

2023 State of Nevada Enhanced HMP Update

Randy Brawley

Wise Oak Consulting, L.L.C.SM

Randy.Brawley@WiseOakConsulting.com

704-572-7333



Major NEHMP Update Overview

- As an update, much of the general outline and general content remains the same but updated
- Reviewed/updated every page
- SMEs updated every hazard
- The State updated the relevant information such as NHMWG members, accomplishments, etc.
- Major changes include:
 - Impact of climate change
 - Integration with the THIRA
 - Integration with the State of Nevada Threats and Hazards Guide
 - Increased whole community information via extensive National Risk Index maps
 - Completely new HAZUS runs for the major rivers
 - New HAZUS runs for Mt. Rose, Frenchman Fault, and Mt Ruby USGS scenarios
 - Section 3 hazard prioritization is updated based on the online survey results
 - Section 4 was updated
 - With the more detailed hazard analysis in Section 3, the climatology appendix was dropped – it would also need a major update

Impact of Climate Change

- Incorporated the State of Nevada Climate Strategy
- Detailed assessment of the fiscal impact of climate change focused on the 5 main climate strategy hazards
 - Drought
 - Floods
 - Heat & Heat Waves
 - Loss of Snow
 - Wildfire
- Feedback form the 2018 plan review dictated more on the impact of climate
 - General climate change trends are understood
 - There is little information available on specific impacts for respective hazards
 - Estimating the financial impact of climate change is especially challenging
 - Focused detail analysis beyond the big 5 hazards from the State of Nevada Climate Strategy is not practical at this point

	Heat & Heat Waves	Drought	Loss of Snow	Floods	Wildfire Risk
CLIMATE SCIENCE					
Historical Trends	Increasing temp; Rates of increase are higher in urban areas than rural areas	Increasing evaporative demand; More drought that not in last 10 years	Decrease between 20-60% from 1955-2016	No historical trends; Most recent flooding events are 2017 and 2006	Between 1984-2017, 4 of the 5 years with the largest area burned have occurred since 2005.
Projected Trend & Confidence	Increase in average temp; Increase in frequency and severity of heat waves HIGH Confidence	Increase in frequency and intensity Confident	By the end of this century, projections indicate a potential 30-50% reduction in April snowpacks;; Earlier snow melt HIGH Confidence	More frequent flooding; Confident	Increase of invasive species, increasing fire spread; Increase drying of fuels; Increase precipitation variability affecting fuel production HIGH Confidence
IMPACTS					
Public Health	Increased risk of mortality and morbidity; Increase in preterm births	Potential for mental health impacts; Increased dust due to drying and lowered water levels in desert terminal lakes	Greater change of flooding and associated safety risks	Greater risks to public safety, private property, and infrastructure	Wildfire smoke decrease air quality; Increase in respiratory illness; Increases in hospitalizations and emergency room visits
Water Resources	Degradation of water quality; Increased water loss due to higher evaporative demand	Increase in demand and decrease in supply, limiting water availability for all sectors	Loss of a natural reservoir, reduced water storage; More growing days increasing water demand	Decrease in water quality; May limit the ability to capture rainwater for water supply (i.e., too much, too fast)	Potential erosion leading to changes in biogeochemical cycling and water quality
Environment	Species' ranges will shift; Some local extinctions; Negative impacts on wildlife health including higher mortality	Drought impacts to plant health and growth; Potential for plant mortality	Less and earlier-in-the-year availability of surface water and ground water limiting the bioavailability of water	Increased sheet and river bank erosion affecting Riparian habitats	More cheatgrass, loss of native sagebrush further increasing wildfire risk; Loss of forested areas will impact erosion and sedimentation into watersheds; Negatively impacts wildlife species
Recreation & Hospitality	Decrease in time available to be safely outside; Deterrent to attracting visitors	Partial loss of recreational opportunities due to limited snow pack; Dust to negatively impact tourism	Partial loss of recreational opportunities due to decline of snow pack	Flooding impacts in downtown areas of Reno and Las Vegas; Road closures due to flood and landslide risk following wildfire	Increased fire risk and smoke may lead to loss of tourism and recreation during fire season
Ag and Ranching	Health impacts of being outdoors during heat waves; Heat impacts to livestock health and milk production; Longer growing seasons and new crop varieties; Impacts to plant health and crop production; Delayed or reduced production from adapting to shifting seasons and crop performance	Potential decrease on crop yield and production; Decreased forage quantity, range condition; Water hauling needs; Reduction in use of federal land; Increased need of feeding hay; Reduction in land available for production	Earlier and longer duration of irrigation needs due to decrease in run-off later in the season; Reduced irrigation capacity due to lack of water availability; Reduction in rangeland production	Increase erosion and soil loss; Potential crop loss/damage; Damage to water holding and confinement structures; Microbial contamination of crops	Direct livestock losses; Potential impact on forage production due to wildfire-induced changes in vegetation cover including noxious weeds; Crop and forage loss; Federal land permits closed or temporarily closed due to fire; Loss of infrastructure

Integration with the State THIRA

- Increased integration with the THIRA across multiple programs will make all emergency management programs more coherent
 - The family of plans would be based on the same threats and hazards
 - The annual statewide THIRA/SPR update provides for a frequent update
- Section 3 has THIRA information, including a THIRA-HMP crosswalk
- Due to sensitivities, the THIRA executive summary was removed from the appendices and replaced with information to contact DEM for the information

Table 3-2. State of Nevada 2022 THIRA Threats and Hazards of Concern

Northern Nevada	Eastern Nevada	Southern Nevada
Natural Hazards		
Mt. Rose Earthquake	Drought	Drought
Flood	Earthquake	Frenchman Fault Earthquake
Pandemic	Flood	Flood
Festival Severe Weather	Pandemic	Pandemic
Wildfire	Severe Weather – Severe Winds, Thunderstorms, Hail	Wildfire
	Severe Weather – Snowstorm	
	Wildfire	
Technological Hazards		
HAZMAT Release – Rail Tanker Accident	HAZMAT Release – Rail Tanker Accident	HAZMAT Release
	Carlin Tunnel HAZMAT Accident	Utility Interruption – Extreme Heat
	Mining Accident	
Human-Caused Threats		
Active Shooter	Active Shooter	Mass Casualty Attack
Cyberattack - SCADA	Cyberattack	Cyberattack
Cyberattack – Ransomware on Pipeline		Tunnel Poisoning Gas Attack
		Pipeline Attack

Table 3-3. HMP – 2022 THIRA Crosswalk.			
HMP Profiled Hazard	HMP Risk	THIRA Threat/Hazard	THIRA Jurisdiction
Natural Hazards			
Avalanche	Low	N/A	
Drought	High	Drought	<ul style="list-style-type: none"> • Eastern Nevada • Southern Nevada
Earthquake	High	<ul style="list-style-type: none"> • Mt. Rose Earthquake • Ruby Mt. Earthquake • Frenchman’s Fault Earthquake 	<ul style="list-style-type: none"> • Northern Nevada • Eastern Nevada • Southern Nevada
Expansive Soil	Low	N/A	
Floods	High	Flood	<ul style="list-style-type: none"> • Northern Nevada • Eastern Nevada • Southern Nevada
Extreme Heat	High	N/A	
Fissures and Subsidence	Low	N/A	
Infectious Diseases	High	Pandemic	<ul style="list-style-type: none"> • Northern Nevada • Eastern Nevada • Southern Nevada
Infestation	Low	N/A	
Landslide & Debris Flow	Low	N/A	
Land Subsidence	Low	N/a	
Seiche	Low	N/A	
Straight-Line Winds	Medium	Severe Weather – Severe Winds, Thunderstorms, Hail	<ul style="list-style-type: none"> • Eastern Nevada
Thunderstorms & Lightning (Hail)	Medium	Severe Weather – Severe Winds, Thunderstorms, Hail	<ul style="list-style-type: none"> • Eastern Nevada
Tornado	Low	N/A	
Volcanoes	Low	N/A	
Wildland Fire & Wildland Urban Interface	High	Wildfire	<ul style="list-style-type: none"> • Northern Nevada • Eastern Nevada • Southern Nevada
Winter Storms & Extreme Cold	High	Severe Weather – Snowstorm	Eastern Nevada

Integration with the State THIRA

- Increased integration with the THIRA across multiple programs will make all emergency management programs more coherent
 - The family of plans would be based on the same threats and hazards
 - The annual statewide THIRA/SPR update provides for a frequent update
- Section 3 has THIRA information, including a THIRA-HMP crosswalk
- Due to sensitivities, the THIRA executive summary was removed from the appendices and replaced with information to contact DEM for the information

Integration with the State Threats and Hazards Guide



Hazards were renamed to match the Threats and Hazards Guide



Hazards were re-organized in Section 3 accordingly



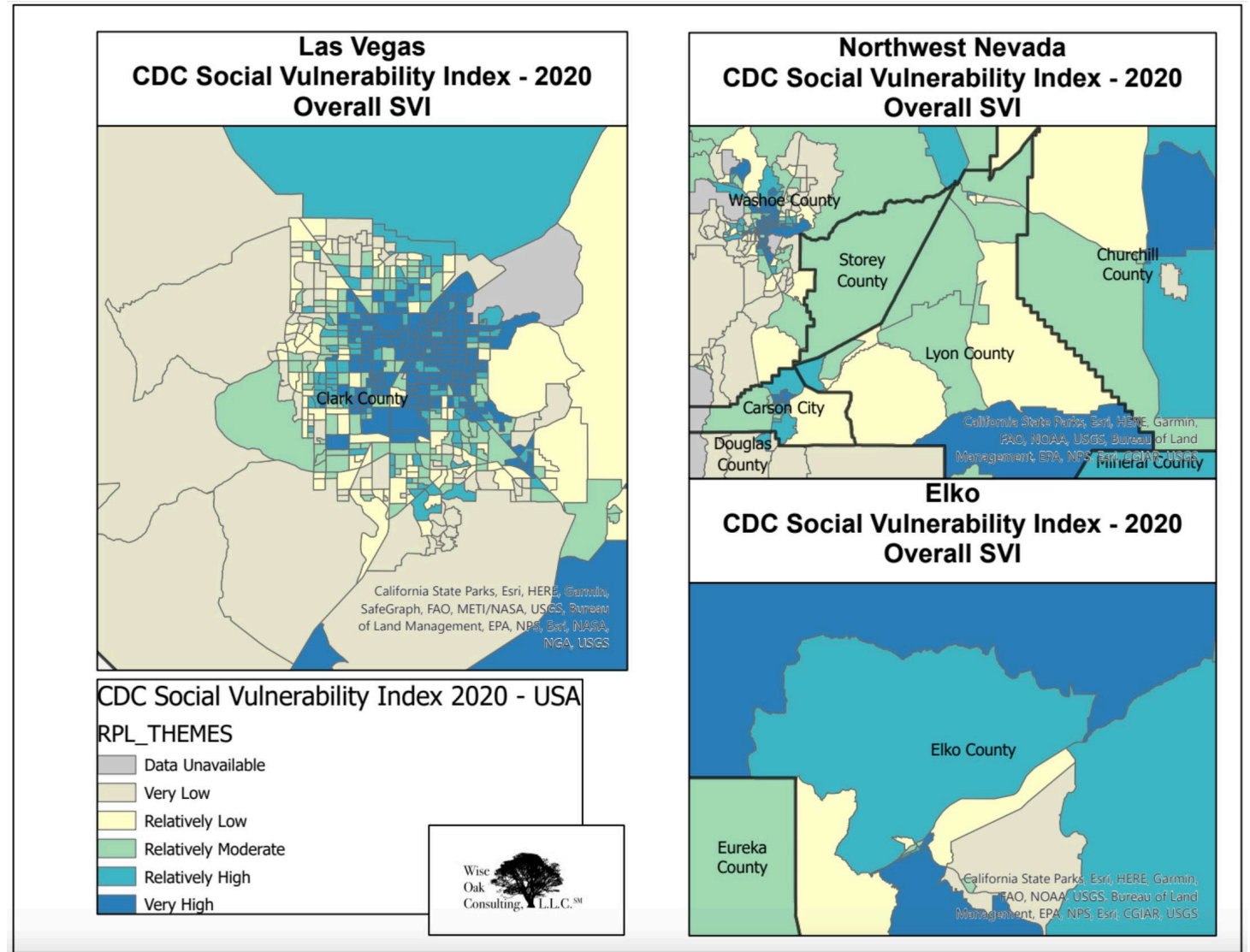
Technological Hazards are now in their own Section 3 subsection



Human-caused threats are mentioned but not analyzed

Increased Whole Community Assessment

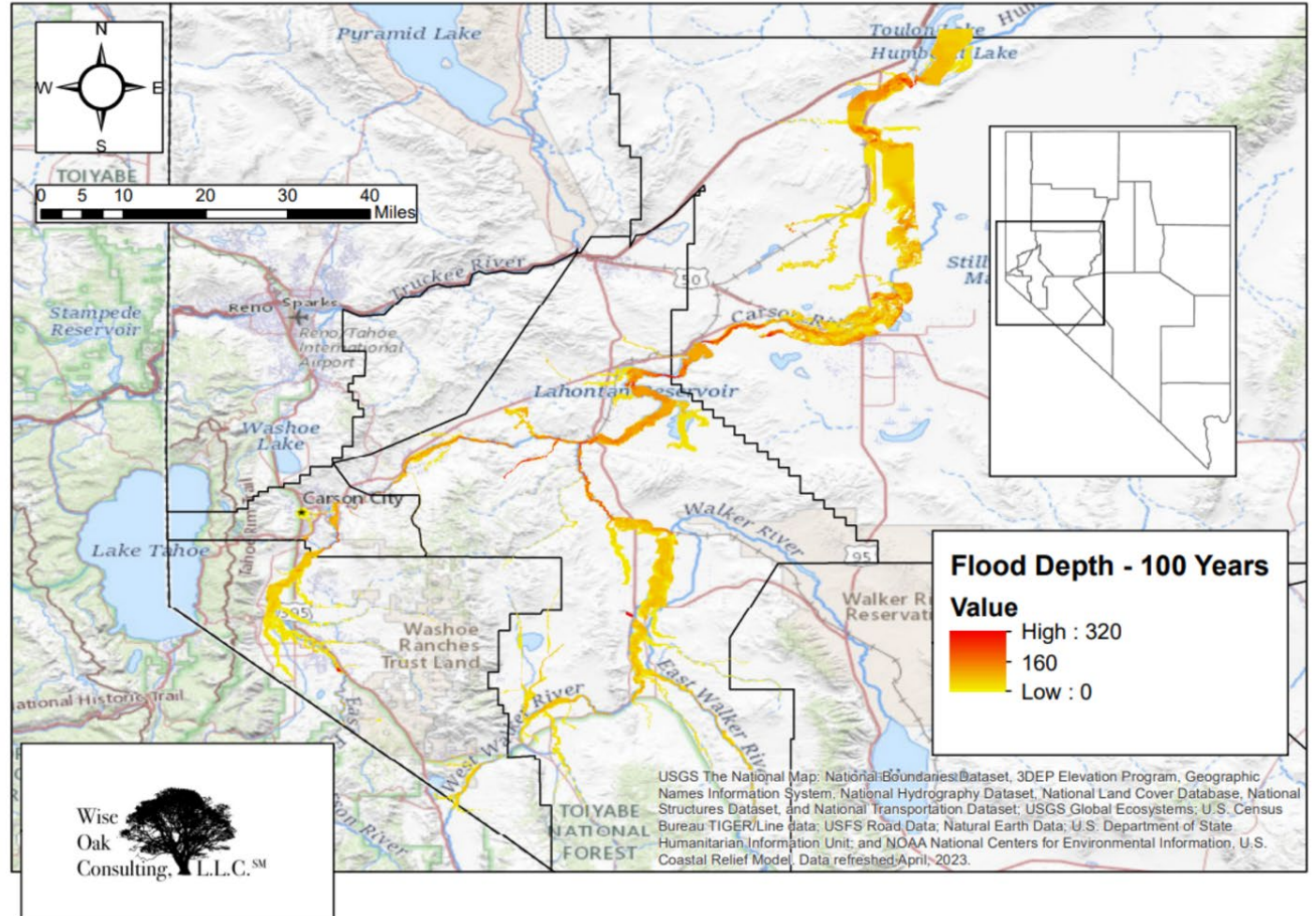
- Extensive National Risk Index maps
- Six (6) new maps were added to each hazard
 - Incorporate National Risk Index information
 - State level view
 - Expanded view for Reno, Las Vegas, and Elko



New Flood HAZUS Runs

- Carson River Basin
- Colorado river
- Humboldt River
- Muddy River
- Truckee River
- Virgin River
- Walker River

HAZUS Flood Scenario - 100 Year Flood Depth - Carson River Basin



New USGS Scenario Earthquake HAZUS Runs

- M6.9 Mt. Rose Earthquake
- M 6.6 Frenchman Mountain Fault
- M6.9 Ruby Mountain Earthquake

Table 3-53. Estimate Losses - USGS Scenarios for Mt. Rose, Frenchman Mountain, Ruby Mountain.

USGS HAZUS Scenario	HAZUS Loss Ratio	Total Government Building Exposure	Total Government Building Loss	Critical Government Building Exposure	Critical Government Building Loss
M 6.9 Mt. Rose	6.2%	\$16,440,258,550	\$1,019,296,030	\$5,855,123,000	\$363,017,626
M 6.6 Frenchman Mountain	.24%	\$15,422,768,450	\$37,014,644	\$5,518,494,650	\$13,244,387
M 6.9 Ruby Mountain	1.2%	\$1,771,254,150	\$21,255,050	\$899,283,900	\$10,791,407
Total	N/A	\$33,634,281,150	\$1,077,565,724	\$12,272,901,550	\$387,053,420

Section 3 Hazard Survey

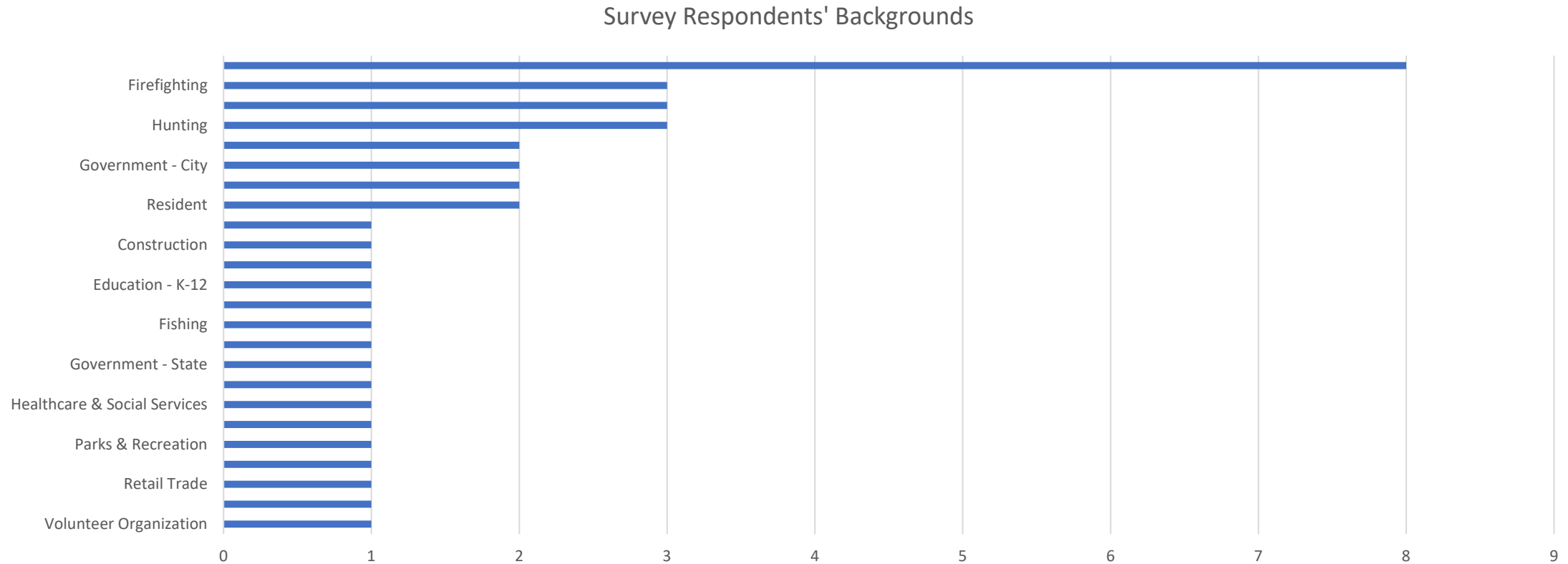


**Web-based survey shared
with all State mitigation
partners**



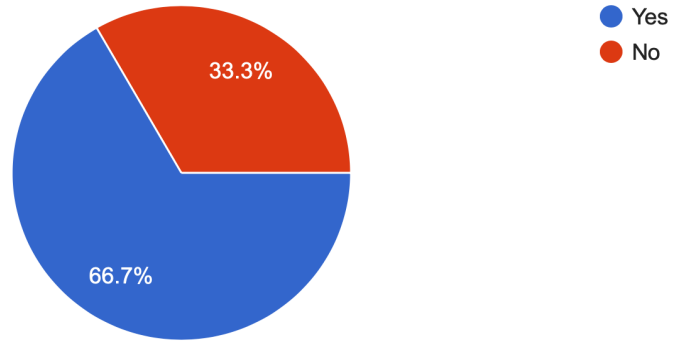
**Threats and Hazards were
broken out and addressed
separately**

Survey Respondents' Backgrounds



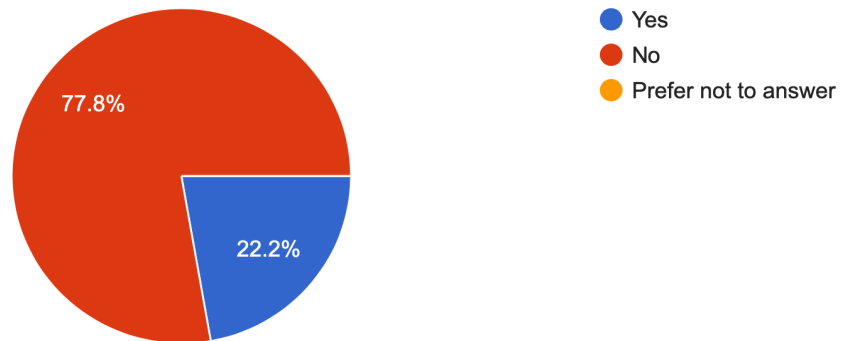
Do you work with people with disabilities and others with access and functional needs?

9 responses



Do you identify as a person with disabilities or others with access and functional needs?

9 responses



Survey Respondents AFN Background

Threat & Hazard Prioritization

- Respondents rated each factor on a scale of 1-5
- Each rating was weighted heavier the more "severe" the rating
 - Score of 1 – 10% weight
 - Score of 2 – 15% weight
 - Score of 3 – 20% weight
 - Score of 4 – 25% weight
 - Score of 5 – 30% weight
- A weighted average determined the score for each threat/hazard
 - $\text{Score} = 10 * ((0.1 * "1") + (0.15 * "2") + (0.2 * "3") + (0.25 * "4") + (0.3 * "5"))$

Natural Hazards

Hazard	Probability / Frequency	Magnitude / Severity	Warning Time	Duration	Overall Total	Rank
Wildfire	24.5	25	26.5	22	98	1
Extreme Heat	26	21	15.5	22	84.5	2
Floods	23	20	21.5	17.5	82	3
Drought	24.5	19.5	13	24.5	81.5	4
Earthquake	19	22	24	15.5	80.5	5
Winter Storm	23.5	20	17.5	18.5	79.5	6
Thunderstorm & Lightning	23	17.5	22	11.5	74	7
Infectious Diseases	19	19.5	11.5	23.5	73.5	8
Straight-Line Winds	21.5	17.5	19.5	11	69.5	9
Landslide	17	15.5	17	17	66.5	9
Avalanche	16	15.5	19	15.5	66	11
Volcanoes	12.5	14.5	19	17	63	12
Tornado	11	14.5	21	14	60.5	13
Infestation	14	15.5	11.5	17.5	58.5	14
Fissures and Subsidence	12	14	12.5	17.5	56	15
Expansive Soil	11.5	12.5	11	16	51	16
Seiche	11	12	13.5	13	49.5	17

Technological Hazards

Hazard	Probability / Frequency	Magnitude / Severity	Warning Time	Duration	Overall Total	Rank
HAZMAT	23.5	20.5	26	17.5	87.5	1
Flash Floods	24.5	20	20.5	14.5	79.5	2
Dam Failure	16	21	20.5	20	77.5	3

Human-caused Threats

Hazard	Probability / Frequency	Magnitude / Severity	Warning Time	Duration	Overall Total	Rank
Terrorism/WMD	17	22	24.5	19	82.5	1
Cyberattack	21.5	18.5	22	19	81	2
Active Assailant	21	21	25	12.5	79.5	3

New Hazard Prioritization

- “High”, “Medium,” “Low” based on natural breaks in the rankings
- Extreme heat and drought risk moved up to “High”
- Although respondents put pandemic in “Medium” risk, we retained it in “High” because we are still emerging from the impacts due to climate change

Risk Categories Assigned to Nevada Hazards		
High Risk	Medium Risk	Low Risk
Wildfire	Thunderstorms & Lightning	Volcanoes
Extreme Heat	Infectious Diseases	Tornado
Floods	Straight-Line Winds	Infestation
Drought	Landslide	Fissures & Subsidence
Earthquake	Avalanche	Expansive Soil
Winter Storm	Flash Floods	Seiche
HAZMAT	Dam Failure	Land Subsidence and ground failure
Terrorism / WMD		Volcanic Activity
Cyberattack		Expansive Soil
Active Assailant		

Section 4 Updated

- Nine (9) NHMWG members responded
- Same process as in 2018
 - Totaled scores from each respondent for each STAPLEE item
 - Totaled scores for each goal
 - Sorted goals from high to low score
 - Top 25% are High risk
 - Second 25% are Medium risk
 - Bottom 50% are Low risk
- Goals added due climate change / weather trend
 - Extreme Heat
 - Drought

Goal	Goal Number	Goal Description	Strategic Action	Your Assessment								Total
				2018 Priority	Social (1-5)	Technical (1-5)	Administrative (1-5)	Political (1-5)	Legal (1-5)	Economic (1-5)	Environmental (1-5)	
Goal 6	6.A	Reduce the impact of drought	Increase drought condition monitoring	High	24	31	30	30	31	25	34	205
Goal 6	6.B	Reduce the impact of drought	Direct providers to develop water conservation plans that include strategies like water metering, tiered-rating, and outdoor watering guidelines that limit irrigation to cooler times of day.	High	25	38	37	30	29	23	38	220
Goal 6	6.C	Reduce the impact of drought	Increase the efficient use of agricultural water.	High	31	32	37	28	28	24	38	218
Goal 6	6.D	Reduce the impact of drought	Modify and amend the state water law.	High	23	27	26	16	16	25	36	169
Goal 6	6.E	Reduce the impact of drought	Identify new water sources, including water reuse.	High	29	32	37	32	23	26	36	215
Goal 6	6.F	Reduce the impact of drought	Improve access to information about drought mitigation and response programs.	High	30	32	38	34	30	24	37	225



Next Steps

- The plan is posted for public review
 - https://dem.nv.gov/about/Hazard_Mitigation/
- Complete the FEMA Hazard Mitigation Plan review Guide
- Final editorial review
- Submit to FEMA for approval pending adoption
- Update per FEMA feedback
- Submit for State adoption

Summary