

Work-related fatal injuries from disasters

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Workshop

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Methods

- BLS Census of Fatal Occupational Injuries:
 - Covers all *work-related injury* fatalities that occur in the U.S.
 - Uses multiple data sources: death certificates, workers compensation reports, medical examiner reports, news media, fatality investigation reports, etc.
 - Work relationship substantiated

Methods cont...Obtaining the dataset on “Natural Disasters”

- Used regular CFOI codes such as Event, Source, Secondary Source
- Supplemented with a search of CFOI narrative field, a descriptive free text field, to search for keywords such as:
 - Flood
 - Hurricane
 - Blizzard
 - Earthquake
 - Storm surge
 - Forest fire

Disaster-relation considerations

- Hazardous condition

Fatal injury resulted from material forces of disaster's impact.

Examples: direct injuries, injuries from transportation system damage, release of hazardous chemicals

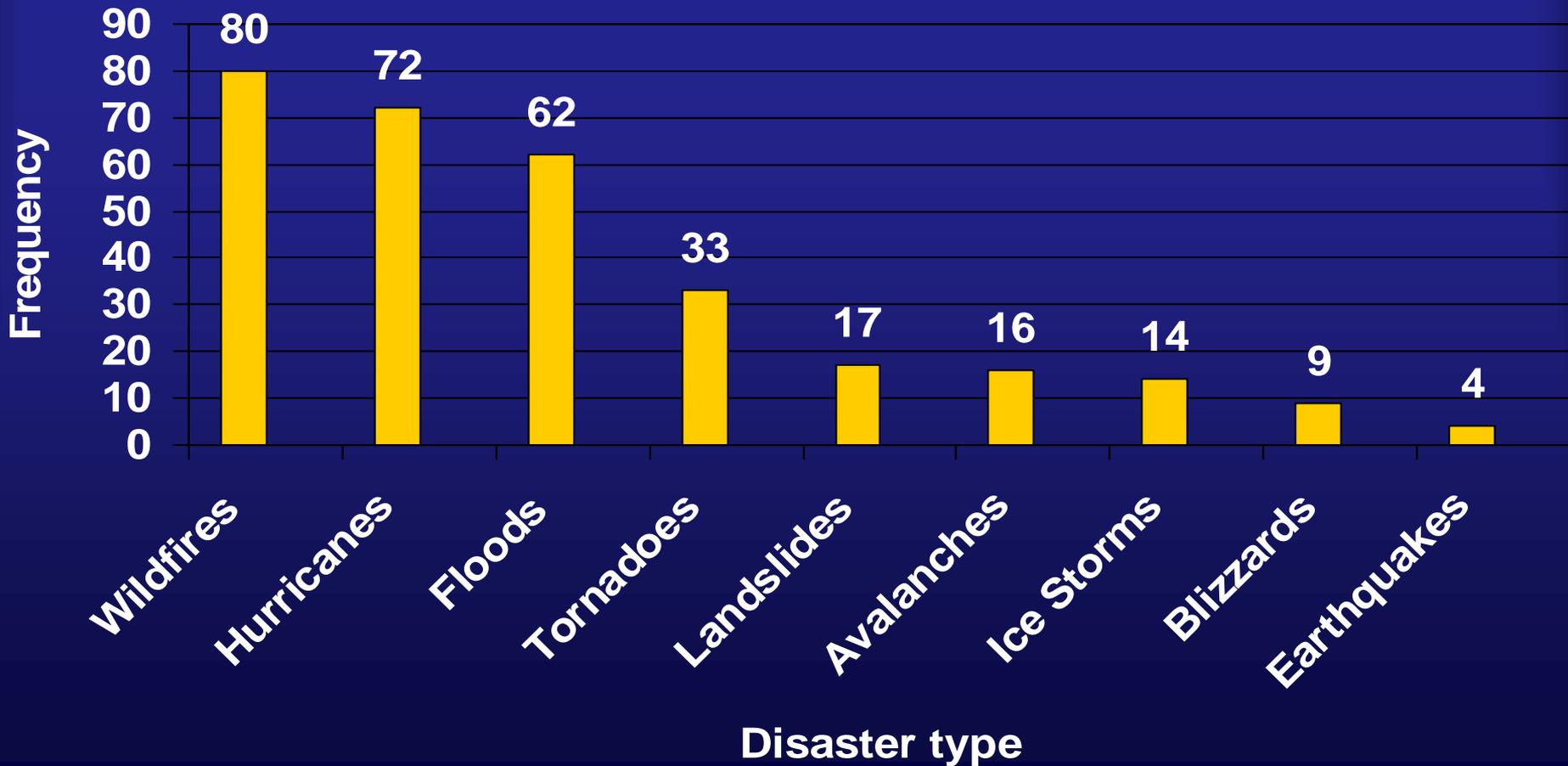
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- Pursuit of worker

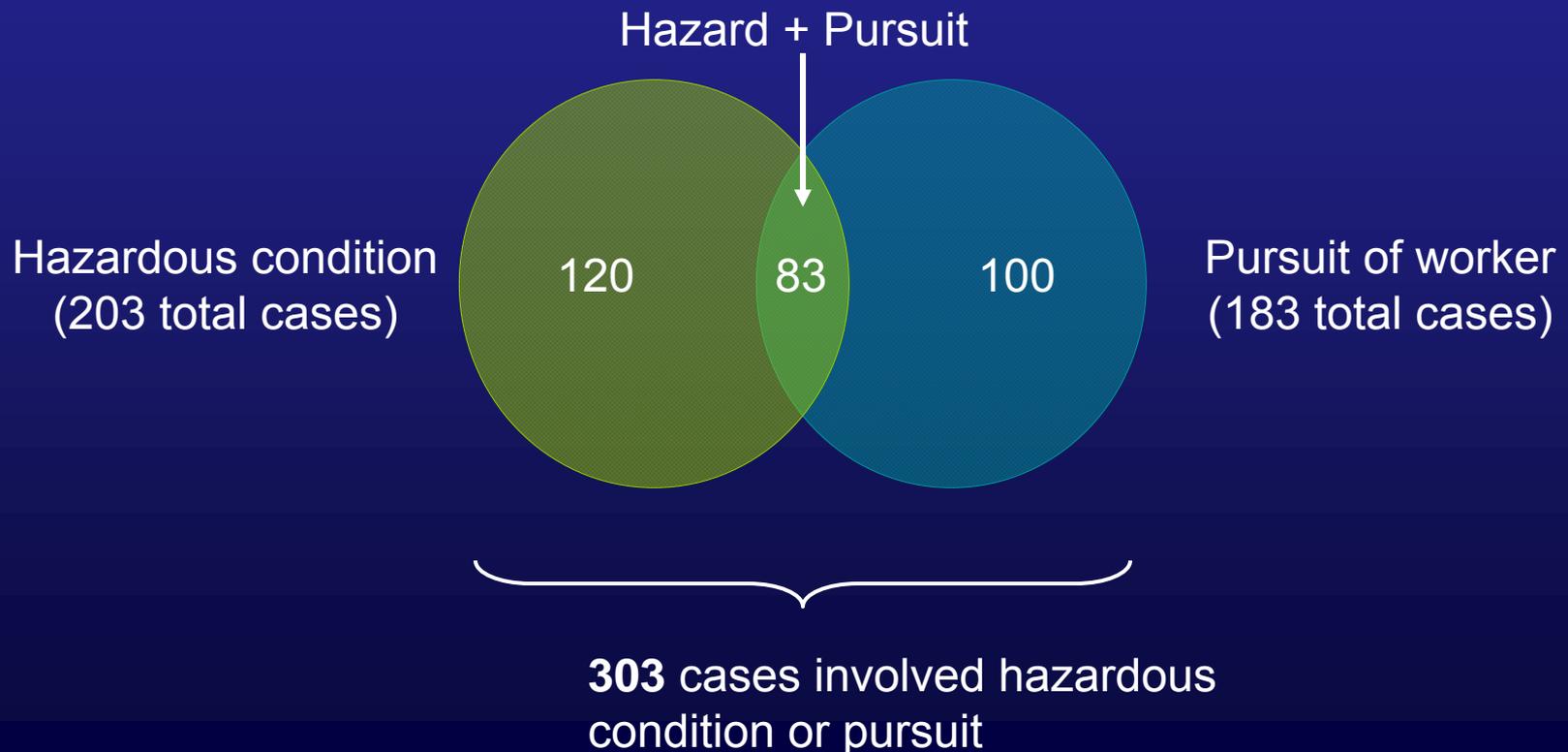
Regardless of how injury occurred, the area of disaster mitigation the worker was involved in.

Examples: rescuing, restoring power, repairing damaged buildings, debris clearance

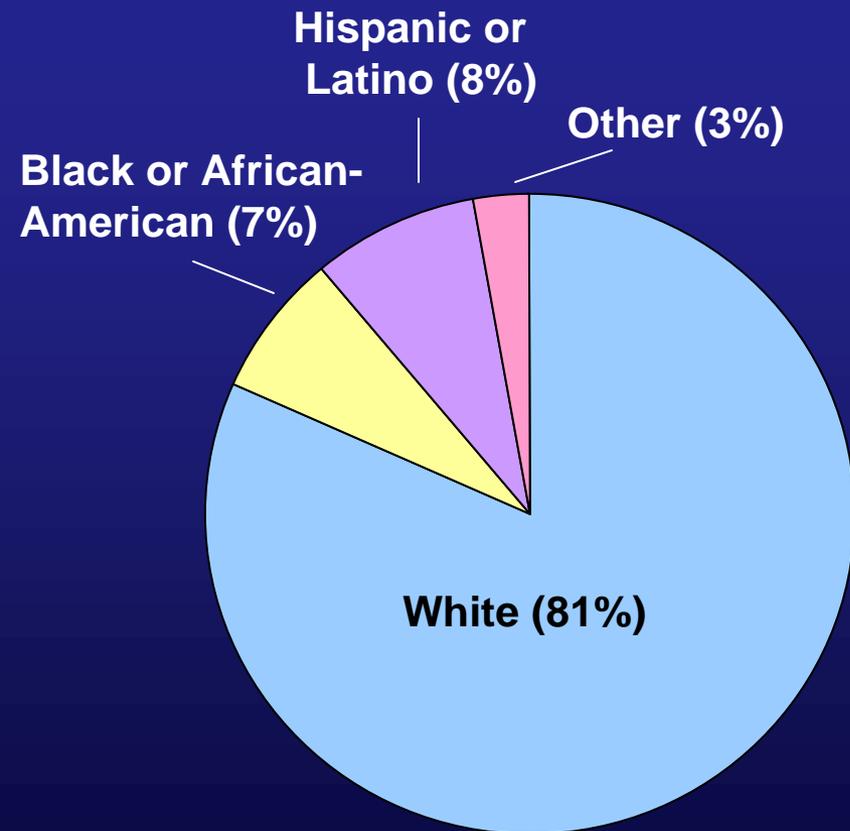
Work-related disaster fatalities 1992-2006



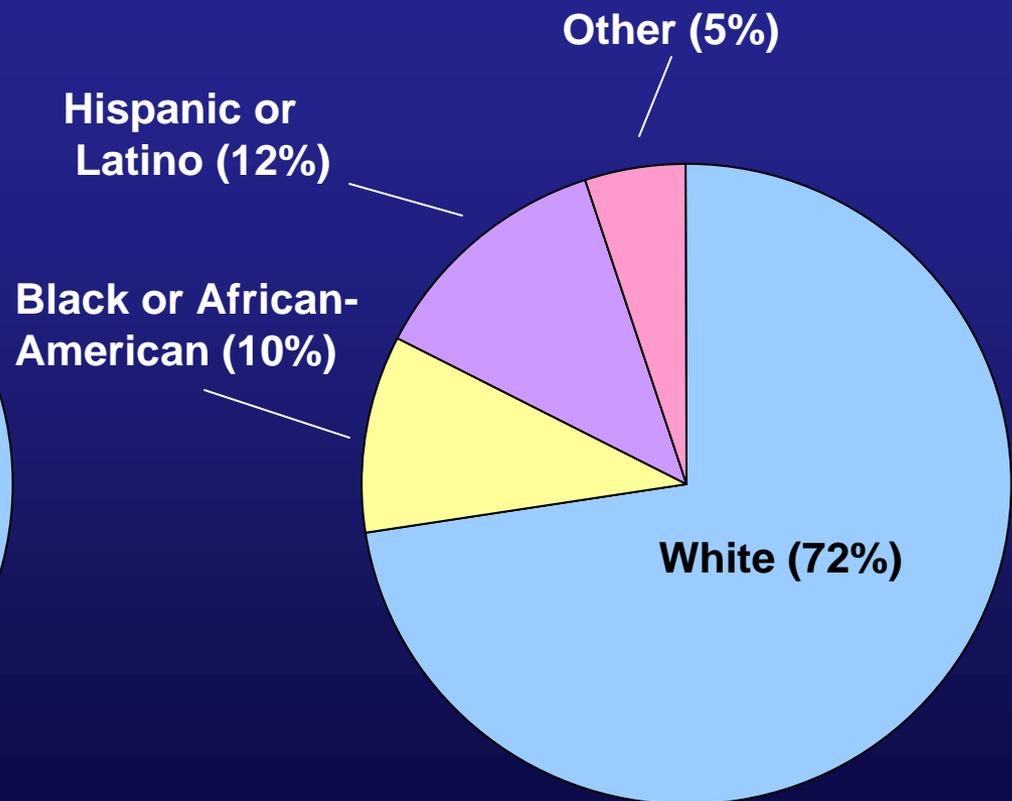
Disaster-relation of worker deaths (307 total cases 1992-2006)



Race and Ethnicity—Disaster cases versus all workers

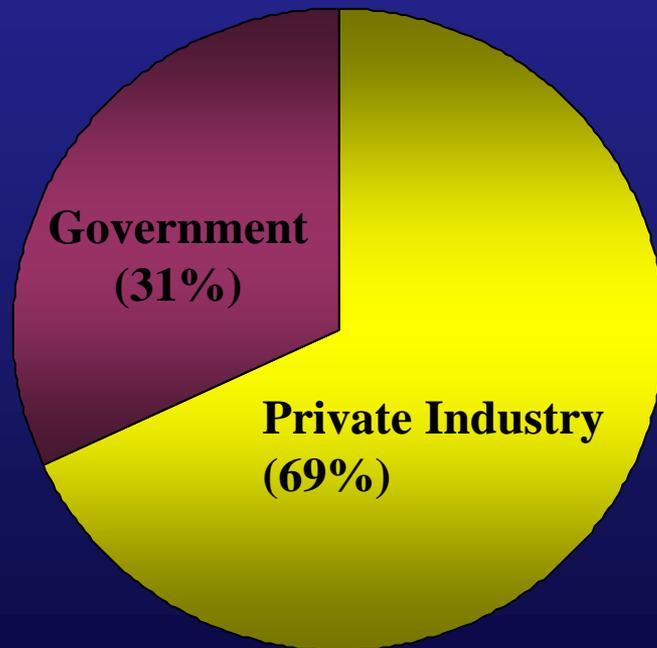


**Disaster-related fatal injuries,
1992-2006**

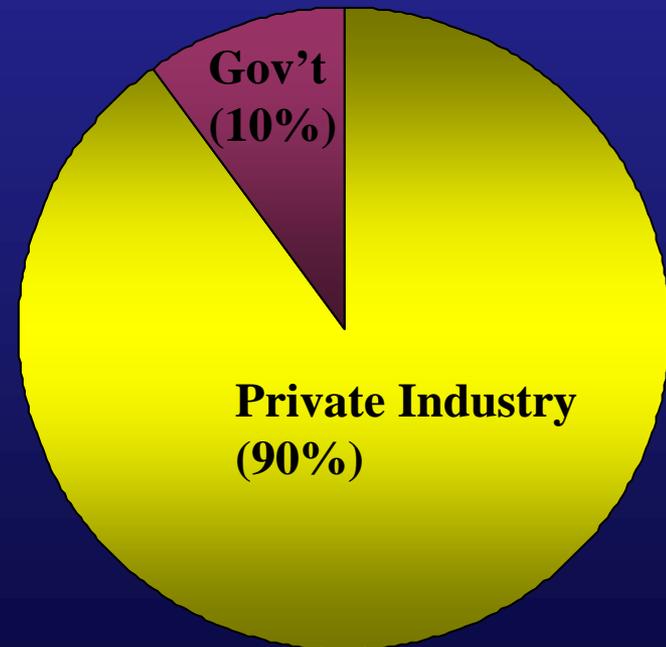


**All worker fatal injuries,
1992-2006**

Public Sector vs. Private Sector

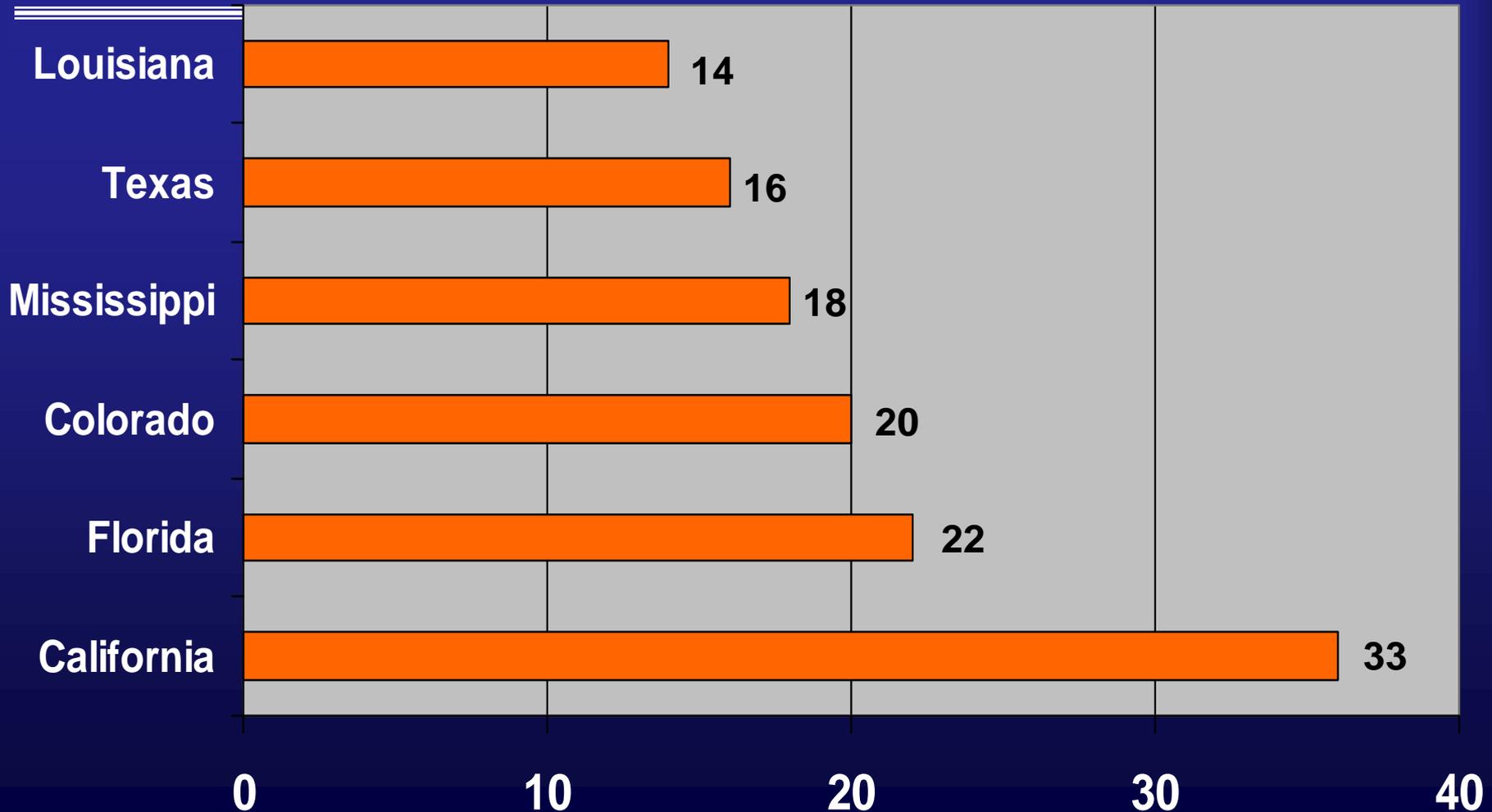


**Disaster-related fatal injuries,
1992-2006**



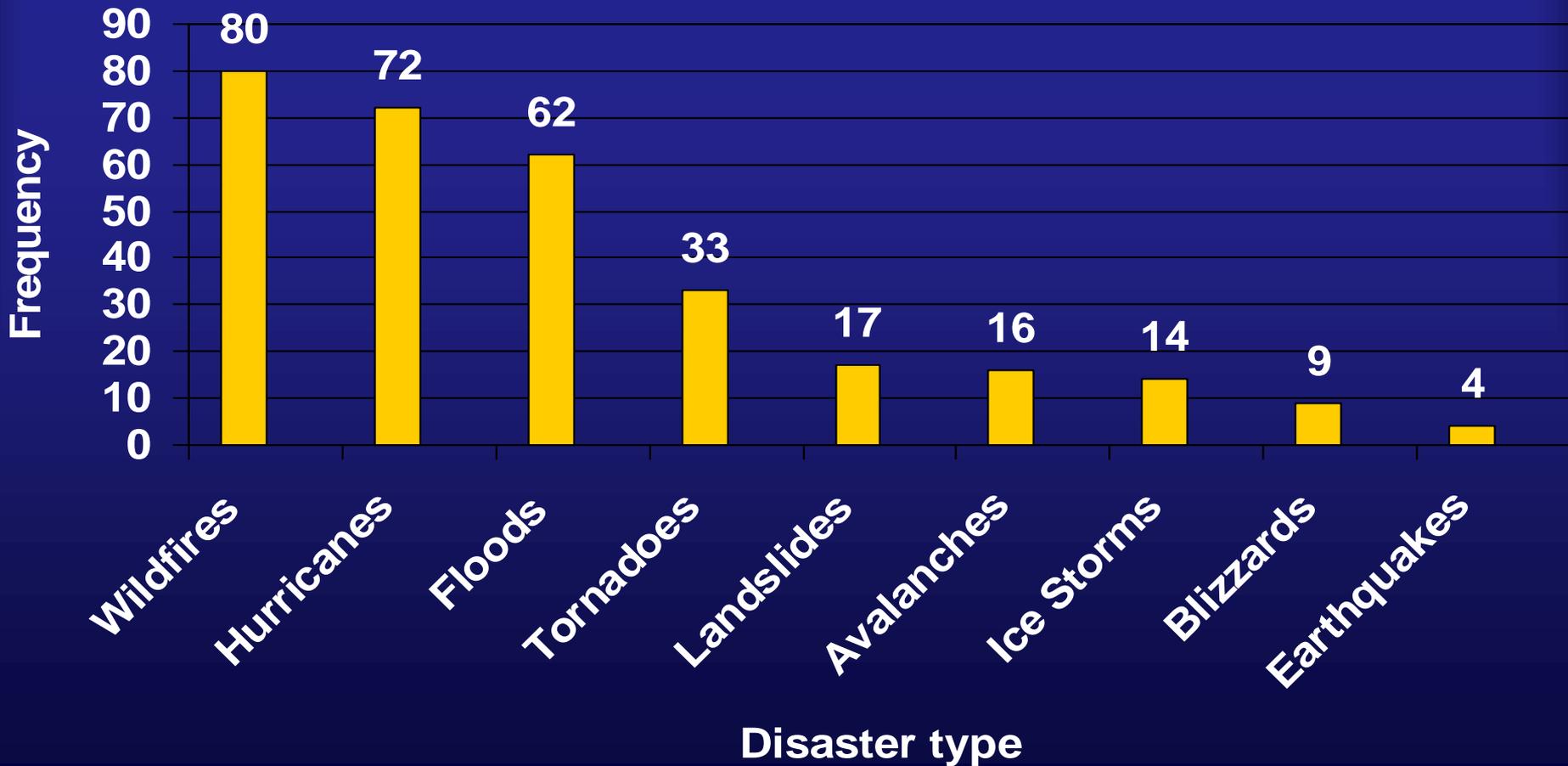
**All worker fatal injuries,
1992-2006**

Work-related disaster fatalities by State: Top Six



Source: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2008

Work-related disaster fatalities 1992-2006



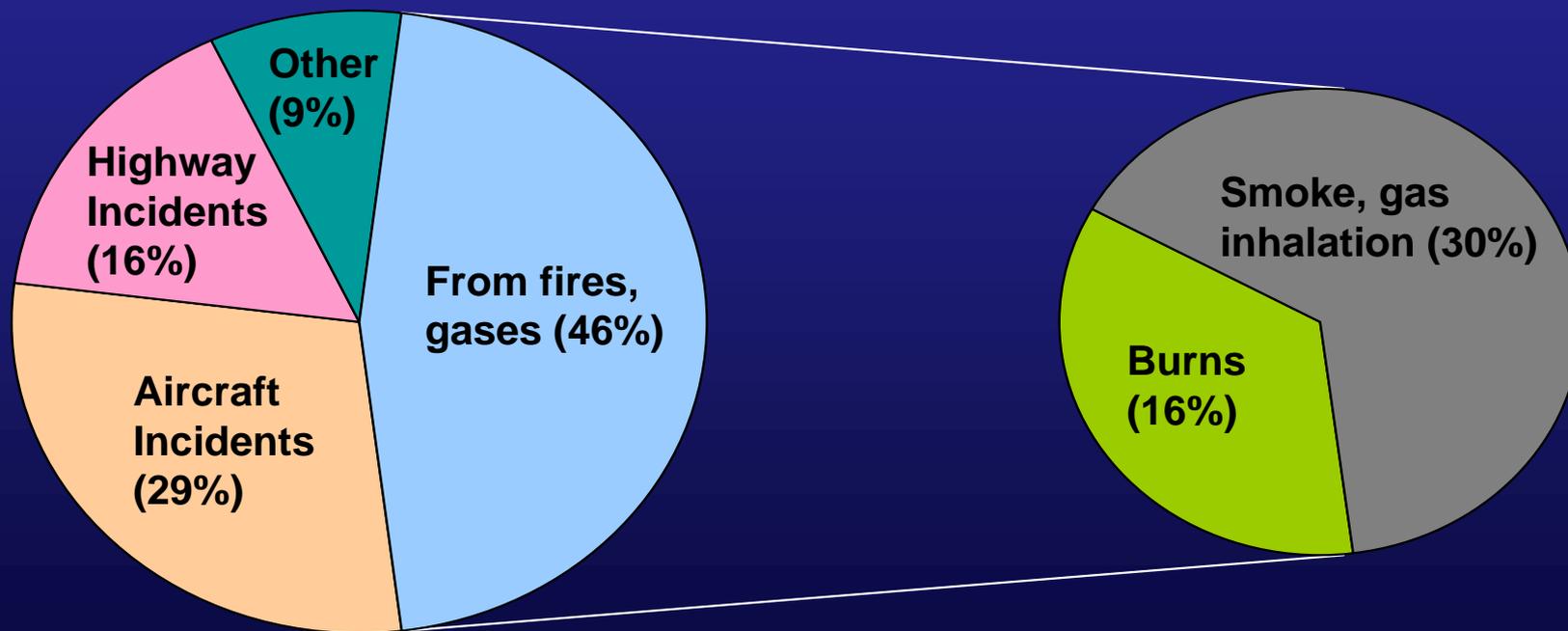
Wildfires (n= 80)

- Two most common States for worker deaths related to wildfires are California (20 cases) and Colorado (15 cases)
- On average, about 5 worker fatalities per year from wildfires. However, there were 16 in 2003 and 15 in 1994.

Disaster-relation – Wildfires

- Almost all workers fatally injured by wildfires were engaged in pursuits related to mitigating the hazard. Nearly all were attempting to quench or divert the fire, or were traveling to fight the fire.

Worker deaths involving wildfires



(N = 80)

Wildfires: 2 main occupations

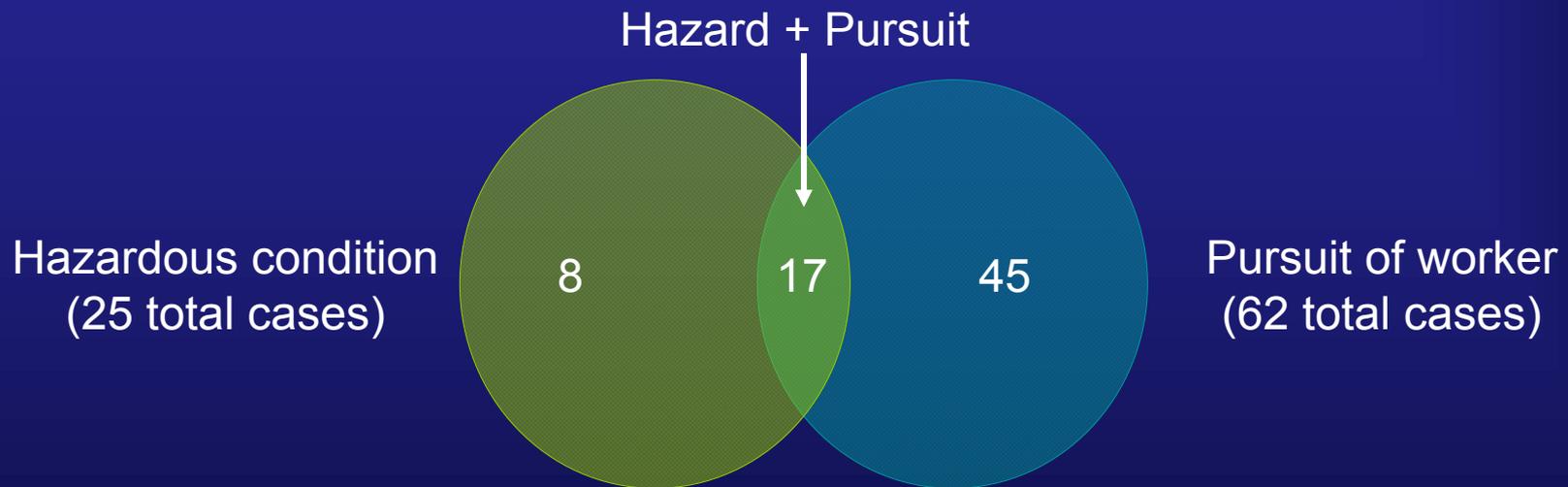
(1) Firefighting and fire prevention occupations $\approx 64\%$

→ about 61% of these employed by federal government

(2) Aircraft pilots $\approx 24\%$

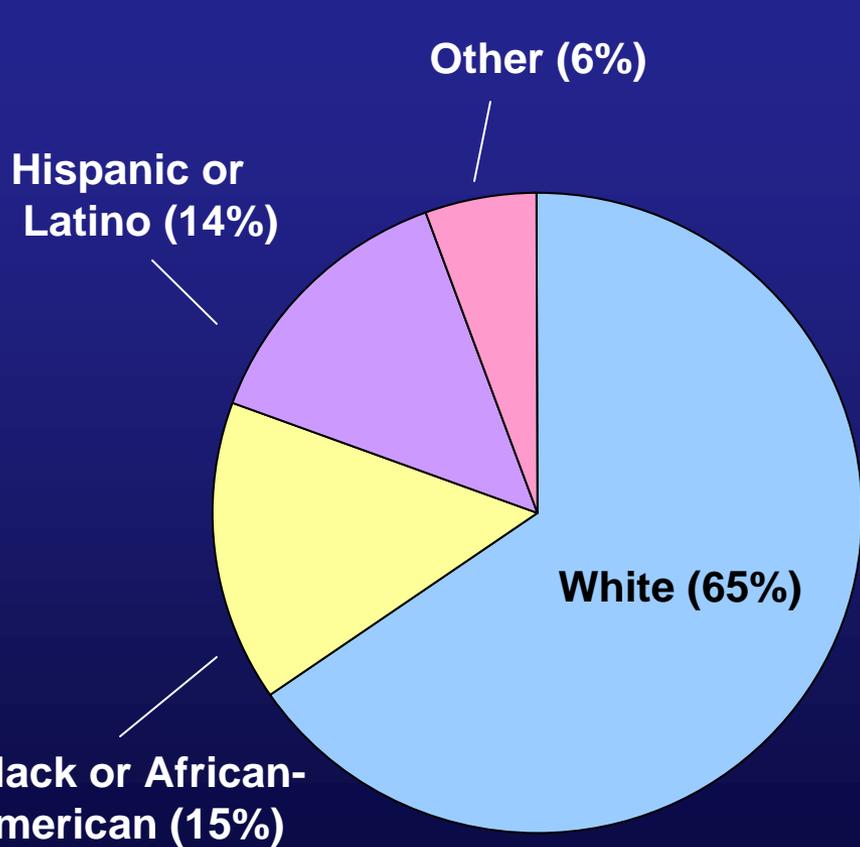
→ mostly from private industry

Disaster-relation – Hurricanes (N = 72)

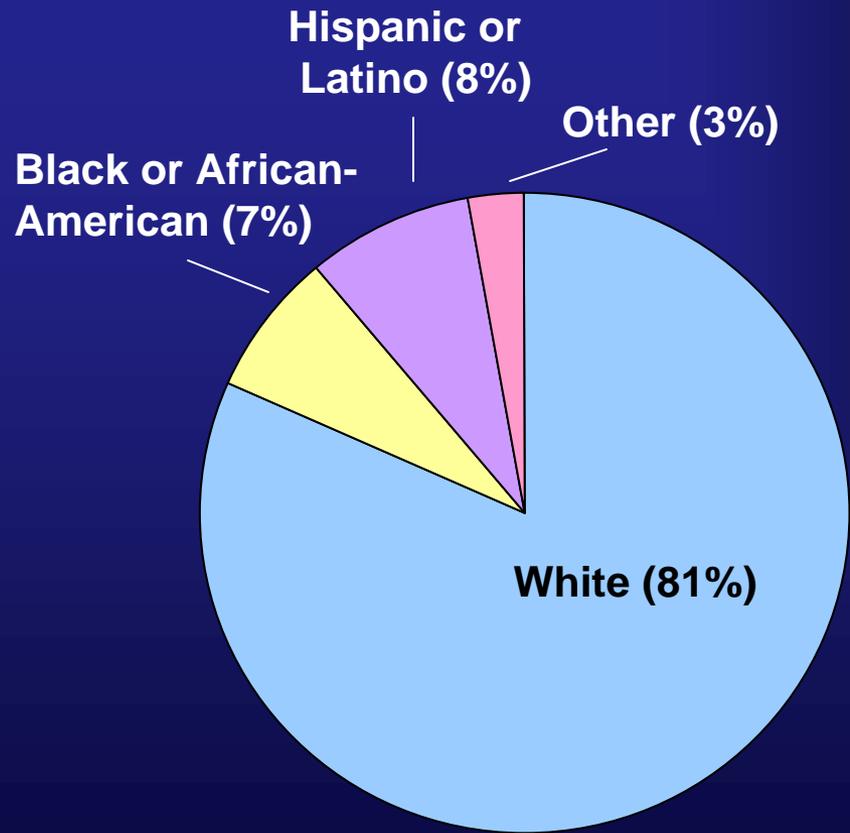


* Four cases involved the use of generators.

Race and Ethnicity—Hurricane cases versus other disasters

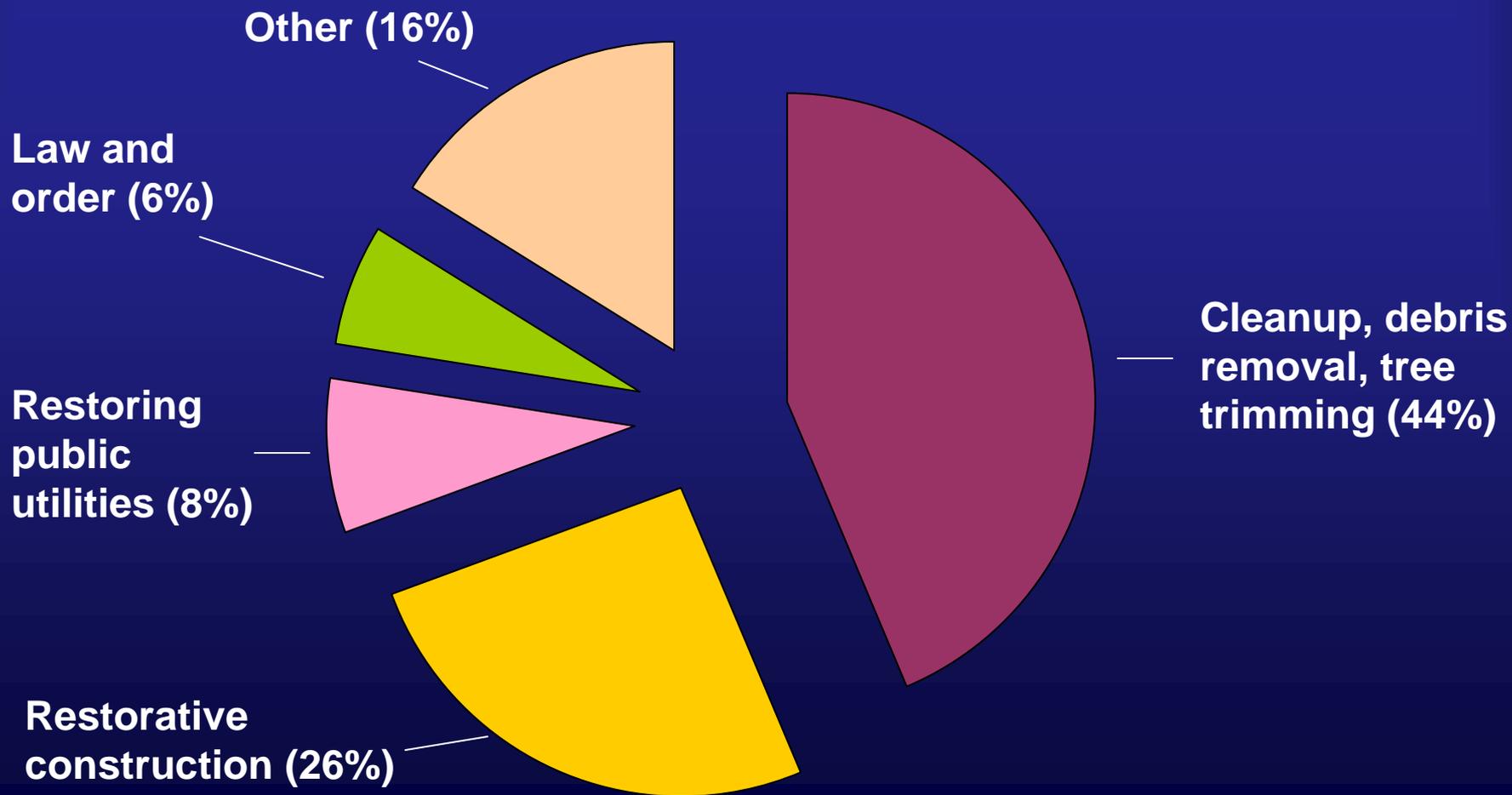


Hurricane-related fatal injuries, 1992-2006



All disaster-related fatal injuries, 1992-2006

Hurricane-related pursuits of fatally injured workers (of the 62 cases with known pursuits)



Fatal events related to hurricanes

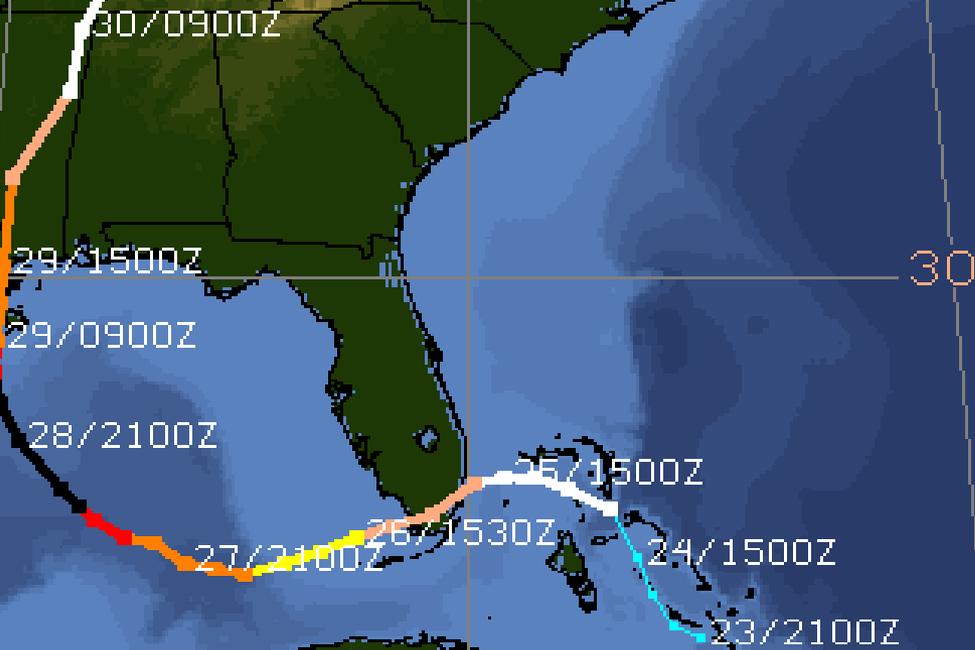
Event	Percent
Struck by falling tree, branches	18%
Highway	11%
Contact with electrical current	10%
Falls from roof	8%
Water vehicle incidents	7%

Table 1. Common components of injury events — Hurricanes (N = 72)

Event	Percent
Trees, logs	24%
Highway vehicle	14%
Excavation machinery	10%
Fishing boats (drownings)	7%
Roofs (i.e. falls)	7%
Generators	6%

- TROPICAL DEPR
- TROPICAL STORM
- CATEGORY 1
- CATEGORY 2
- CATEGORY 3
- CATEGORY 4
- CATEGORY 5

Katrina



90

80

70

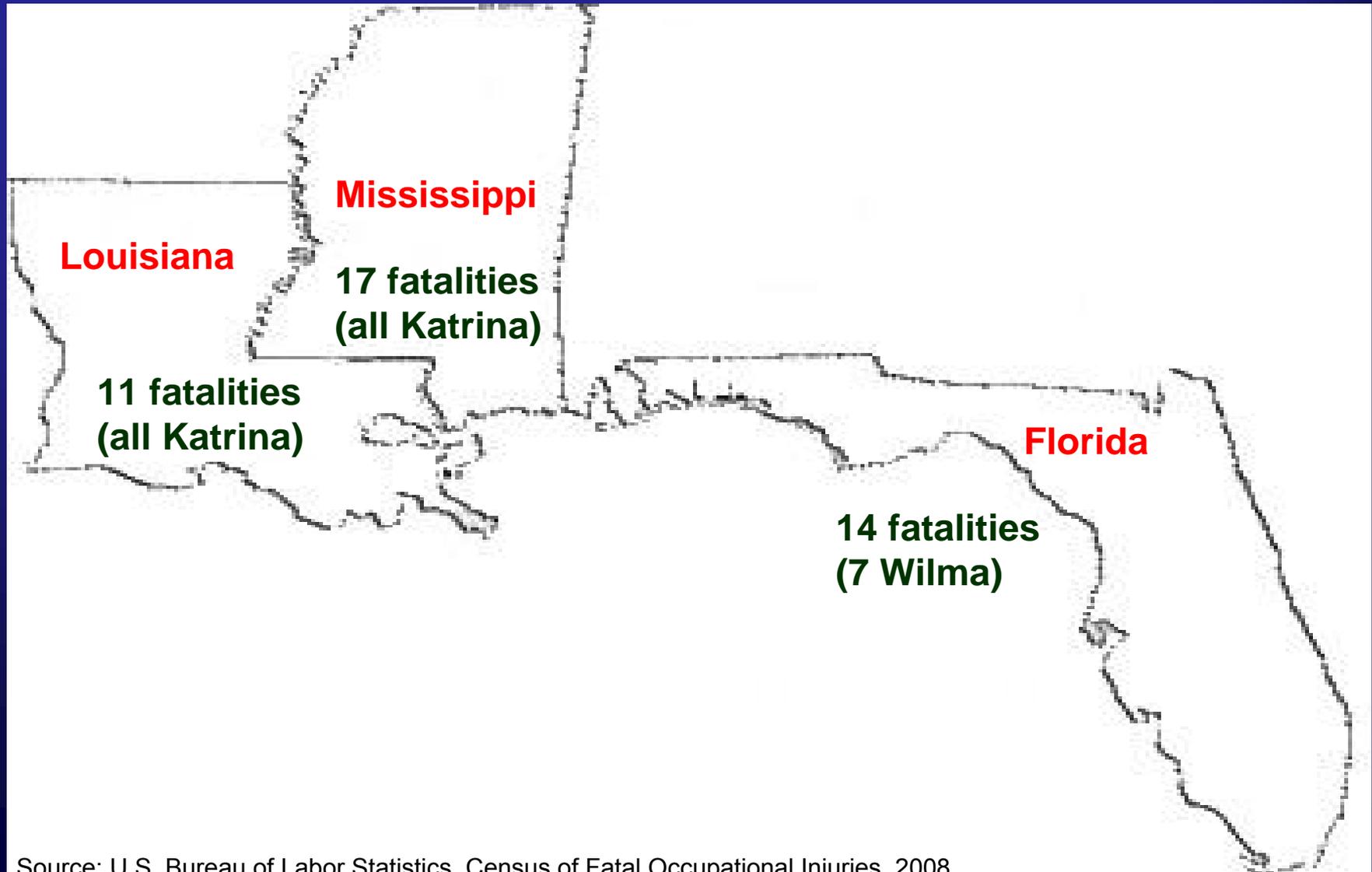
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20

- TROPICAL DEPR
- TROPICAL STORM
- CATEGORY 1
- CATEGORY 2
- CATEGORY 3
- CATEGORY 4
- CATEGORY 5



Fatal injuries to workers: 2005 hurricanes (47 total cases)



Workers fatally injured – 2005 hurricanes

Occupation	Hurricane fatalities	Rate (National rate per 100,000 workers = 4.0)
Construction and extraction workers	14	12.9
→ Construction laborers	9	23.0
Grounds maintenance workers	8	14.2
Installation, maintenance, and repair workers	6	7.6
Transportation and material moving workers	5	17.9
Protective service workers	4	8.9

How many days after landfall?

Of the 2005 hurricane cases, counting both deaths due to hazards and deaths related to the pursuits:

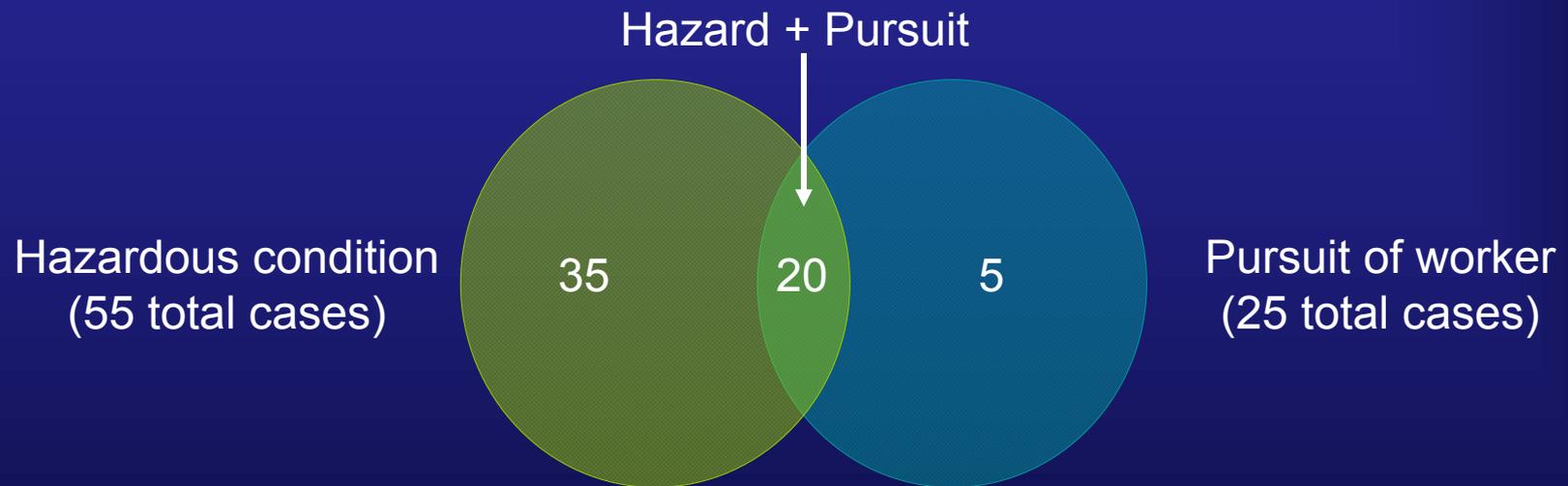
Fatal injuries occurred a median of 36.5 days after landfall.

*5 days when a Hazard was identifiable.

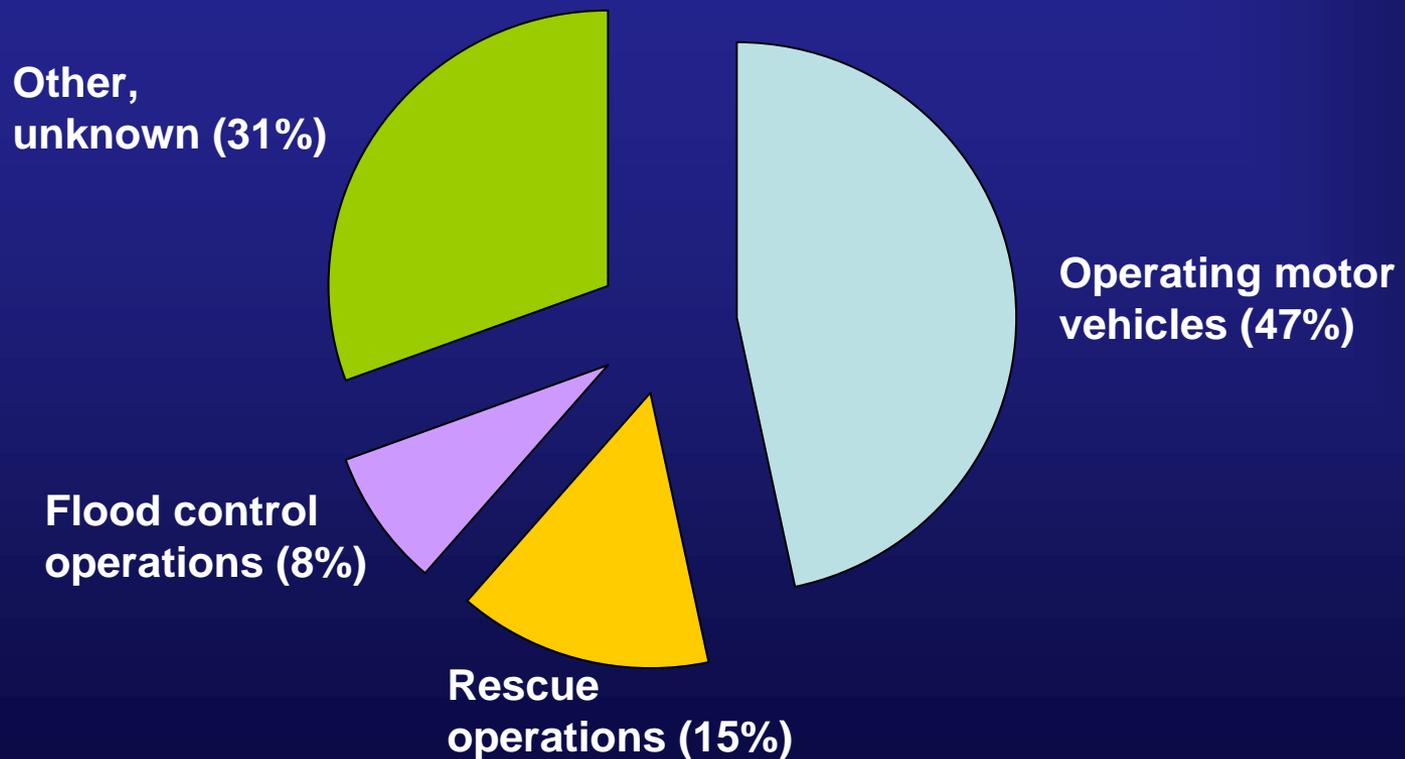
Floods (n= 62) (excluding hurricane floods)

- 76% of fatalities were drownings.
- Almost 1/2 involved motor vehicles.
- Common occupations
 - * Protective service workers (19%)
 - * Motor vehicle operators (18%)

Disaster-relation - Floods



Flood epidemiology: Activities



Tornadoes (n = 33)

- All 33 deaths resulted from force of tornado winds.

- Of these:

Caught in crushed or collapsing materials = 42%

Struck by object = 21%

Highway incident = 15%

Tornadoes cont...

Many industries affected. Private industry workers made up 91% of fatalities (normal CFOI percentage).

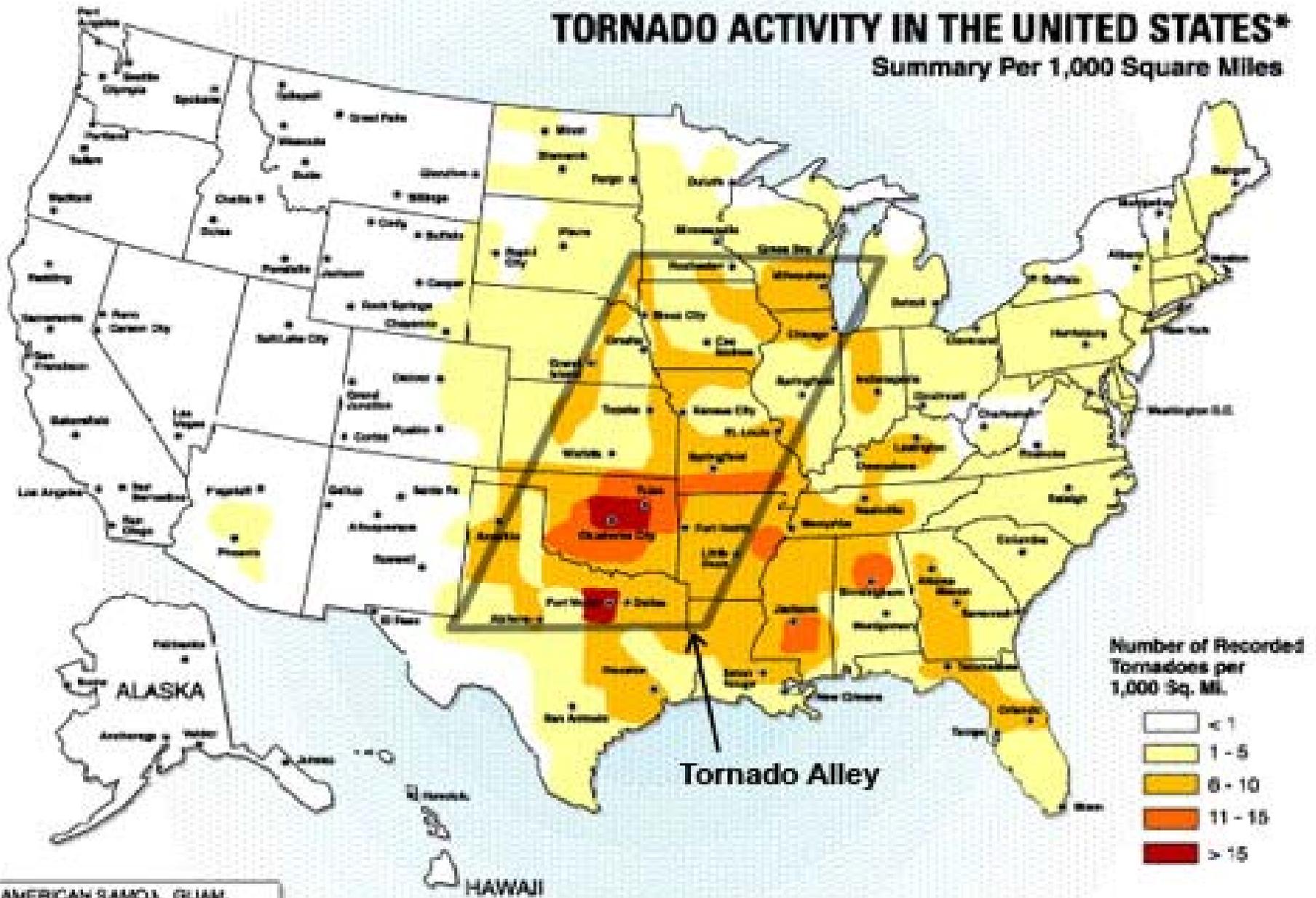
Fatalities often occurred in structures (unlike most other work-related disasters discussed here).

Tornadoes geographically

- About $\frac{1}{2}$ of fatal occupational injuries occur in “tornado alley” States (TX, OK, KS, NE, SD, MN, WI, IL, IA, MO, AK, LA, MI).

TORNADO ACTIVITY IN THE UNITED STATES*

Summary Per 1,000 Square Miles



* Based on NOAA, Storm Prediction Center Statistics

The number of tornadoes recorded per 1,000 square miles

Landslides & Mudslides (n = 17)

- Thirteen (76%) died from direct physical onset of landslide.
- Six (35%) occurred in California; four (24%) occurred in Oregon.
- Five (29%) of the deaths were to timber cutting workers.

Ice Storms (n = 14)

- Ten (71%) of the fatalities were electrocutions. Five of the workers were attempting to restore power.
- Eight (57%) occurred in the South Census Region.

Blizzards (n = 9)

- Eight of the nine were transportation incidents.
 - ▶ Six of these were aircraft incidents.