



Washoe County Regional Hazard Mitigation Plan Update Public Meeting



Casey Garnett, Lead Planner, IEM
Myrna Chase, Planner II, IEM

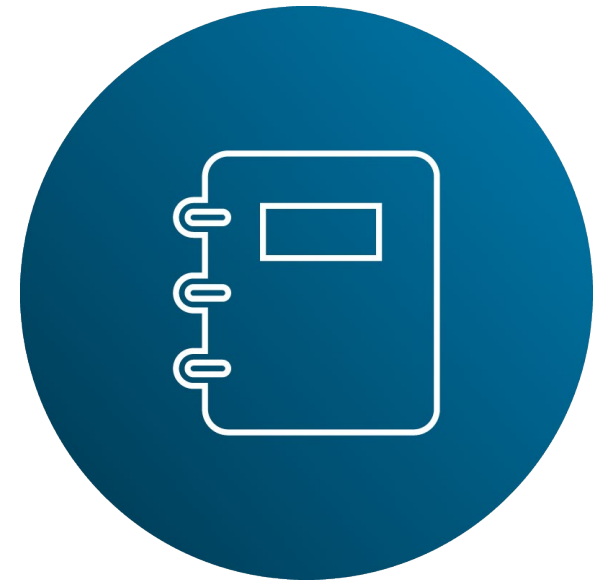
5/18/2024





Agenda

- What is Hazard Mitigation?
- What is Hazard Mitigation Planning?
- Who's Involved
- Public Input
- Identifying Hazards
- Making a Hazard Profile
- Assessing Capabilities
- Developing the Mitigation Strategy
- Public Survey
- Next Steps





Hazard Mitigation

- ***Hazard Mitigation*** is any sustained action to reduce or eliminate the long-term risk to human life and property from hazards.



EVERY \$1 SPENT ON
MITIGATION SAVES
\$6 ON FUTURE
DISASTER LOSSES

WWW.NIBS.ORG - NATURAL HAZARD
MITIGATION SAVES REPORT 2019





Benefits of Mitigation

- Break the cycle of disaster damage, reconstruction, and repetitive damage.
- Increase public safety and prevent loss of life or injury.
- Speed up recovery and reduce business and economic interruption.
- Help with other community objectives, such as capital improvements, preserving open(green) space, and increasing economic resiliency.





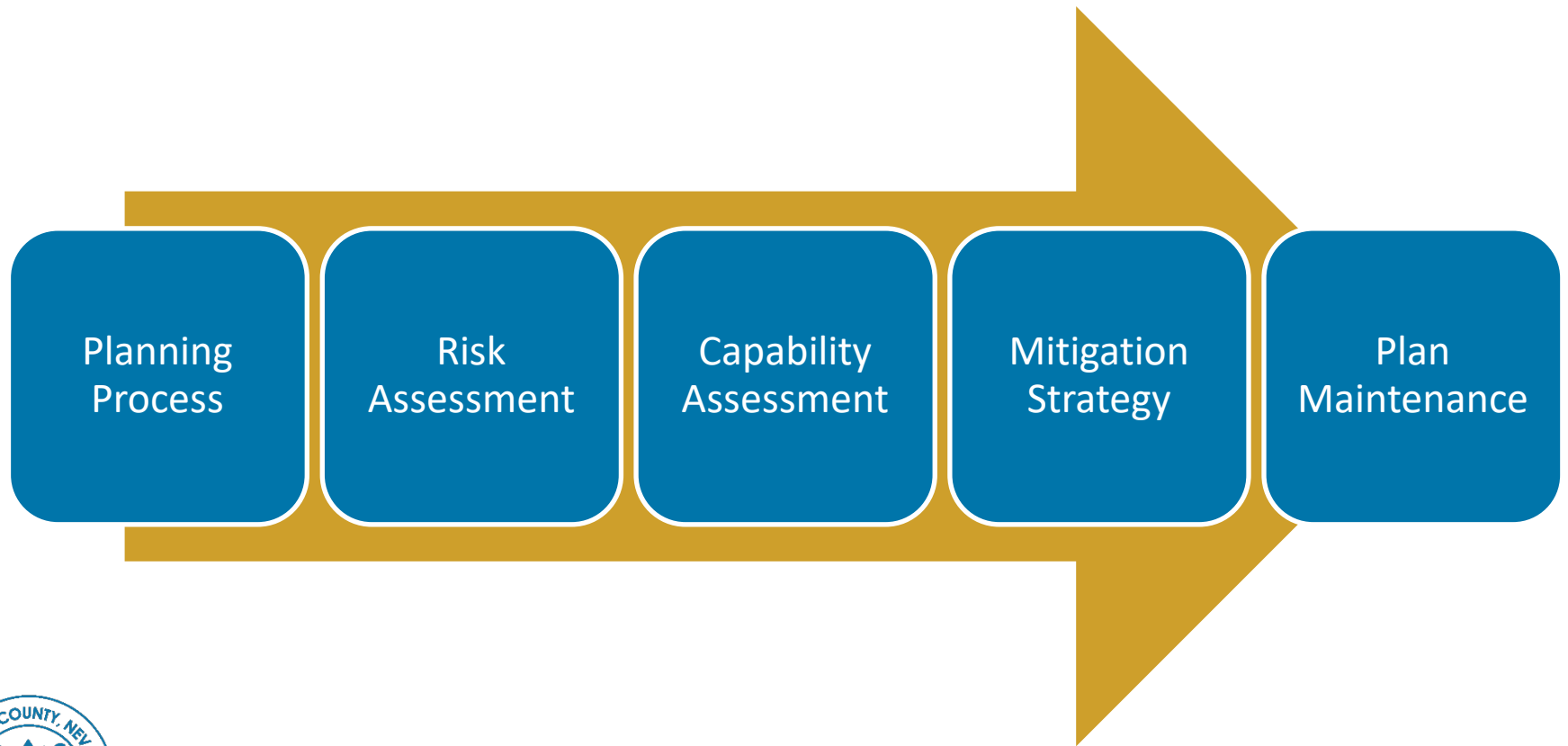
Hazard Mitigation Planning

- The mitigation plan describes the participants' vision for hazard mitigation.
- Opportunity to promote partnerships and sustainable communities and reduce disaster-related costs.





The Structure of the Plan





Why Update the Plan?

- States, tribes, and local jurisdictions (including special districts) are required to have a FEMA-approved and adopted hazard mitigation plan to receive funding through grant programs, such as:
 - Hazard Mitigation Grant Program (HMGP)
 - Building Resilient Infrastructure and Communities (BRIC)
 - Flood Mitigation Assistance (FMA)
- Plan must be updated every 5 years.
- Plan must meet state and federal planning requirements.



Overview of Your Hazard Mitigation Plan



- Executive Summary
- Introduction
- Planning Process
- Community Profile
- Risk Assessment
 - Hazard Profiles and Vulnerability Assessment
 - Consequence Analysis
- Capability Assessment
- Mitigation Strategy
- Program Implementation
- References
- Annexes
- Appendices



Who's Involved

- Plan Participants:
 - Washoe County
 - City of Reno
 - City of Sparks
 - Reno–Sparks Indian Colony
 - Pyramid Lake Paiute Reservation
 - North Lake Tahoe Fire Protection District
 - Truckee Meadows Fire Protection District
 - Truckee River Flood Management Authority





Public Input

- Public input helps identify areas of risk and potential solutions.
- Public Meeting: *thank you for participating!*
- Public Survey:

**WE NEED YOUR FEEDBACK
TO MAKE OUR COMMUNITY SAFER**

WASHOE COUNTY, NEVADA
1861

PARTICIPATE IN THE SURVEY

The Hazard Mitigation Plan for Washoe County is being updated.

EM
RENO
City of Sparks
GREEN WILDERNESS
WASHOE COUNTY, NEVADA
1861





Identifying Hazards

- Hazards included:
 - Avalanche and landslide
 - Criminal acts and terrorism
 - Drought
 - Earthquake
 - Energy emergency
 - Flooding
 - Hazardous materials incident
 - Infectious disease
 - Radiological waste transport
 - Severe storms (winter storm and windstorm)
 - Transportation incident (aircraft crash)
 - Volcano
 - Wildland fire





Discussion Question

Which of these hazards concern you the most?





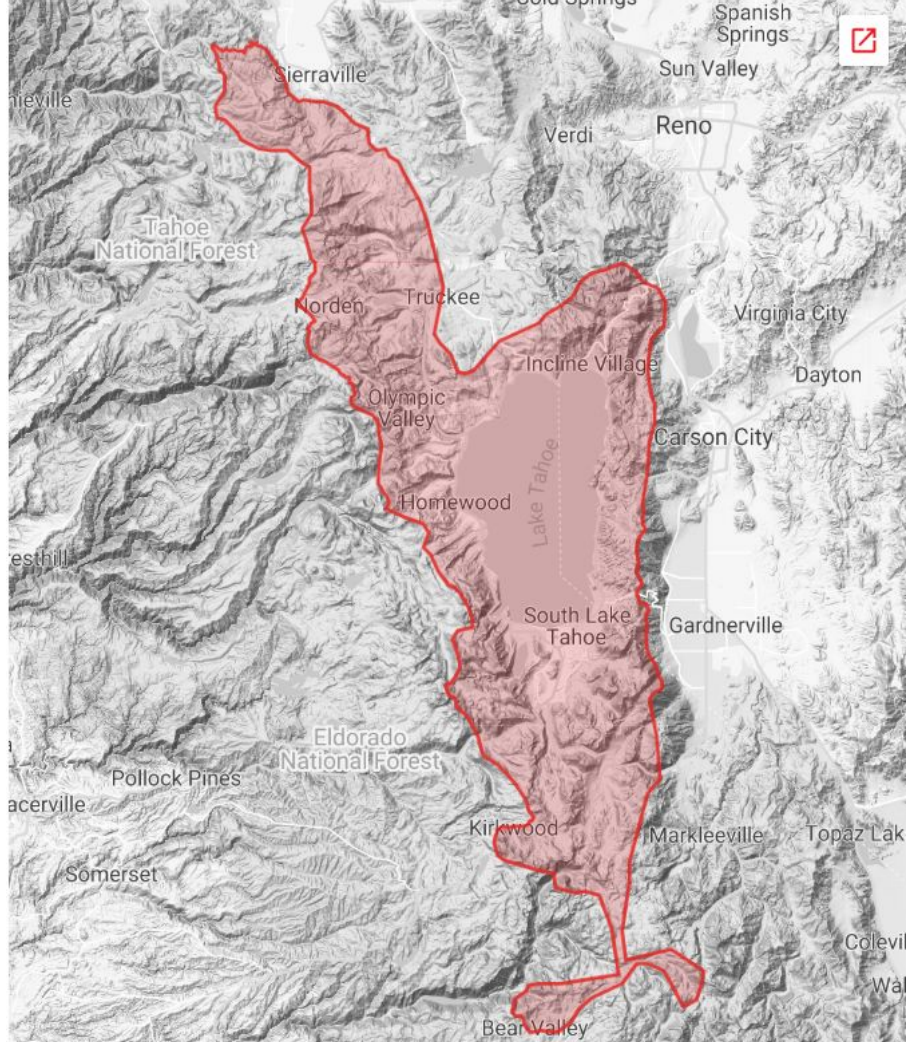
Celebrating **20** *years!*



SIERRA AVALANCHE CENTER

1985 – Bob Moore of
Tahoe National Forest
began issuing Avalanche
Warnings during periods
of HIGH danger.









THE BOTTOM LINE

New snow with strong winds will form slabs of wind-blown snow along ridges, gully features, and exposed areas. New storm snow may not bond well to itself or the old snow surface causing unstable storm slabs. Make a plan that includes cautious route finding and decision making to avoid today's avalanche problems.

Avalanche Forecast

Weather

Observations

AVALANCHE DANGER i

Monday, April 3, 2023

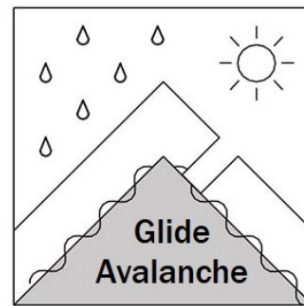
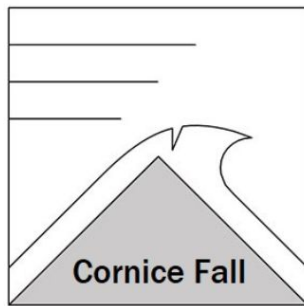
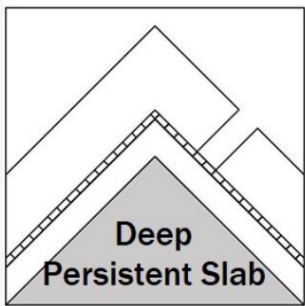
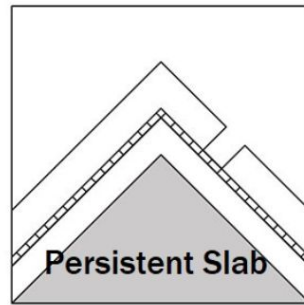
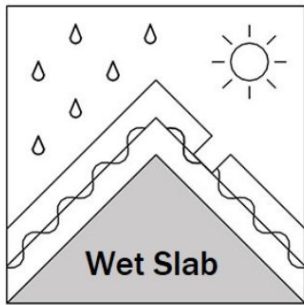
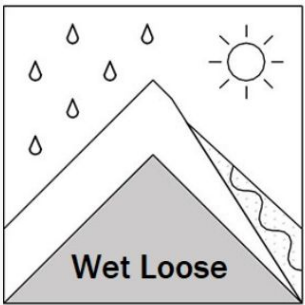
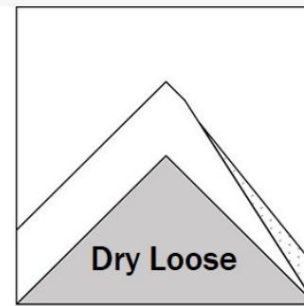
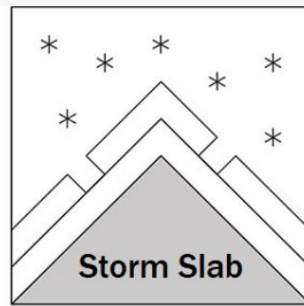
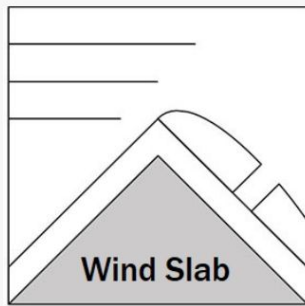
Tuesday, April 4, 2023



DANGER SCALE



+ Danger Scale



Today's Forecast:

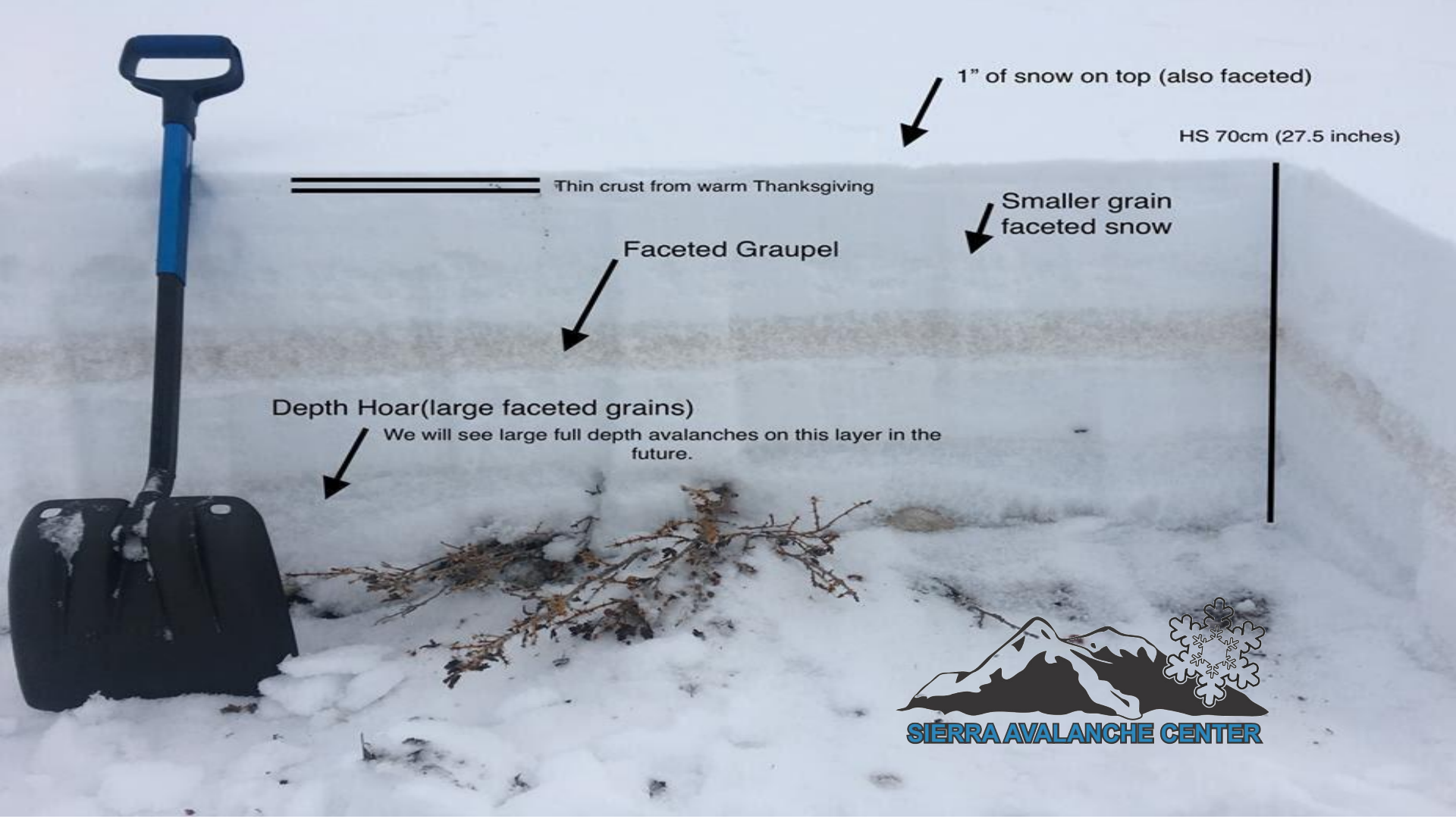
Recent snow and avalanche observations

Last night's remote weather data

Today's weather forecast







1" of snow on top (also faceted)

HS 70cm (27.5 inches)

Thin crust from warm Thanksgiving

Smaller grain faceted snow

Faceted Graupel

Depth Hoar (large faceted grains)

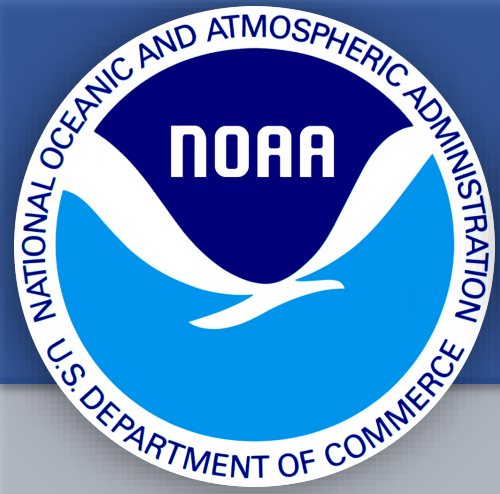
We will see large full depth avalanches on this layer in the future.



SIERRA AVALANCHE CENTER







Drought Risk in Northern NV

Weather Forecast Office

Reno, NV

Saturday, May 18

weather.gov/reno 775-673-8100

Truckee "River" start from Lake Tahoe, April 2015 (Doug Boyle, UNR)



Chris Johnston

Meteorologist

National Weather Service

Reno, Nevada

The simplest definition is: insufficient water to meet needs.

FIVE TYPES OF DROUGHT

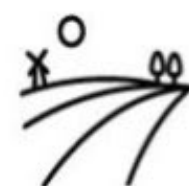
1 METEOROLOGICAL drought refers to an extended period of dry weather patterns.



2 HYDROLOGICAL drought refers to low water supply in our rivers, lakes, aquifers, and other reservoirs that often follows meteorological drought.



3 AGRICULTURAL drought occurs when a water shortage significantly damages or destroys agricultural crops.



4 ECOLOGICAL drought is the most recently defined type of drought and refers to widespread ecological damage caused by the lack of soil moisture.



5 SOCIOECONOMIC drought refers to when a water shortage affects the supply and demand of drought commodities, such as water, food grains, and fish.



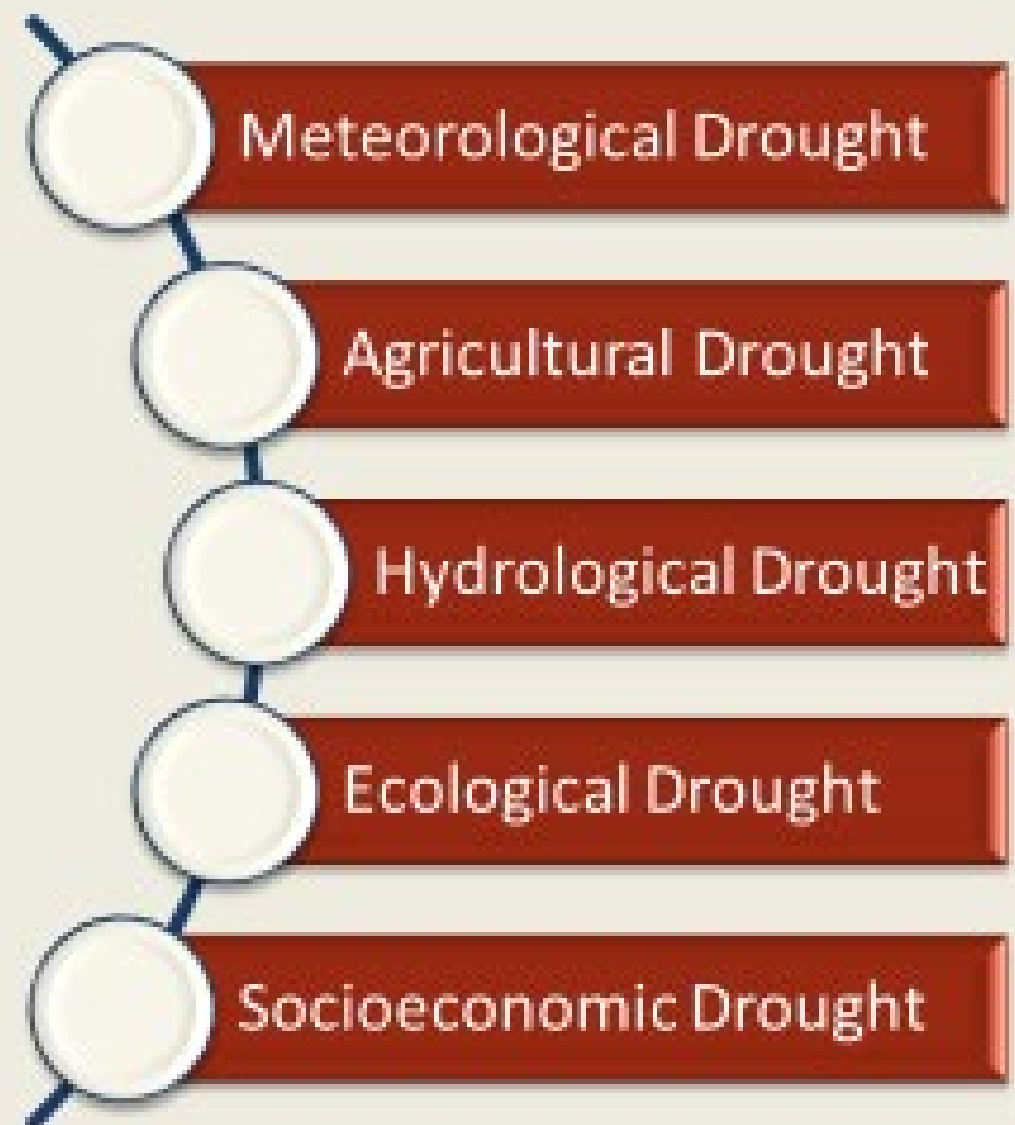
Image and definition: Living with Drought, UNR

Drought

A Challenge From Many Perspectives

Nevada is the driest state in the nation; multi-year droughts are common

- Drought is hard to predict
- Drought is often a slow-moving disaster with nonstructural impacts
- **Many definitions of drought**
 - All relate to insufficient water to meet needs
 - A deficiency of precipitation over an extended period of time, resulting in a water shortage (Drought.gov)
 - A deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area (NOAA NWS)



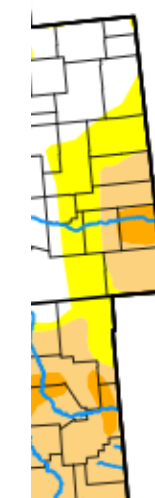
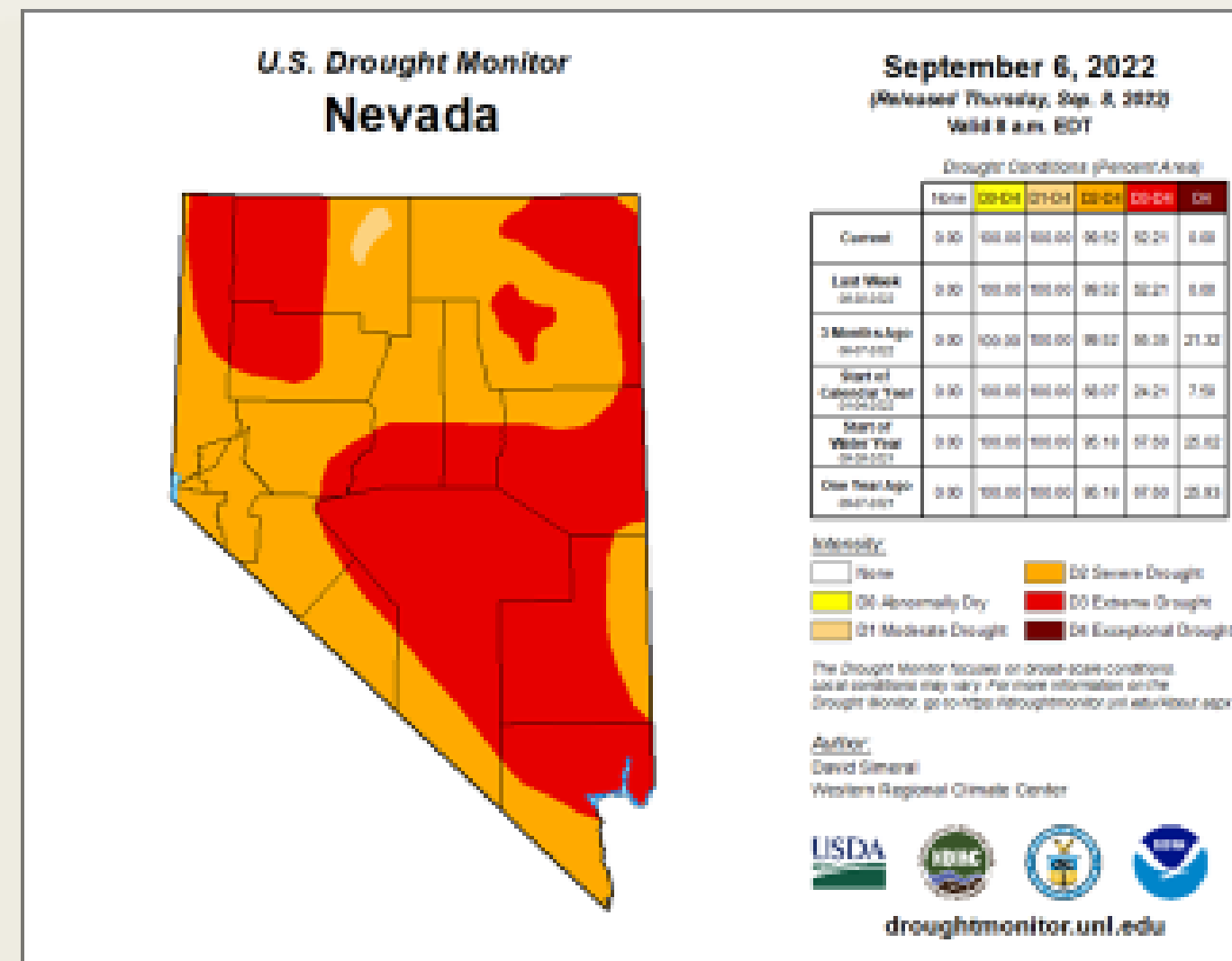
DROUGHT MONITORING

Drought Monitor:

- Updated weekly
- Composite drought indicator tool
- Multiple variables are considered
 - Precipitation, streamflow, reservoir levels, temperature and evaporative demand, soil moisture, vegetation health, drought impact reports

U.S. Drought Monitor Category

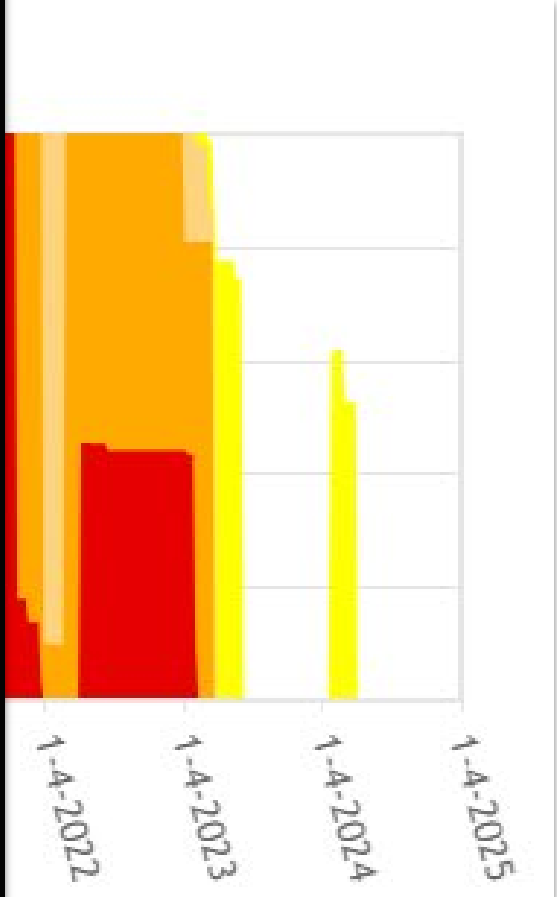
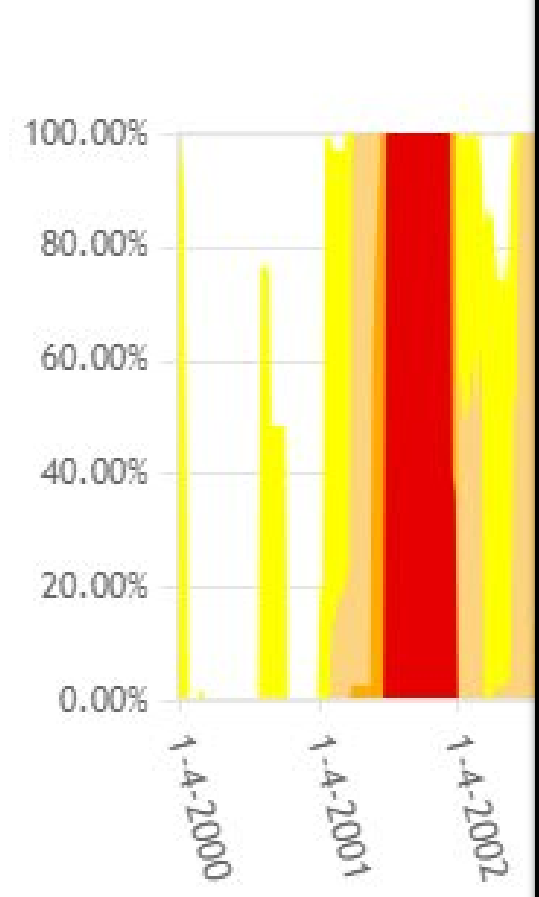
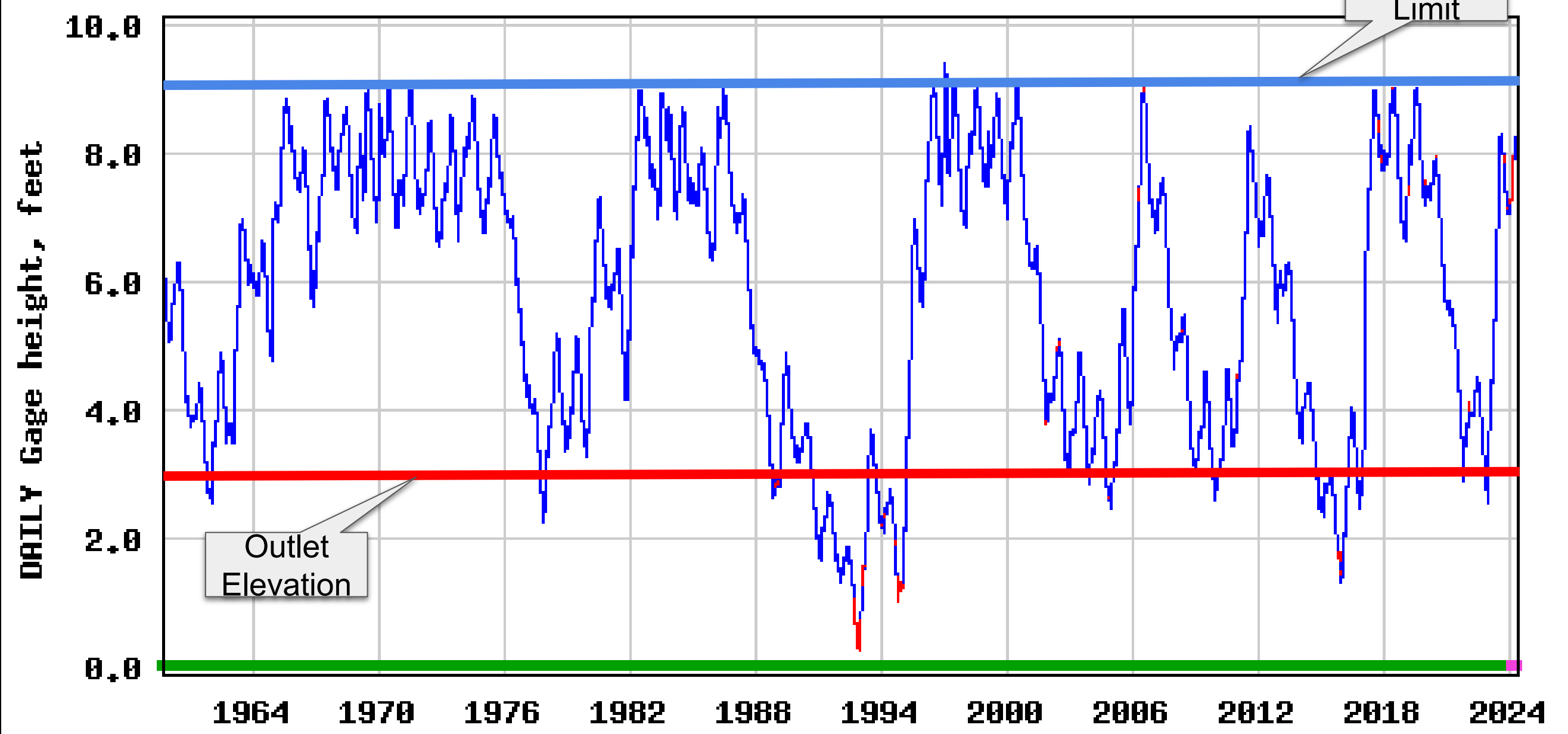
- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought
- D3 - Extreme Drought
- D4 - Exceptional Drought



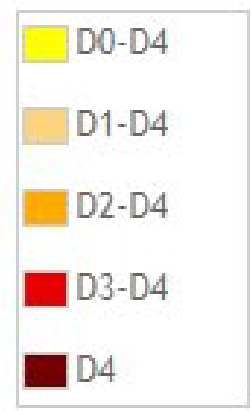
2024
EDT

<https://droughtmonitor.unl.edu/>

USGS 10337000 LAKE TAHOE A TAHOE CITY CA



- Daily observation at midnight gage height
- Estimated daily observation at midnight gage height
- Period of approved data
- Period of provisional data



Start and end timing of drought is very difficult to predict.



- **Harder to prepare from one extreme to the next.**
- **Changes in extremes can be thought of as the hydrologic cycle on steroids.**
- **Water supply timing may shift earlier as snow melts earlier**
- **More winter precip falling as rain → snow drought.**

Image: Yale Climate Connections, Spencer Platt/Getty Images.

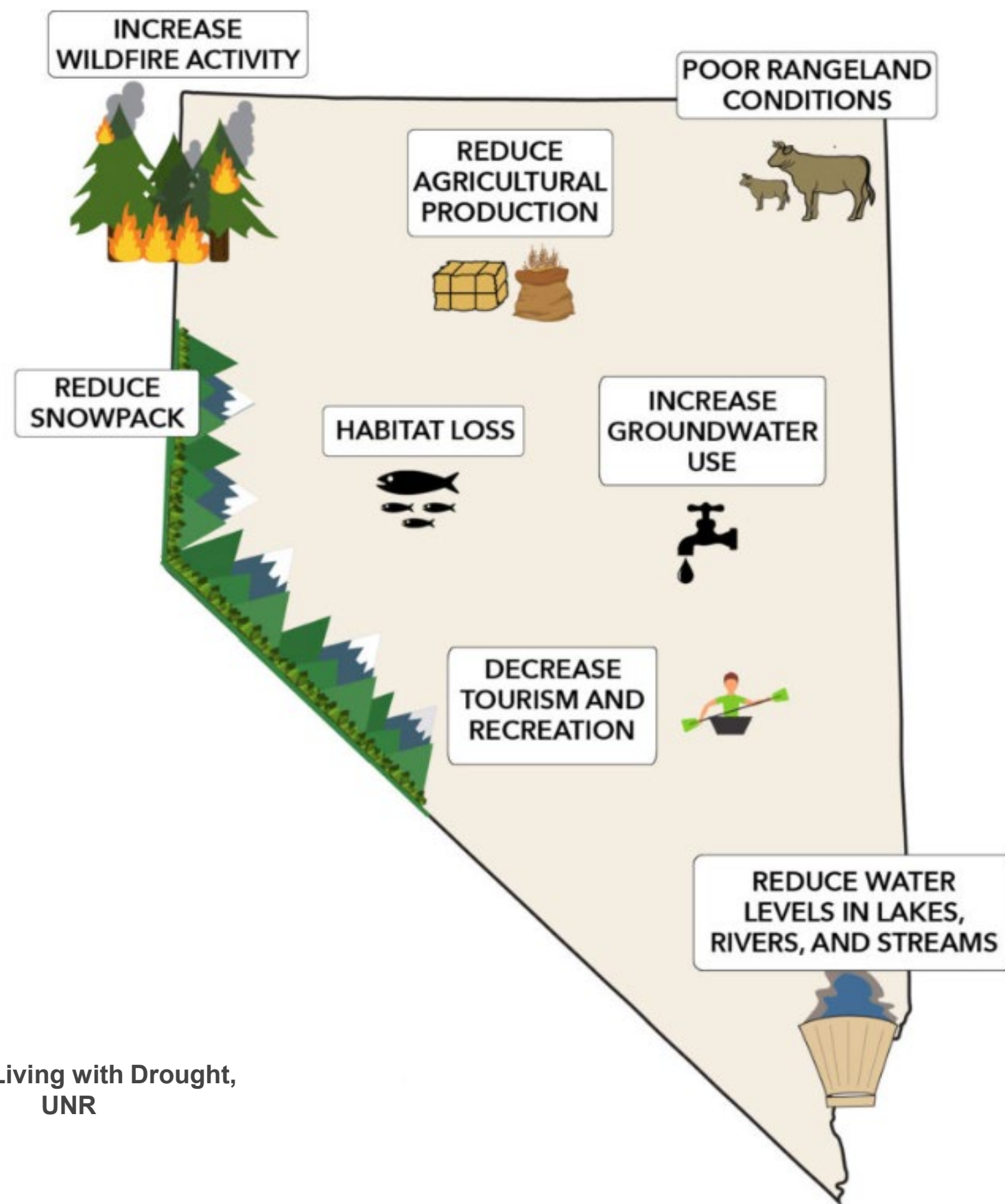


Image: Living with Drought, UNR

Water supply concerns - agriculture/livestock

Water rights: Minimum flows allocated

Health, wildfire, dust, smoke concerns

Recreational impacts

Historical Trends

Increasing evaporative demand due to higher temperatures has worsened droughts.

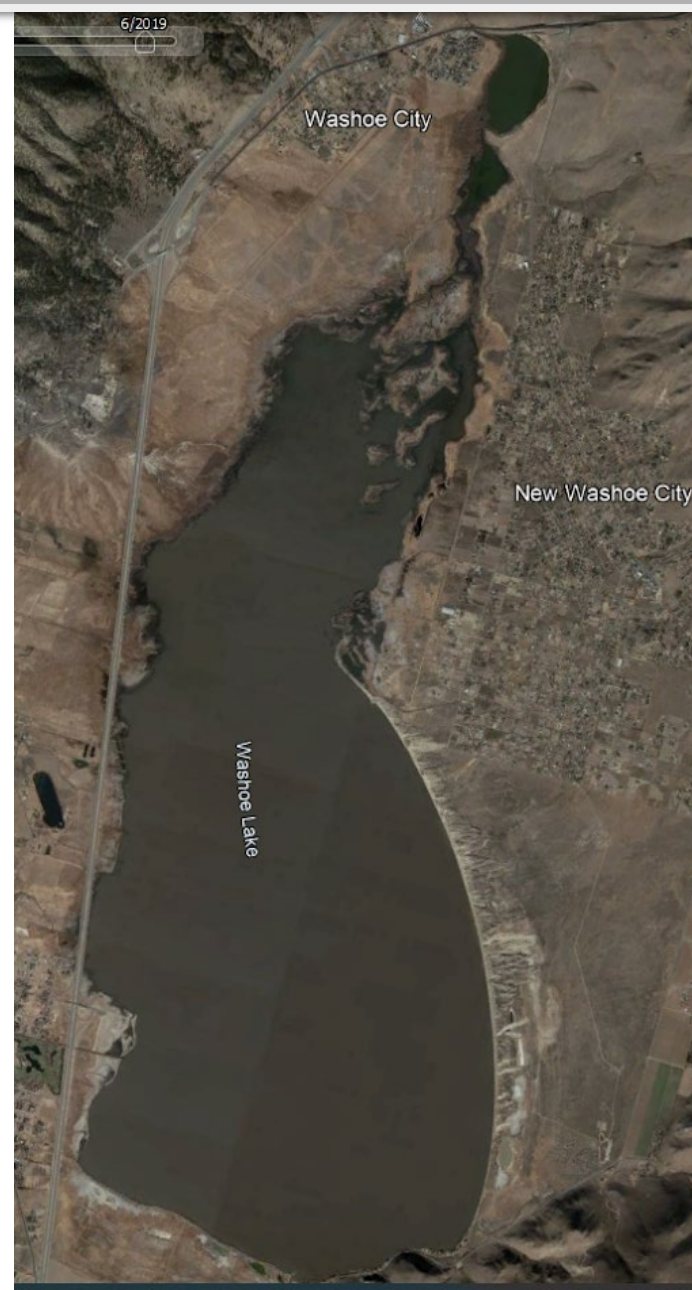
Projected Trends and **Confidence**

Drought will increase in frequency and severity, in part to due higher temperatures, even if precipitation remains the same or slightly increases.

HIGH confidence.



Washoe Lake: April 2015 vs June 2019



Washoe Lake: Drought years. Photo: UNR, Nevada Bureau of Mines and Geology

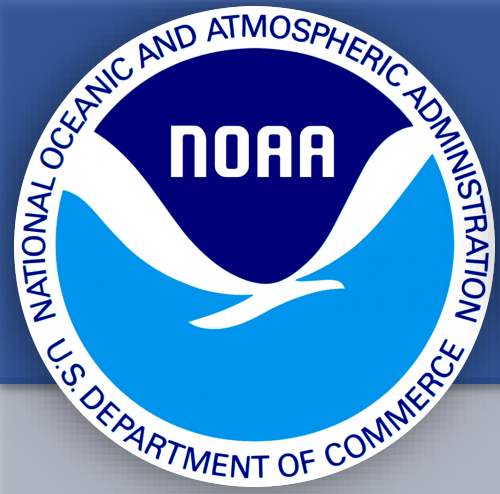


Thank You!

Weather Forecast Office
Reno, NV
Saturday, May 18



christopher.johnston@noaa.gov



Severe Storms

Weather Forecast Office

Reno, NV

Saturday, May 18

weather.gov/reno 775-673-8100



Chris Johnston

Meteorologist

National Weather Service

Reno, Nevada

Severe storms are any dangerous meteorological phenomenon with the potential to cause damage, serious social disruption, or loss of human life.



Strong Winds



Floods



Heavy Snow



Wildfire



Dust Storms



Thunderstorms

Rivers in the Sky

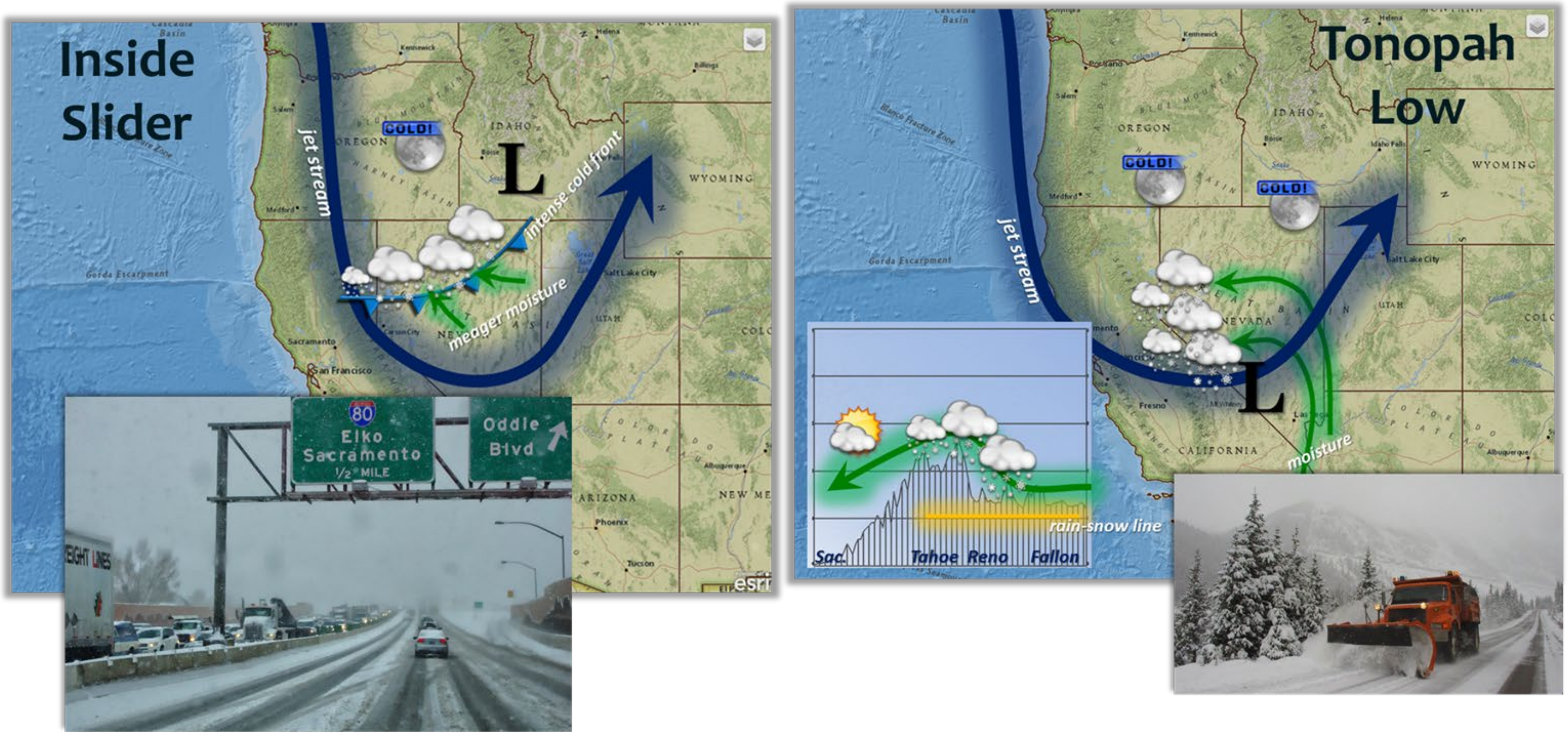
Atmospheric rivers are giant flowing streams of water vapor. While weaker atmospheric rivers bring needed rainfall, more intense atmospheric rivers can cause extreme precipitation, flooding and dangerous mudslides.





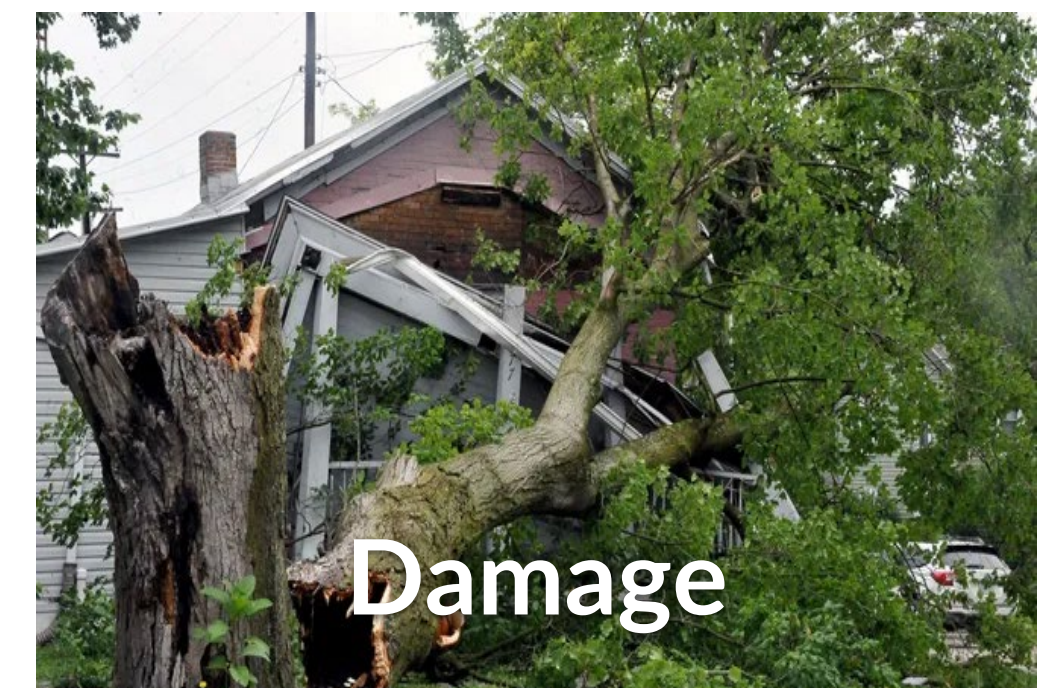
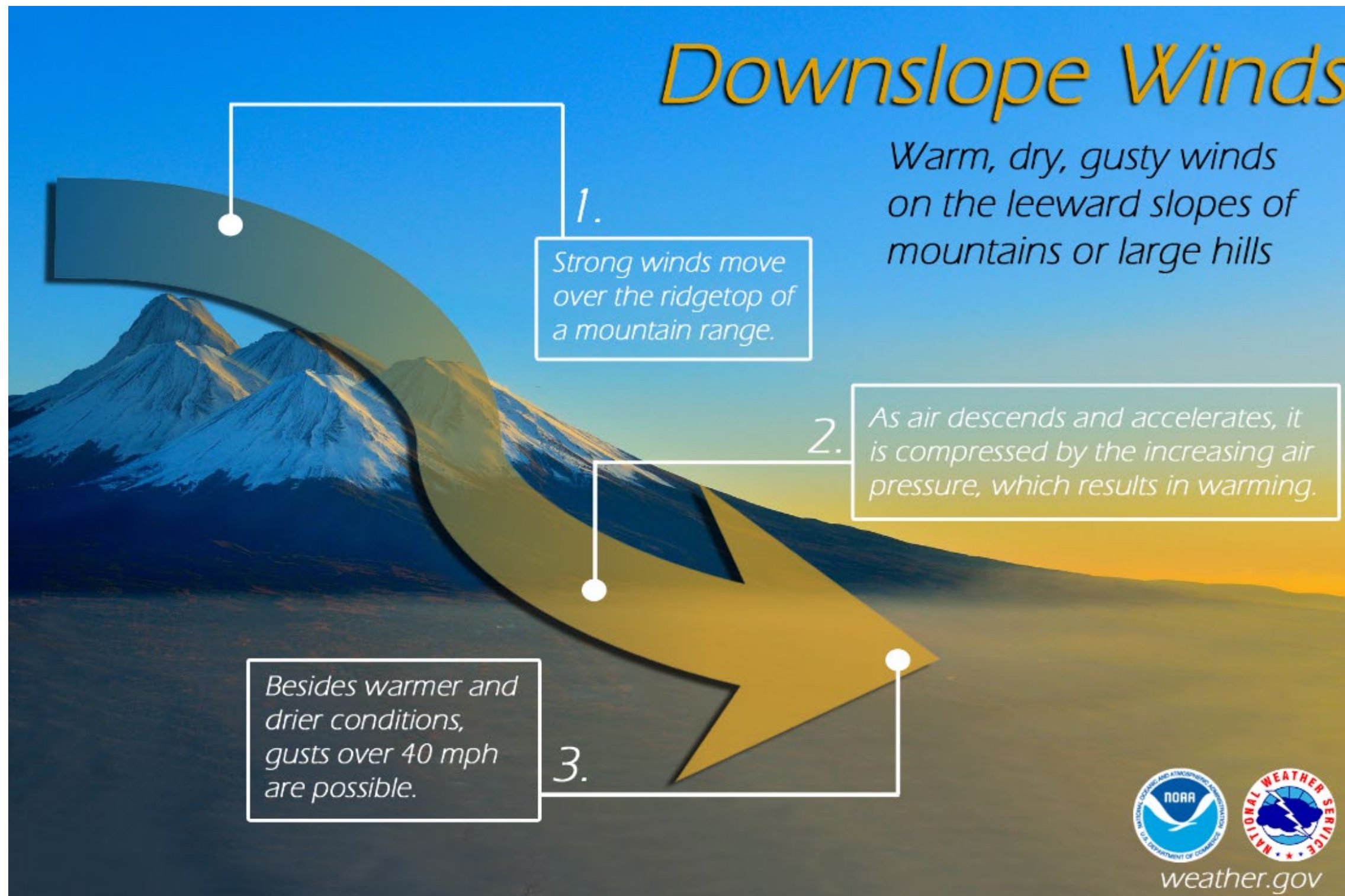
Inside Slider/Tonopah Low - Heavy Snow

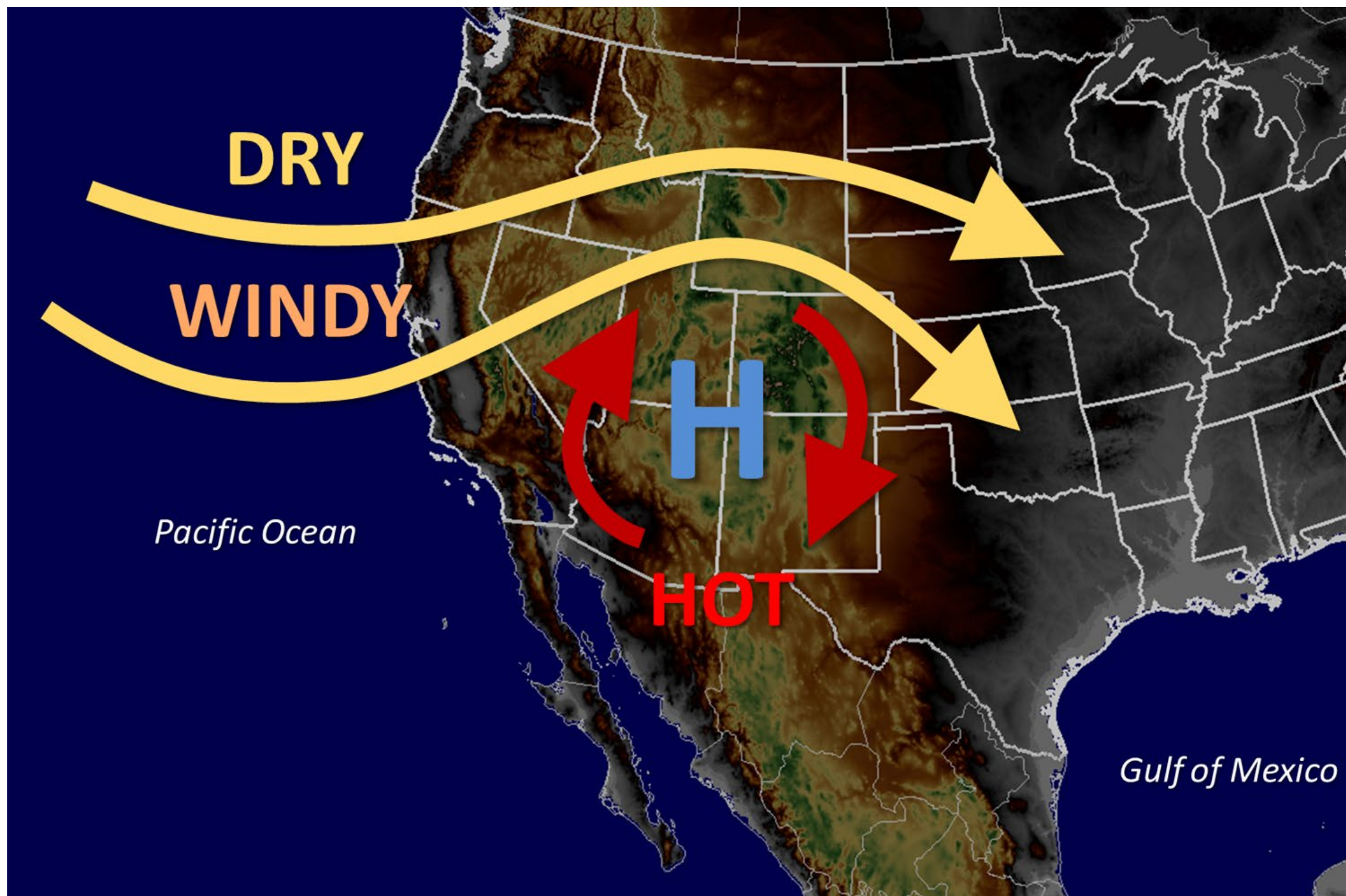
Weather Forecast Office
Reno, NV
Saturday, May 18



Low pressure systems that swing down from the northeast Pacific bring cold air, moisture, and convergence leading to heavy snows.

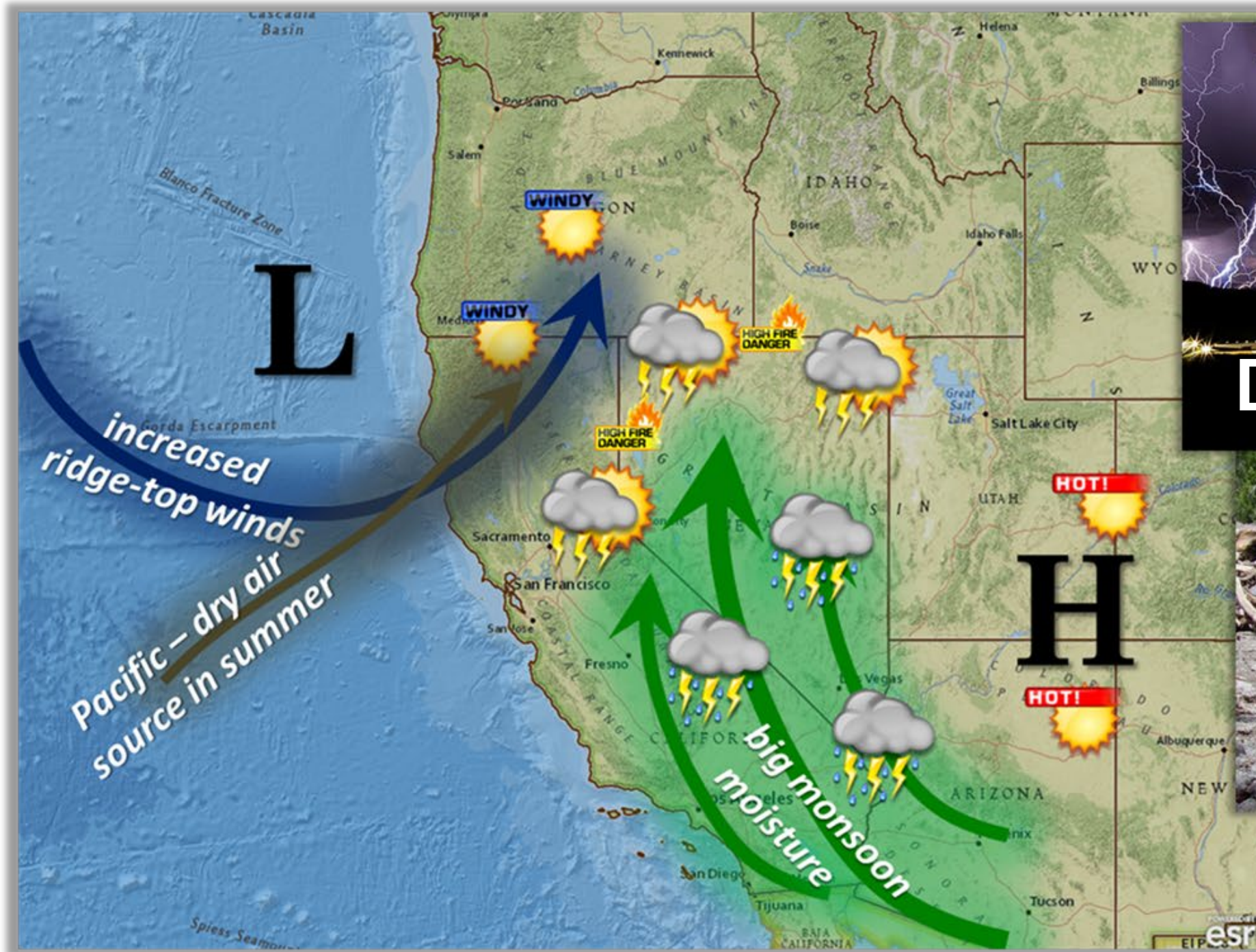
Here in western Nevada we can see strong downsloping winds during winter storms. We can also see strong winds from thunderstorms, too.





The combination of strong winds from a low pressure system over the west coast and dry/hot air from a high pressure system over the Great Basin can produce the conditions needed to start wildfires.

Strong Thunderstorms



Deadly Lightning



Flash Floods



Dust Storms

During the summer we can see strong thunderstorms, which can produce strong winds, flash flooding, dust storms, large hail, and deadly lightning.



Thank You!

Weather Forecast Office
Reno, NV
Saturday, May 18



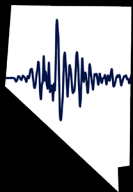
christopher.johnston@noaa.gov



Earthquake Safety in Nevada



University of Nevada, Reno

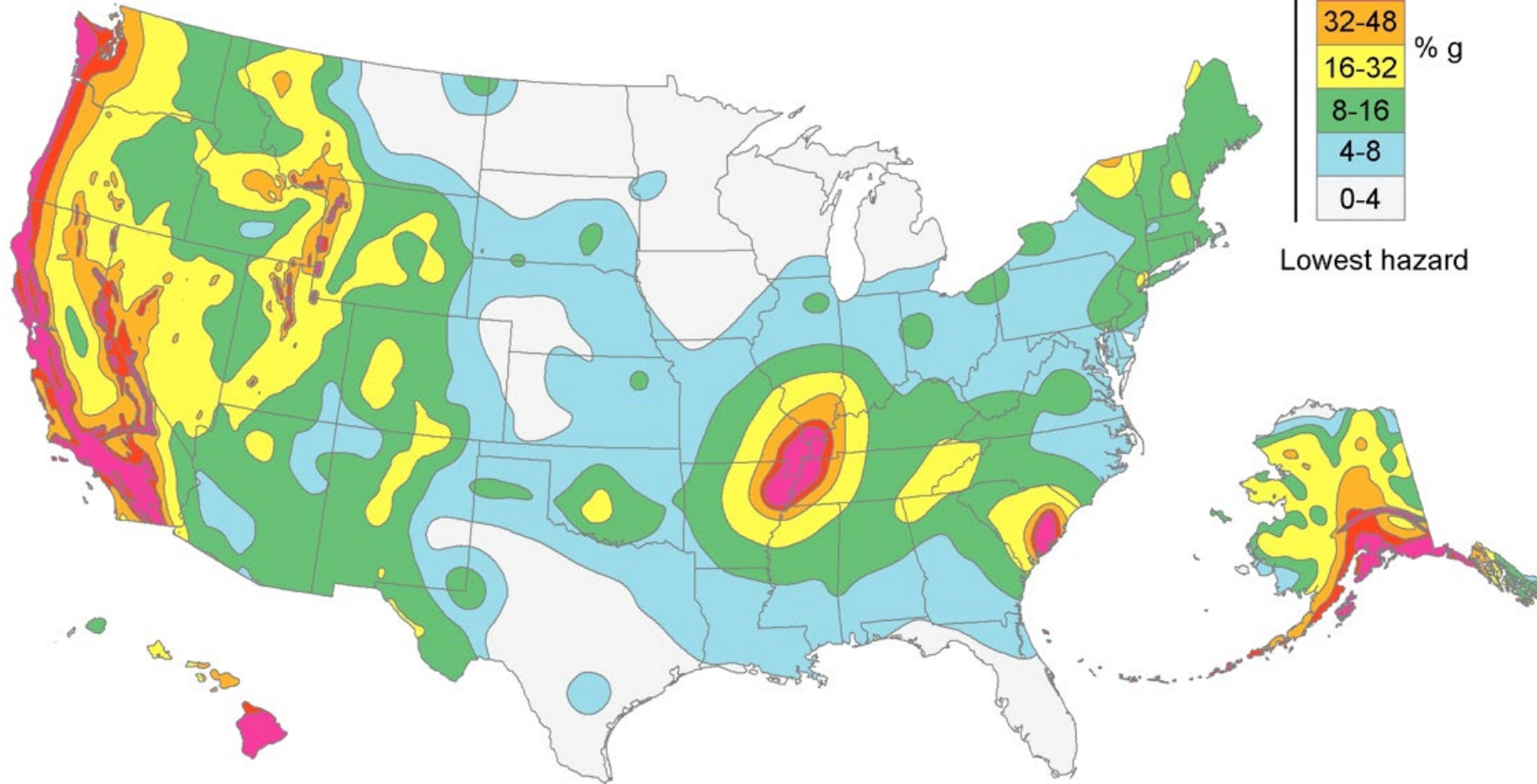


NEVADA
SEISMOLOGICAL
LABORATORY

William Savran, Ph.D. | May 18, 2024



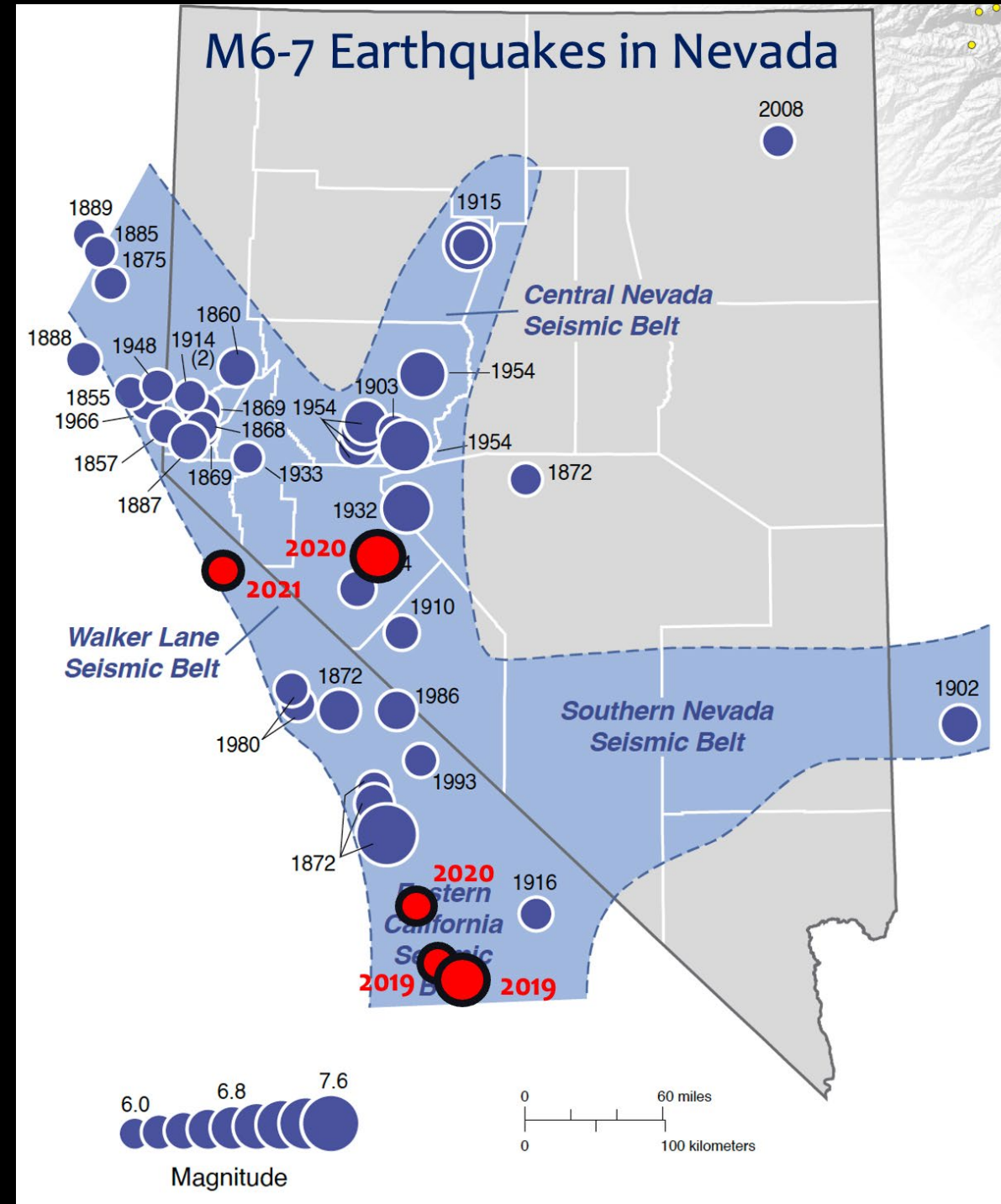
U.S. Earthquake Hazards Map



- Nevada ranks 3rd in seismic activity -
- 2nd in contiguous US -

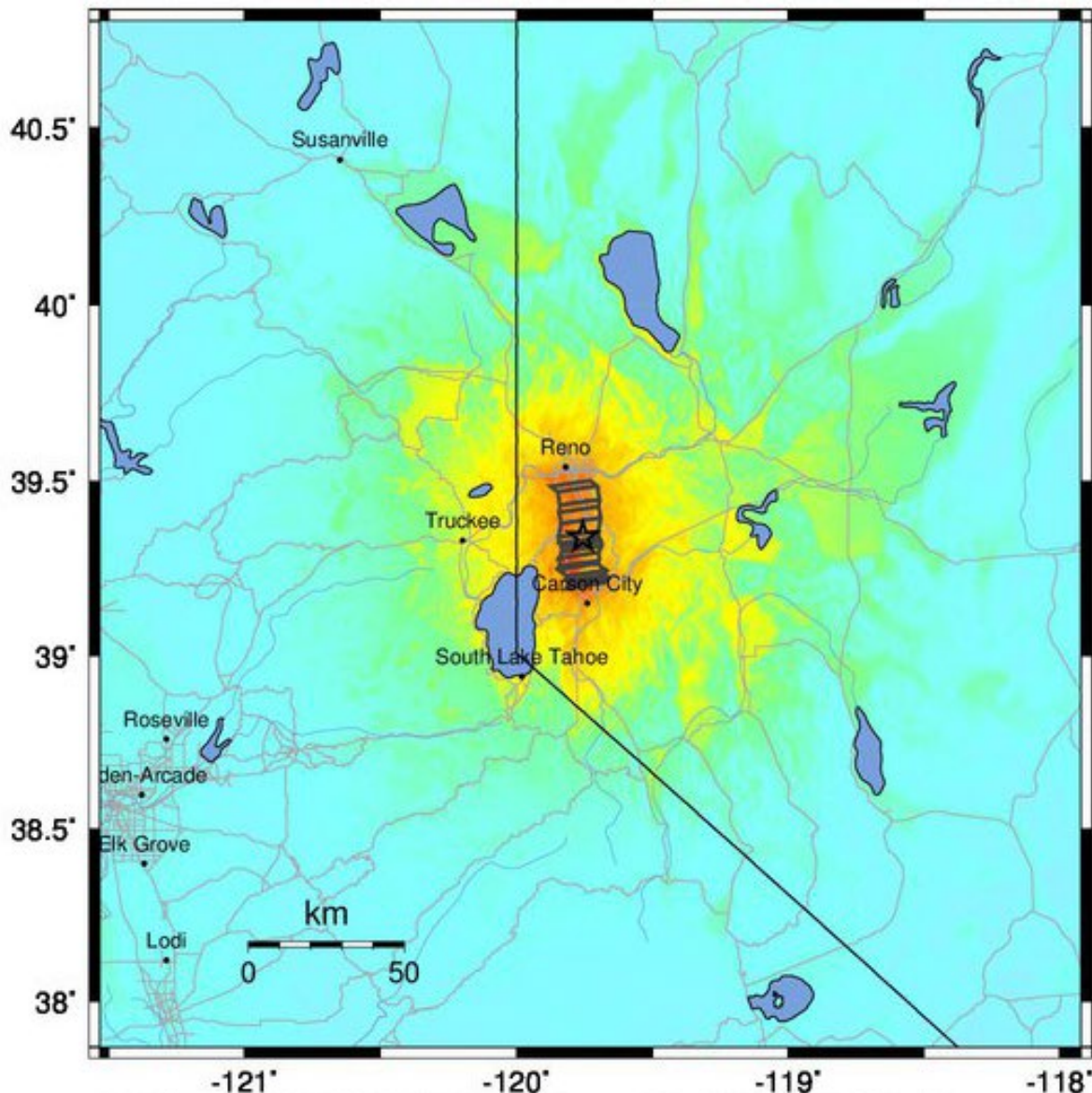
Nevada is earthquake country!

- Nevada ranks third in the nation for earthquakes per year behind California and Alaska
- We have experienced numerous large earthquakes that have the potential to cause damage and casualties
- Most recently was the M6.5 Montecristo earthquake near Tonopah



M6.9 Scenario on Mt. Rose Fault

- MMI 8-9 in Carson, Washoe, Reno Valley
- MMI 8 means nearly everything is thrown on the floor, poorly constructed buildings partial or full collapse, damage to well constructed buildings
- Ground motions on the order of 0.5-0.7g



PLANNING SCENARIO ONLY -- Map Version 3 Processed 2017-05-15 04:51:06 PM MDT

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

EXCLUSIVE ON6 NEWS

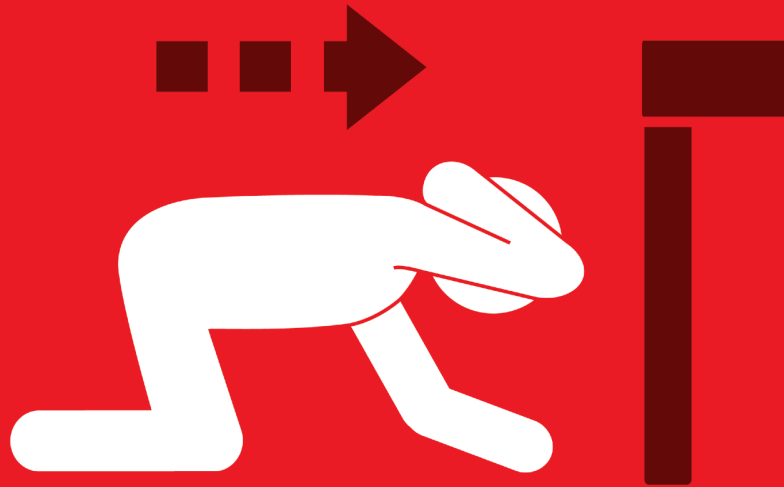
ADT



What to do during an earthquake



DROP!



COVER!



HOLD ON!



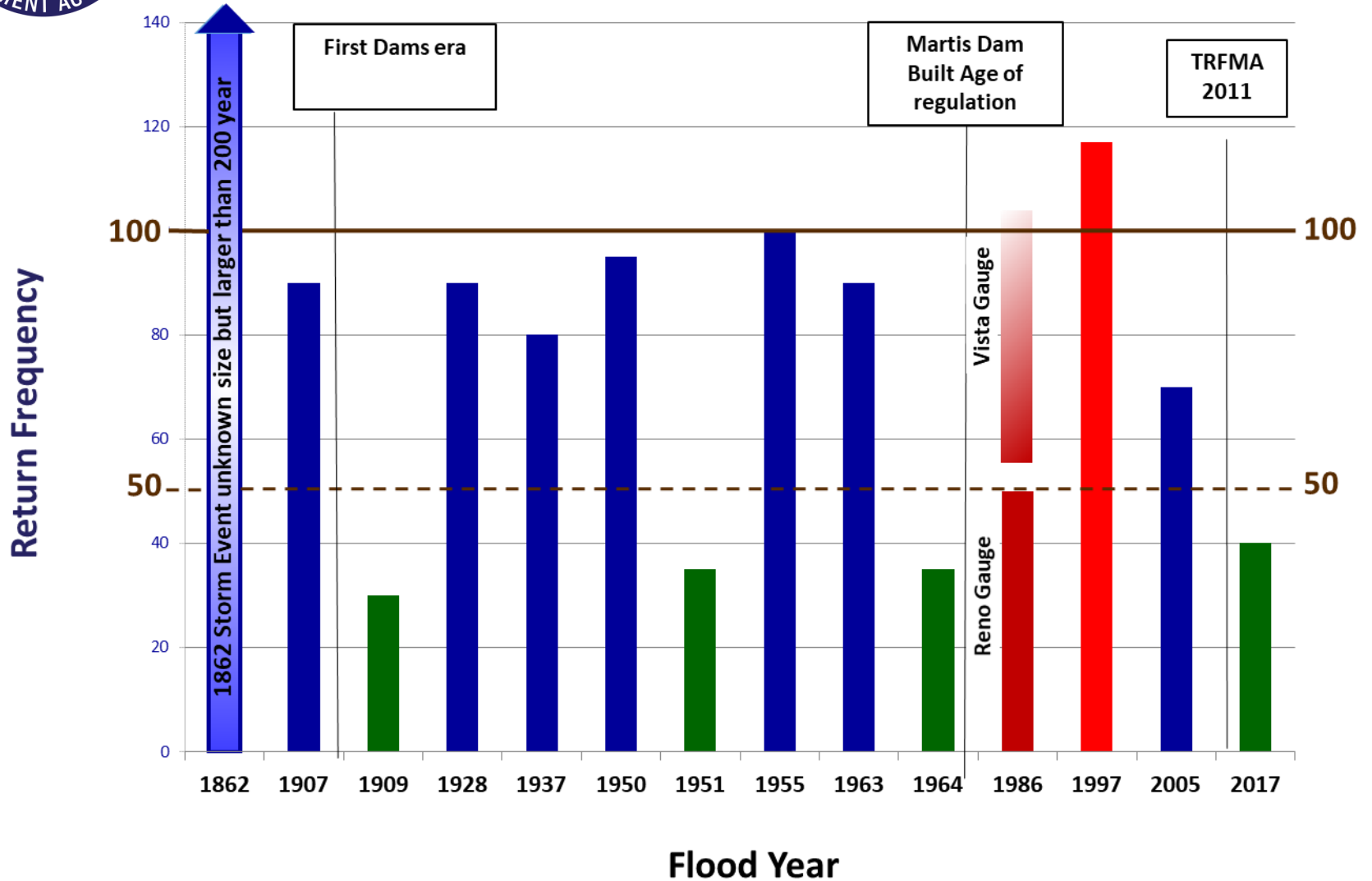
Flood Hazards & Mitigation in the Truckee Meadows

May 18, 2024

Danielle Henderson
NATURAL RESOURCE MANAGER



Flooding History – Regional Risk



1997 Flood

Sparks Industrial Area



*Lake Street
Bridge Debris
Removal*



*Rosewood
Lakes
&
Hidden
Valley*



Downtown Reno



1997 Flood – Debris at Derby Dam





TRFMA – Organization & Funding



- Flood Project managed by WC from 1998 -2011
- **Flood Management Authority officially formed in 2011**
 - ✓ Interlocal Cooperative Agreement – Sparks, Reno, and WC
 - ✓ Governed by Board of Directors
 - Sparks: Mayor Lawson, Donald Abbott (Chair)
 - Reno: Naomi Duerr, Miguel Martinez
 - Washoe County: Alexis Hill (VC), Clara Andriola
- Sales Tax Funds (1998) – Dedicated 1/8-cent to public safety and Flood Project yields \$8M (\$5M to \$6M after EOC debt service)
- Mission: create infrastructure and manage flood-related operations



Completed Capital Projects

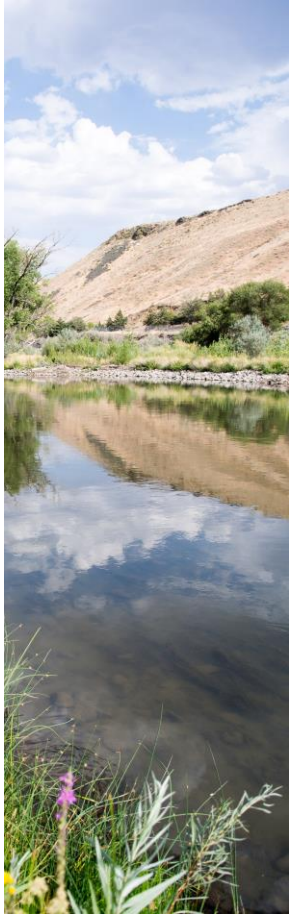


- New Virginia Street Bridge – \$12.2M
- Reno-Sparks Indian Colony Levee & Floodwall – \$1.8M
- Hidden Valley Engineering Study – \$0.5M
- Ecosystem Restoration: 102 Ranch, Lockwood, Lower Mustang Ranch, Tracy Power Plant – \$6.5M
- North Truckee Drain Realignment – \$5M
- Property Purchases, Relocations, Demolitions – \$48M



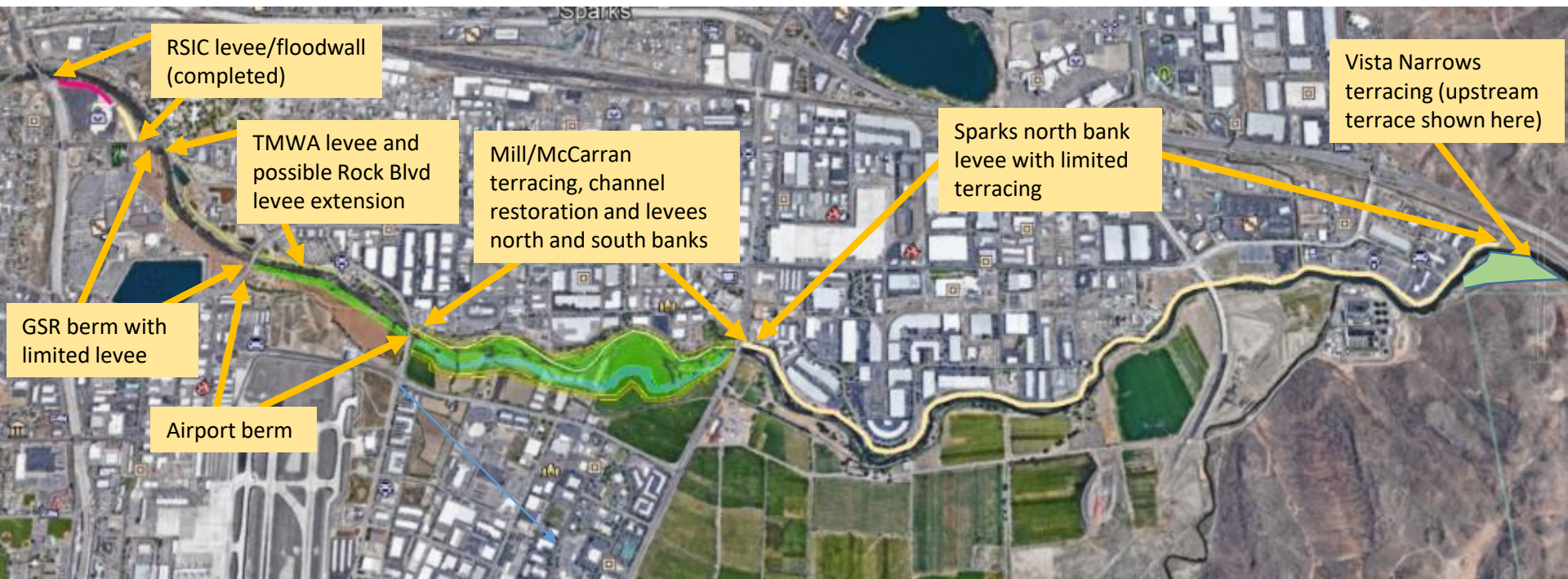
Current Work

- **Focused on Vista Narrows Floodplain Terracing Project**
- Developing 60% designs for new Meadows Project elements
- Managing the Physical Map Revision effort – just submitted package to FEMA for review (~2-yr process)
- Home Elevation Program continues (TRFMA + FEMA funds)
- Flood Warning System O&M and coordination with regional emergency managers
- Ongoing property management (security & clean-up)
- Overhauling TRFMA's website





New Meadows Project – Conceptual Design



WHAT'S NEW:

- Prioritize and build levees and berms (cost-effective, supported by stakeholders) rather than floodwalls
- Green infrastructure: excavate floodplain terraces and realign river channel (Mill & McCarran) to improve flood storage capacity and enhance habitat for fish and wildlife

**All "new" elements will have the same or better hydraulic properties to minimize downstream impacts.*



Proposed Construction Schedule





Area removed from 100-yr floodplain by Flood Project

From 2024 modeling update

Orange Areas:

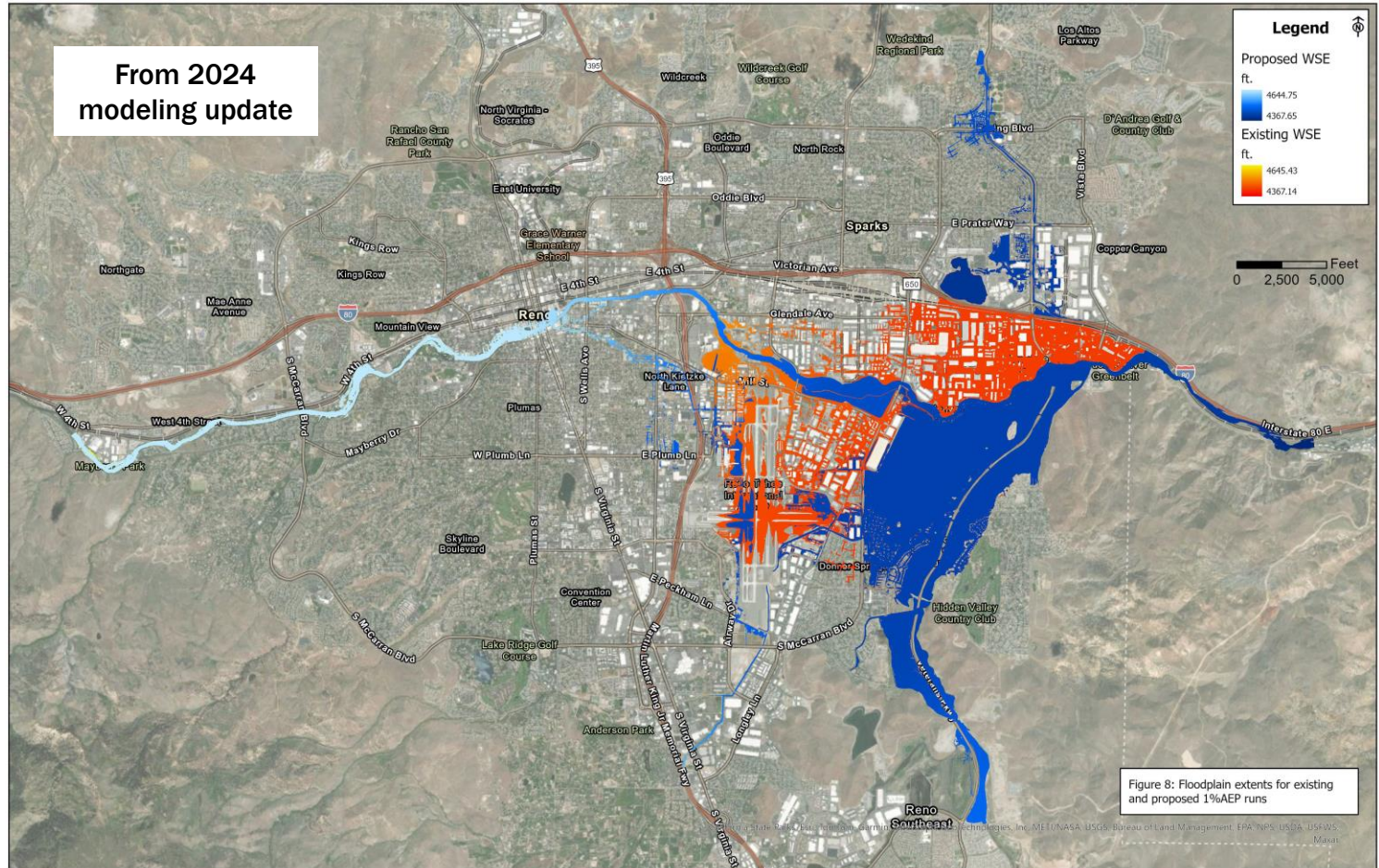
Will be removed from the flood zone after project is complete

Blue Areas:

Existing and future flood zone

Economic Benefit:

Flood impact of a 1997-type flood event reduced by as much as \$2 billion





Vista Narrows Floodplain Terracing Project

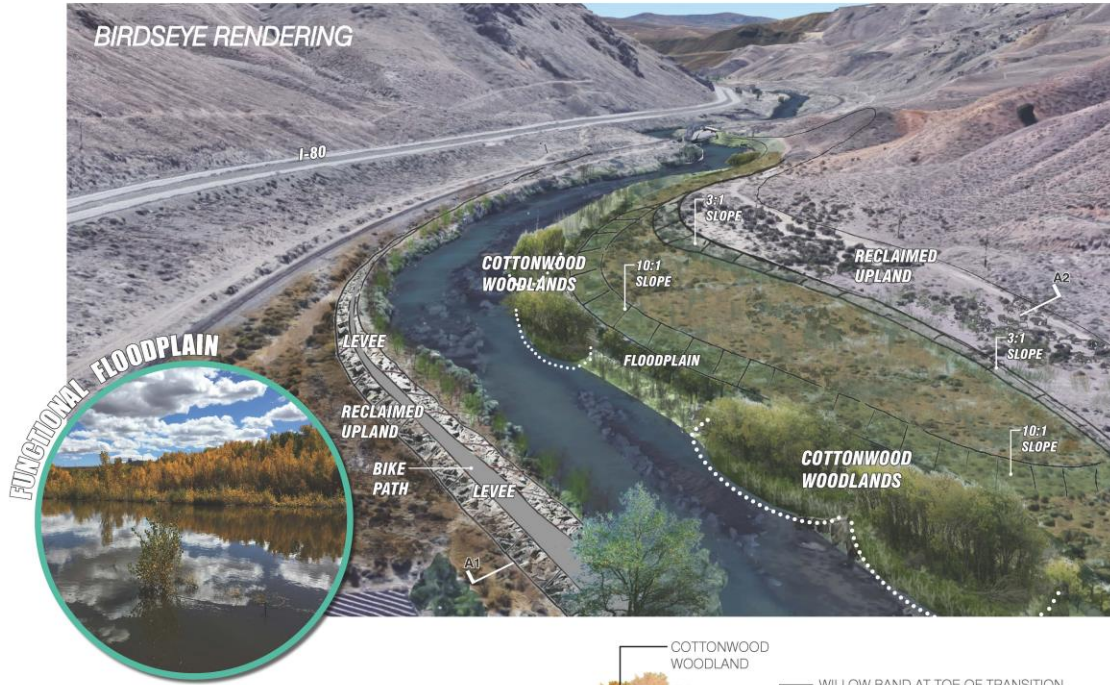


- River Terracing (current project)
 - ✓ Revegetation / Environmental
- Levee (part of larger project done later)
 - ✓ Armoring / Willows
- Floodwall (part of larger project done later)

**Balance Meadows benefits with downstream impacts*
*** Only opens up enough to prevent project-induced flooding in Meadows outside of industrial areas (only a slight drop in WSE)*

VISTA NARROWS

FLOODPLAIN TERRACE



SUMMARY: The construction of Terrace 6 involves lowering the south bank and re-establishing a wide, hydraulically-connected floodplain. The active floodplain areas nearest to the river bank will be planted with wetland and riparian vegetation that includes cottonwood and willow, native grasses, and emergent wetland plants. These areas will also include large rock to provide stability and hydraulic complexity in this geomorphically active zone. A band of willows will be situated along the toe of a gentle (10:1) slope that will support upland riparian shrubs adapted to periodic flooding. As the slope gradually transitions towards upland, more xeric, drought tolerant native shrubs and grasses will be established. Plantings will include container plants (for trees and some shrubs), live stakes (for willow), wetland plugs, and various mixes of hydroseed. The revegetation approach makes use of a detailed understanding of inundation frequencies and extents, anticipated depth to groundwater, and natural geomorphic processes to allow plant communities to become self-sustaining.



SECTION A1 - A2



Are you prepared for the next flood?

Now is the time to get ready.

- MAKE A KIT
- HAVE A PLAN
- BE PREPARED

Helpful resources
available online at
trfma.org



NORTHERN NEVADA
Public Health

Infectious Disease Risk Across the Region

Heather Kerwin, MPH, CPH
Epidemiology Program Manager

Infectious Diseases

- Epidemiology Program is with Northern Nevada Public Health's Epidemiology & Public Health Preparedness Division
 - Staff include 1 Program Manager/Senior Epidemiologist, 5 Epidemiologists, 2 Statisticians, and 1.5 FTE Office Support Specialist
 - Conduct surveillance and report data to CDC as required by the federal government and Nevada Revised Statutes 441A
 - **24/7 infectious disease reporting line 775-328-2447**
- Track and investigate reportable infectious diseases
 - Person-to-person (many are vaccine preventable)
 - Vectors to people (mosquitos, ticks, wild game, livestock, pets)
 - Food or water to people (bacterial growth or contamination of fecal matter to mouth)
 - Healthcare associated infections (germs picked up in a hospital or healthcare setting)
- Also monitor for infectious agents which could be used in acts of bioterrorism
 - Botulism, anthrax



Infectious Disease Risk in the Region

Disease Group	Risk Level	Background	Examples
Foodborne or waterborne	Moderate	<p>Most frequently reported</p> <p>Usually from improper food handling, storage, or reheating</p> <p>Drinking untreated/recreational water</p>	<i>E. coli</i> , salmonella, giardia, cryptosporidiosis, campylobacteriosis, listeriosis, botulism
Vaccine preventable	High	<p>Nevada has historically low vaccination rates</p> <p>Equates to a higher number of persons who can become case zero and spread to others</p> <p>Not a large urban center, however Washoe County is home to special events drawing visitors from around the county</p>	Measles, polio, influenza, diphtheria, hepatitis A, hepatitis B, mumps, mpox
Vectorborne	Low → Moderate	<p>Depending on drought conditions can see larger years for mouse & rodent populations</p> <p>Ticks are becoming more common</p> <p>As temperatures increase, concerns with <i>Anopheles</i> mosquito populations increasing</p>	Hantavirus, West Nile Virus, Lyme Disease, rabies, malaria, plague, dengue

Infectious Disease Risk in the Region

Disease Group	Risk Level	Background	Examples
Person-to-person, not vaccine preventable	Varies	Various conditions	Sexually transmitted infections, tuberculosis (not routinely vaccinated in the US), outbreaks
Emergent pathogens	Low	Would not expect to see a case in our region first, however equal risk as rest of county – currently low across nation	Highly pathogenic avian influenza, viral hemorrhagic fevers like ebola
Antimicrobial resistant organisms	Moderate → Higher	Area hospitals have systems in place to prevent and reduce risk, however Las Vegas is home to the largest outbreak of <i>Candida auris</i> in the nation and still growing	Carbapenem resistant organisms, Carbapenemase producing organisms, <i>Candida auris</i>



NORTHERN NEVADA
Public Health+

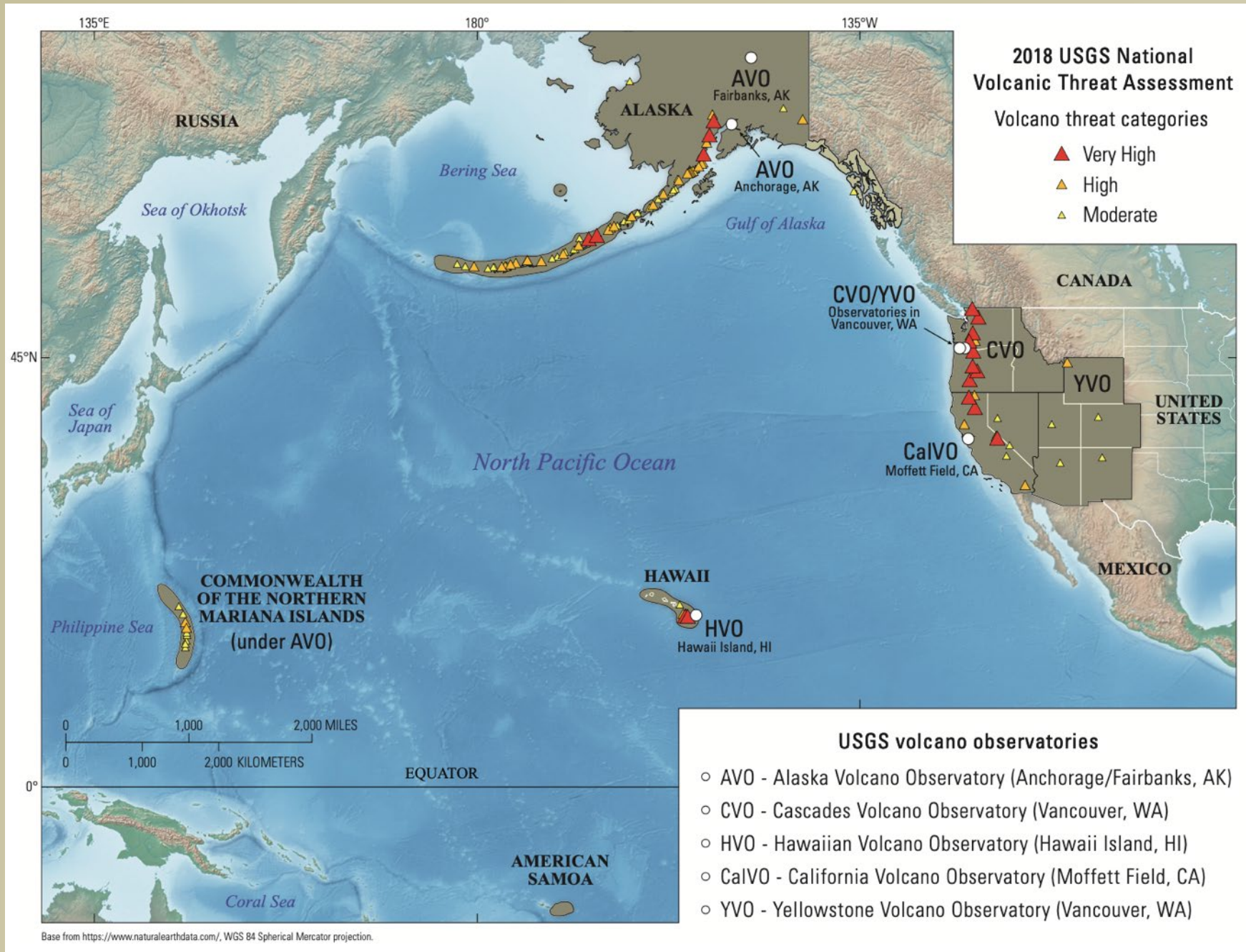


Andy Calvert
Scientist-in-Charge
USGS California
Volcano Observatory

Over the past 30 yrs, 43 volcanoes in the US produced 95 eruptions and 32 episodes of unrest. About 50 US volcanoes with potential to harm (red & orange).

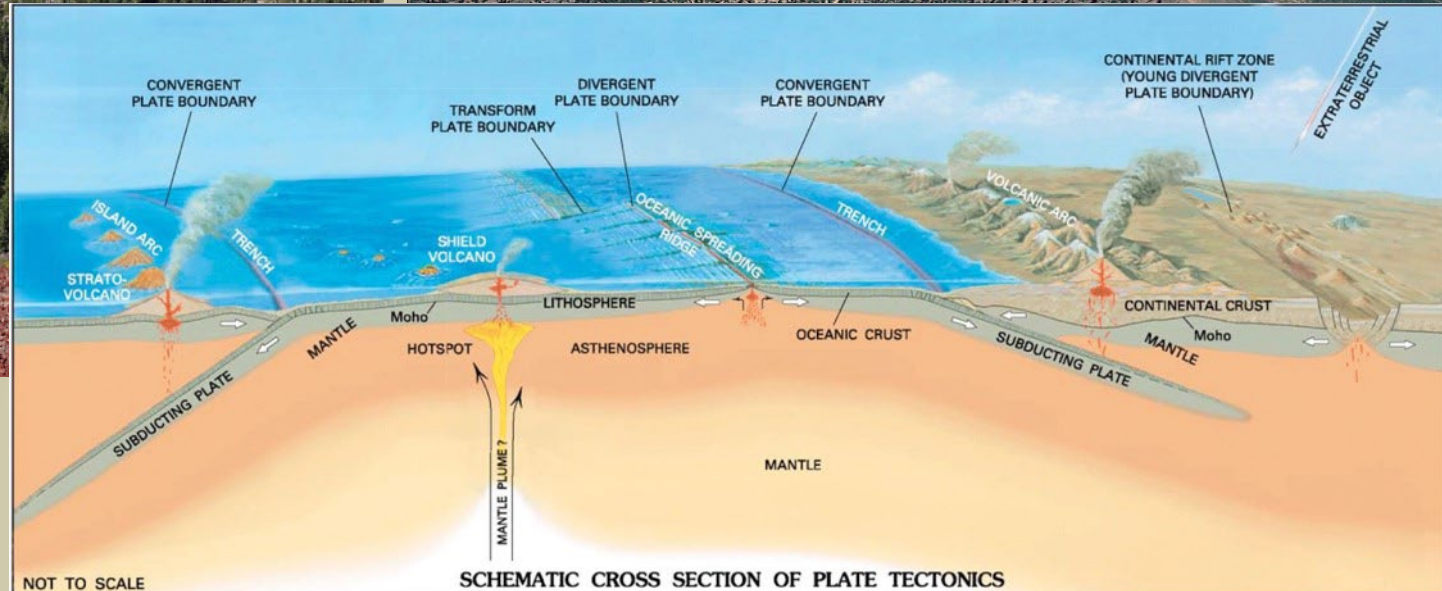
The USGS Volcano Science Center has ~200 staff in five observatories

- Monitor capable volcanoes
- Coordinate with partners
- Educate public
- Research volcanic histories and processes
- Respond to unrest



What is a volcano?

An area where melted rock (magma) reaches the surface.



Volcano Hazards

2016, Pavlof Volcano, Alaska
N. Almandmoss, USCG

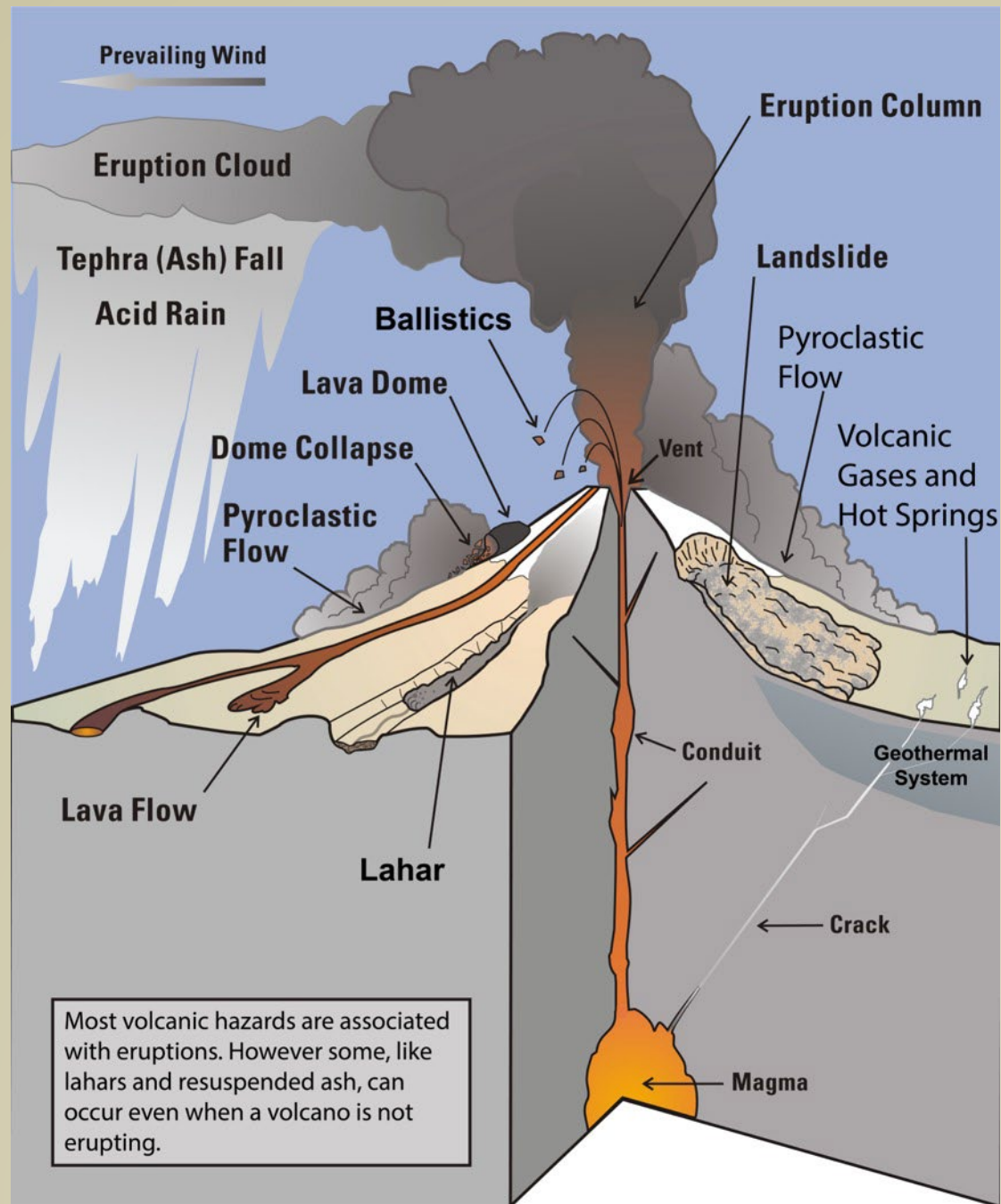


Explosive Eruptions
Damaging and life-threatening

2018, Kilauea Volcano, Hawaii
C. Parchetta, USGS



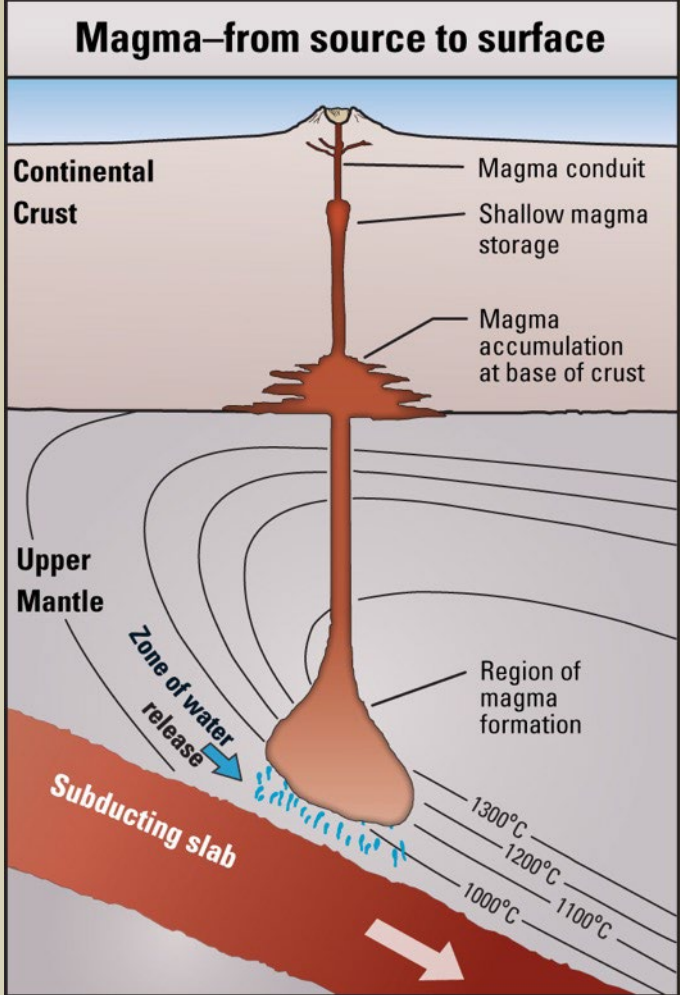
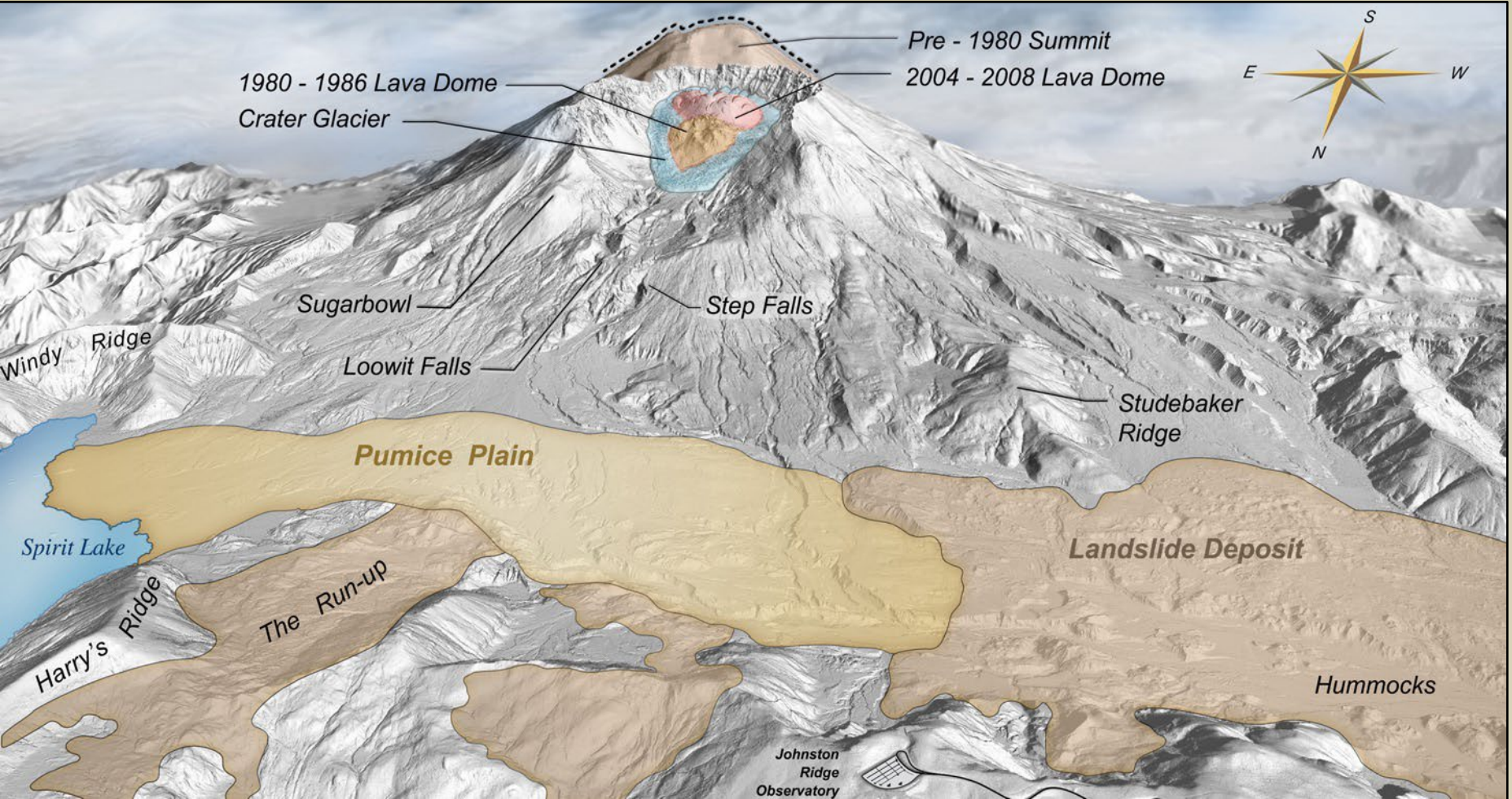
Effusive Eruptions
Damaging, but probably not life threatening

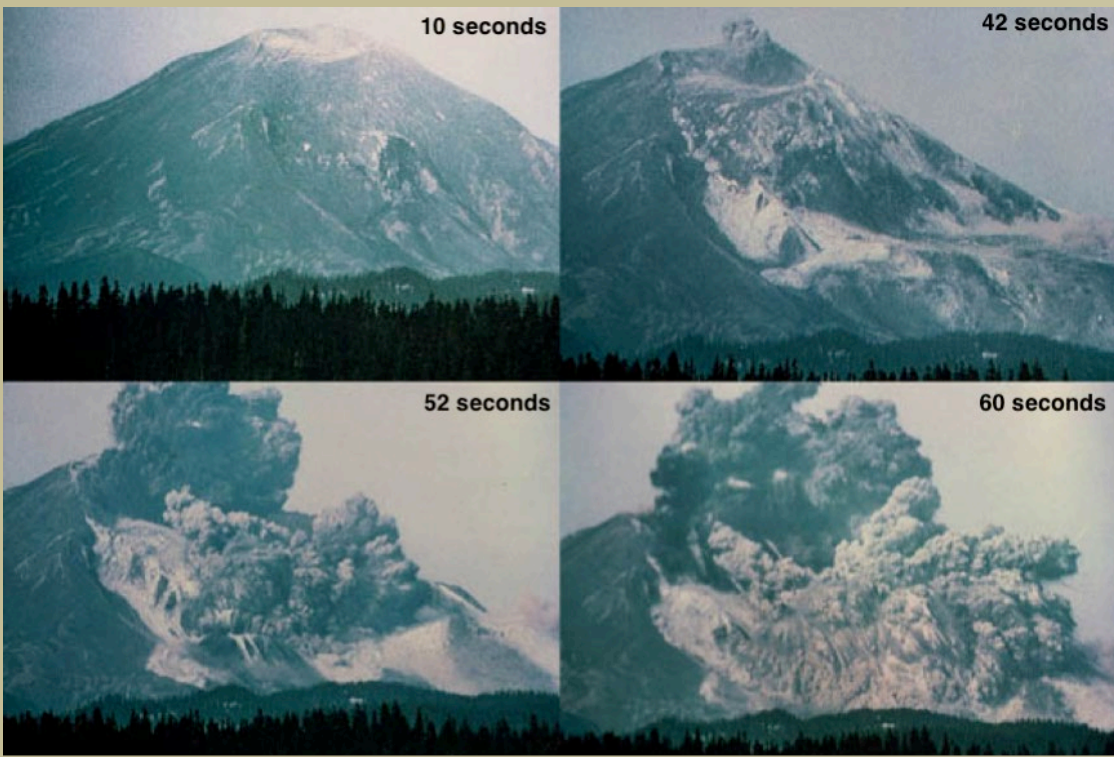


<https://pubs.usgs.gov/fs/2018/3075/fs20183075.pdf>

Mount St. Helens Washington

Mt. St. Helens unrest began March 1980 with a deep earthquake, followed by shallowing seismicity and significant deformation (>3' per day) of the north flank through May. On Sunday morning, May 18 at 8:32 am a M5 earthquake triggered the largest recorded landslide, a pyroclastic surge that mowed down forests, and a Plinian eruption that delivered ash to the east.



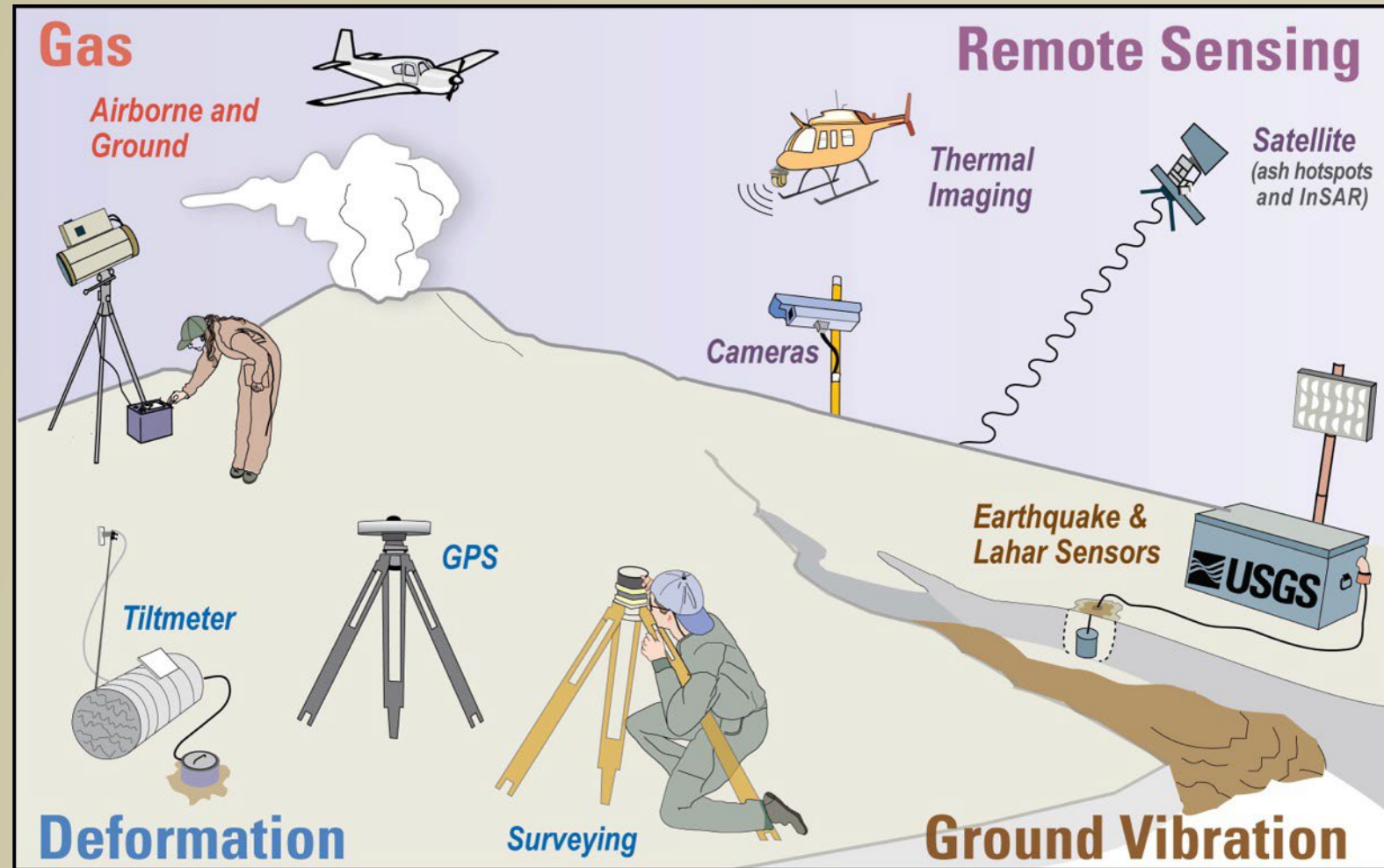


May 18, 1980



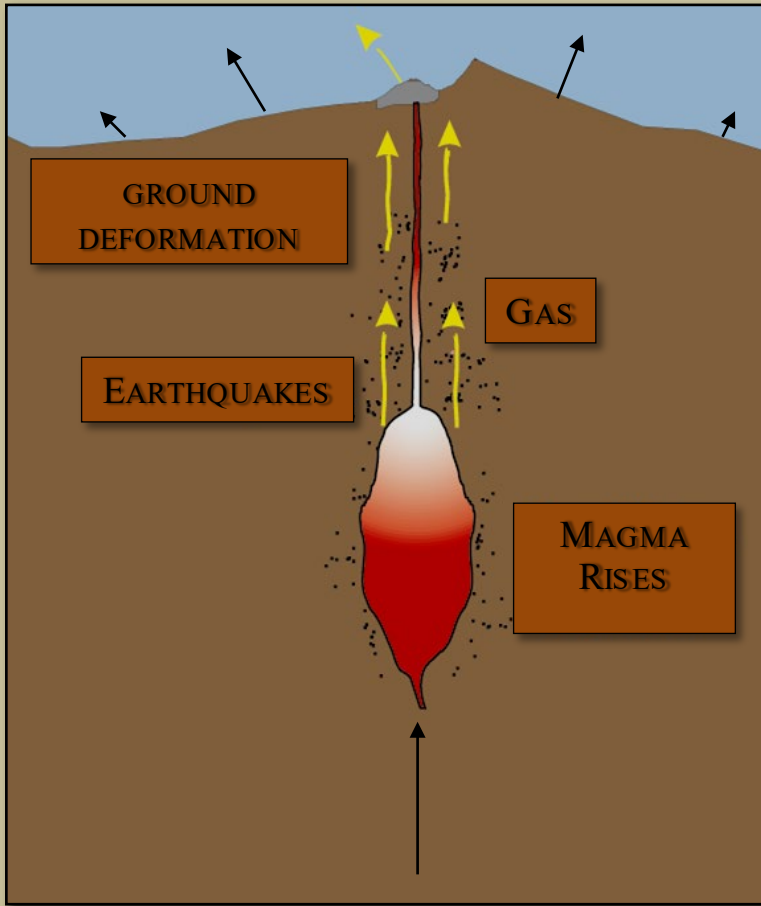
Most volcanoes don't erupt most of the time. How do we tell when they might?

- Volcanoes typically cause earthquakes as magma/gas works its way to the surface
- They typically deform (commonly inflate) prior to eruption
- They usually emit gas as magma ascends



SHORT-TERM FORECASTING

SENSORS & DATA STREAMS



Modern Methods of Volcano Monitoring





The California Volcano Observatory is responsible for monitoring and studying California and Nevada volcanoes, and for preparing for volcanic unrest.

<https://usgs.gov/calvo>





Making a Hazard Profile

- Describes the location, extent, previous occurrences, future probability, vulnerability, and impacts.
- Includes a consequence analysis.
- Evolves mapping and conducting loss estimates for identified hazards.





Discussion Question

What parts of your community are most vulnerable to these hazards?





Assessing Capabilities

- Evaluation of current mitigation capabilities:
 - What policies, resources, and programs are in place?
 - Do they support hazard mitigation?
 - How could these capabilities be expanded or improved upon?





Developing the Mitigation Strategy

- Long-term blueprint for reducing disaster losses
- Includes goals, actions, and an action plan.
- Identifies a comprehensive range of actions.



Creating Defensible Space
Reduces the Impacts of Wildfires



Seismic Retrofitting Helps Protect
Communities from Earthquakes



Rain Gardens Provide Many Benefits
Including Reducing Flooding and
Stormwater Runoff





Mitigation Goals

- Goals from the previous plan:
 - Goal 1: Maintain and expand transportation routes across the County, during and after key hazard events.
 - Goal 2: Maintain emergency services capabilities by providing redundancy.
 - Goal 3: Maintain key communications to ensure connectivity during and after key hazard events.
 - Goal 4: Maintain the reliability of utilities (electricity, gas, drinking water, sewer) during and after key hazard events.
 - Goal 5: Minimize property damage and reduce repetitive losses to property from key hazards.
 - Goal 6: Increase public participation and responsibility in reducing their risks.





Types of Actions

- Local plans and regulations
- Structure and infrastructure projects
- Natural systems protection
- Education and awareness programs





Discussion Question

What mitigation actions do you want to see implemented?





Public Survey

- Any additional feedback? The public survey is open now till June 1st:

Washoe County Regional Hazard
Mitigation Plan Public Survey



Encuesta del Plan Regional de
Mitigación de Riesgos de Condado
de Washoe





Next Steps

- Plan participant plan review.
- Public plan review.
 - *Please check the County website for updates!*
- Submit plan for State and FEMA plan review.
- Each plan participant adopts the plan.
- Receive final FEMA approval once plan is adopted.
- Implement the plan.



Questions



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