

Supplemental Materials



















Top-20 Most Destructive California Wildfires [Data based on CAL FIRE]

Top 20 Most Destructive California Wildfires

FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1* Camp Fire (Under Investigation)	November 2018	Butte County	153,336	18,804	86
2 TUBBS (Under Investigation)	October 2017	Napa & Sonoma	36,807	5,636	22
3 TUNNEL - Oakland Hills (Rekindle)	October 1991	Alameda	1,600	2,900	25
4 CEDAR (Human Related)	October 2003	San Diego	273,246	2,820	15
5 VALLEY (Electrical)	September 2015	Lake, Napa & Sonoma	76,067	1,955	4
6 WITCH (Powerlines)	October 2007	San Diego	197,990	1,650	2
7* WOOLSEY (Under Investigation)	November 2018	Ventura	96,949	1,643	2
8 CARR (Human Related)	July 2018	Shasta County, Trinity County	229,651	1,604	8
9 NUNS (Under Investigation)	October 2017	Sonoma	54,382	1,355	3
10 THOMAS (Under Investigation)	December 2017	Ventura & Santa Barbara	281,893	1,063	2
11 OLD (Human Related)	October 2003	San Bernardino	91,281	1,003	6
12 JONES (Undetermined)	October 1999	Shasta	26,200	954	1
13 BUTTE (Powerlines)	September 2015	Amador & Calaveras	70,868	921	2
14 ATLAS (Under Investigation)	October 2017	Napa & Solano	51,624	783	6
15 PAINT (Arson)	June 1990	Santa Barbara	4,900	641	1
16 FOUNTAIN (Arson)	August 1992	Shasta	63,960	636	0
17 SAYRE (Misc.)	November 2008	Los Angeles	11,262	604	0
18 CITY OF BERKELEY (Powerlines)	September 1923	Alameda	130	584	0
19 HARRIS (Under Investigation)	October 2007	San Diego	90,440	548	8
20 REDWOOD VALLEY (Under Investigation)	October 2017	Mendocino	36,523	546	9



^{**&}quot;Structures" include homes, outbuildings (barns, garages, sheds, etc) and commercial properties destroyed.



^{***}This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

Date	Name	Area	Mag.	Deaths	Injuries
4/18/1906	San Francisco	Northern–Central	7.9 M _w	700–3,000+	
2/9/1971	San Fernando	LA Area	$6.6~\mathrm{M_w}$	58–65	200–2,000
4/4/2010	Baja California	Baja California	$7.2~\mathrm{M}_\mathrm{w}$	2–4	100-233
3/10/1933	Long Beach	South Coast	6.4 M _w	115–120	
10/17/1989	Loma Prieta	Santa Cruz Mts	$6.9~\mathrm{M_w}$	63	3,757
1/17/1994	Northridge	LA Area	$6.7~\mathrm{M_w}$	57	8,700+
12/8/1812	San Juan Capistrano	South Coast	6.9–7.5	40	
10/21/1868	Hayward	Bay Area	$6.3-6.7~{ m M}_{ m w}$	30	
3/26/1872	Lone Pine	Eastern	7.4–7.9 M _w	27	56
6/29/1925	Santa Barbara	Central Coast	$6.8~\mathrm{M_w}$	13	
7/21/1952	Kern County	Central Valley	$7.3~\mathrm{M_w}$	12	Hundreds
5/18/1940	El Centro	Imperial Valley	$6.9~\mathrm{M_w}$	9	20
10/1/1987	Whittier	LA Area	5.9 M _w	8	200
6/22/1915	Imperial Valley	Imperial Valley	5.5 M _w	6	
12/25/1899	San Jacinto	Inland Empire	$6.7~\mathrm{M_w}$	6	
6/28/1992	Landers	Inland Empire	7.3 M _w	3	400+
8/22/1952	Kern County	Central Valley	$5.8~\mathrm{M_w}$	2	Several
12/22/2003	San Simeon	Central Coast	6.6 M _w	2	40
1/9/1857	Fort Tejon	Central–Southern	7.9 M _w	2	
4/21/1918	San Jacinto	Inland Empire	6.7 M _w	1	Several

Top-20 Most Destructive California Earthquakes

Data based on USGS

Crisis Management Concepts



				[Part I]	[Part II]
	Risk Mitigation	Business Resumption	Contingency Planning	Business Continuity	Disaster Recovery
Objective	Prevent Impact or Reduce Risk	Process Restoration	Process Workaround	Critical Biz Processes/ Ops Recovery	Critical IT and Infrastructure Assets Recovery
Focus	Prevention	Return to Normality	Reduce Biz Disruption	Reduce Impact To Business Processes/Ops	Reduce Impact To Critical Assets
Event Example	Flood Proofing	Burnt Building	System Down	Earthquake	Ransomware
Solution	Build Elevated Structures	New Facility	Use Manual Process	Robust Biz Recovery Planning	Robust On-Site & Off-Site Recovery Strategies



Causes of Disasters (Examples)

Natural Disaster

➤Snow/Ice Storm

≻Earthquake

>Wildfire

>Wind Storm

≻Flood

≻Lightning

➤ Heavy Rain & Floods

Volcanic
Eruptions

Human-Caused Hazards (Deliberate)

Theft

Violence

Fraud

Arson

Malicious Damage

Strike

Human-Caused Hazards (Deliberate)

Riot

Bomb Damage

Bomb Hoax

Terrorists

Hacking

Human-Caused Hazards (Accidental)

Operator Error

Explosion

Fire

Water Leaks

Fire Extinguisher Discharge

Human-Caused Hazards (Indirect)

Power Failures

Infrastructure Failures

Smoke Damage

Fire Suppression Agents

Hardware & Software Failures



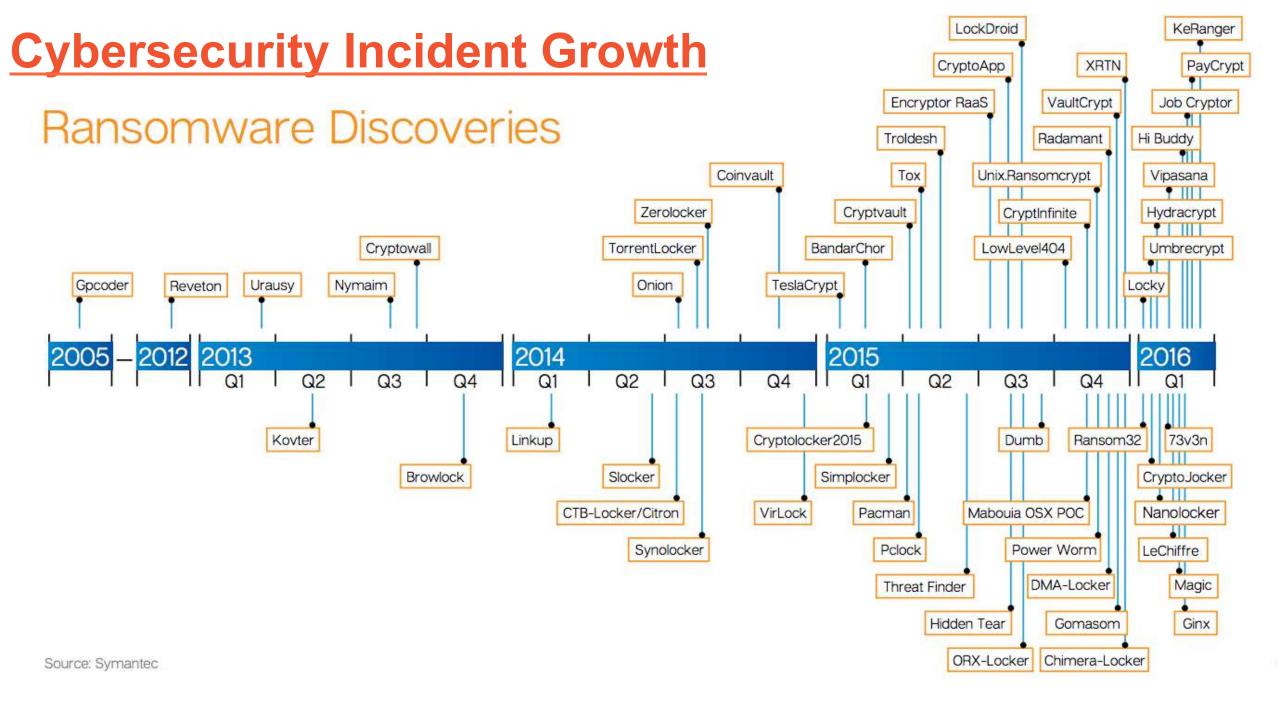
Effects of Disasters (Examples)

Effects of Business Disaster

- Operation/Service Disruption
- Revenue Interruption
- Impact to Reputation
- Costs of Repair
- Cost of Recovery
- Lower Morale
- Loss of Control

Effects of IT Disaster

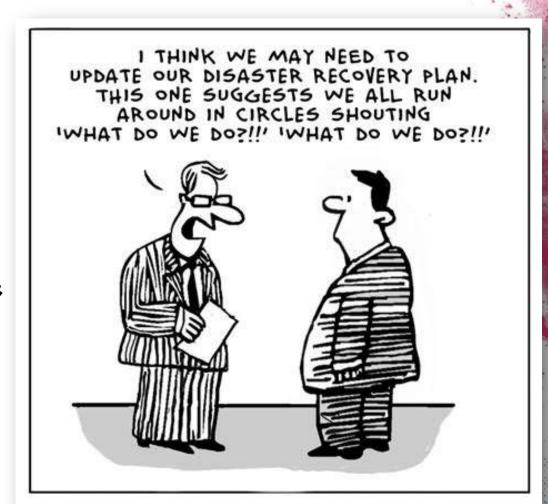
- Denial of Service
- Data Loss
- Loss of Personnel
- Loss of System Function
- Lack of Information
- Denial of Access
- Compromised or Corrupted Data
- Damaged Computing Environment
- Productivity Loss



IT Recovery Objectives

- Minimizing Disruption of Business Operations
- Minimizing Risk of Delays
- ☐ Ensuring a Level of Security
- ☐ Assuring the Availability of Mission & Business Critical Data
- ☐ Alleviate Management Concerns
- ☐ Aiding in Restoration of Operations with Speed







Business Impact Analysis

BIA can be calculated using either a qualitative or a quantitative approach.

☐ Qualitative

Qualitative analysis depends on the experience of employees and consultants to arrive at risk scores.

□ Quantitative

Results of the quantitative approach are estimates of potential dollar losses based on known costs or revenue streams.



IT Recovery Planning Considerations

□Capacity: securing enough resources to scale as needed.

Security: providing physical security to protect assets.

Network Infrastructure: including software components such as firewalls and load balancers.

Support: making available skilled technicians to perform maintenance and to address issues.

Bandwidth: planning suitable bandwidth for peak load.

Facilities: ensuring physical infrastructure, including equipment and power.