Wildfires

Introduction/History

Wildfires burn thousands of acres in Arizona annually. According to the Southwest Coordination Center Historical Fire Data, during the 21-year period 1990-2011, Arizona had an annual average of 3,068 wildfires affecting an average of 213,302 acres each year. On average, 57% of the wildfires were human caused, while 43% were lightning caused. A combination of extended drought, unhealthy forest conditions, and expanding population centers support the likelihood of increased wildfire occurrence and more severe impacts over the coming years.

Table RA-89: Wildfires in Arizona by Type, 2000-2011

Year	Human Caused		Lightning Caused		Total	
	Fires	Acres Burned	Fires	Acres Burned	Fires	Acres Burned
2000	1,407	45,657	2,172	37,239	3,579	82,896
2001	1,820	12,762	1,347	17,741	3,167	30,503
2002	1,833	599,383	1,385	30,493	3,218	629,876
2003	1,337	118,280	1,594	86,240	2,931	204,520
2004	1,473	49,072	1,409	183,070	2,882	232,142
2005	2,723	197,737	1,196	564,222	3,919	761,959
2006	1,483	36,566	1,597	119,286	3,080	155,852
2007	1,397	22,382	1,057	62,060	2,454	84,442
2008	1,141	52,244	649	49,392	1,790	101,636
2009	1,452	88,772	875	133,857	2,327	222,629
2010	1,014	39,600	493	42,611	1,507	82,211
2011	1,106	898,875	788	82,314	1,894	981,189
Total	**18,186**	**2,161,330**	**14,562**	**1,408,525**	**32,748**	**3,569,855**

Source: Southwest Coordination Center, 2013

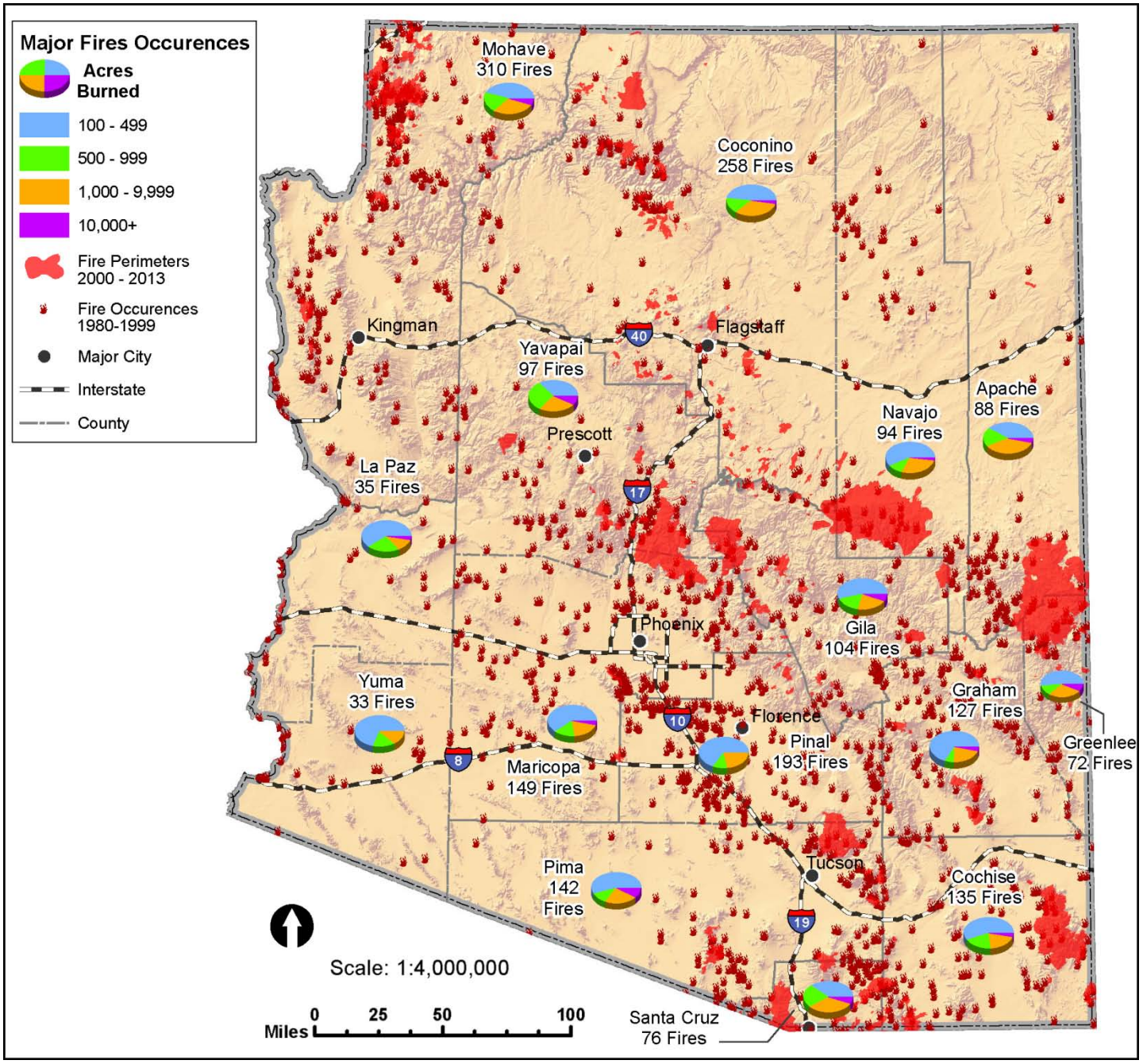
Following are a few of the most significant wildfires in Arizona history:

- June-July 2013. Yarnell Hill Fire, 8,400 acres. A lightning-caused fire that originated 3.5 miles west of the community of Yarnell. On Sunday, June 28th, the fire rapidly grew in size and intensity. Strong erratic winds pushed the fire in several directions at the same time. Nineteen (19) members of the Granite Mountain Hotshot Crew lost their lives battling this fire on June 30, 2013. Residents of the communities of Yarnell and Peeples Valley were forced to evacuate. The Yarnell Hill Fire destroyed 108 homes in Yarnell and damaged an additional 25 others.
- June-July 2013. Dean Peak Fire, approximately 5,400 acres. A lightning-caused fire in the Hualapai Mountains, 10 miles southeast of Kingman. This fire led to the communities of Pine Lake and Pinion Pine Estates being evacuated. No structures were lost.
- June 2013. Doce Fire, 6,732 acres. The Doce Fire began burning in the Prescott National Forest, 8 miles northwest of Prescott and is believed to be human-caused. The fire required 781 personnel to control and residents of Williamson Valley were forced to evacuate 465 homes. Fortunately, no homes were destroyed in this fire.

- June 2011. Wallow Fire, 538,049 acres. The Wallow fire is the largest fire in the history of Arizona wildfires. It was started by two men who didn't properly take care of their campfire. The fire destroyed 32 homes, damaged five (5) others, destroyed five (5) businesses, as well as 36 outbuildings, and involved well over 3,000 personnel to contain it. Alpine, Blue River Greer, Nutrioso, Sunrise, Springerville, and Eagar were evacuated.
- May 2011. Horseshoe Fire, 222,954 acres. This fire was started by human causes and in its first day burned through 9,000 acres. It threatened the Town of Portal and had to be evacuated. There were over 800 personnel and eight (8) helicopters involved in the over month long battle to contain this wildfire.
- June 2005. Cave Creek Complex, 248,310 acres. This was Arizona's second largest wildfire in state history. Caused by lightning from a summer storm, this desert fire burned thousands of acres within the first hour and threatened several communities on the outskirts of metropolitan Phoenix.
- June 2003. Aspen Fire, 84,750 acres. The Aspen fire burned for nearly a month on the slopes of the Santa Catalina Mountains and destroyed 340 homes and business in the community of Summerhaven.
- June 2002. Rodeo/Chediski, 468,638 acres. This fire caused 30,000 people to evacuate, destroyed over 450 homes, and caused an estimated $34 million in damages. The largest fire in Arizona history started when an arsonist set the Rodeo Fire on the Fort Apache Indian Reservation near the Rodeo Fairgrounds. On June 20, a second blaze began near Chediski Peak, 15 miles from the Rodeo fire. The two fires spread quickly northeast and steadily widened toward each other, combining on June 23. On June 25, President Bush declared a national disaster for Apache, Coconino, Gila, Navajo Counties, and the Fort Apache Reservation. An estimated $50 million dollars were spent fighting the fire. 58% of the burned area experienced high intensity burn and extensive smoke damage occurred in Apache County outside the direct burn area. (FEMA, September 2002).
- June 1990. Dude Fire, 24,174 acres. Killed six firefighters, destroyed 63 homes. This fire burned in the Tonto National Forest, northeast of Payson (Arizona Republic, June 30, 2003).

Significant wildfires (100+ acres) in Arizona, shown in the following map, are strongly concentrated in the southeast and across the central and north-central portion of the State. Many Arizona wildfires have occurred near population centers and have been a significant threat to life and property. Arizona's population has continued to grow at one of the highest rates in the nation, with many communities pushing further and further into adjacent wildland areas. Coupled with ongoing drought conditions and decreasing health of Arizona forests and woodlands, these conditions pose an ever-increasing risk of major loss due to wildland fire.

Map RA-16: Significant Wildfires 1980 through 2013



Source: RMGSC 2013; USFS Fire & Aviation Management 2013; ASFD 2013; AGIC 2013; Baker 2013

This map shows large fire locations from 1980 thru 1999, and fire perimeters from 2000 thru May 2013 reported at over 100 acres. Data is from the USGS Rocky Mountain Geographic Science Center (RMGSC), the USFS Fire & Aviation Management and Arizona State Forestry Division. The numerous fires less than 100 acres are not displayed due to limited map size and impacts on readability.

Table RA-90: Major Wildfire Events by County

County	Number of Occurrences for Each Category of Acres Burned				
	100 - 499	500 - 999	1,000 - 9,999	10,000+	Total
Apache	36	14	35	3	88
Cochise	75	29	27	4	135
Coconino	125	35	91	7	258
Gila	56	18	24	6	104
Graham	85	10	28	4	127
Greenlee	37	8	22	5	72
La Paz	21	9	4	1	35
Maricopa	90	25	29	5	149
Mohave	140	54	101	15	310
Navajo	54	10	28	2	94
Pima	78	16	36	12	142
Pinal	127	23	42	1	193
Santa Cruz	30	15	27	4	76
Yavapai	36	26	28	7	97
Yuma	23	6	4	0	33
Total	**1,013**	**298**	**526**	**76**	**1,913**

Based on historical data and spatial analysis - Baker 2013

Wildfire Susceptibility

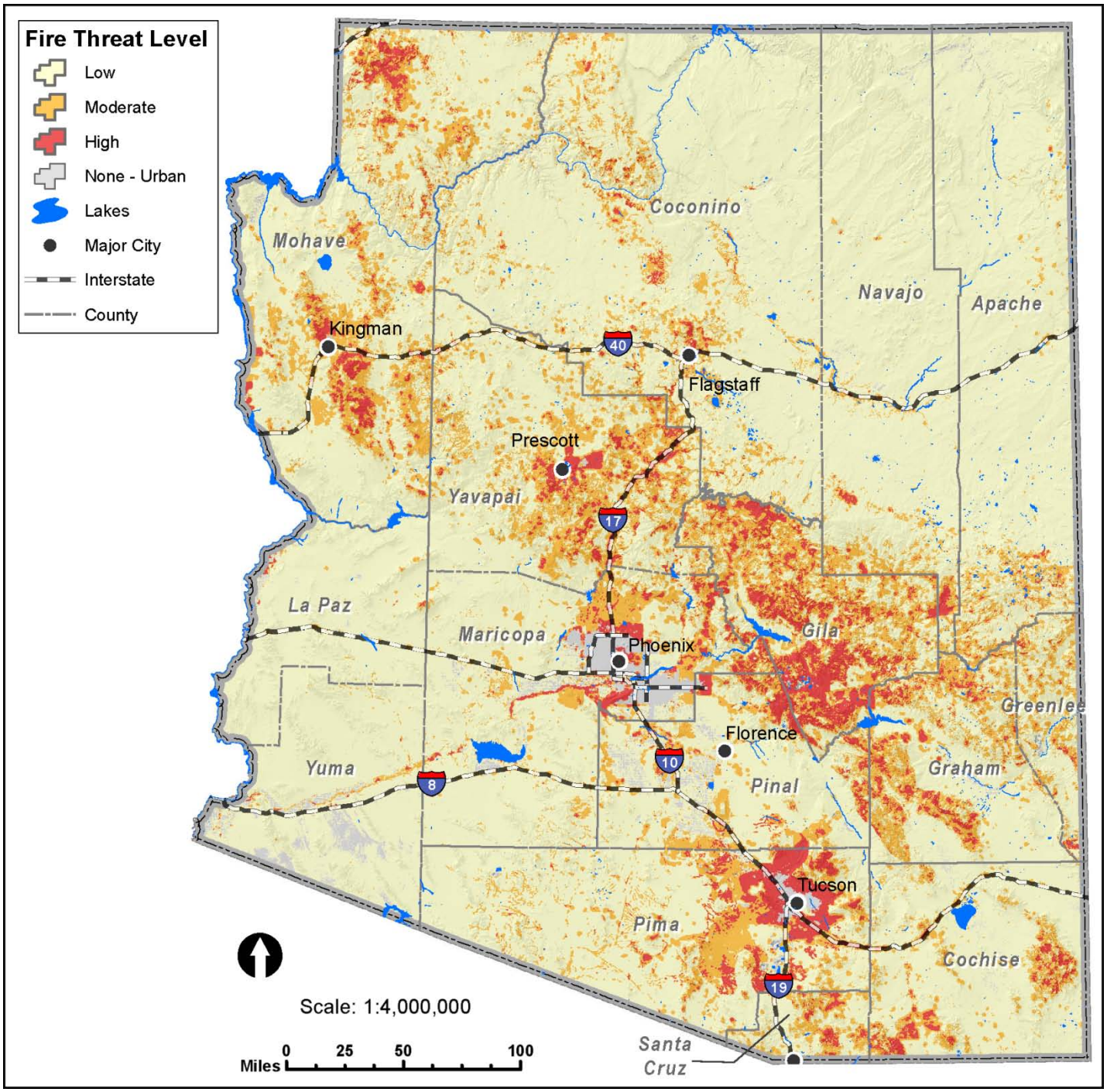
The assessment of the likelihood of wildfire occurrence is depicted in the following Wildfire Hazard Areas map. The Wildfire Hazard Areas is based on Fire Threat Index (FTI) data, one of many key products of the West Wide Wildfire Risk Assessment (WWA) project that define the current fire situation in the western states. The WWA analysis work was completed in October 2012.

The FTI reflects the likelihood of an acre burning. The calculation process integrates the probability of an acre igniting and the expected final fire size into a single measure of wildland fire susceptibility. The assessed fire size is based on the rate of spread in four weather percentile categories.

The key inputs and intermediate data used in the risk model to produce the Wildfire Threat layer are:

- Probability of fire occurrence, derived from:
    - Historic fire locations and fire occurrence areas.
    - Weather influence zones derived from historic weather observations categorized into weather percentile categories
- Fire behavior (rate of spread) derived from:
    - Surface fuels
    - Canopy closure
    - Canopy characteristics
    - Topography
- Fire suppression effectiveness, derived from
- Historic fire sizes
- Historic protection organization

Map RA-17: Wildfire Hazard Areas



Source: West Wide Wildfire Risk Assessment (WWA) 2010; AGIC 2013; Baker 2013

Potential Secondary/Cascading Effects

Indirect effects of wildfire can be catastrophic. Smoke from wildfires often have severe impacts on human health of both firefighters and residents, and wildfires affect critical public infrastructure, have severe business and economic impacts, affect local government budgets, and have many other significant cascading effects. In addition to stripping the land of vegetation and destroying forest

resources, large, intense fires can harm the soil, waterways and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams thereby enhancing flood potential, a significant issue in Arizona, and harming aquatic life and degrading water quality. Lands stripped of vegetation are also subject to increased landslide hazards.

Probability and Magnitude

Depending upon the needs of the user and the availability of data, there are many different approaches to fire modeling. However, nationally accepted or utilized wildfire models have not been developed for the evaluation of wildfire risk or conducting vulnerability analysis. In addition, most wildfire modeling conducted to date has been focused on wildfire behavior, not true probability and magnitude modeling. This is because the probability of ignition and the probable wildfire size have generally not been considered. In addition, there have been major limitations in terms of software systems, data availability, and data coverage/resolution.

These limitations aside, with improving GIS programs and data availability, there are a growing number of wildfire hazard assessment models. In addition, as a part of the National Fire Plan, communities have also been identified across the US that are at risk to wildfires.

Wildland Urban Interface Communities at Risk Program

Urban wildland interface areas, where development meets wildland vegetation, where both vegetation and the built environment provide fuel for fires, have increased significantly throughout the U.S. Due to this increase, there is risk of major losses from wildfires. Following the severe wildfires during the summer of 2000, the Secretaries of Agriculture and the Interior developed the National Fire Plan, a program to reduce wildland fire risks to communities and the environment, and to save the lives of firefighters and the public. The Plan is a long-term program based on cooperation and communication among federal agencies, state and local governments, tribes, communities and interested publics. The program includes a 10-Year Comprehensive Strategy and an Implementation Plan.

As part of the National Fire Plan, the Wildland Urban Interface Communities at Risk Program was developed in order to reduce the risk of wildland fire in urban interface communities through education, prevention, hazardous fuels reduction, and to increase fire protection capabilities. A key step in realizing this goal was the identification of areas that are at high risk of damage from wildfire. Federal land managers authorized state and tribal authorities to determine which communities were under significant risk from wildland fire on or in the vicinity of Federal lands. In some states, communities that are not on or within the vicinity of federal lands were also included, primarily in eastern states. States and tribes were asked to follow a consistent process established by an interagency group at the national level, or state teams could use existing community assessment systems when those systems met or exceeded the standardized process. The outcome of this process was the *Wildland Urban Interface Communities at Risk*, which was first published in the Federal Register on January 4, 2001 and revised to include additional communities on August 17, 2001. The official list for Arizona is updated and maintained by the Arizona State Forester and the Arizona State Forestry Division. Table 3 shows how many communities are identified in each county.

Table RA-91: Urban Wildland Interface Communities in Arizona

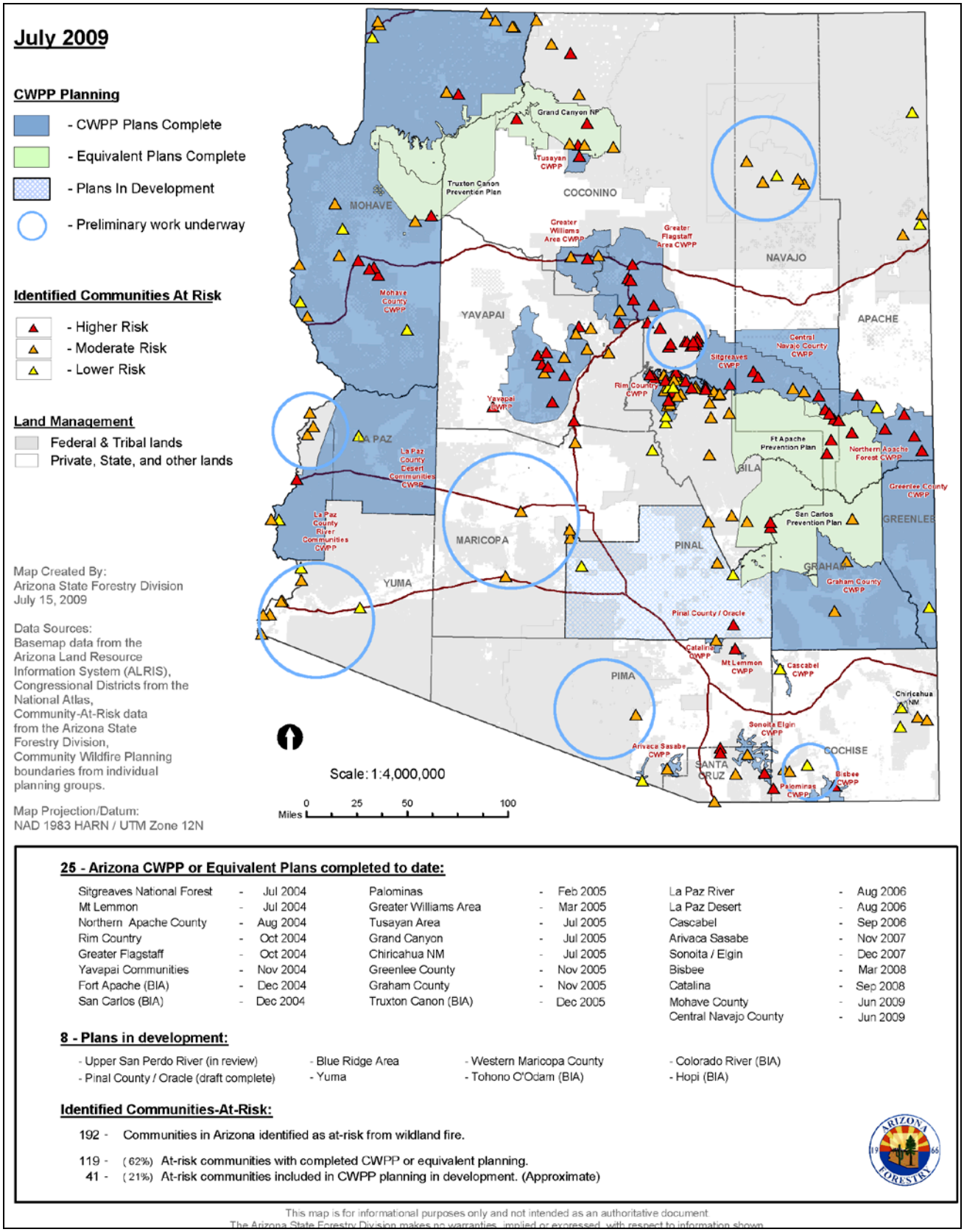
County	# of Communities
Apache	12
Cochise	10
Coconino	37
Gila	40
Graham	3
Greenlee	1
La Paz	7
Maricopa	5
Mohave	22
Navajo	15
Pima	5
Pinal	6
Santa Cruz	6
Yavapai	15
Yuma	8
Total	**192**

Source: Arizona State Forestry Division, 2009

The information contained in the list is used by interagency groups of land managers at the state and/or tribal level to collaboratively identify priority areas benefiting from hazardous fuels reduction and other support. Federal land management agencies and state foresters will focus special attention on these areas in a concerted effort to reduce wildfire hazards.

The map below was produced by Arizona State Forestry Division in July 2009. It identifies 192 Communities-At-Risk from wildfire, with corresponding risk level. Additionally, this map identifies areas that have Community Wildfire Protection Plans (CWPP), or equivalent plans, in place as of 2009. As shown in table below, there are currently a total of 26 completed plans that encompass 65% of the identified communities at risk.

Map RA-18: Community Wildfire Protection Planning and Identified Communities-At-Risk



25 - Arizona CWPP or Equivalent Plans completed to date:

Sitgreaves National Forest	- Jul 2004	Palominas	- Feb 2005	La Paz River	- Aug 2006
Mt Lemmon	- Jul 2004	Greater Williams Area	- Mar 2005	La Paz Desert	- Aug 2006
Northern Apache County	- Aug 2004	Tusayan Area	- Jul 2005	Cascabel	- Sep 2006
Rim Country	- Oct 2004	Grand Canyon	- Jul 2005	Arivaca Sasabe	- Nov 2007
Greater Flagstaff	- Oct 2004	Chiricahua NM	- Jul 2005	Sonoita / Elgin	- Dec 2007
Yavapai Communities	- Nov 2004	Greenlee County	- Nov 2005	Bisbee	- Mar 2008
Fort Apache (BIA)	- Dec 2004	Graham County	- Nov 2005	Catalina	- Sep 2008
San Carlos (BIA)	- Dec 2004	Truxton Canon (BIA)	- Dec 2005	Mohave County	- Jun 2009
				Central Navajo County	- Jun 2009

8 - Plans in development:

- Upper San Perdo River (in review)
- Pinal County / Oracle (draft complete)
- Blue Ridge Area
- Yuma
- Western Maricopa County
- Tohono O'Odam (BIA)
- Colorado River (BIA)
- Hopi (BIA)

Identified Communities-At-Risk:

192 - Communities in Arizona identified as at-risk from wildland fire.

119 - (62%) At-risk communities with completed CWPP or equivalent planning.
41 - (21%) At-risk communities included in CWPP planning in development. (Approximate)

This map is for informational purposes only and not intended as an authoritative document.
The Arizona State Forestry Division makes no warranties, implied or expressed, with respect to information shown.

Table RA-92: Completed Arizona Community Wildfire Protection Plans

Community / Area	Date Completed
Sitgreaves National Forest	July 2004
Mt Lemmon	July 2004
Apache National Forest in Apache County	August 2004
Rim Country	October 2004
Greater Flagstaff	October 2004
Yavapai Communities	November 2004
Fort Apache	December 2004
San Carlos	December 2004
Palominas	February 2005
Greater Williams Area	March 2005
Tusayan Area	July 2005
Grand Canyon	July 2005
Chiricahua County	November 2005
Greenlee County	November 2005
Graham County	November 2005
Truxton Canon	December 2005
La Paz River Communities	August 2006
La Paz Desert Communities	August 2006
Cascabel	September 2006
Arivaca Sasabe	November 2007
Sonoita Elgin	December 2007
Bisbee	March 2008
Catalina	September 2008
Mahave County	June 2009
Central Navajo County	June 2009
Blue Ridge Area	January 2010
Southern Gila County	May 2012
Total Arizona CWPP:	**27**

Source: Arizona Forestry Division, 2013

Work continues to encourage implementation of existing community plans and development of additional plans throughout the state. The flowing table lists communities with plans in development. Additional information is available from the Arizona State Forestry Division.

Table RA-93: Arizona Community Wildfire Protection Plans In-Development

Community / Area
Upper San Pedro River
Pinal County/Oracle
Yuma
Western Maricopa County
Tohono O'odham Nation

Colorado River
Hopi
Total Arizona CWPP In Development: 7

Source: Arizona Forestry Division, 2009

Vulnerability

Losses due to wildfire are estimated by intersecting the state-owned critical and non-critical facilities with the wildfire hazard threat zones depicted on Map 33. No standardized loss to ratios exist at this time, so for the purposes of this Plan, the loss to exposure ratio for state-owned critical and non-critical facilities located within "High" wildfire hazard areas are estimated to be 0.20 (20%), and 0.05 (5%) for those located in "Medium" hazard areas. No losses are estimated for low wildfire hazard areas.

As shown in the tables below, there are 412 state own facilities exposed to high wildfire hazard risk which amounts $20.8 million in losses to potentially impacted state-owned critical and non-critical facilities are estimated for the high wildfire hazard areas. This does not account for the additional 559 facilities exposed to a medium wildfire hazard risk that which could reach an additional 10.4 million in losses.

Table RA-94: State-Owned Asset Inventory Loss Estimates Based on Wildfire

County	Facilities Exposed	Percentage of Statewide Exposure	Estimated Replacement Cost	Estimated Structure Loss
High Hazard				
Apache	7	1.70%	1,802,198	360,440
Coconino	22	5.34%	4,053,195	810,639
Gila	72	17.48%	18,809,616	3,761,923
Graham	1	0.24%	0	0
La Paz	1	0.24%	38,221	7,644
Maricopa	145	35.19%	37,398,177	7,479,635
Mohave	30	7.28%	5,528,283	1,105,657
Navajo	4	0.97%	1,532,945	306,589
Pima	52	12.62%	24,013,694	4,802,739
Pinal	20	4.85%	1,663,574	332,715
Santa Cruz	7	1.70%	348,315	69,663
Yavapai	50	12.14%	9,242,394	1,848,479
Yuma	1	0.24%	1,406	281
Statewide Total	**412**	**100.00%**	**104,432,017**	**20,886,403**

County	Facilities Exposed	Percentage of Statewide Exposure	Estimated Replacement Cost	Estimated Structure Loss
Medium Hazard				
Apache	15	2.68%	1,282,833	64,142
Cochise	9	1.61%	2,991,491	149,575
Coconino	41	7.33%	4,335,484	216,774
Gila	58	10.38%	3,897,590	194,879
La Paz	29	5.19%	2,900,249	145,012
Maricopa	37	6.62%	35,667,611	1,783,381
Mohave	17	3.04%	1,682,469	84,123
Navajo	4	0.72%	1,161,822	58,091
Pima	176	31.48%	94,283,337	4,714,167

County	Facilities Exposed	Percentage of Statewide Exposure	Estimated Replacement Cost	Estimated Structure Loss
Pinal	63	11.27%	44,514,523	2,225,726
Santa Cruz	21	3.76%	3,115,763	155,788
Yavapai	84	15.03%	12,017,962	600,898
Yuma	5	0.89%	770,699	38,535
Statewide Total	**559**	**100.00%**	**208,621,832**	**10,431,092**

Table RA-95: State Facilities Located in the High Wildfire Hazard Area

State Facilities in the High Wildfire hazard Area	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma	Total
Critical Facilities																
Banking and Finance Institutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Communications Infrastructure	0	0	2	0	0	0	1	3	1	1	1	0	0	2	0	**11**
Electrical Power Systems	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Emergency Services	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	**2**
Gas and Oil Facilities	0	0	1	2	0	0	0	1	0	0	0	0	0	5	0	**9**
Government Services	0	0	9	34	1	0	0	67	4	3	16	0	0	19	0	**153**
Transportation Networks	0	0	0	3	0	0	0	0	0	0	7	0	0	7	0	**17**
Water Supply Systems	0	0	2	9	0	0	0	4	3	0	3	4	0	2	0	**27**
Non-Critical Facilities																
Businesses	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
Cultural	0	0	5	0	0	0	0	0	2	0	0	0	0	0	0	**7**
Educational	0	0	1	5	0	0	0	8	0	0	9	0	0	0	0	**23**
Recreational/ Leisure	7	0	1	5	0	0	0	44	19	0	1	14	7	12	1	**111**
Residential	0	0	1	14	0	0	0	15	1	0	15	2	0	2	0	**50**
Total	**7**	**0**	**22**	**72**	**1**	**0**	**1**	**145**	**30**	**4**	**52**	**20**	**7**	**50**	**1**	**412**

Regarding human vulnerability, a total population of 1,485,027 people, or 23.2% of the total 2010 state population, is potentially exposed to a high wildfire hazard area (as shown in below). Of which 242,633 are over the age of 65, which are especially vulnerable to hazards due to mobility and health restrictions.

Table RA-96: Population Exposure to Wildfire

County	Total	Low	Medium	High	Total Exposure	Percent Exposed
Apache	71,518	48,936	9,516	1,720	60,172	84.1%
Cochise	131,346	39,515	24,198	9,238	72,951	55.5%
Coconino	134,421	44,860	20,156	3,488	68,504	51.0%
Gila	53,597	2,575	15,920	17,436	35,931	67.0%
Graham	37,220	17,320	909	3,594	21,823	58.6%
Greenlee	8,437	4,286	318	24	4,628	54.9%
La Paz	20,489	8,470	1,180	567	10,217	49.9%
Maricopa	3,817,117	198,074	163,582	80,960	442,616	11.6%
Mohave	200,186	41,692	40,796	8,273	90,761	45.3%
Navajo	107,449	57,125	9,215	9,978	76,318	71.0%
Pima	980,263	39,289	49,694	180,844	269,827	27.5%
Pinal	375,770	77,948	38,717	18,293	134,958	35.9%
Santa Cruz	47,420	25,559	5,547	728	31,834	67.1%
Yavapai	211,033	36,977	52,808	31,467	121,252	57.5%
Yuma	195,751	36,145	6,176	914	43,235	22.1%
Statewide Total	**6,392,017**	**678,771**	**438,732**	**367,524**	**1,485,027**	**23.2%**

Table RA-97: Over 65 Population Exposed to Wildfire

County	Total	Over 65	Over 65 Exposed	Over 65 Exposed
Apache	71,518	8,268	7,136	86.3%
Cochise	131,346	22,688	13,394	59.0%
Coconino	134,421	11,924	7,182	60.2%
Gila	53,597	12,450	8,636	69.4%
Graham	37,220	4,261	2,360	55.4%
Greenlee	8,437	1,016	742	73.0%
La Paz	20,489	6,683	3,953	59.1%
Maricopa	3,817,117	462,641	56,170	12.1%
Mohave	200,186	46,658	21,776	46.7%
Navajo	107,449	14,241	10,557	74.1%
Pima	980,263	151,293	49,308	32.6%
Pinal	375,770	52,071	20,061	38.5%
Santa Cruz	47,420	6,224	4,016	64.5%
Yavapai	211,033	50,767	31,283	61.6%
Yuma	195,751	30,646	6,060	19.8%
Statewide Total	**6,392,017**	**881,831**	**242,633**	**27.5%**

Based on the historic record, there is a distinct possibility for either deaths or injuries, although typically, most wildfire related deaths and injuries are associated with the fire-fight. There is also a high probability of population displacement for most of the inhabitants within the wildfire area during an event.

The compilation of risk assessment data from local plans, as shown below, indicates that approximately $48.2 billion in locally identified critical and non-critical facilities are exposed to wildfire hazard, with approximately $5.04 billion in potential losses estimated.

Table RA-98: Local Risk Assessment & Loss Estimates Based on Wildfire

County/ Jurisdiction	Total Buildings	Exposed Buildings	Total Estimated Asset Value (x $1000)	Asset Value Exposed to Hazard (x $1,000)	Estimated Potential Losses (x $1,000)
Apache	36,818	27,418	$4,353,765	$3,320,611	$350,389
Cochise**	59,633	3,927	$11,794,138	$773,618	$82,392
Coconino**	53,466	28,066	11823344	5568627	806554
Gila	29,170	10,718	4854321	1,649,551	$252,512
Graham	13,130	834	1935759	118,213	$9,308
Greenlee	4,078	302	$510,861	$27,951	$2,823
La Paz	16,200	1,111	$2,888,808	$734,321	$118,471
Maricopa	541,259	386	$164,894,580	$72,881	$10,844
Mohave	86,841	40,583	$14,065,296	$7,460,080	$492,466
Navajo	53,472	41,440	$7,668,023	$6,056,887	$890,391
Pima**	440,794	57,467	$96,840,841	$15,461,422	$1,269,697
Pinal	11,785	5,932	$13,472,739	$1,008,006	$72,656
Santa Cruz	14,217	747	$3,098,495	$158,910	$20,213
Yavapai	87,895	24,104	$16,149,585	$4,193,422	$504,202
Yuma	68,384	11,483	$12,584,649	$1,630,983	$160,269
Statewide Total	**1,517,142**	**254,518**	**$366,935,204**	**$48,235,483**	**$5,043,187**

Sources: Individual County plans fire vulnerability tables.

For a detailed vulnerability break down of exposure and potential losses by community see Community Vulnerability to Wildfire Loss (By County) in this Plan's Appendices.

Risk & Vulnerability

Based on the *Index Values* and *Assigned Weighting Factors* determined in the CPRI table discussed at the beginning of this section and updated by the Planning Team, the results based on Wildfire are shown below. County CPRI average values are also given below. These figures are based on information provided in their current respective mitigation plans.

Table RA-99: State CPRI Results for Wildfire

Risk Due to Wildfire					
Hazard	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score (max: 4)**
Wildfire	Highly Likely	Limited	< 12 hours	< One Week	**3.15**
	4	2	3	3	

CPRI Score = (Probability x .45)+(Magnitude/Severity x .30)+(Warning Time x .15)+(Duration x .10).

Table RA-100: County CPRI Results for Wildfire

County	CPRI
Apache	2.68

Cochise	2.55
Coconino	3.23
Gila	3.17
Graham	2.63
Greenlee	2.93
La Paz	2.80
Maricopa	2.43
Mohave	2.94
Navajo	2.53
Pima	2.58
Pinal	2.72
Santa Cruz	3.50
Yavapai	3.10
Yuma	2.43
Average	**2.84**

Source: Arizona county hazard mitigation plans.

Environmental Risk & Vulnerability

Based on the *Index Values* and *Assigned Weighting Factors* determined in the Environmental Risk CPRI table discussed at the beginning of this section and updated by the Planning Team, the results based on Wildfire are shown below.

Table RA-101: State Environmental CPRI Results for Wildfire

Environmental Risk Due to Wildfire				
Component	**Probability of an Impact**	**Magnitude/ Severity**	**Duration of Impact/Damage**	**CPRI Score (max: 3.6)**
Air	Unlikely	Negligible	< 1 month	**.90**
Water	Unlikely	Limited	6 months+	**2.1**
Soil	Unlikely	Limited	6 months+	**2.1**
Average CPRI Environmental Risk Rating: 1.7 (max 3.6)				

Consequences / Impacts

- **Public**
  The impact to the general public from wildfire is typically injuries (burns), illness (smoke inhalation & psychological) and even death. During fires that threaten populated areas, evacuation plans are exercised. Over the years, Arizona has evacuated thousands of residences, providing sheltering for the citizens as well as pets and livestock.
- **Responders to the Incident**
  Incident responders face the same threats the general public does, but on a more significant and probable level. In addition, responders can be hurt accessing fires in areas that have rough or steep terrain. The chance for injury, illness and/or death is very high for responders. The Dude Fire of 1990, sadly demonstrated the most severe threat to wildfire incident responders. This fire destroyed 63 homes and burned over 24,000 acres in the Tonto National Forest and killed six firefighters. Other threats to responders may include exhaustion, usually experienced

in very large fires that continue for extended periods of time and long term effects of environmentally caused diseases.

- **Continuity of Operations / Delivery of Services**
  As is discussed in other hazard sections of this Plan, the level of effectiveness of a specific facility/service would be dependent on the severity of the hazard and how much damage the facility and its equipment and files, etc. sustain. Even with certain critical facilities remaining operational, the performance and delivery of services may easily be hindered during an event due to damaged, closed and impassable roads. In the case of wildfire, travel may be affected by damaged transportation routes, no traffic control resulting from power outages and blocked routes due to downed trees and/or power poles. Smaller jurisdictions with little or no wildfire experience may have limited staff and resources which may inhibit their ability to continue operations/services. Arizona has several small, somewhat isolated communities in wildfire prone areas. These jurisdictions are less likely to have the ability to remain operational and self-sustaining during and after an event. Larger jurisdictions typically have more facilities, infrastructure, equipment and staff and are usually more spread out over multiple areas. This leaves these operations less vulnerable, especially when they can operate out of a variety of locations.

- **Environment**
  As experienced in 1992, the Rodeo Chediski Fire, the largest fire in Arizona history, significant damage to the land was sustained. Fifty-eight (58%) of the burned area experienced high intensity burn and extensive smoke damage occurred outside the direct burn area. As a result, the critical Little Colorado River, and Salt River watersheds are subject to increased erosion and siltation for years to come. The indirect effects of wildfire can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams thereby enhancing flood potential, which is a significant issue in Arizona and harming aquatic life and degrading water quality. Lands stripped of vegetation are also subject to increased landslide hazards.

- **Economic / Financial Condition of Jurisdiction**
  The Rodeo Chediski fire of 1992 caused an estimated $34 million in damages. More than 30,000 people evacuated and over 450 homes were destroyed. Additionally, an estimated $50 million dollars were spent fighting the fire. Neither of these estimates take into account the costs for post-fire assessments or rehabilitation, the economic impact/revenue loss to the recreation areas burned and loss of revenue and inventory destruction experienced by an Indian tribe's timber company, just to mention a few.

- **Public Confidence in Jurisdiction's Governance**
  As is typical of most natural hazards, swiftness of response is critical. The effects of fire have been, and continue to be, very destructive and disruptive to the jurisdiction, and the effects can extend well past the event period.

  Power outages are likely and travel may be hindered due to flood waters, debris and blocked roads. These issues further support the need for quick response and emergency work. In most events, it is almost inevitable that there will be some decrease in confidence in the jurisdiction's capabilities. In the case of power outages, the cause may be damaged or complete loss of equipment as opposed to a simple repair. When major damage is done, it can take what appears to the consumer to be an excessive amount of time to restore all power. When damages are to this level, it is in the best interest of everyone involved to keep the public well informed of the damage extent, status of repairs and provide realistic expectations. Doing so may have a positive impact on the public's confidence level by letting them know the situation is being resolved and is under control. Lack of communication can be mistaken for lack of action, resulting in frustration, anger, negativity, etc.

Resources

Definitions

Sources

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