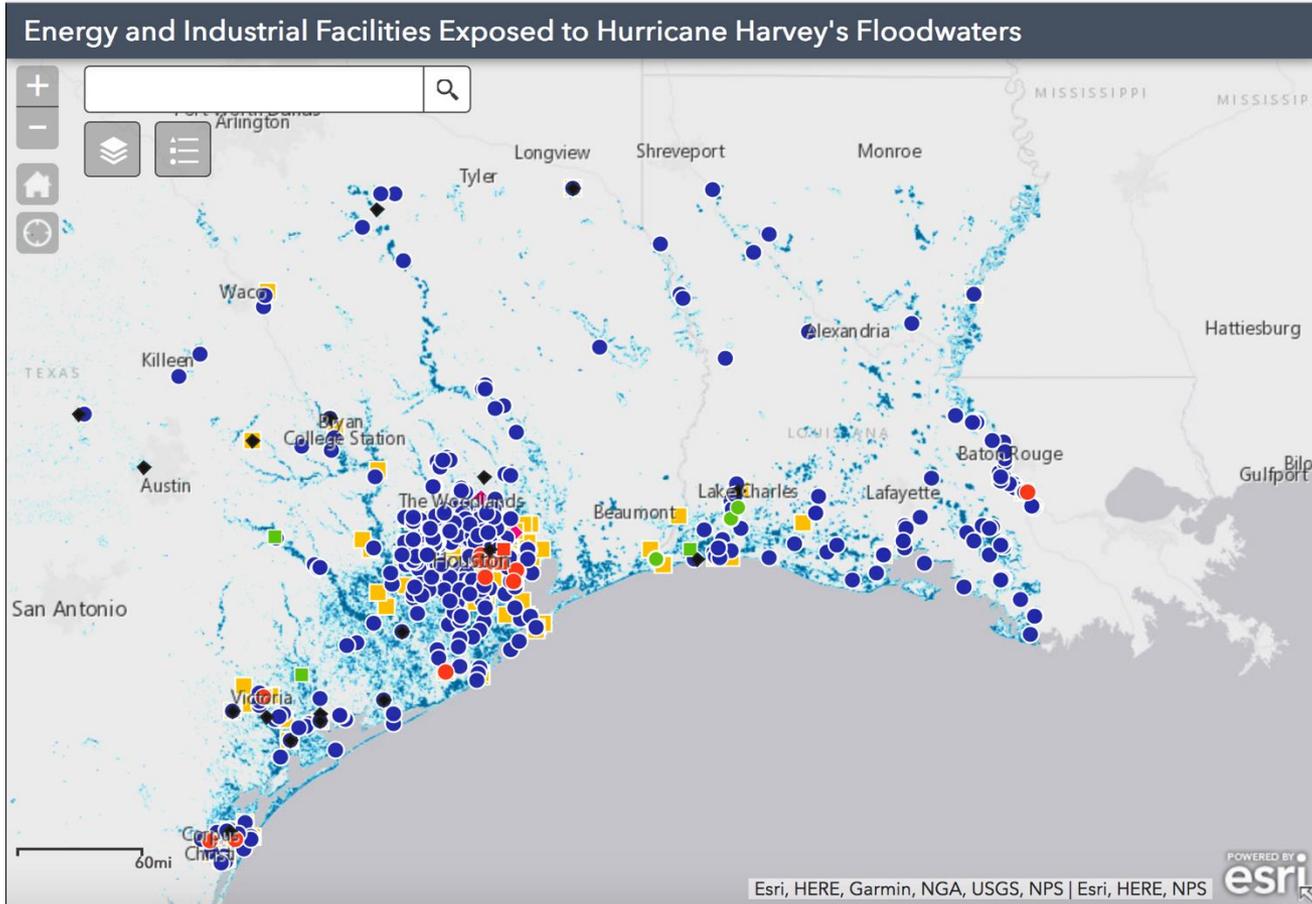
1. Hurricane Harvey Negligence and Criminal Suits Against Chemical Plant
2. CLF Litigation for Failure to Adapt Petroleum Products Storage and Distribution Facilities Highlight a Need to Update State Permitting Requirements
3. National Environmental Policy Act (NEPA) & “Little NEPA” Opportunities to Integrate Climate Considerations into Environmental Review
4. Ratemaking Petitions to Incentivize State Public Utility/Service Commissions (PUCs/PSCs) to Understand and Prepare for Climate Change Impacts





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# Vulnerability of Gulf Coast Energy & Industrial Infrastructure



**Legend** ✕

- Area Flooded by Hurricane Harvey
- Power Plants
- LNG Import/Export Terminals
- Natural Gas Processing Plants
- Petroleum Refineries
- Petroleum Product Terminals
- Wastewater Treatment Facilities
- Superfund Sites
- EPA Risk Management Plan Facilities
- Toxic Release Inventory Sites

# Failure to Adapt Litigation: Hurricane Harvey Lawsuits Against Arkema Chemical Plant

*The New York Times*

## *Chemical Maker and Its Chief Indicted for Explosions During Hurricane Harvey*



Smoke rising from the Arkema chemical plant in Crosby, Tex., last September. Flooding from Harvey, which was a Category 4 hurricane that struck southeast Texas, had knocked out the refrigeration system needed to keep chemicals stable at the plant.  
KTRK, via Associated Press

### Selected Lawsuits:

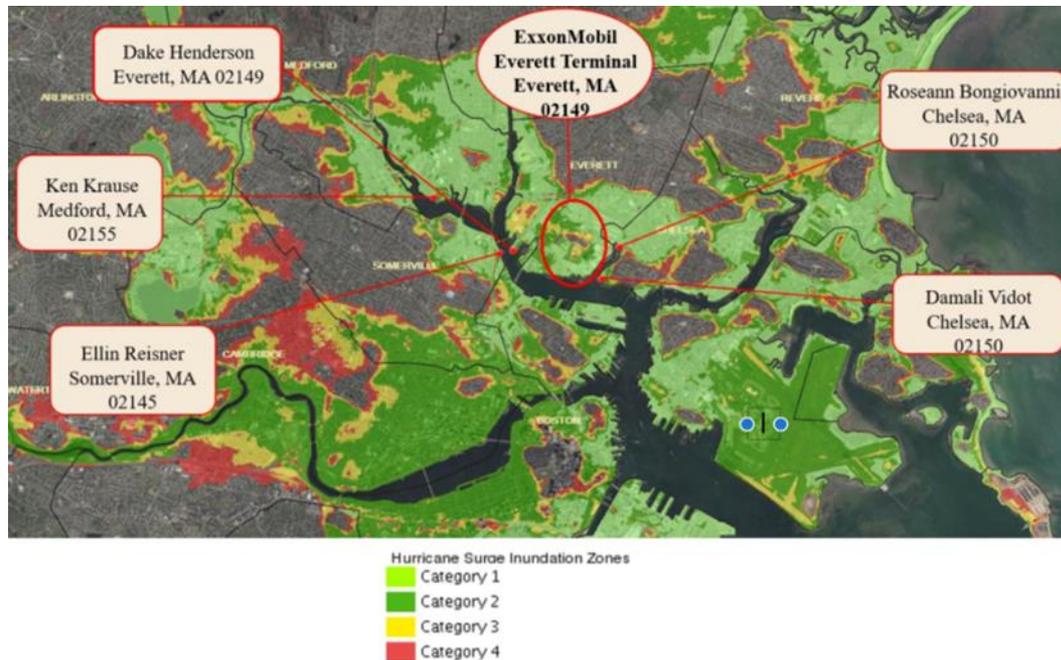
1. Harris County & the State of Texas v. Arkema Inc., No. 2017-76961-7 (Tex. Dist. Ct., Nov. 16, 2017).
  - A. Claims filed under
    - i. Texas Clean Air Act
    - ii. Texas Water Code
    - iii. Harris County Floodplain Regulations
2. Graves et al. v. Arkema Inc. et al, No. 4:17-cv-03068 (Tex. S. Dist. Ct, Sept. 7, 2017)
  - A. Negligence Claims
3. The State of Texas vs. Arkema Inc., No. 160031001010 – 3 (Harris County Tex. Dist. Ct., Order entered Aug. 3, 2018)
  - A. Criminal Charges



# Failure to Adapt Litigation: CWA & RCRA Suits

## Conservation Law Foundation v. ExxonMobil Corp., No. 1:16-cv-11950 (D. Mass. Filed Sept. 29, 2016)

- 15 Causes of Action Listed: 14 under the Clean Water Act (CWA),  
1 under the Resource Conservation & Recovery Act (RCRA)



Map based on data from the “SLOSH” model (Sea, Lake, and Overland Surges from Hurricanes), developed by NOAA’s National Weather Service.

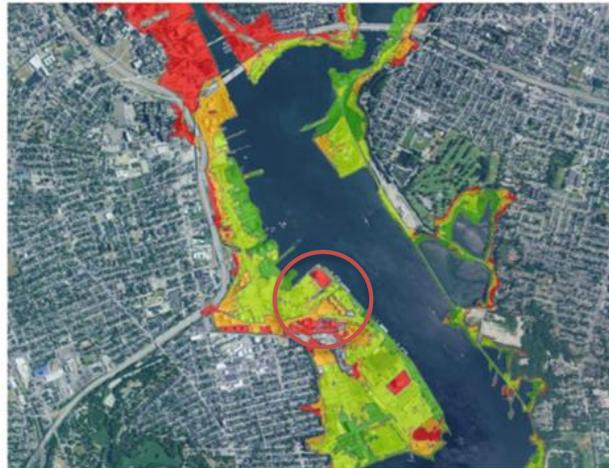


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# Failure to Adapt Litigation: CWA & RCRA Suits

## Conservation Law Foundation, Inc. v. Shell Oil Products US, No. 1:17-cv-00396 (D. R. I. filed Aug. 28, 2017)

- 21 Causes of Action Listed: 20 under the Clean Water Act (CWA),  
1 under the Resource Conservation & Recovery Act (RCRA)  
\*Proposed 2<sup>nd</sup> amended complaint would add additional alleged  
violation of RCRA regulations



Hurricane Surge  
Inundation Areas (Worst  
Case) for Providence  
County



Map based on data from the “SLOSH” model (Sea, Lake, and Overland Surges from Hurricanes), developed by NOAA’s National Weather Service.



# Failure to Adapt Litigation: CWA & RCRA Claims

## Clean Water Act Claims:

- Allege each company has “*past and ongoing failures*” to comply with the Clean Water Act and National Pollutant Discharge Elimination System (“NPDES”) or state-level equivalent (RIPDES) permits.
- Such permits include discharges of industrial wastewater, process water, and storm water associated with industrial activity
- Alleged Violations Concern:
  - Numeric Effluent Limits
  - Operational Requirements for Outflows
  - Planning Requirements Including Those Concerning Storm Water and Spill Prevention & Control
  - Monitoring, Reporting, Informational Requirements
  - Incomplete Amendments or Updates



Photo of ExxonMobil's Everett facility on the Mystic River in Massachusetts. Credit: CLF

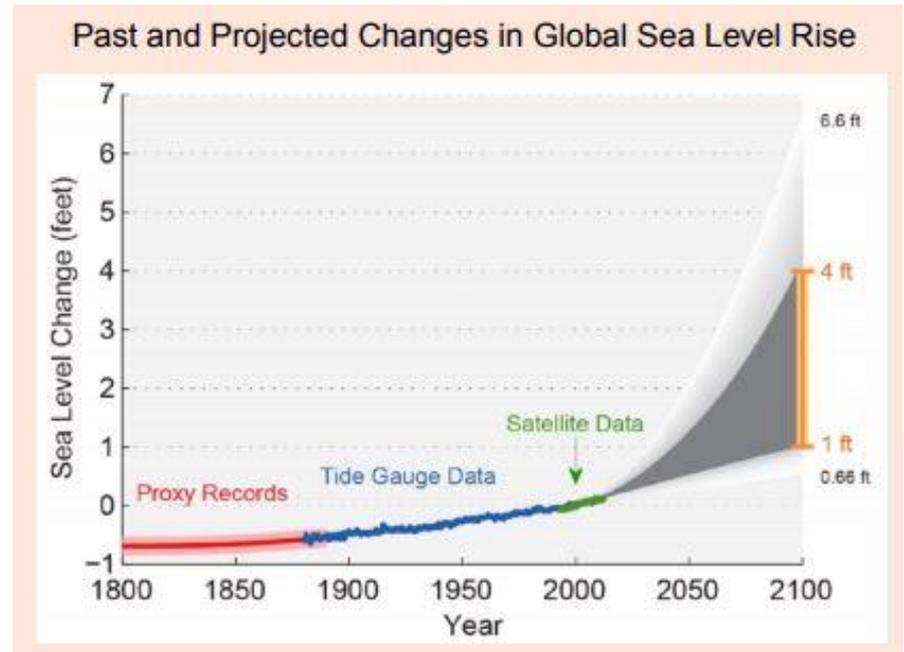
## Resource Conservation & Recovery Act Claim:

- Allege each company has “contributed and is contributing to past and present handling, storage, treatment, transportation, or disposal of solid and hazardous wastes which *may present an imminent and substantial endangerment to health or the environment* in violation of RCRA.”



# Failure to Adapt Litigation: CWA & RCRA Status

- September 2017: The U.S. District Court for the District of Massachusetts found that:
  - **CLF has standing** for present and imminent “injuries to its members’ aesthetic and recreational interests in the Mystic River.”
  - **CLF lacks standing** “for injuries that allegedly will result from rises in sea level, or increases in the severity and frequency of storms and flooding, that will occur in the far future, such as in 2050 or 2100.”



Left: USGCRP, 4<sup>th</sup> National Climate Assessment (2014), Figure 2.26; Adapted from Parris et al. 2012.

# Clean Water Act Litigation: Permit Shields & Government Opportunities

## Effect on Permit Shields & Opportunity to Update Permit Requirements

- Under the CWA, NPDES permit holders are “shielded” from liability for discharges made in compliance with their permits. See 33 U.S.C. § 1342(k).
- If the CLF suits are unsuccessful, that could expand the permit shield.
- ***Importance of updating NPDES permit requirements to reflect climate adaptation needs and for states to update water quality standards.***



# Failure to Adapt: Environmental Review

- **The National Environmental Policy Act (NEPA) § 102(2)(c)**: Requires all agencies of the Federal Government conducting major Federal actions significantly affecting the quality of the human environment, to produce a detailed statement on (i) the environmental impact of the proposed action, (ii) unavoidable adverse environmental effects of the proposed action, and (iii) alternatives to the proposed action.
- **2016 CEQ Guidance (withdrawn in April 2017)**: Provided a framework to clarify agencies obligations under NEPA to consider the effects of climate change including on the current and future affected environment.





# Failure to Adapt: Environmental Review

## **Recent NEPA Case Law Demonstrates Obligation to Consider Climate Impacts:**

- AquaAlliance, et al., v. U.S. Bureau of Reclamation, 2018 WL 903746, at \*38-\*39 (E.D. Cal. Feb. 15, 2018)
  - Found that the Bureau failed to adequately account for effects of climate change on water management project
- Kunaknana v. U.S. Army Corps of Engineers, 23 F. Supp. 3d 1063, 1092-98 (D. Alaska 2014)
  - Determining that USACE should consider whether to prepare supplemental EIS for issuance of § 404 permit in light of new information on climate change. (Subsequent decision found that USACE reasonably determined that a SEIS was not needed.)
- Idaho Rivers United v. United States Army Corps of Engineers, 2016 WL 498911, at \*17 (W.D. Wash. Feb. 9, 2016)
  - Finding the USACE analysis of the effect of climate change on sediment disposition was adequate

# National Environmental Policy Act Litigation & Petition Opportunities

- **FERC Guidance** issued in 2017 requires applications involving LNG facilities to report on natural hazards in the project area including: “...extreme winds and flooding (including scour effects) associated with hurricanes, flashfloods, storm surge, tsunami, or sea level rise due to climate change.”
- **Public Comments:** The Sabin Center has submitted comments on seven proposed LNG facilities since 2014, asking FERC to consider how climate impacts will affect facilities
- **FERC Orders:** Examples of FERC Orders Finding Adequate Consideration of Climate Impacts on Facilities:
  - Order Denying Rehearing and Stay re Dominion Cove Point LNG, LP (Docket CP13-113-001)
  - Order on Rehearing re Algonquin Gas Transmission, LLC et al under CP16-9 (Dockets: CP16-9-001, CP16-9-008)



Cove Point LNG Export Facility  
Credit: Dominion Energy



# “Little NEPA” State-Level Opportunities

Table 2.0 – Legal Requirements to Consider Climate Change Impacts in EIA

Jurisdiction	Law	Policy / Guidance	Content
<b>UNITED STATES</b>			
<b>Massachusetts</b>	Massachusetts Environmental Policy Act (MEPA) (2009 Amendments)	<i>Draft MEPA Climate Change Adaptation and Resiliency Policy</i> (2014) <sup>35</sup>	MEPA was amended in 2009 with the following language: “In considering and issuing permits, licenses, and other administrative approvals and decisions, the respective agency, department, board, commission or authority shall also consider reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise.” <sup>36</sup>
<b>New York</b>	State Environmental Quality Review Act (SEQRA)	<i>Commissioner’s Policy – Climate Change and DEC Action</i> (2010) <sup>37</sup>	A 2010 policy document directs the NY State Department of Environmental Conservation (DEC) staff to “identify potential adverse impacts from climate change” on all DEC programs, “incorporate climate change adaptation strategies into applicable DEC programs, actions and activities” and to “use the best available scientific information of environmental conditions resulting from the impacts of climate change.” <sup>38</sup>
<b>New York City, NY</b>	City Environmental Quality Review Act (CEQR)	<i>CEQR Technical Manual</i> (2014) <sup>39</sup>	The CEQR Technical Manual states: “...depending on a project’s sensitivity, location, and useful life, it may be appropriate to provide a qualitative discussion of the potential effects of climate change on a proposed project in environmental review. Such a discussion should focus on early integration of climate change considerations into the project and may include proposals to increase climate resilience and adaptive management strategies to allow for uncertainties in environmental conditions resulting from climate change.” <sup>40</sup>
<b>Washington</b>	State Environmental Policy Act (SEPA)	<i>WSDOT, Guidance for NEPA and SEPA Project-Level Climate Change Evaluations</i> (2014) <sup>41</sup>	A 2014 guidance document published by the Washington State Department of Transportation (WSDOT) outlines an analytical process and provides template language for assessing the impacts of climate change on all WSDOT projects subject to NEPA and SEPA. <sup>42</sup>

Wentz, “Assessing the Impacts of Climate Change on the Built Environment under NEPA and State EIA Laws,” (2015) available at <http://wordpress.ei.columbia.edu/climate-change-law/files/2016/06/Wentz-2015-08-Climate-Change-Impact-on-Built-Environment-.pdf>.

# Working with Public Utility/Service Commissions: NYC Case Study

## New York State Public Service Commission Case No. 13-E-0030:

- [Petition](#), filed Dec. 12, 2012, requesting that the PSC require its utilities to prepare and implement plans that will address the anticipated impacts of climate change.
- [Final Order](#), issued Feb. 21, 2014, requiring Con Edison to implement state-of-the-art measures to plan for and protect its electric, gas, and steam systems from climate change impacts.
- The Storm Hardening and Resiliency Collaborative was simultaneously created to develop innovative resiliency measures and to consider how best to invest the proposed \$1 billion in storm hardening funds.



*ConEdison and Metropolitan Transportation Authority (MTA) employees at a temporary ConEdison substation in 2013.*

*Credit: MTA/flickr*

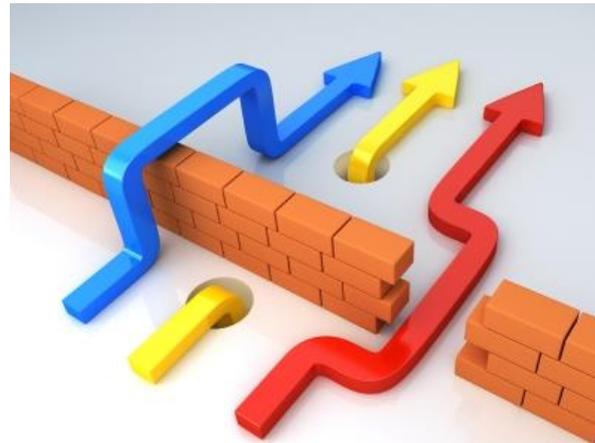


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## Road Map: Bucket 2

### 2. Updating the National Flood Insurance Program (NFIP) for Climate Change & Opportunities for Local and State-Level Actions

- “Discounts for Buyouts” Proposal
- Adoption of Robust Substantial Damage/Improvement Standards
- State-Level Flood Risk Disclosure Laws

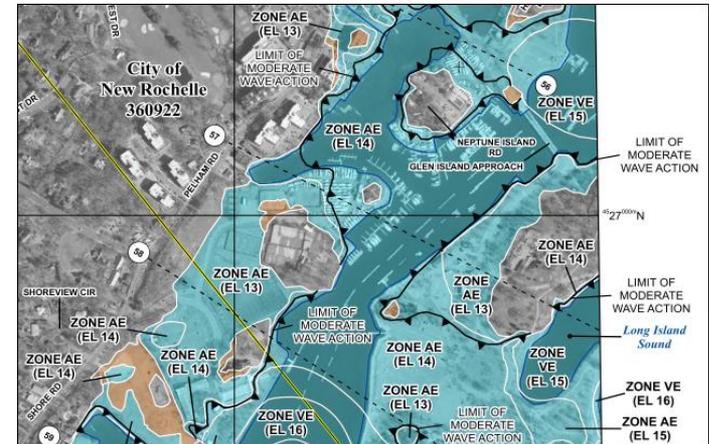




# NFIP: Overview

## The National Flood Insurance Program (NFIP)

- **The National Flood Insurance Act of 1968** as amended by the **Flood Insurance Protection Act of 1973** and modified by **Flood Insurance Reform Acts of 1994 and 2004**
- Provides federally backed flood insurance protection for property owners and for renters in communities that enter the program.
- **To enter the program communities adopt smarter floodplain development that meet minimum standards set by FEMA , including:**
  - Building and zoning code requirements
  - Adoption of Flood Insurance Rate Maps (FIRMs), designating the level of flood hazard across an area. Including Special Flood Hazard Areas (SFHAs): areas in the 100-year flood plain—meaning they have a 1-percent chance of a flood occurring in a given year.



Example of FEMA FIRM Map

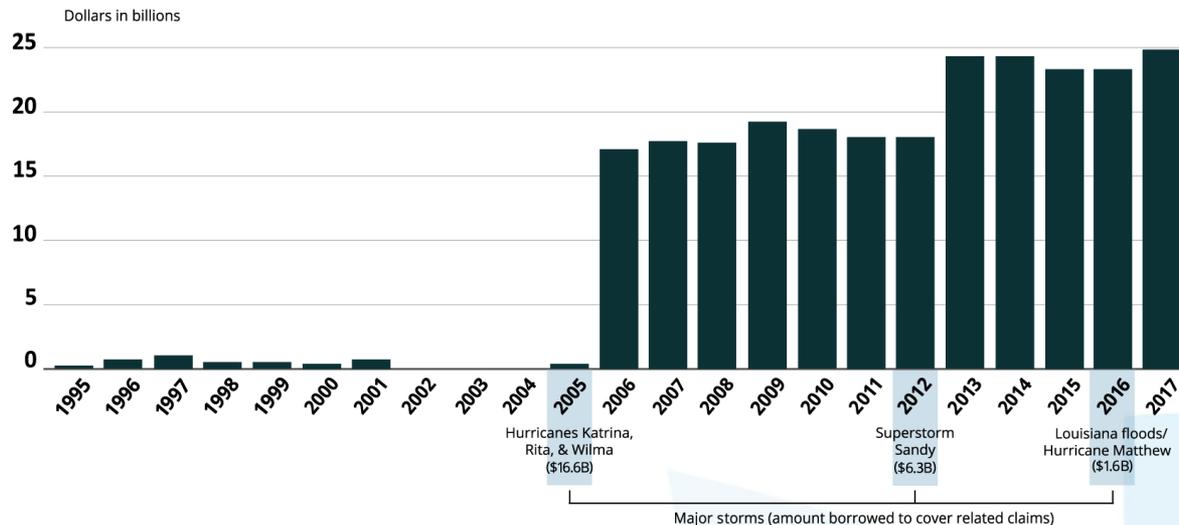


# NFIP: Status & Debts

## Rising Debts and Reform Challenges:

- The NFIP has issued 5.1 million low-cost flood insurance policies with collectively \$1.3 trillion insurance in force, located in more than 22,000 communities in all 50 states
- As of July 2018, the NFIP had racked up \$20.5 billion in debt (reflects the \$16 billion Congress already forgave in October 2017)
- The Biggert-Waters Flood Insurance Reform Act of 2012 attempted to restore fiscal soundness; sections repealed by Homeowner Flood Insurance Affordability Act of 2014

## FLOOD INSURANCE OUTSTANDING DEBT



Source: [GAO-17-425](#)



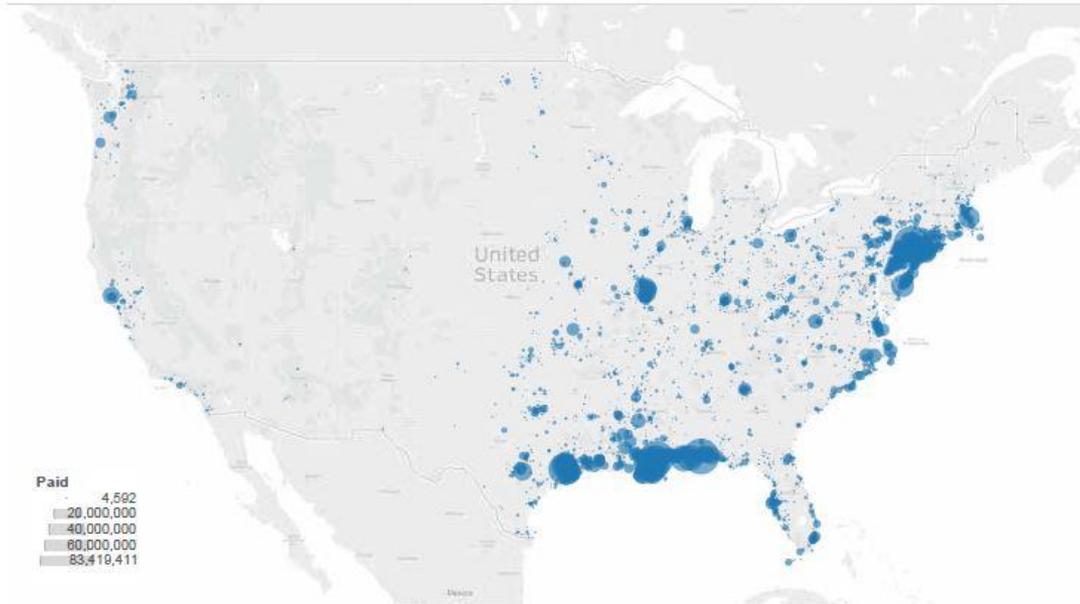
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# NFIP: Severe Repetitive Loss Properties (SRLPs)

## Cycle of “Flood-Rebuild-Repeat”

FIGURE 1: DAMAGES PAID BY THE NFIP TO REBUILD SEVERE REPETITIVE LOSS PROPERTIES BETWEEN 1978 AND 2015.

The top states, ranked by both the number of properties and total damages, are Louisiana (7,223 properties, \$1.22 billion in damages), Texas (4,889 properties, \$0.96 billion), New Jersey (3,246 properties, \$0.66 billion), New York (1,802 properties, \$0.40 billion), Florida (1,601 properties, \$0.37 billion), and Missouri (1,526 properties, \$0.19 billion).<sup>27</sup>



- The NFIP paid \$5.5 billion to repair and rebuild more than 30,000 “Severe Repetitive Loss Properties” (SRLPs) between 1978 and 2015.
- These SRLPs constitute only 0.6% of the 5.1 million properties insured through the NFIP, but cost 9.6% of all damages paid out of the NFIP as of 2015.

How to Break the Cycle of Repeated Flooding with Climate-Smart Flood Insurance Reforms, NRDC IB: 17-07-A, 2 (July 2017), available at <https://www.nrdc.org/sites/default/files/climate-smart-flood-insurance-ib.pdf>.

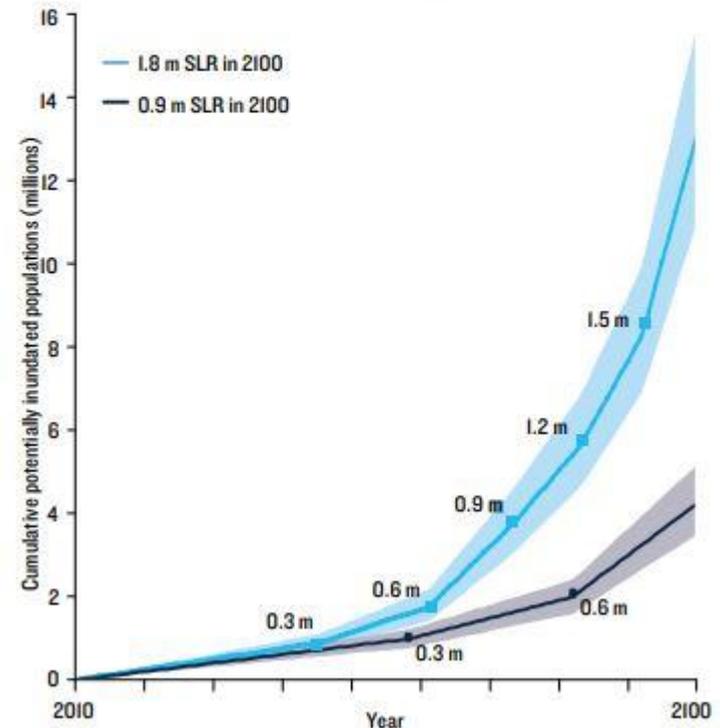


# NFIP: Climate Change & Sea Level Rise

## Escalating Risks & Costs of Climate Change :

- Climate change and SLR will increase the number of people needing coverage under the NFIP and loss costs per policy:
  - The SFHA estimated to grow between 40-45% by 2100.
  - Average loss cost per policy may increase approximately 90% by the year 2100
- NRDC estimates that 3 feet of sea level rise by 2100 could result in an additional 820,000 SRLPs and 6 feet of SLR would result in 2.57 million more SRLPs.

**FIGURE 3: IN THE UNITED STATES, THE HOMES OF 4.2 MILLION PEOPLE COULD BE INUNDATED BY 3 FEET (0.9 METERS) OF SEA LEVEL RISE, AND 13.1 MILLION COULD BE AFFECTED BY A RISE OF 6 FEET (1.8 M) BY THE END OF THIS CENTURY. REPRINTED WITH THE AUTHOR'S PERMISSION<sup>46</sup>**



Sources: AECOM, [The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100](#) (2013), ES-7; NRDC, [How to Break the Cycle of Repeated Flooding with Climate-Smart Flood Insurance Reforms](#) (2017), <https://www.nrdc.org/sites/default/files/climate-smart-flood-insurance-ib.pdf>.



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# NFIP: “Discounts for Buyouts”

## “Discounts for Buyouts” Proposal:

- Offers qualifying homeowners a guarantee of a **future** buyout as a benefit of their flood insurance coverage
- Reduces flood insurance premium as incentive
- Voluntary
- FEMA funded, administered by states
- Benefits:
  - Discourages long lag-time for buyout
  - Lets homeowner remain in place until flood occurs
  - Avoids sinking dollars into “flood-rebuild-repeat” cycle



Source: How to Break the Cycle of Repeated Flooding with Climate-Smart Flood Insurance Reforms, NRDC IB: 17-07-A, 2 (July 2017), <https://www.nrdc.org/sites/default/files/climate-smart-flood-insurance-ib.pdf>.

Upper: Photo credit: Steve Mackay, homeowner;  
Lower: Photo Credit: Michael Blazewicz (2013)



# NFIP: “Discounts for Buyouts”

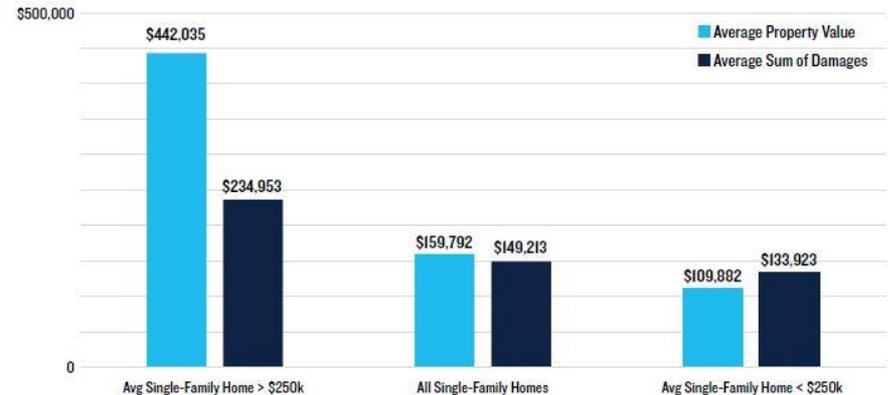
## “Discounts for Buyouts” Proposal:

### ➤ Suggested Requirements:

- The homeowner has flood insurance, and the property is valued at less than \$250,000 (the maximum insurable value under the NFIP).
- The owner is low- or middle-income (earns less than 120 percent of adjusted median income for their community).
- The property has a history of being damaged in floods or is at a high risk of being flooded in the future.
- The property is located in a community that supports and promotes efforts to help people relocate from flood-prone areas and is willing to take ownership.
- FEMA determines that it would be cost-effective to purchase the property, rather than have the NFIP continue to pay to rebuild.

FIGURE 2: LESS-EXPENSIVE HOMES ARE MORE LIKELY TO SUFFER DAMAGE THAT EXCEEDS THE PROPERTY'S VALUE

Among severe repetitive loss properties worth less than \$250,000, the average single-family home suffered total damages amounting to 122 percent of the property value. For properties worth more than \$250,000, average total damages were 53 percent of the average property value. Across all severe repetitive loss properties that are single-family homes, the average property value was just slightly more than the average sum of all flood damages.



Source: [NRDC](#)



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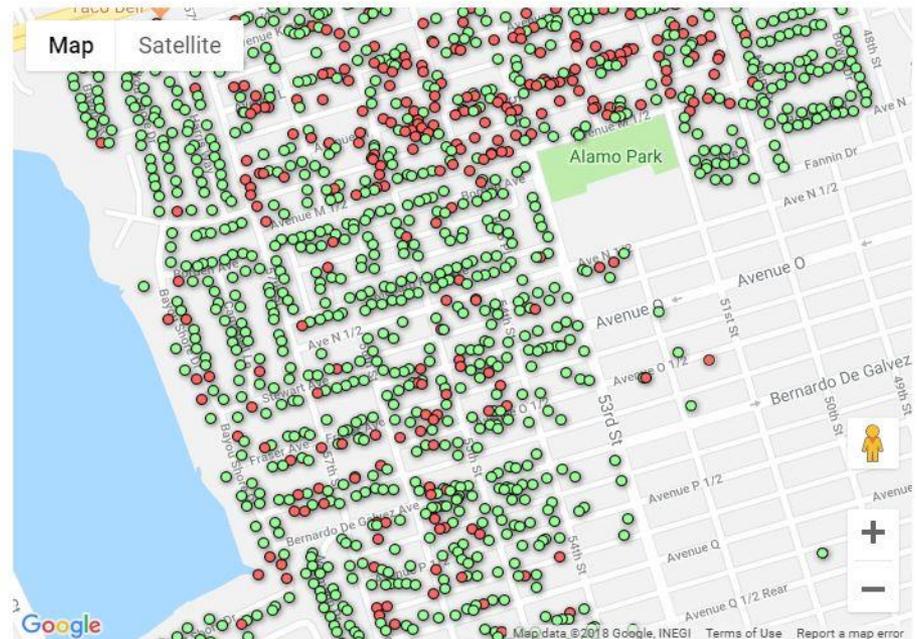
# NFIP: Resilience Enhancing Substantial Damage/Improvement Standards

## Shortcomings of SI/SD Standards:

- “Substantial damage” is defined by FEMA as damage of any origin sustained by a structure for which the cost of restoring the structure would equal or exceed 50% of the market value of the structure before the damage occurred. (See 44 C.F.R. 59.1 )
- **Issues**
  - Does Not Calculate Damage Cumulatively
  - The 50% Threshold Fails to Capture Significant Damage

## Rebuilding in harm's way

Thousands of homes in Galveston were declared less than 50 percent damaged (green dots) even though they had five or more feet of water. Select a home to see the water depth and damage assessment.

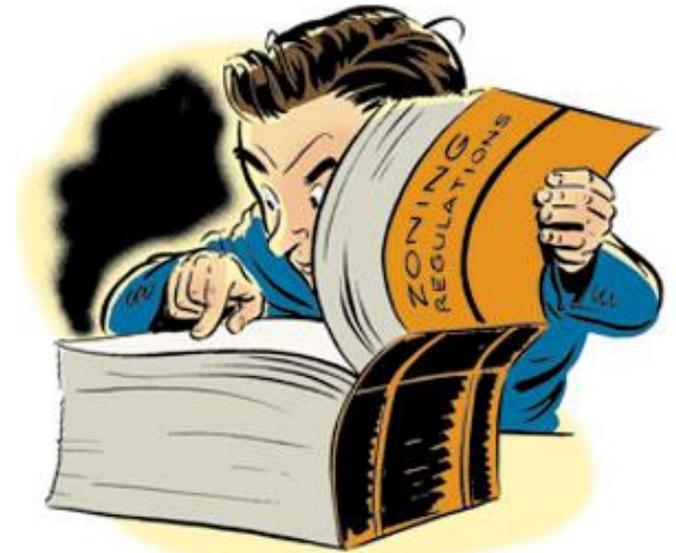


Source: Data from City of Galveston. Created by Mark Collette/Houston Chronicle

# NFIP: Improve Substantial Damage/Improvement Standards

## Incentivizing More Ambitious Flood Ordinances:

- Through the Community Rating System (CRS) program, communities can secure a discount on flood insurance premiums for their residents by adopting cumulative or lower threshold SD/SI Standards.
  - Roughly 400 communities receive CRS credit for cumulative standard, 25 for lower threshold (forthcoming paper from NRDC & the Sabin Center based on 2013 data).
- States can encourage adoption of more rigorous standards by integrating the language into **model flood ordinances**.
- Review of state model ordinances found at least 12 states with optional higher standards, 7 states which had default higher standards in the model flood ordinance.





# NFIP: Improve Substantial Damage/Improvement Standards

## Model Flood Ordinances:

*Cumulative and Lower Threshold Substantial Damage/Improvement Standard Model Ordinance*

### Substantial Damage

*Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed **40 percent** market value of the structure before damage occurred. Substantial damage also means flood related damage sustained by a structure on two (2) separate occasions during a 10-year period for which the costs of repairs at the time of each such flood event, on average, equals or exceeds **20 percent** of the market value of the structure before the damage occurred.*

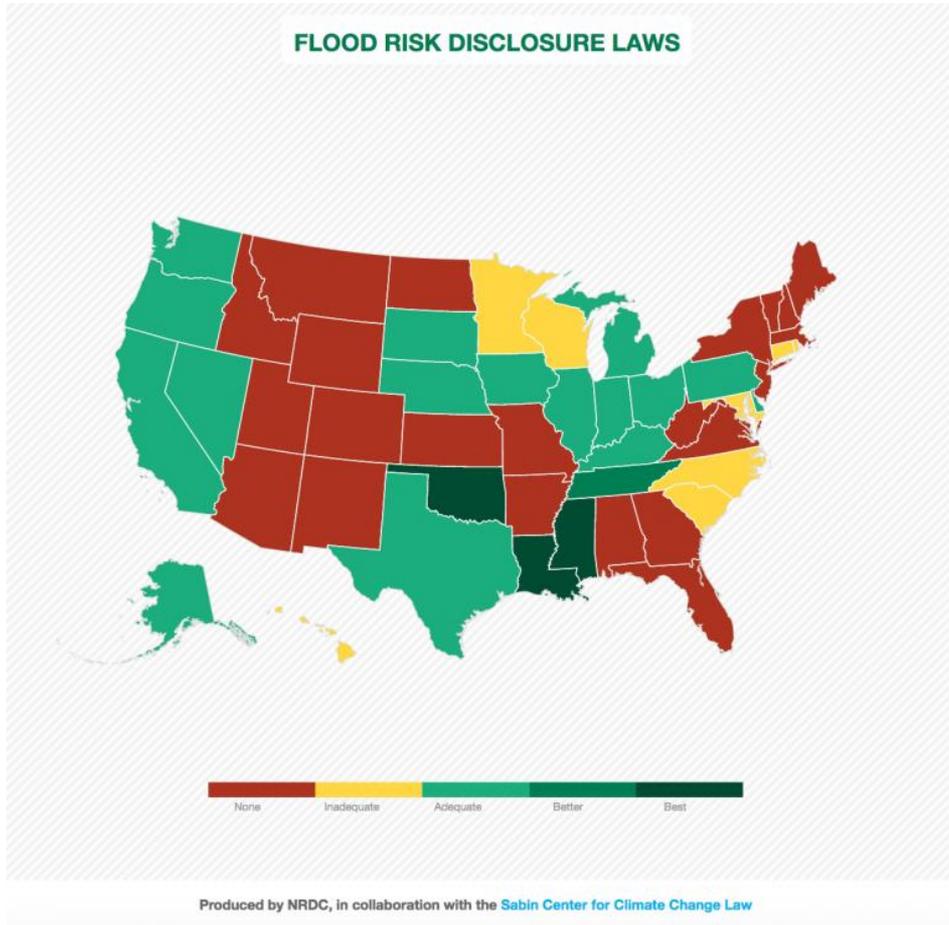
### Substantial Improvement

*Substantial improvement means any combination of repairs, reconstruction, rehabilitation, addition, or other improvement, the cost of which equals or exceeds **40 percent** of the market value of the structure before the 'start of construction,' taking place during a [10+ year time period]. This term includes structures that have incurred 'substantial damage,' regardless of the actual repair work performed.*



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# NFIP: State Flood-Risk Disclosure Laws



Interactive Map: <https://www.nrdc.org/flood-disclosure-map>

- 21 states lack statutory or regulatory requirements for sellers to disclose a property's history of flood damages or other factors related to flood risk.
- 29 states, plus Washington, DC, at a minimum, require sellers to disclose whether the property is in a designated flood plain before the point of sale.
- Only 10 states additionally require disclosure of whether there have been any flood damages to structures on the property.



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### Important Links:



[www.columbiaclimatelaw.com](http://www.columbiaclimatelaw.com)



[www.climatecasechart.com](http://www.climatecasechart.com)



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