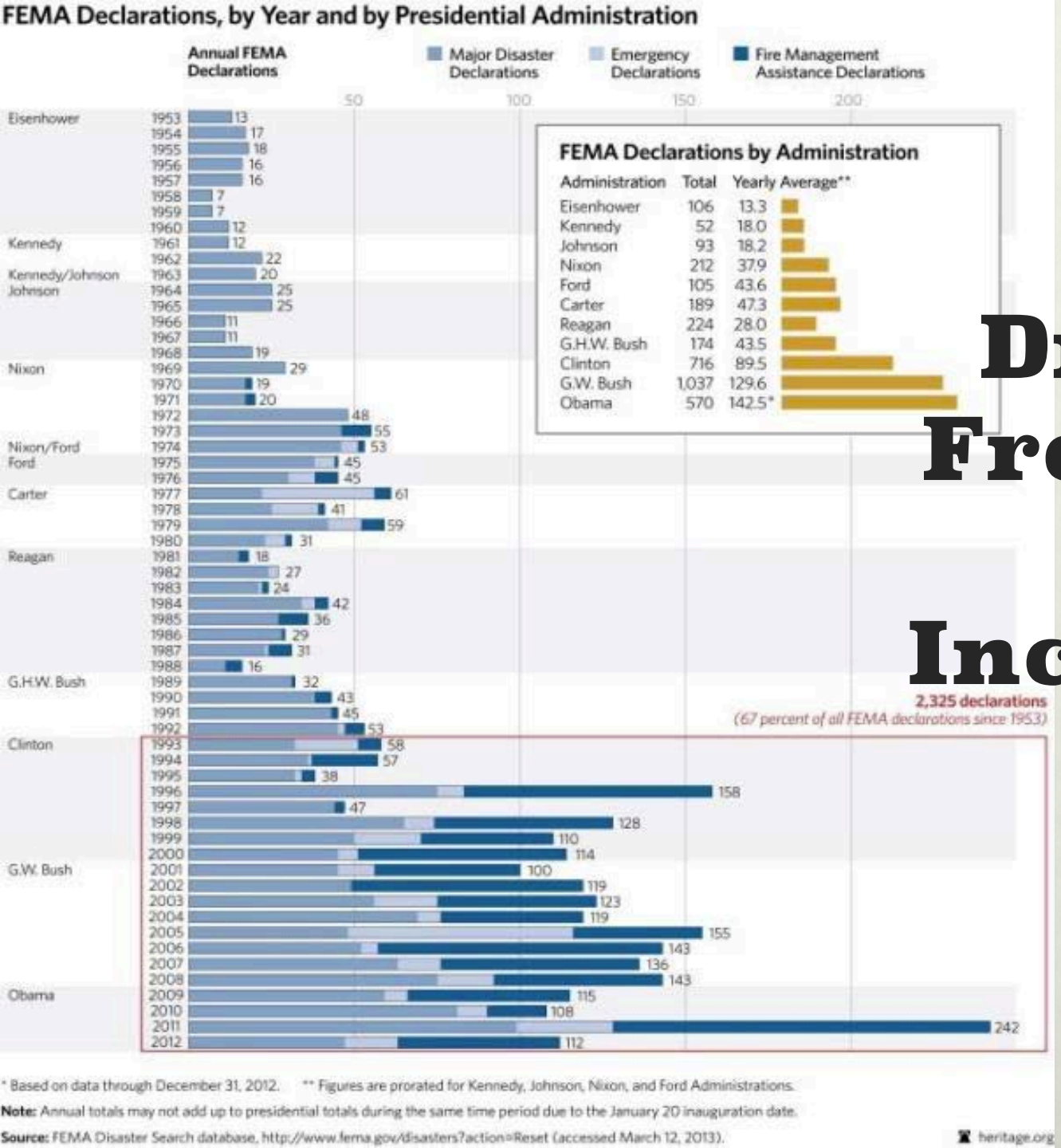
Hazagation

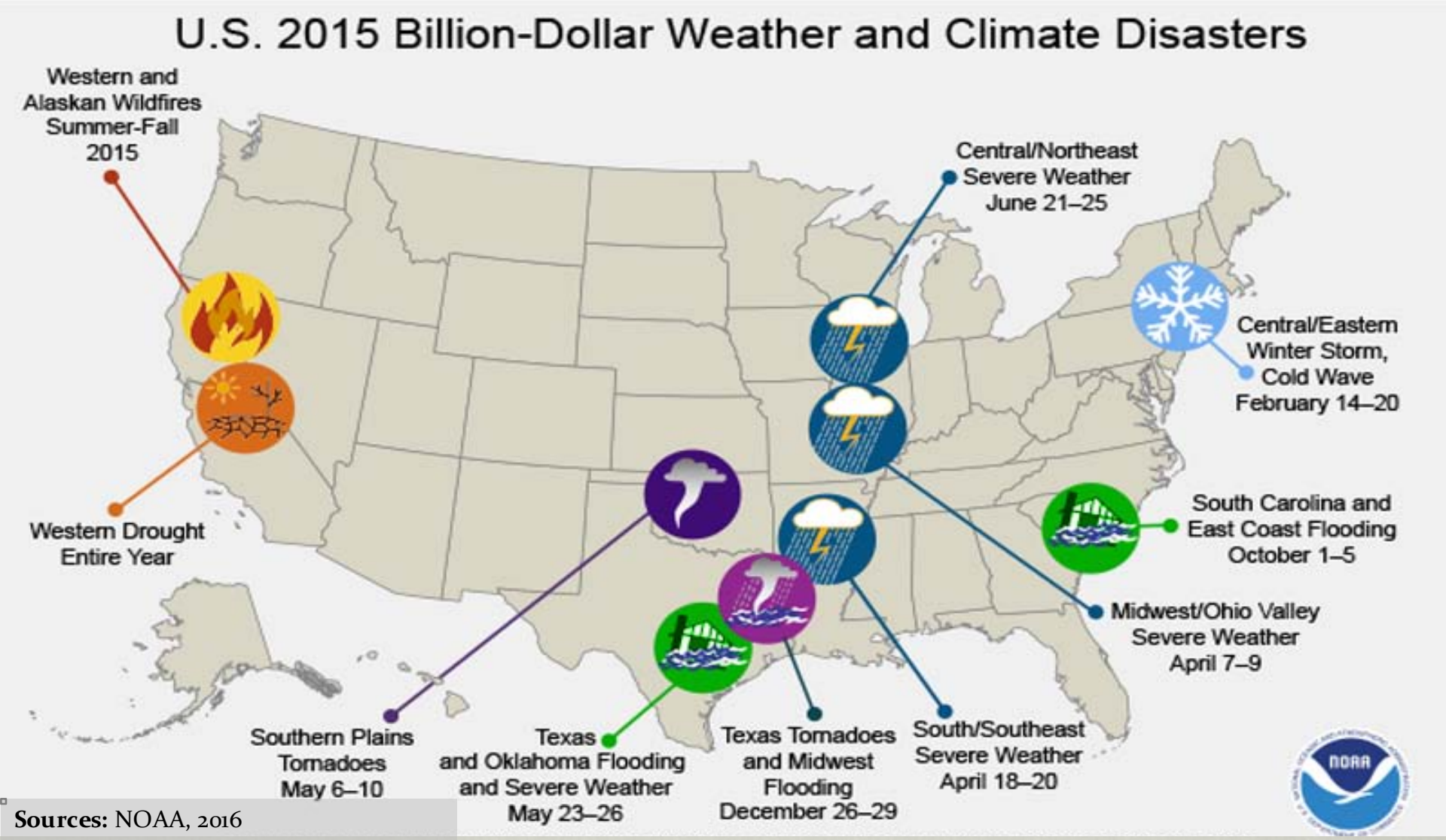
Integrating climate change into multi-hazard mitigation planning

Disaster Frequency is Increasing



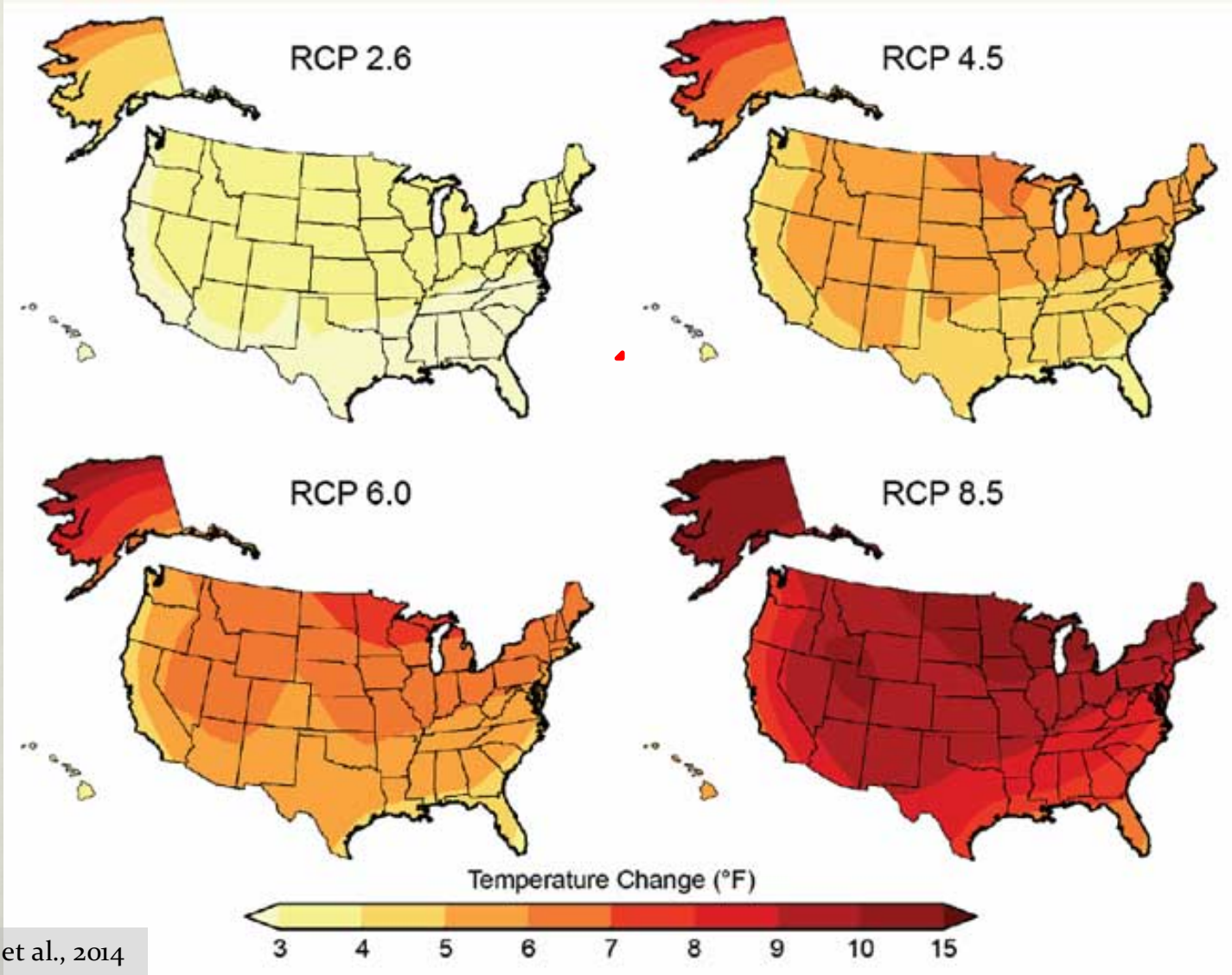
http://www.heritage.org/research/testimony/2013/03/small-business-disaster-reform-act-of-2013

Cost of Disasters is Rising



Sources: NOAA, 2016

The Climate is Changing

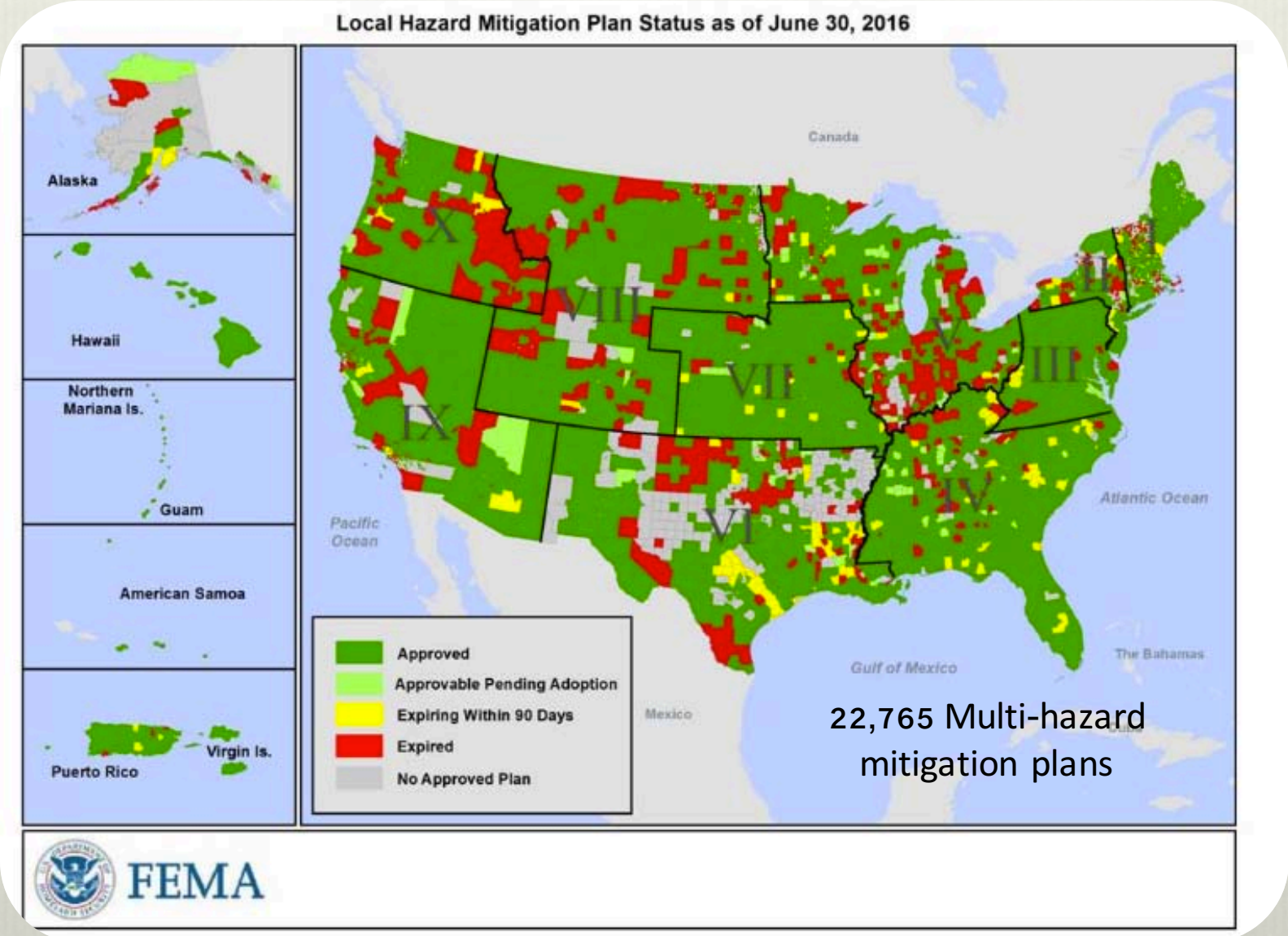


Source: Walsh et al., 2014

Local Communities Disproportionately Impacted

Local Stand Alone Climate Adaptation Plans

Local Hazard Planning



What is Hazard Mitigation?

- Sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their affects.

- The purpose of hazard mitigation is to:
  - Protect people and property from natural and manmade hazards; and
  - Minimize the costs of disaster response and recovery

What is a Local Hazard Mitigation Plan (LHMP)?

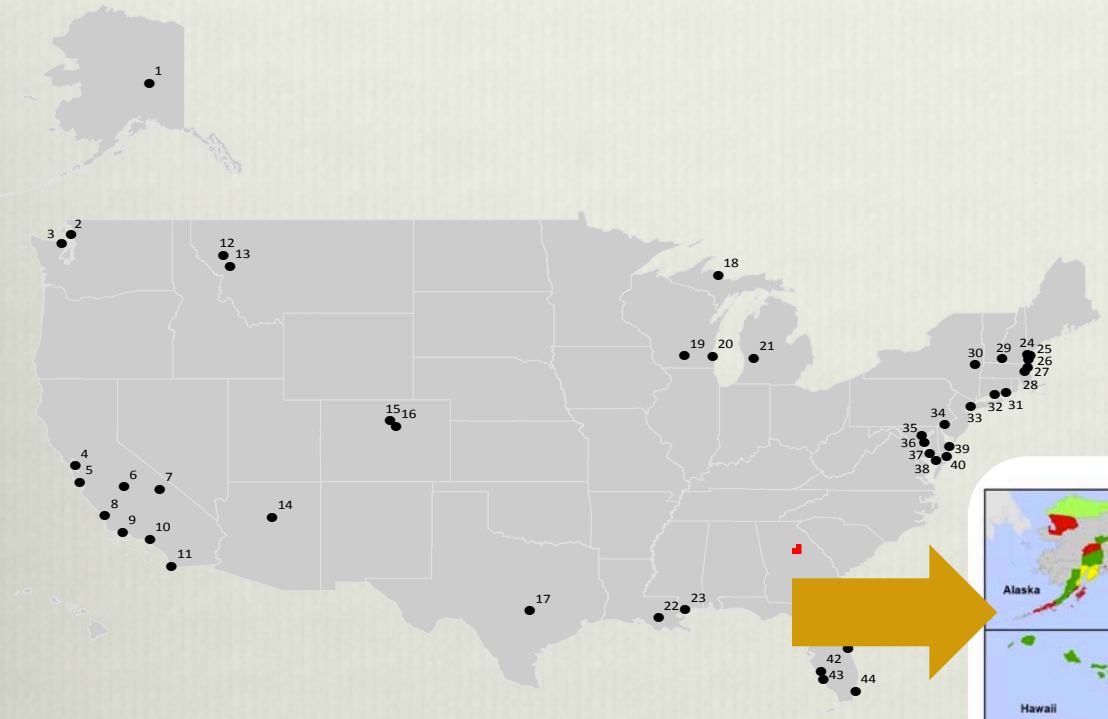
- A local jurisdiction or Tribal plan through which a local jurisdiction:
  - Identifies and profiles local hazards;
  - Assesses the community's risk from local hazards; and
  - Develops a hazard mitigation strategy to reduce potential losses identified in the risk assessment
- LHMP's are required for eligibility for some federal mitigation program funding (44 CFR Part 201)
- A LHMP is not regulatory

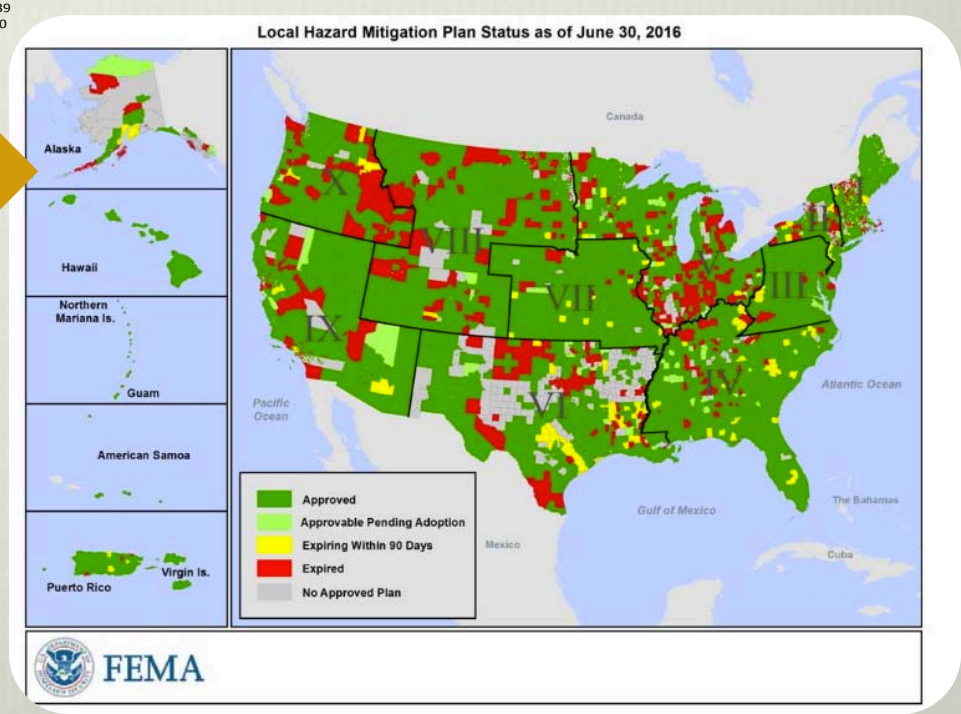
Planning for Current and Future Hazards

Existing Required Material per the FEMA Crosswalk	Opportunity to Integrate Climate Change
Element A: Planning Process	
A1: Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?	Include climate-related stakeholders both from within the government and from the community, in the planning process. (A1) Climate change discussed during public discussions
A2: Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as others interests to be involved in the planning process?	Include regional climate-related entities in your planning process. (A2)
A3: Does the Plan document how the public was involved in the planning process during the drafting stage?	
A4: Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?	Include detail from existing climate plans or reports into your analysis. This includes plans at higher and lower levels of government. (A4)
A5: Is there discussion of how the community(ies) will continue public participation in the plan maintenance process?	
A6: Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle?)	Develop plan to integrate new climate information as it becomes available and adjust strategies/actions accordingly. (A6)
Element B: Hazard Identification and Risk Assessment	
B1: Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?	Consider either: 1) adding climate change as a stand alone hazard; or 2) adding how climate change could affect the type, location, severity, duration, and reoccurrence intervals for all the other hazards in your community. (B1) Climate change considered as a stand alone hazard
B2: Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?	Make sure that climate change is factored into probability calculations for future hazards. (B2)
B3: Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?	Include climate-related changes to hazards in the vulnerability analysis and hazard impact summaries. (B3)
B4: Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?	Consider also including structures likely to be flooded in the future given changes to the floodplain likely to take place in a climate-altered future. (B4)
Element C: Mitigation Strategy	
C1: Does the Plan document each jurisdiction's existing authorities, policies, programs, and resources and its ability to expand on and improve these existing policies and programs?	Include programs related to climate change in your capability assessment. (C1)
C2: Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?	Consider discussing how community will go beyond NFIP and look at structures in the 1 in 500 year (or more) floodplain. (C2)
C3: Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?	Design goals with climate change considerations in mind. (C3)
C4: Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?	Make sure a mixture of short and long-term strategies are selected and that these strategies are designed to be viable in a climate-altered future. Look at green infrastructure, physical infrastructure, policy, planning, and general adaptive strategies. (C4)
C5: Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction?	Include criteria related to climate change in the evaluation of potential actions, thereby ensuring that most strategies selected for implementation are climate-smart. This includes including the cost of inaction in the cost-benefit analysis to make sure that the cost of adaptation (action and inaction) are both accounted for. (C5)
C6: Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate?	Integrate climate-related priorities into other plans, such as comprehensive, sustainability, or capital improvements plans to the fullest extent possible. (C6)
Element D: Plan Review, Evaluation, and Implementation (applicable to plan updates o	
D1: Was the Plan revised to reflect changes in development?	

How could one integrate climate change into the crosswalk?

Sample





35 local hazard mitigation plans

Example: Austin, TX

- Climate stakeholders on **planning team**
- Austin Climate Protection Program part of **capacity assessment**
- Climate change specific **actions** (tree planting; research; downscaling)
  - Climate impacts: flood, wildfire, drought, extreme heat, infectio disease
- **Plan maintenance** – Make connections to CAP

Example: Waveland, MS

- Climate change and sea level rise are assessed in the **Hazard Assessment** (stand alone hazard)
- The **vulnerability assessments** include a section on "Climate adaptation and X (coastal hazard, erosion, drought, etc.)"
  - Two presentations of vulnerability: with climate change and without
- Invited climate adaptation-related stakeholders to **public** meetings
- Some climate-specific **actions**; many actions that have adaptation value

Example: Santa Cruz, CA

- All **hazards** include a section on "Climate adaptation considerations"
- Some sections include details about climate change and future risk and **probability of hazard** occurrences
- Same author for LHMP and Adaptation Plan
- Climate adaptation specific **actions**: planning; policies
- Climate Adaptation Plan is an appendix – was originally intended to be the LHMP

Example: Baltimore, MD

- Joint hazard mitigation and climate adaptation plan
- All hazards evaluated based on **projected changes in climate**
- Specifically looked at vulnerability to **1 in 500 year floodplain**
- Nearly all **actions** are both hazard mitigation and climate adaptation actions
- Discusses **regional climate initiatives** and has a plan for **continually updating** the plan

Summary

Existing Required Material per the FEMA Crosswalk	Opportunity to Integrate Climate Change
Element B: Hazard Identification and Risk Assessment	
B1: Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction?	Consider either: 1) adding climate change as a stand alone hazard; or 2) adding how climate change could affect the type, location, severity, duration, and reoccurrence intervals for all the other hazards in your community. (B1)
B2: Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?	Make sure that climate change is factored into probability calculations for future hazards. (B2)
B3: Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?	Include climate-related changes to hazards in the vulnerability analysis and hazard impact summaries. (B3)
B4: Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?	Consider also including structures likely to be flooded in the future given changes to the floodplain likely to take place in a climate-altered future. (B4)

Thank you


Positive proof of global warming.
18th Century
1900
1950
1970
1980
1990
2006

Results

- 30/35 plans discuss climate change
  - Average of 27.6% of climate criteria per plan
  - Range: 86% - 0%
  - *General discussion about climate change and natural hazards (77%)*
  - *Actions that are specifically designed to be viable in a climate altered future (53%)*

Results

- Infrequent:
  - *Plan to integrate new climate information…*
  - *Regional climate initiatives*
  - *Evaluation of … structures in the 1 in 500+ year floodplain*
- Only 4 plans used 50% of approaches (all vanguards)