

## How to see presenter notes . . .

- The following slide set contains the presenter's notes (when provided) explaining the slide.
- To see the notes, look for an orange-colored text icon in the upper left corner.
- Double click the icon and the notes will appear. Adjust the size of the text box containing the notes by dragging the lower corners.

# Potential Flooding from ARkStorm

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## BIOGRAPHICAL SKETCH

For over five years, Kathy, a licensed Professional Engineer (P.E.) in the state of California and a Certified Floodplain Manager (CFM), has served as Engineer/Program Specialist for the Map Modernization (Map Mod) Program both in Region IX and as an employee of the Regional Management Center (RMC) with Baker, Corp. As Regional Engineer with FEMA Region IX, Kathy oversees development and preparation of FEMA flood mapping products.

She has earned a master's degree in Chemical Engineering from the University of VA – Charlottesville and a bachelor's degree in Civil Engineering from the University of NE – Lincoln. Ms. Schaefer is recognized as a leader in FEMA's Map Mod implementation and program delivery.

## ABSTRACT

A state-of-the-art meteorological model was created by the ARkStorm atmospheric team to estimate pressures, wind speeds, temperatures, and precipitation time series in nested grid with resolution up to 2 km. The wind speed time series are being used directly for ARkStorm damage modeling, but it was impractical to input the precipitation time series into a statewide hydrological and hydraulic model to produce flood maps. Instead, ARkStorm is using FEMA's digital Flood Insurance Rate Maps, and the associated National Flood Hazard Layer, as a representation of areas vulnerable to flooding under the ARkStorm scenario.

As a part of the Map Modernization Program, FEMA created a seamless, digital National Flood Hazard Layer. Building on the success of Map Modernization, FEMA is transitioning to a new program entitled RiskMAP. Risk MAP's vision is to collaborate with State, local, tribal entities to deliver quality flood hazard data that increases public awareness and leads to mitigation actions that reduce risks to life and property. An overview of how the seamless National Flood Hazard Layer was used to support the goals of both Risk MAP and ARkStorm, in this innovative pilot project, will be presented.



# FEMA

## California Extreme Precipitation Symposium

- **Federal Emergency Management Agency (FEMA)**
  - **Kathy Schaefer,**  
FEMA Region IX Engineer



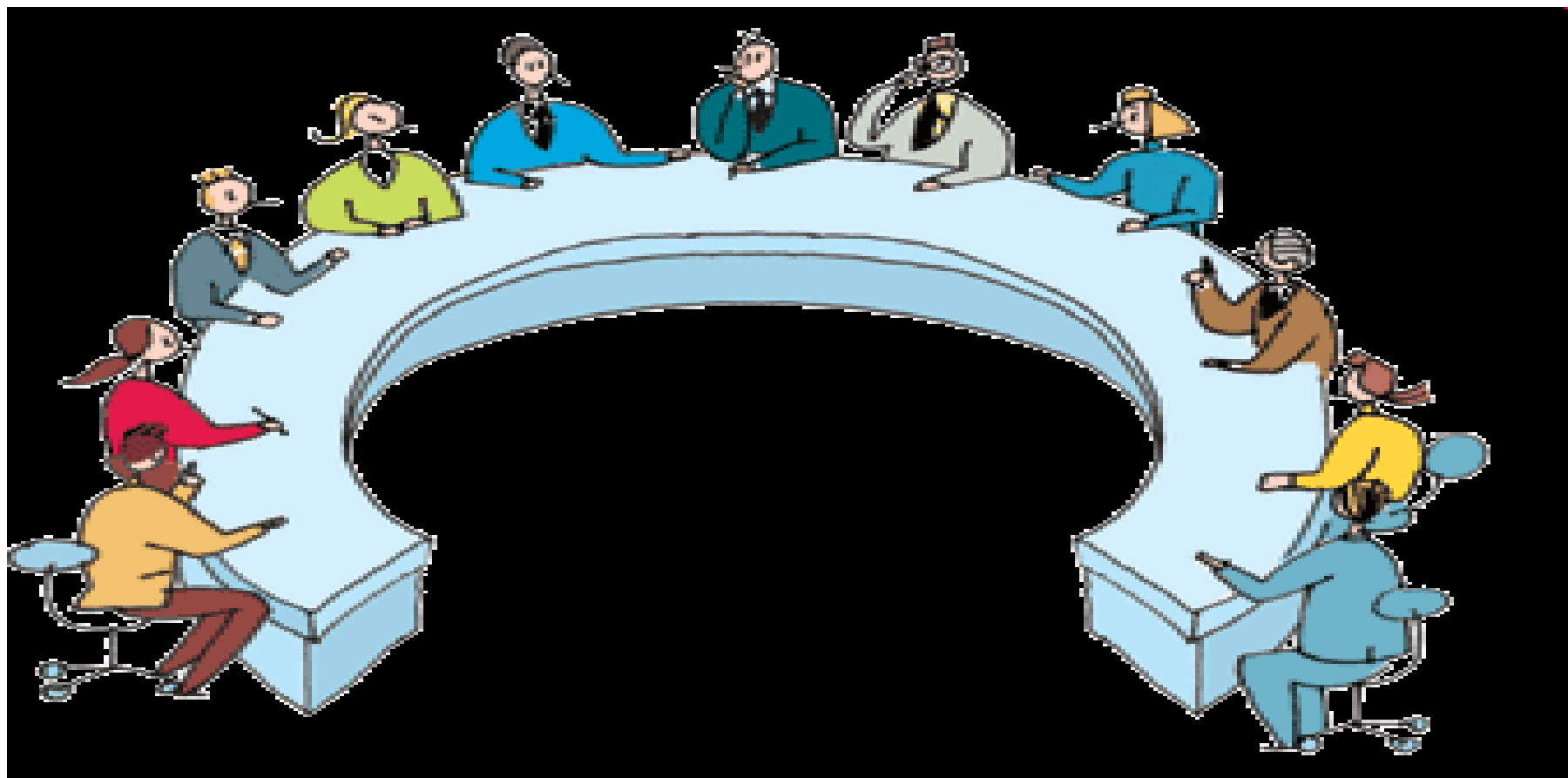
# Denial





# Negotiation

Flood Map  
Modernization





# Negotiation

Flood Map  
Modernization





# Negotiation

Flood Map  
Modernization

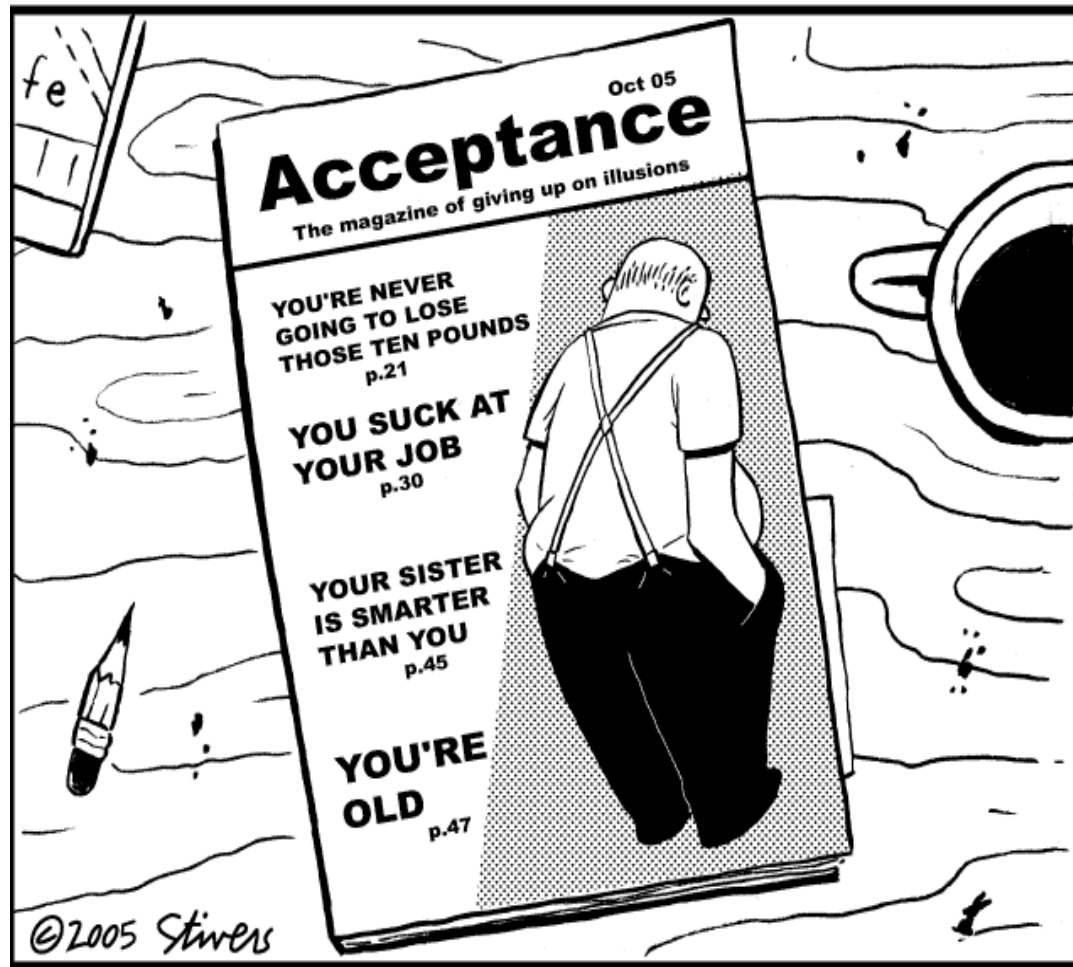




# Depression



# Acceptance



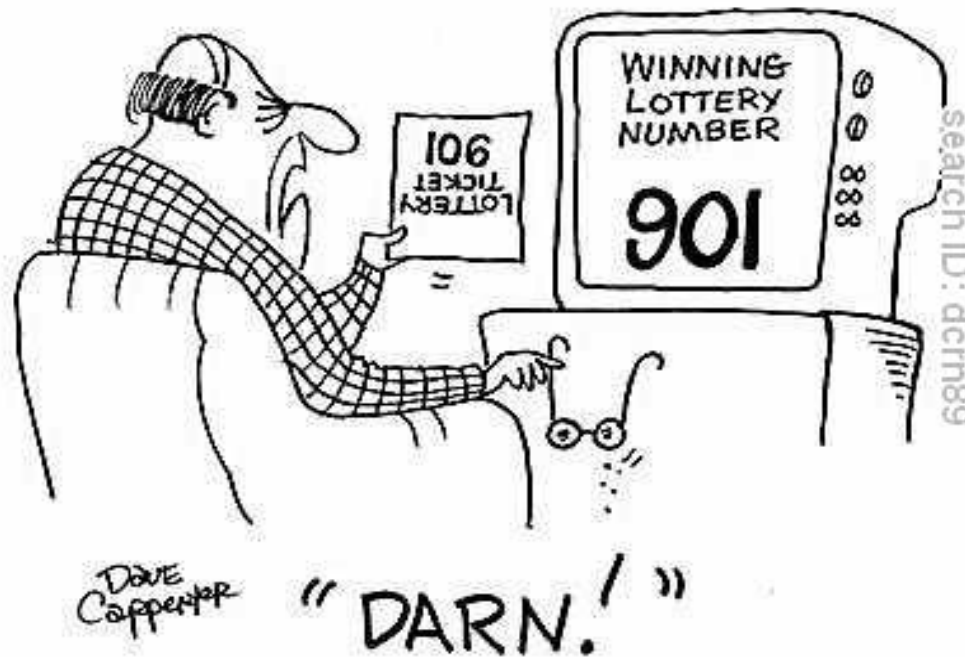


**Why is this process so painful?  
So confrontational?**

# Risk Brain Defect

Flood Map  
Modernization





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# Risk Brain Defect

## Odds of Winning

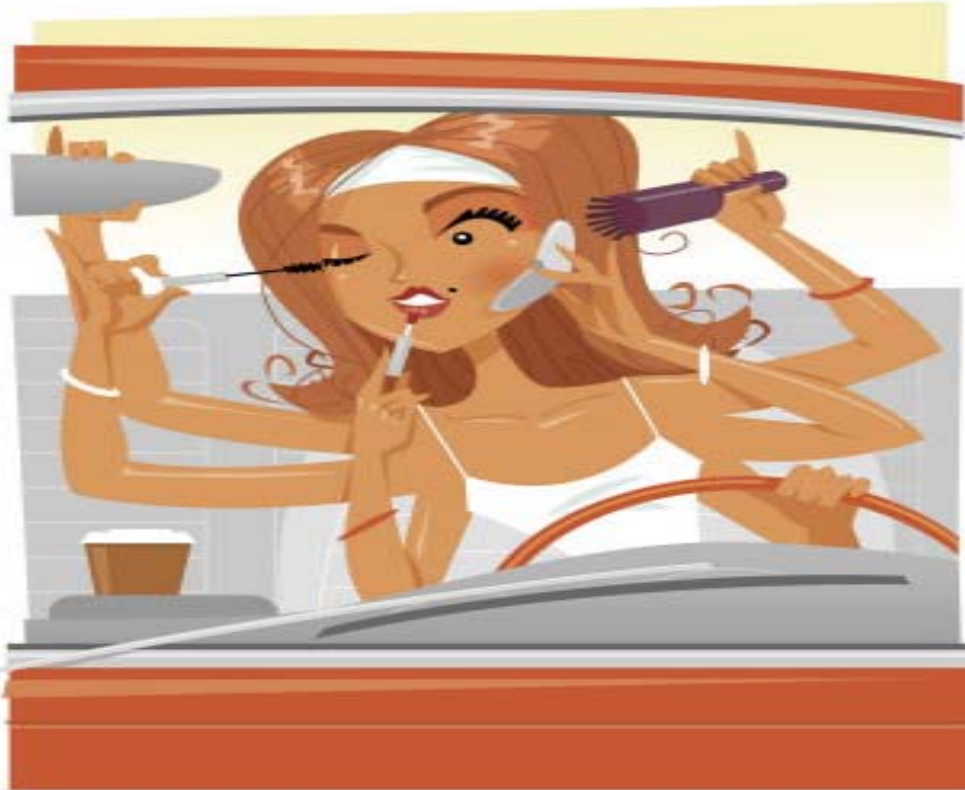
Match	Prize	Odds
OOOOO + 	JACKPOT	1:1,359,288
OOOOO	\$5,000	1:90,619
OOOO + 	\$500	1:10,456
OOOO	\$20	1:697
OOO + 	\$5	1:418
OOO	\$2	1:28
	\$1	1:8

Overall odds of winning are approximately 1:6



# Risk Homeostasis

Flood Map  
Modernization





# Risk Homeostasis

Flood Map  
Modernization





# Status Quo Bias

Flood Map  
Modernization





# Tragedy of the Commons

Flood Map  
Modernization





# Superman will save us

Flood Map  
Modernization



# How can we overcome these brain defects?



# With Nudges

Flood Map  
Modernization





# Denial





# Go Angry Early

Flood Map  
Modernization

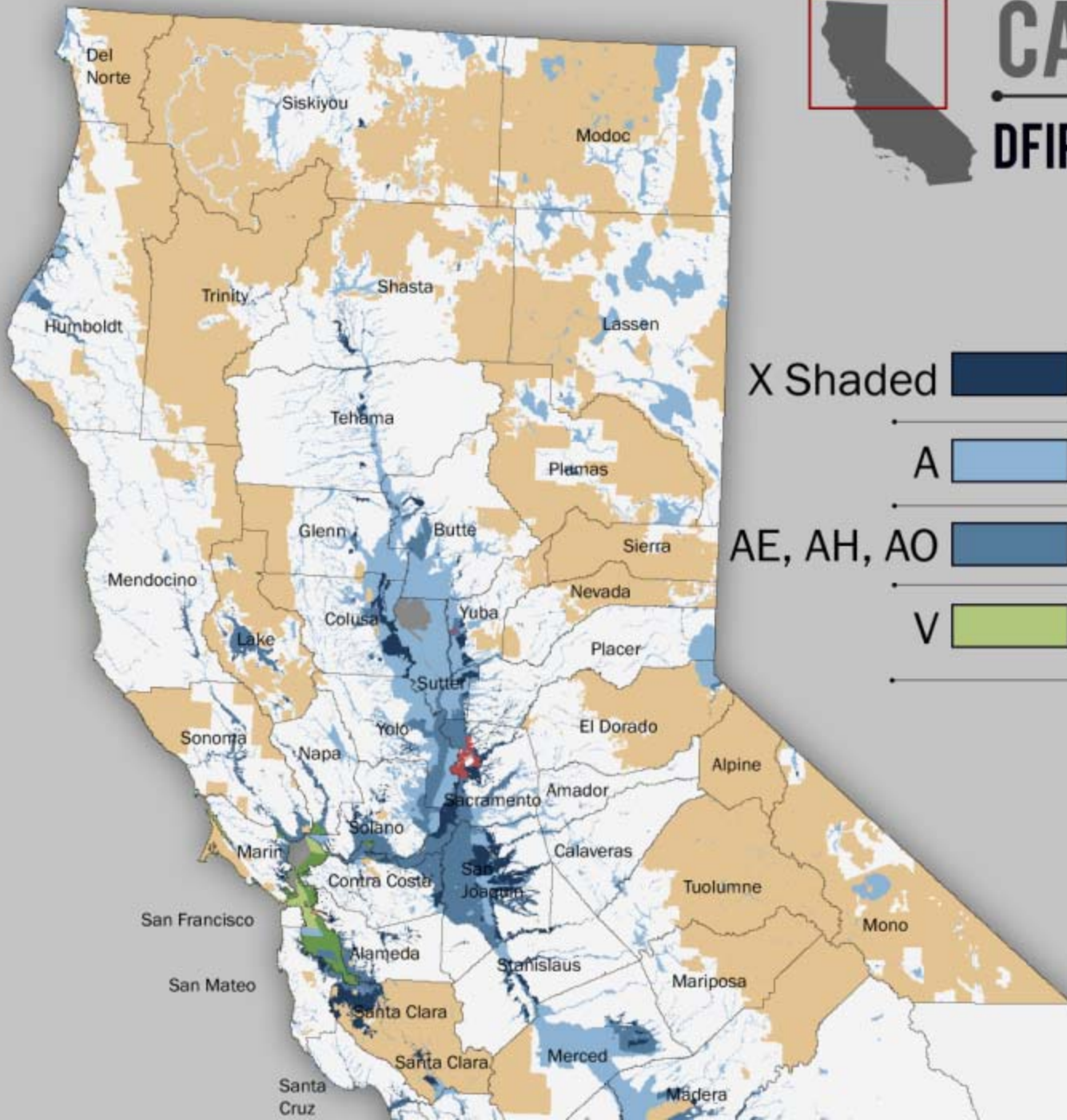


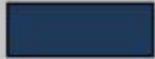







# ANGER



# CALIFORNIA

## DFIRM FLOOD ZONES

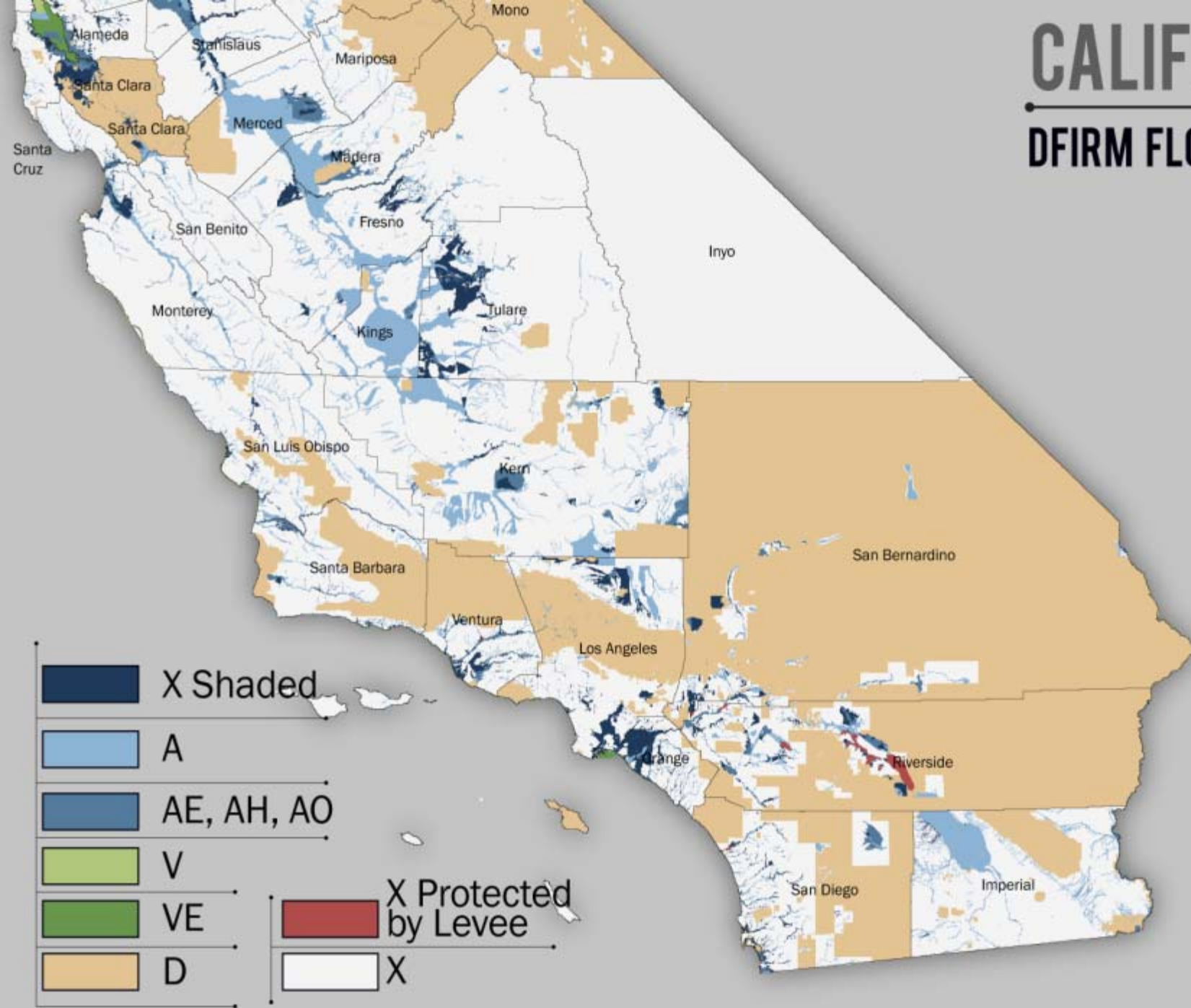


X Shaded		VE	
A		D	
AE, AH, AO		X Protected by Levee	
V		X	

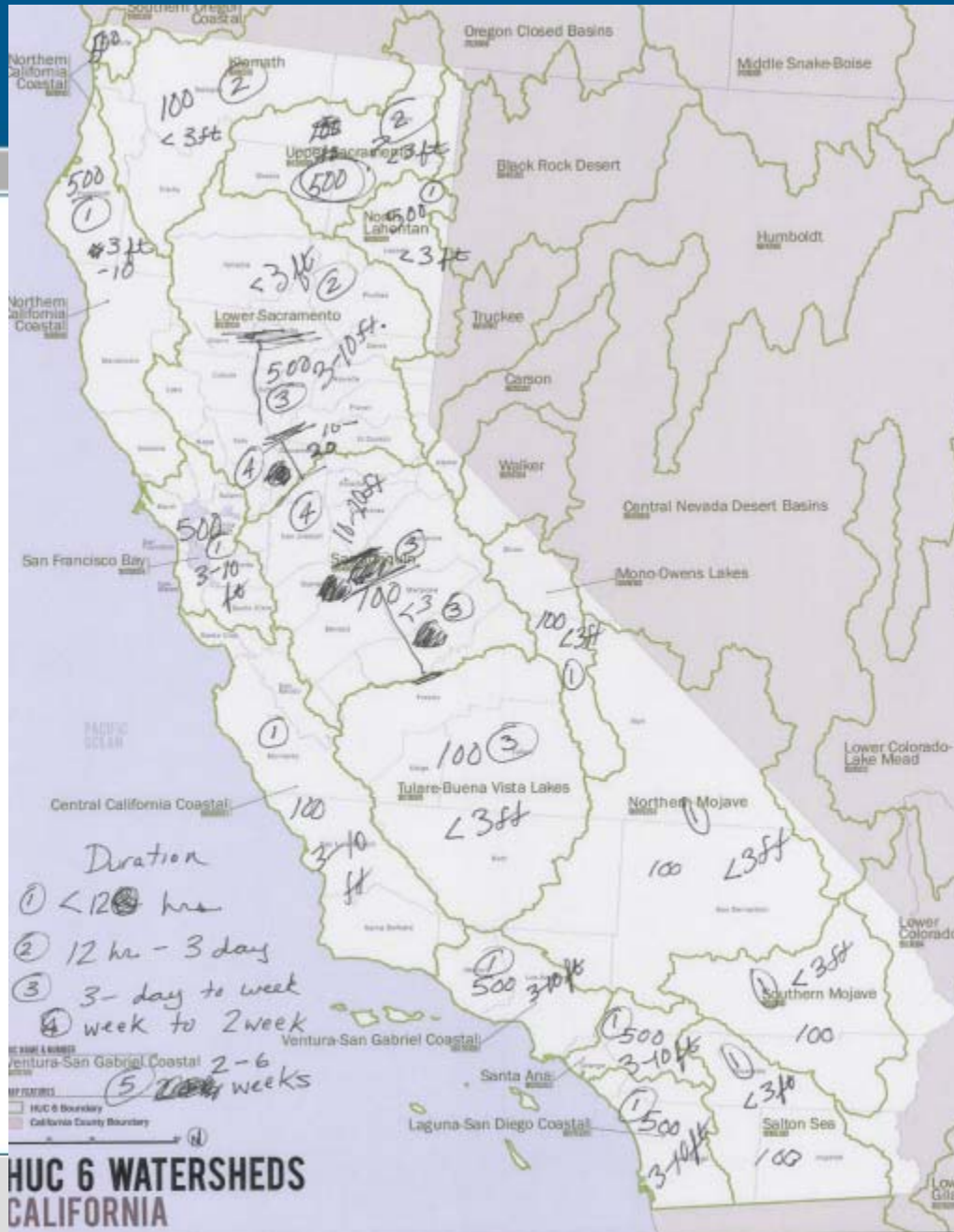
# CALIFORNIA

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## DFIRM FLOOD ZONES



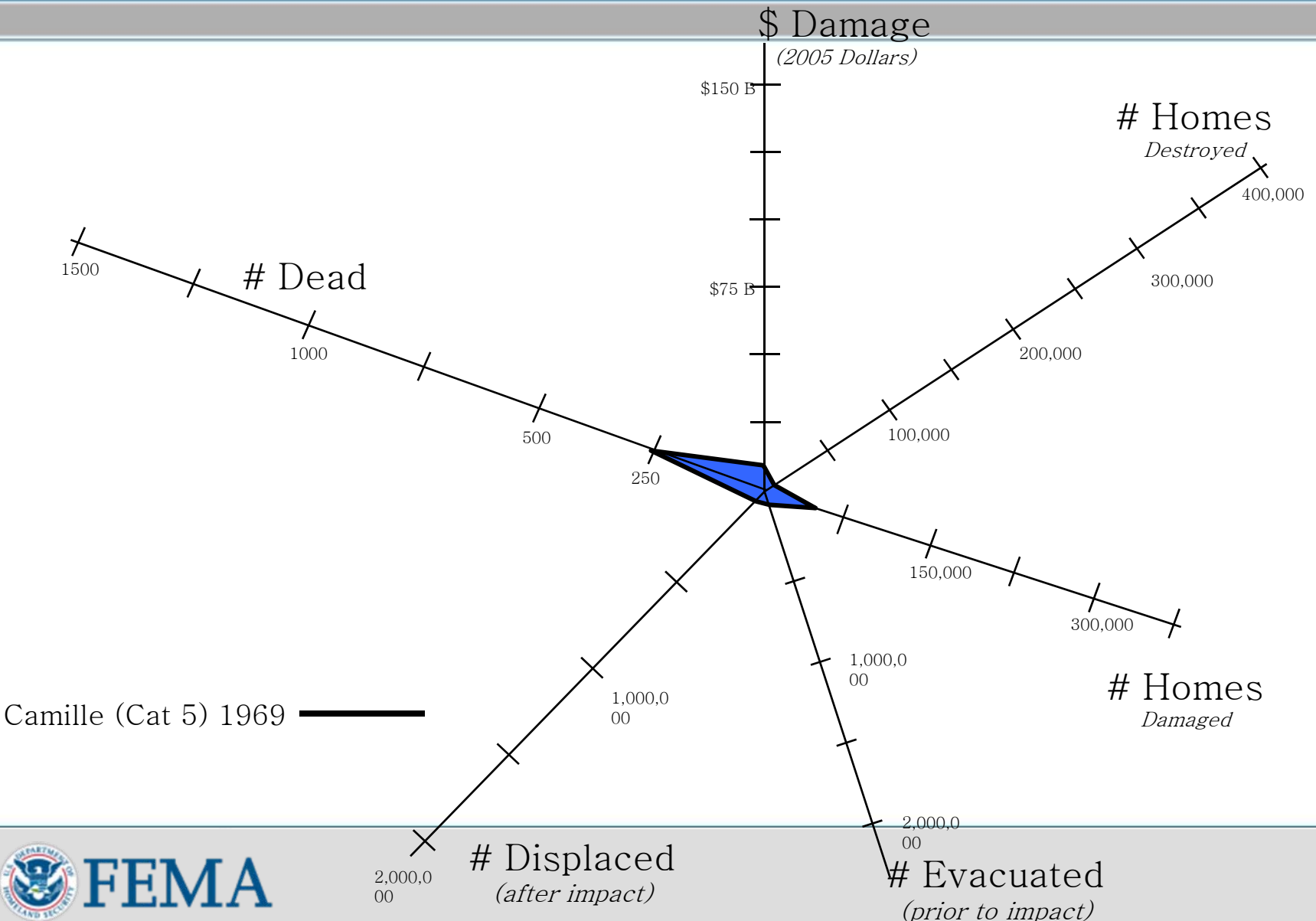
- X Shaded
- A
- AE, AH, AO
- V
- VE
- D
- X Protected by Levee
- X





# Hurricane Camille

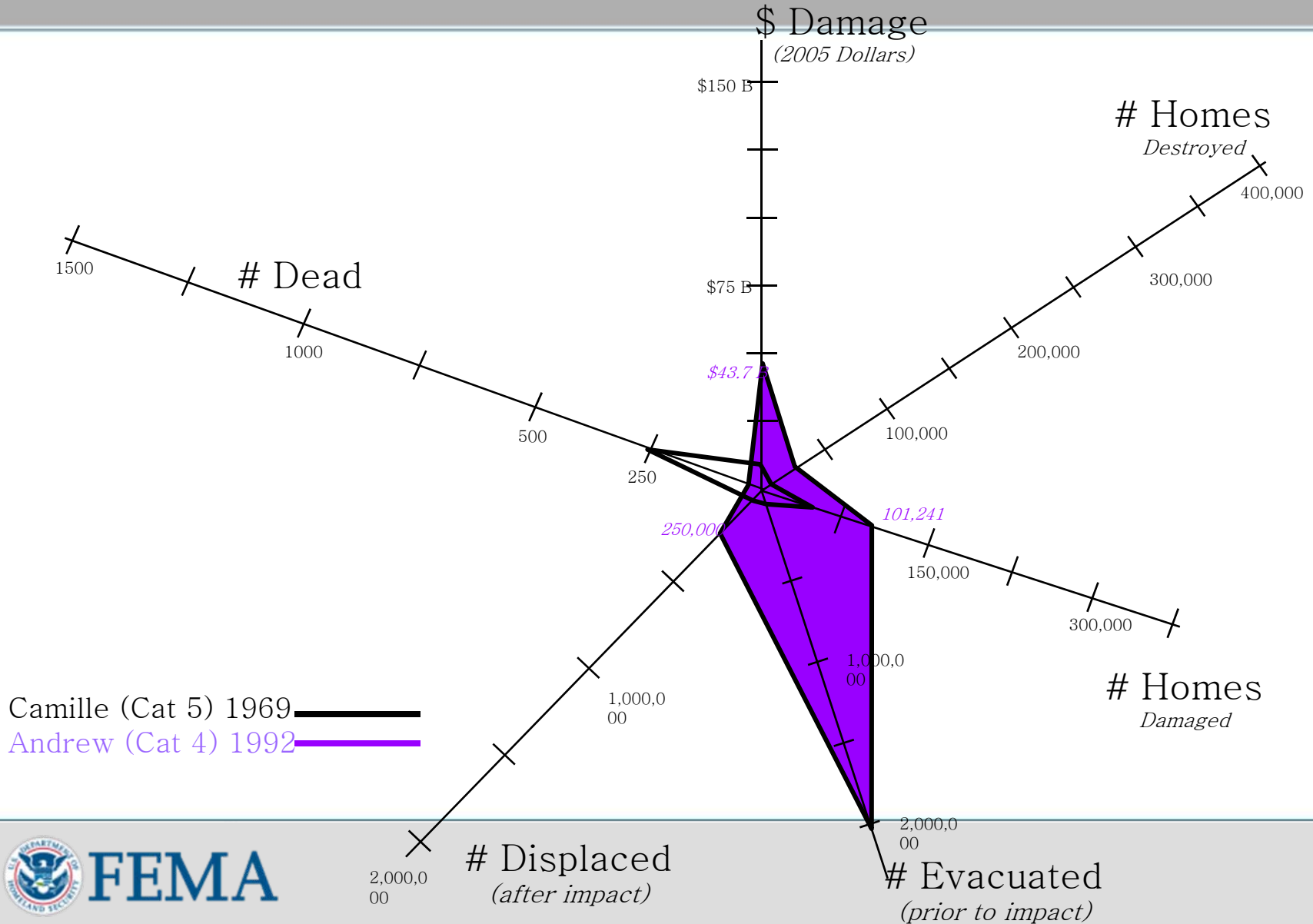
Flood Map  
Modernization





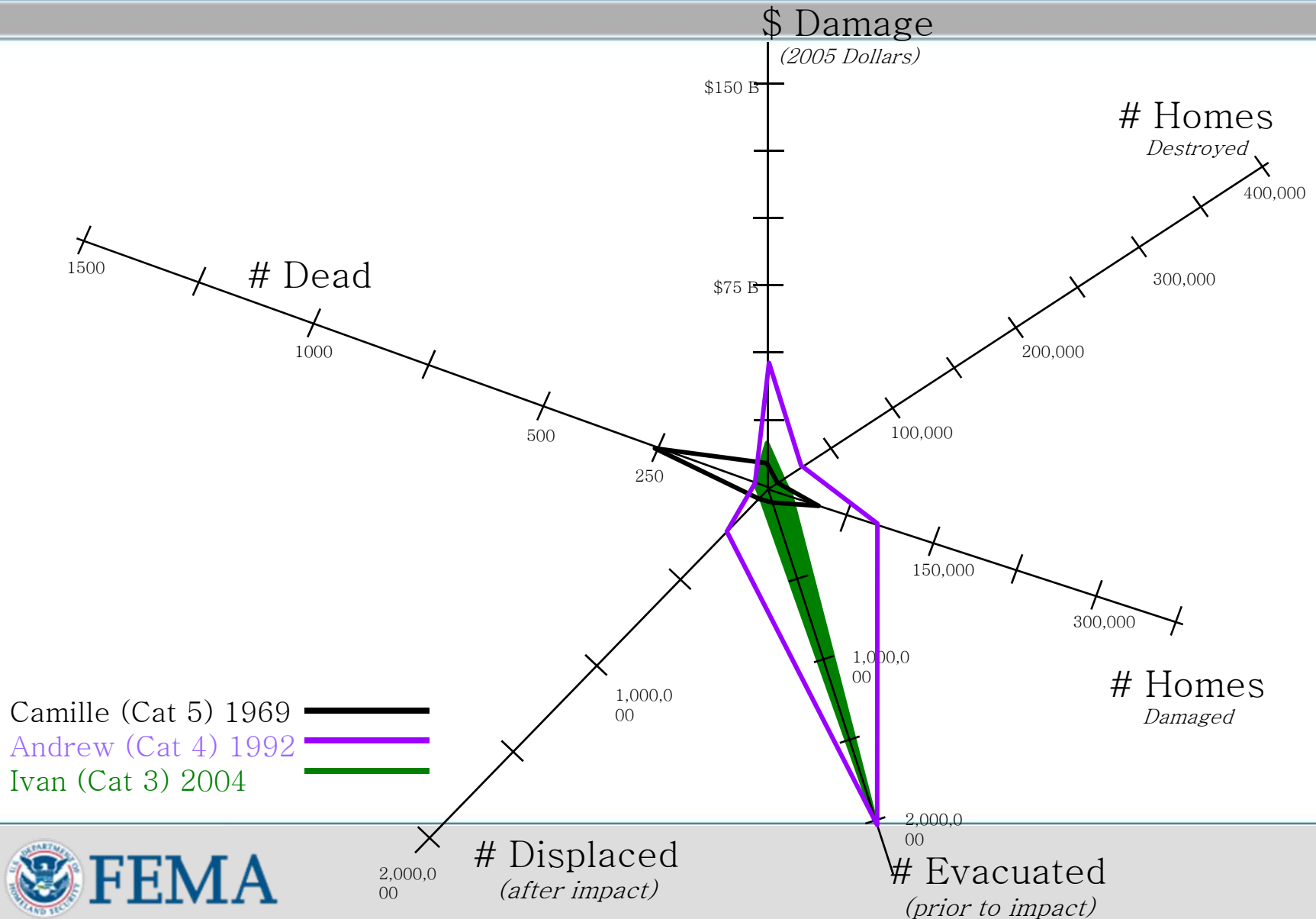
# Camille & Andrew

Flood Map  
Modernization



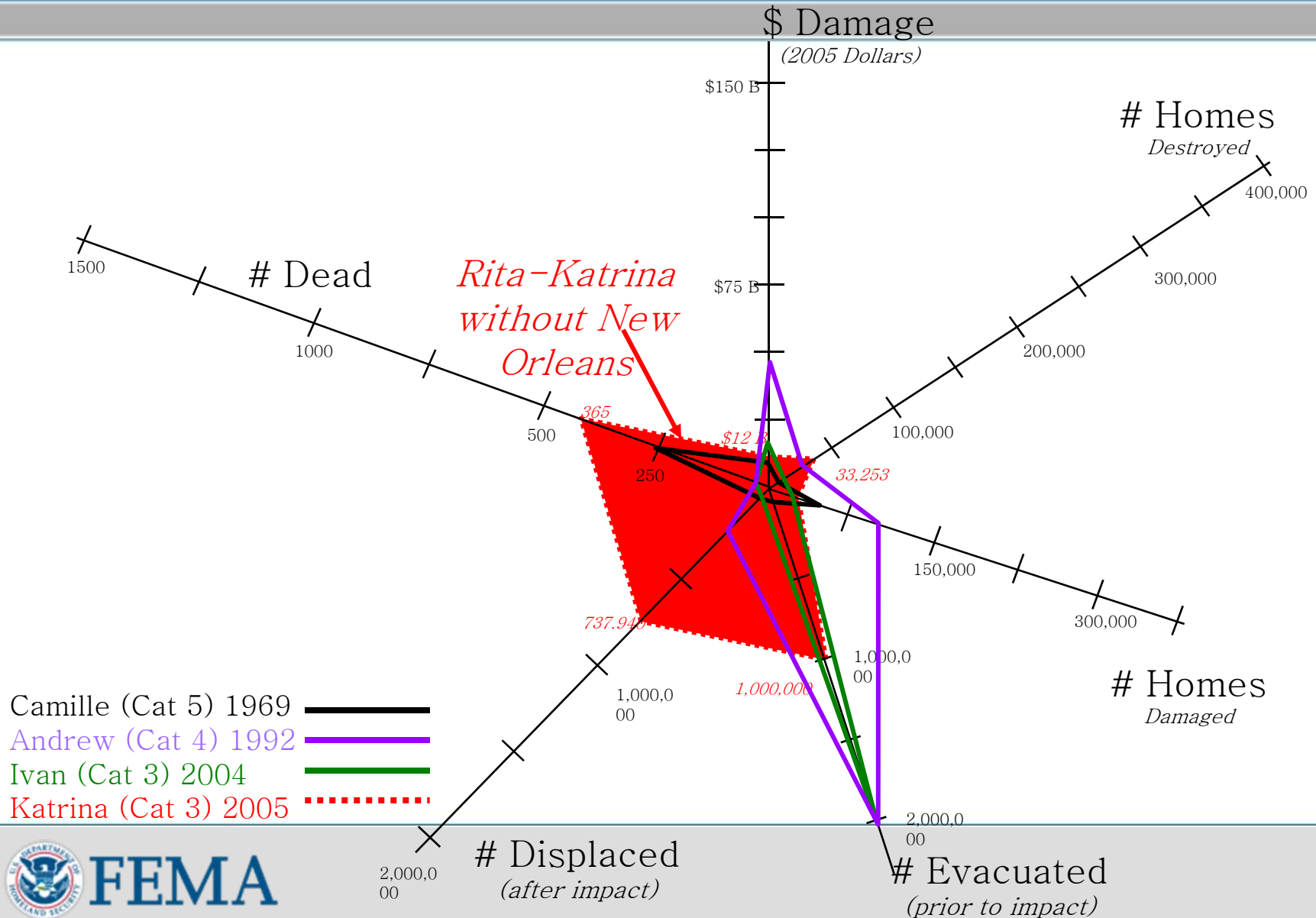
# Camille, Andrew and Ivan

Flood Map  
Modernization



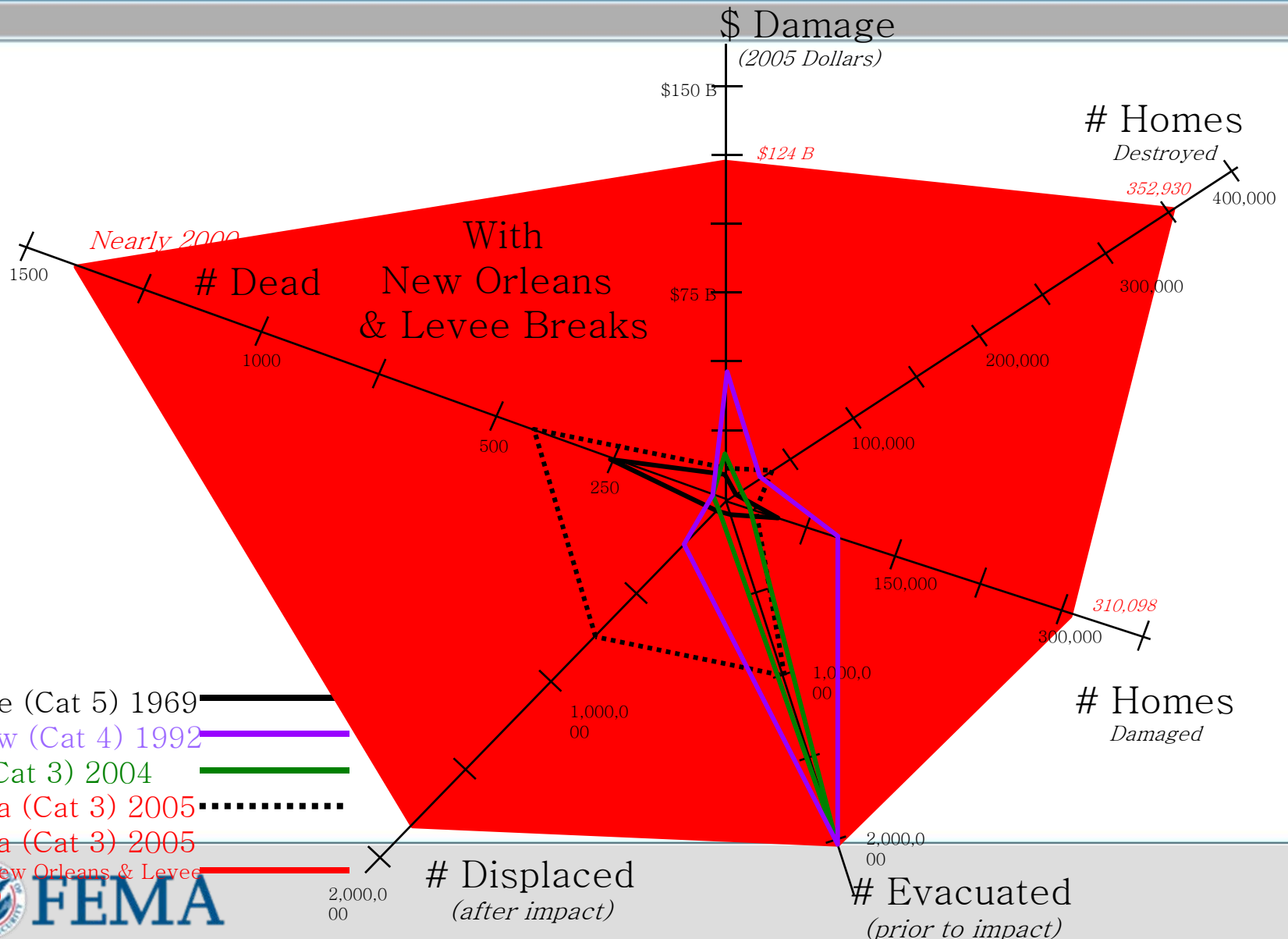
# Katrina & Rita w/o New Orleans

Flood Map Modernization



# Hurricanes Katrina & Rita

Flood Map Modernization



- Camille (Cat 5) 1969
- Andrew (Cat 4) 1992
- Ivan (Cat 3) 2004
- Katrina (Cat 3) 2005
- Katrina (Cat 3) 2005 (with New Orleans & Levee Breaks)



**“You cannot prepare for a catastrophe by planning for a disaster.” Unknown**





**FEMA**