

Hazard Identification and Risk Assessment (HIRA) 2023

EPSOM HAZARD MITIGATION

Overall Risk Ranking, Highest Magnitude and Change in Intensity of Natural Hazards Over the Next 10 Years

① Determine Probability and Severity of Natural Hazard to Town Over Next 10 Years

Probability of Occurrence in 10 Years		Severity of Impact to the Town	
1 Unlikely	0 - 25% chance	1 Limited	Human Injury: ◊ Injuries treatable with first aid. Essential Services/Infrastructure: ◊ Minor "quality of life" disturbance, shutdown for 3 days or less. Property or Economic Damage: ◊ Less than 10%.
2 Possible	25 - 50% chance	2 Significant	Human Injury: ◊ Significant injuries or illnesses result in no permanent disability. Essential Services/Infrastructure: ◊ Shutdown for up to 2 weeks. Property or Economic Damage: ◊ 10% to 25%.
3 Likely	51 - 75% chance	3 Critical	Human Injury: ◊ Significant injuries or illnesses result in permanent disability. Essential Services/Infrastructure: ◊ Complete shutdown for at least 2 weeks. Property or Economic Damage: ◊ 25% to 50%.
4 Highly Likely	76 - 100% chance	4 Catastrophic	Human Injury: ◊ Death or multiple deaths. Essential Services/Infrastructure: ◊ Complete shutdown for 30 days or more. Property or Economic Damage: ◊ Greater than 50%.

② Determine Percentage of Hazard Intensity Change Over Next 10 Years. Assume the Natural Hazard WILL OCCUR.

Natural Hazard Intensity Change in Next 10 Years									
-100%	-75%	-50%	-25%	0%	25%	50%	75%	100%	
Extreme Decrease	High Decrease	Moderate Decrease	Slight Decrease	Change	Slight Increase	Moderate Increase	High Increase	Extreme Increase	

③ Determine Highest Magnitude/Extent of Natural Hazard Over Next 10 Years. Assume the Natural Hazard WILL OCCUR.

Natural Technological and Human Hazard Categories	Severity of Impact to the Town				Overall Risk SCORE	RANKED TOP SCORES Natural Hazards	② How Much Will the Intensity of this Natural Hazard Change in TOWN Over the Next 10 Years? Use a Scale of -100% (Extreme Decrease) to 0% (No Change) to 100% (Extreme Increase) from TODAY	③ Identify the Highest Magnitude or Extent that could occur in EPSOM in the Next 10 Years using the scientific, measurable Scales in the Primary Measurement. Click on the hyperlinks for more information (see also SECONDARY & TERTIARY Scales).	Highest Magnitude of Hazard in Epsom within Next 10 Years	Range of Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/Extent Measurement Scale or Index	PRIMARY Magnitude/Extent Scale or Index Hyperlink	SECONDARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)	TERTIARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)	TOWN NATURAL HAZARD CONCERN SUMMARY
	Probability of Occurrence in 10 Years See scale below 1 Unlikely 2 Possible 3 Likely 4 Highly Likely	Human Injury Impact See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	Essential Services / Infrastructure Impact See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	Property Damage or Economic Impact See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic											
Hydrologic Hazards															
DROUGHT	3	2	3	4	9.0		0.0%		D0 Abnormally Dry to D4 Exceptional Drought	US Drought (D-scale) Monitor Intensity Scale	https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH				HIGH
WILDFIRE Brushfire, Outdoor Fires, Accidental, etc	4	3	3	3	12.0	3	0.0%		Low (Green) to Extreme (Red) Fire Danger	National Fire Danger Rating System	https://www.nh.gov/nhdfi/community/daily-fire-danger.htm https://www.wfas.net/index.php/fire-danger-rating-fire-potential-danger-32/class-rating-fire-potential-danger-51				EXTREME
COLD WEATHER STORMS (Atmospheric Hazards)															
WINTER STORMS, BLIZZARD (winds >35 mph, visibility <0.25 mile, >3 hours), NOR'EASTER (tropical pattern, low pressure, follows East Coast)	4	3	3	3	12.0	3	0.0%		1 Notable to 5 Extreme Snowfall	Northeast Snowfall Impact Scale (NESIS)	https://www.ncei.noaa.gov/access/monitoring/rsi/nesis				EXTREME
ICE STORM	4	3	3	3	12.0	3	0.0%		0 Damage to 5 Ice Damage	Sperry-Piltz Ice Accumulation Index	https://www.spia-index.com/				EXTREME
EXTREME TEMPERATURES (Atmospheric Hazards)															
COLD WAVE Wind Chill, Freezing	3	4	3	2	9.0		0.0%		<5 minutes to > 2 hours for Frostbite Times	NOAA Wind Chill Temperature Index	https://www.noaa.gov/jetstream/global/wind-chill	NWS Frost and Wind Chill Alerts https://www.weather.gov/safety/cold-wind-chill-warning			HIGH
HEAT WAVE Excessive Heat	3	4	3	2	9.0		0.0%		Class IV Very Warm to Class I Extremely Hot	NOAA Heat Index	https://www.noaa.gov/jetstream/global/heat-index	NWS Excessive Heat Alerts https://www.weather.gov/safety/heat-wv	See also www.heat.gov for information and heat projection maps		HIGH
FLOODING (Hydrologic Hazards)															
DAM FAILURE Water Overtop, Breach, Beaver, etc.	2	3	3	3	6.0		0.0%		Non-Menace to High Hazard Dam Class	NHDES Dam Hazard Classifications	https://www.des.nh.gov/documents/db-15-classification-dams-new-hampshire				MEDIUM
INLAND FLOODING Rain, Snow Melt, Flash Floods- Cause Ditch Erosion, Washouts, Pond Overtop, etc	3	3	3	2	8.0		0.0%		100 Year to 500 Year Flooding	Special Flood Hazard Areas (SFHAs) on 2010 & Preliminary Digital Flood Rate Insurance Maps (Zones A, AE, X)	https://msc.fema.gov/portal/home	NH OPD Current NH Floodplain Mapping Activities https://www.nheconomy.com/office-of-planning-and-development/what-we-do/floodplain-management-program/floodplain-maps	FEMA Flood Zone Designation Descriptions (2010) https://efotg.sc.egov.usda.gov/references/public/NM/FEMA_FL_D_HAZ_guide.pdf		HIGH

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		Human Injury Impact	Essential Services / Infrastructure Impact	Property Damage or Economic Impact	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic											
RIVER HAZARDS Flood, Ice Jams, Scouring, Erosion, Channel Movement, Debris, etc	4	3	3	3	12.0	3	0.0%	>5% Marginal to >70% High Rainfall Risk	NOAA Excessive Rainfall Risk Categories	https://www.wpc.ncep.noaa.gov/qpf/excessive_rainfall_outlook_ero.php	NOAA Excessive Rainfall Outlook https://www.wpc.ncep.noaa.gov/qpf/excessive_rainfall_outlook_ero.php	FEMA Flood Zone Designation Descriptions (2010) https://efotg.sc.egov.usda.gov/references/public/NM/FEMA_FL_D_HAZ_guide.pdf				
Geologic Hazards																
EARTHQUAKE >4.0MM	2	1	1	1	2.0		0.0%	I Not Felt to X Extreme Shaking Intensity	USGS Modified Mercalli Intensity Scale	https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale	USGS ShakeMap Instrumental Intensity https://earthquake.usgs.gov/data/shakemap/	USGS Earthquakes 2.5M+ https://earthquake.usgs.gov/earthquakes/map/			LOW	
LANDSLIDE Roadside Erosion, Soil, Rockslide, Excavation Areas, etc	1	1	1	1	1.0		0.0%	<1.5 Magnitude to > Magnitude	KGS Earthquake Moment Magnitude (Size) Scale, formerly Richter Magnitude	https://geokansas.ku.edu/measuring-earthquake-magnitude-and-intensity	USGS Landslide Inventory Mapper https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=a120962f459434b8c904b456c82669d	NASA Landslide Viewer https://www.usgs.gov/publications/landslide-handbook-a-guide-understanding-landslides			LOW	
PUBLIC HEALTH (Biologic Hazards)	4	4	4	4	16.0	1	0.0%									
Swimming Water Quality								Bacteria Advisory to Bacteria Warning	NHDES Cyanobacteria/Public Beach Bacterial Warning Levels	https://experience.arcgis.com/experience/180c28fa3a4c4371a9771d999454e8c4/	https://www.des.nh.gov/water/healthy-swimming	FEMA National Risk Index Map https://hazards.fema.gov/nri/map			#N/A	
Air Quality								Good to Hazardous Air Quality	NHDES Air Quality Index	https://www4.des.state.nh.us/air/data/	EPA Air Quality Index (AQI) https://www.airnow.gov/aqi/aqi-basics/					
Drinking or Surface Water Quality								Good Water Quality (Green) to Severe Water Quality (Red)	NHDES Watershed 305(b)Assessment Summary Reports by Watershed 2020-2022	https://www.arcgis.com/apps/webappviewer/index.html?id=d1ba9c5ec85646538e032580e23174f7	NH DES Drinking Water https://www.des.nh.gov/water/drinking-water					

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Natural Technological and Human Hazard Categories	Probability of Occurrence in 10 Years	Severity of Impact to the Town				Overall Risk SCORE	RANKED TOP SCORES Natural Hazards	② How Much Will the Intensity of this Natural Hazard Change in TOWN Over the Next 10 Years? Use a Scale of -100% (Extreme Decrease) to 0% (No Change) to 100% (Extreme Increase) from TODAY	③ Identify the Highest Magnitude or Extent that could occur in the Next 10 Years using the scientific, measurable Scales in the Primary Measurement. Click on the hyperlinks for more information (see also SECONDARY & TERTIARY Scales).						TOWN NATURAL HAZARD CONCERN SUMMARY
		Human Injury Impact	Essential Services / Infrastructure Impact	Property Damage or Economic Impact	See scale below				Highest Magnitude of Hazard in Epsom within Next 10 Years	Range of Options for Highest Magnitude of Hazard in Town Next 10 Years	PRIMARY Magnitude/Extent Measurement Scale or Index	PRIMARY Magnitude/Extent Scale or Index Hyperlink	SECONDARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)	TERTIARY Magnitude/Extent Scale or Index or Explanatory Information (Note Hyperlink if Possible)	
Infectious Diseases	See scale below 1 Unlikely 2 Possible 3 Likely 4 Highly Likely	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	See scale below 1 Limited 2 Significant 3 Critical 4 Catastrophic	Probability x Average Severity Relative Threat SCORE 1 - 16										
Arboviral Diseases									Minimal (White - Very High (Red))	NH DHHS Acute Respiratory Activity by County (weekly map)	https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/influenza-flu/influenza-activity	NH DHHS Infectious Disease Control https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control			
Tickborne Diseases									No Risk (Yellow) to Very High Risk (Red)	NH DHHS Arboviral Risk Map by Town (annual)	https://www.dhhs.nh.gov/sites/g/files/ehbemt476/files/documents2/arbomap-2022.pdf	NH DHHS Mosquito Surveillance and Control https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/mosquito-borne-illnesses/mosquito			
									Rate Per 100,000 persons - Latest 2017-2021 (4 years) = 131 (Merr City) and 101 (Hills)	NH DHHS Reported Cases of Lyme Disease by County 2017-2021	https://www.dhhs.nh.gov/sites/g/files/ehbemt476/files/documents2/lymecounty-2017-2021.pdf	NH DHHS Tickborne Diseases https://www.dhhs.nh.gov/programs-services/disease-prevention/infectious-disease-control/tickborne-diseases			
SOLAR STORMS AND SPACE WEATHER (Space Hazards)	3	2	3	4	9.0										
GEOMAGNETIC STORMS Aurora Borealis					0.0			0.0%	G1 Minor to G5 Extreme	NOAA Geomagnetic Storms Scale	https://www.swpc.noaa.gov/noa-a-scales-explanation				#N/A
SOLAR RADIATION					0.0			0.0%	S1 Minor to S5 Extreme	NOAA Solar Radiation Storms Scale	https://www.swpc.noaa.gov/noa-a-scales-explanation				#N/A
RADIO BLACKOUT					0.0			0.0%	R1 Minor to R5 Extreme	NOAA Radio Blackouts Scale	https://www.swpc.noaa.gov/noa-a-scales-explanation				#N/A
WARM WEATHER STORMS (Atmospheric Hazards)															
HIGH WINDS	4	3	4	4	14.7	2		0.0%	0 Calm to 12 Hurricane Force Wind	Beaufort Wind Scale (Land)	https://www.weather.gov/pqr/lw-ind				EXTREME
THUNDERSTORMS	4	3	3	3	12.0	3		0.0%	1 Marginal to 5 High Thunderstorm Risk	NOAA Severe Thunderstorm Risk Categories	https://www.spc.noaa.gov/misc/about.html		NOAA Precipitation Frequency and Depth https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html?bkmrk=nh		EXTREME
DOWNBURSTS	3	3	3	3	9.0			0.0%	<2.5 miles wide Microburst to >2.5 miles wide Macroburst	NOAA Downbursts	https://www.noaa.gov/jetstream/wind_damage				HIGH
LIGHTNING	4	3	4	4	14.7	2		0.0%	LAL 1 No Thunderstorms to LAL 6 Dry Lightning Activity	NWS Lightning Activity Level (LAL)	https://graphical.weather.gov/definitions/defineLAL.html				EXTREME
TORNADOES	4	4	4	4	16.0	1		0.0%	EF0 65-85mph to EF5 >200 mph	NOAA Enhanced Fujita Scale	https://www.spc.noaa.gov/efscale/	NOAA Enhanced F Scale for Tornado Damage 2007 https://www.spc.noaa.gov/fag/tornado/ef-scale.html			EXTREME

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Work Session 1.4
8/16/2023
CNHRPC Contact Stephanie at salexander@cnhrpc.org 603-226-6021

① Determine Probability and Severity of Natural Hazard to Town Over Next 10 Years

Probability of Occurrence in 10 Years		Severity of Impact to the Town	
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-100%	-75%	-50%	-25%	0%	25%	50%	75%	100%	
Extreme Decrease	High Decrease	Moderate Decrease	Slight Decrease	No Change	Slight Increase	Moderate Increase	High Increase	Extreme Increase	

Natural Technological and Human Hazard Categories	Probability of Occurrence in 10 Years	Severity of Impact to the Town				Overall Risk SCORE	RANKED TOP SCORES Natural Hazards
		Human Injury Impact	Essential Services / Infrastructure Impact	Property Damage or Economic Impact	Probability x Average Severity Relative Threat SCORE 1 - 16		
HAIL	4	3	3	3	12.0	3	
TROPICAL AND POST-TROPICAL CYCLONES Hurricanes, Tropical Storms	2	3	3	2	5.3		
NOT APPLICABLE TO TOWN & REGION							
COASTAL FLOODING (Hydrologic Hazard)	n/a	n/a	n/a	n/a	#VALUE!		
AVALANCHE (Geologic Hazard)	n/a	n/a	n/a	n/a	#VALUE!		
TSUNAMI (Geologic Hazard)	n/a	n/a	n/a	n/a	#VALUE!		
VOLCANIC ACTIVITY (Geologic Hazard)	n/a	n/a	n/a	n/a	#VALUE!		
Technological and Human Hazards, Impacts from Natural Hazards	Not scored in HIRA						
AGING INFRASTRUCTURE Bridges, Culverts, Roads, Pipes, Underground Lines, Debris, etc	not scored	not scored	not scored	not scored	not scored	not ranked	
LONG TERM UTILITY OUTAGE Power, Water, Sewer, Gas, Internet, Communications, Live Wire Danger, etc	not scored	not scored	not scored	not scored	not scored	not ranked	
CONFLAGRATION (FIRE)	not scored	not scored	not scored	not scored	not scored	not ranked	
HAZARDOUS MATERIALS Haz Mat Spills, Brownfields, Trucking, Known and Emerging Contaminants, etc	not scored	not scored	not scored	not scored	not scored	not ranked	
RADIOLOGICAL	not scored	not scored	not scored	not scored	not scored	not ranked	

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	1/4" Pea Size to 4.5" Grapefruit Size Hail Stones	NOAA Hail Size	https://www.weather.gov/bob/hailsize	NWS Hail Size Infographic https://www.weather.gov/vef/T/hunderstorm_infographics		EXTREME
	H0 5mm Hard Hail Storm to H10 >100mm Super Hail Storm	TORRO Hailstorm Intensity Scale Adapted	https://www.torro.org.uk/research/hail/hscale	Tornado and Storm Research Organization (TORRO) International		MEDIUM
	Category 1 74-95 mph Minimal to Category 5 >157 mph Catastrophic Winds	NOAA Saffir-Simpson Hurricane Wind Scale	https://www.nhc.noaa.gov/aboutshws.php			
	N/A	1 Low Danger to 5 Extreme Danger	North American Public Avalanche Danger Scale	https://avalanche.org/avalanche-encyclopedia/human/resources/north-american-public-avalanche-danger-scale/		#VALUE!
	N/A	Elevated 1-3 feet to Extreme >9 feet	NOAA Storm Surge Threat Scale	https://www.weather.gov/mhx/HITStormSurge	NOAA National Storm Surge Risk Maps by Hurricane Category https://experience.arcgis.com/experience/203f772571cb48b1b8b50fdcc3272e2c	#VALUE!
	N/A	Watch to Warning	NOAA Tsunami Program Alerts (Pacific)	https://www.tsunami.noaa.gov/gmef-theme/forecast-warning		#VALUE!
	N/A	0 Magnitude to 8 Magnitude	NPS Volcanic Explosivity Index (VEI) Logarithmic	https://www.nps.gov/subjects/volcanoes/volcanic-explosivity-index.htm		#VALUE!
Not scored in HIRA	Miscellaneous Magnitude information					
	Very Low Risk (Blue) to Very High Risk (Red)	FEMA National Risk Index Map (Natural Hazards and Social Vulnerability)	https://hazards.fema.gov/nri/fnsg			
	No Scale, datasets often up to 5 years old	NH Health and Human Services WISDOM Data Portal	https://wisdom.dhhs.nh.gov/wisdom/index.html			
	1 Everyday to 5 Death Imminent	CDC Radiation Hazard Scale	https://www.cdc.gov/nceh/radiation/emergencies/radiationhazard-scale.htm			

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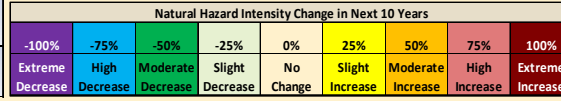
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TRANSPORTATION CRASH Vehicle, Airplane, Helicopter, Rail, Interstate, Pedestrian, Bicycle, etc	not scored	not scored	not scored	not scored	not scored	not ranked	not rated								
MASS CASUALTY INCIDENT As a result of any hazard event	not scored	not scored	not scored	not scored	not scored	not ranked	not rated								
TERRORISM/ VIOLENCE Active Shooter, Hostage, Public Harm, Civil Disturbance/ Unrest, Politically Motivated Attacks, Incendiary Devices, Sabotage, Vandalism, etc	not scored	not scored	not scored	not scored	not scored	not ranked	not rated								
CYBER EVENT Computer Systems Attack, Website Overtake, Cloud Data Breach, Telephone Rerouting, Identity Theft, Phishing, Ransomware, Virus, Phone Scams, etc	not scored	not scored	not scored	not scored	not scored	not ranked	not rated								