Tribal Mitigation Planning Workshop

Module 2: Risk Assessment

FEMA

Plan Development Overview

Remember! Even after your Tribal plan is approved, the planning process continues through implementation of your mitigation strategy. In addition, your plan must be updated every five years to maintain eligibility for certain FEMA grants.

1

Describe your community.

Describe the planning area, Tribal assets, and any unique characteristics of your Tribe.

2

Identify your hazards.

Figure out what natural hazards could occur in your planning area.

3

Explain impacts that hazards can have on the community.

Describe what the natural hazards could do to your people, property, and land and determine the Tribe's biggest hazard concerns.

4

Review your current capability to mitigate the impacts.

Inventory your Tribe's plans, policies, and programs that could be used to protect your community.

5

Develop the strategy.

Keeping in mind your risks and your capabilities, identify your Tribe's mitigation goals and actions.

6

Develop an action plan.

Prioritize your actions and develop the details to assist with implementation.

7

Keep track of progress.

Observe and record progress in implementing your mitigation program using a defined method and schedule.

Risk Assessment

What is a Risk Assessment?

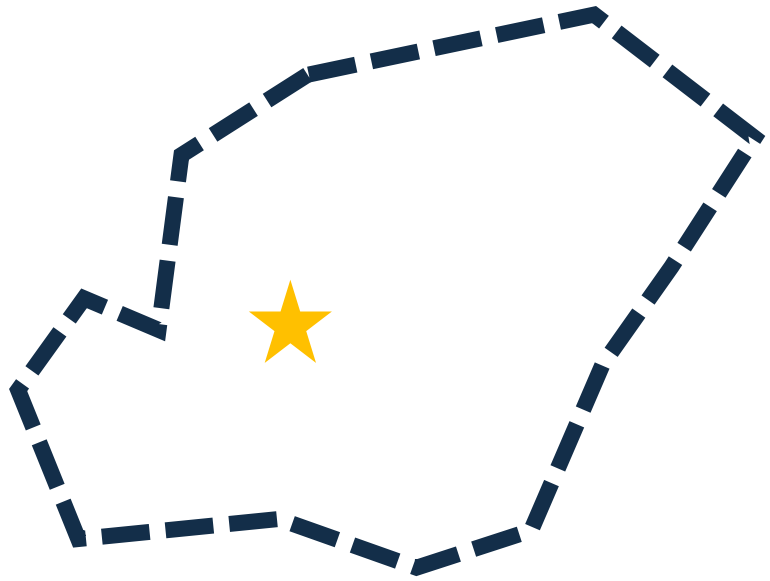
- A process that helps Tribes:
  - Understand how natural events will affect your community
  - Communicate vulnerabilities
  - Inform decision making
- The foundation for a mitigation strategy to reduce future losses
- Focuses on the planning area defined during the planning process

Risk Assessment Terms

1 Describe your community

Describe the Planning Area

- Identify the planning area
- Describe land you maintain outside reservation boundaries
- Identify status of the lands (e.g., fee, trust, usual, and accustomed)



! If you're working with other communities, each community must describe its respective planning area(s)

Who and What do You Want to Protect?

People

Buildings

Economy

Critical Facilities and Infrastructure

Historical, Cultural, and Sacred Sites

Natural Environment

People

- Tribal residents and employees
- Elders, special needs, and other dependent populations
- Visiting populations

Remember how you defined "public" in the planning process!

Economy

- Major employers
- Primary economic sectors
- Key infrastructure that supports economic activity

Historical, Cultural, and Sacred Sites

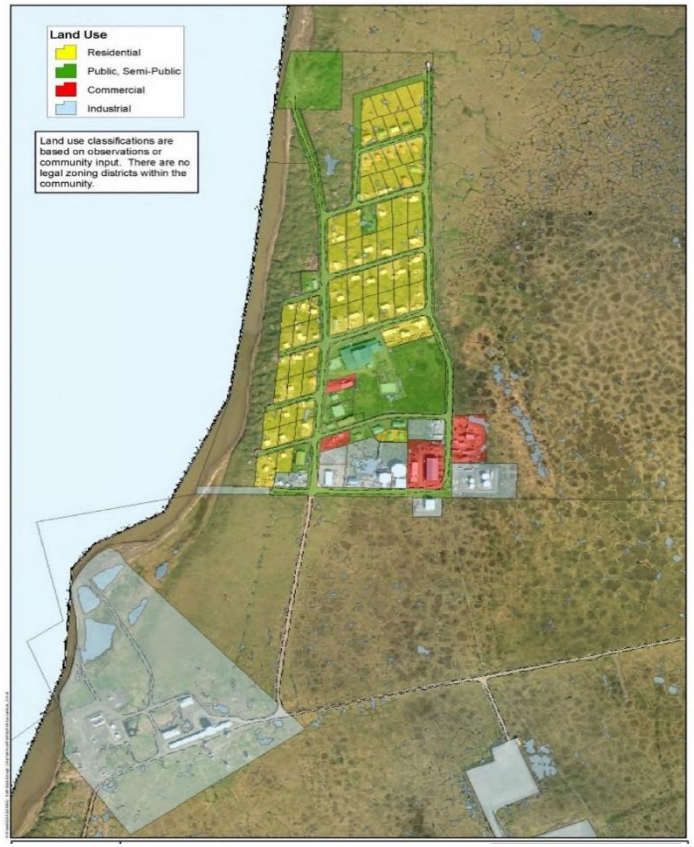
- Includes buildings, objects, sacred sites, historic districts, archival storage facilities, etc.
- May include landscape features
- It is highly recommended that plans discuss these sites, but the information can be kept internal

! Information on cultural and sacred sites, including location and value, can remain private within the Tribe.

Buildings

- Include locations, types, value, and construction materials
- Consider infrastructure:
  - Existing
  - Planned for new development
- Describe planned facilities capital improvements

Figure 4-16 Point Lay Land Use Map



Source: North Slope Borough Hazard Mitigation Plan, 2015

Critical Facilities and Infrastructure

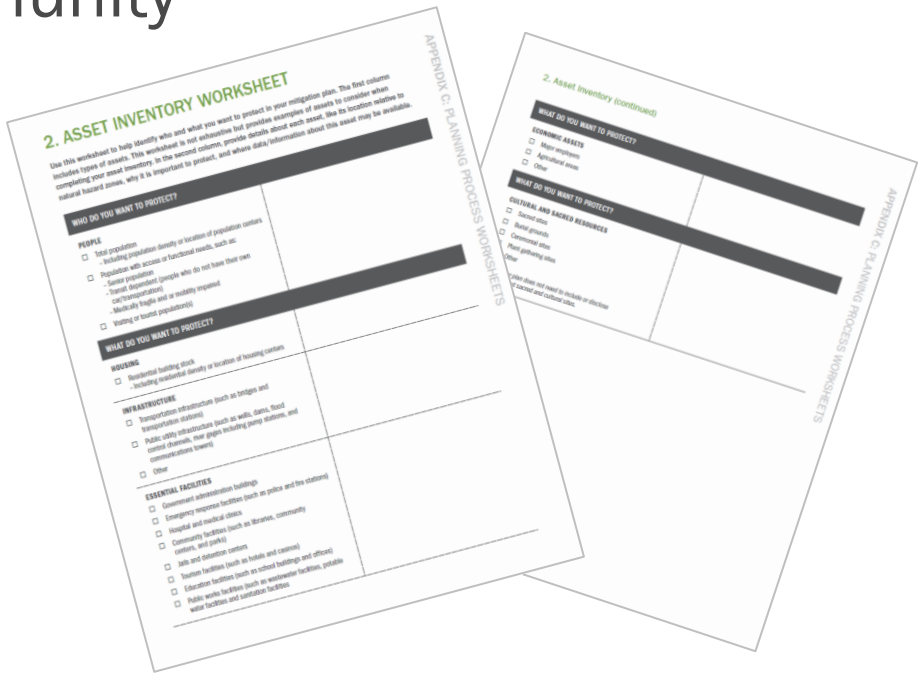
- Include locations, types, value, and construction materials
- Many critical facilities are dependent on utility infrastructure to function, and vice versa

Natural Environment

- Environmental functions that reduce the magnitude of hazards
- Critical habitat areas to protect
- Hunting, gathering, and fishing areas
- Other natural resources

EXERCISE 3

- What is most important to your community? What do you want to protect?
- Using the worksheet, create an inventory of the assets that you have in your community



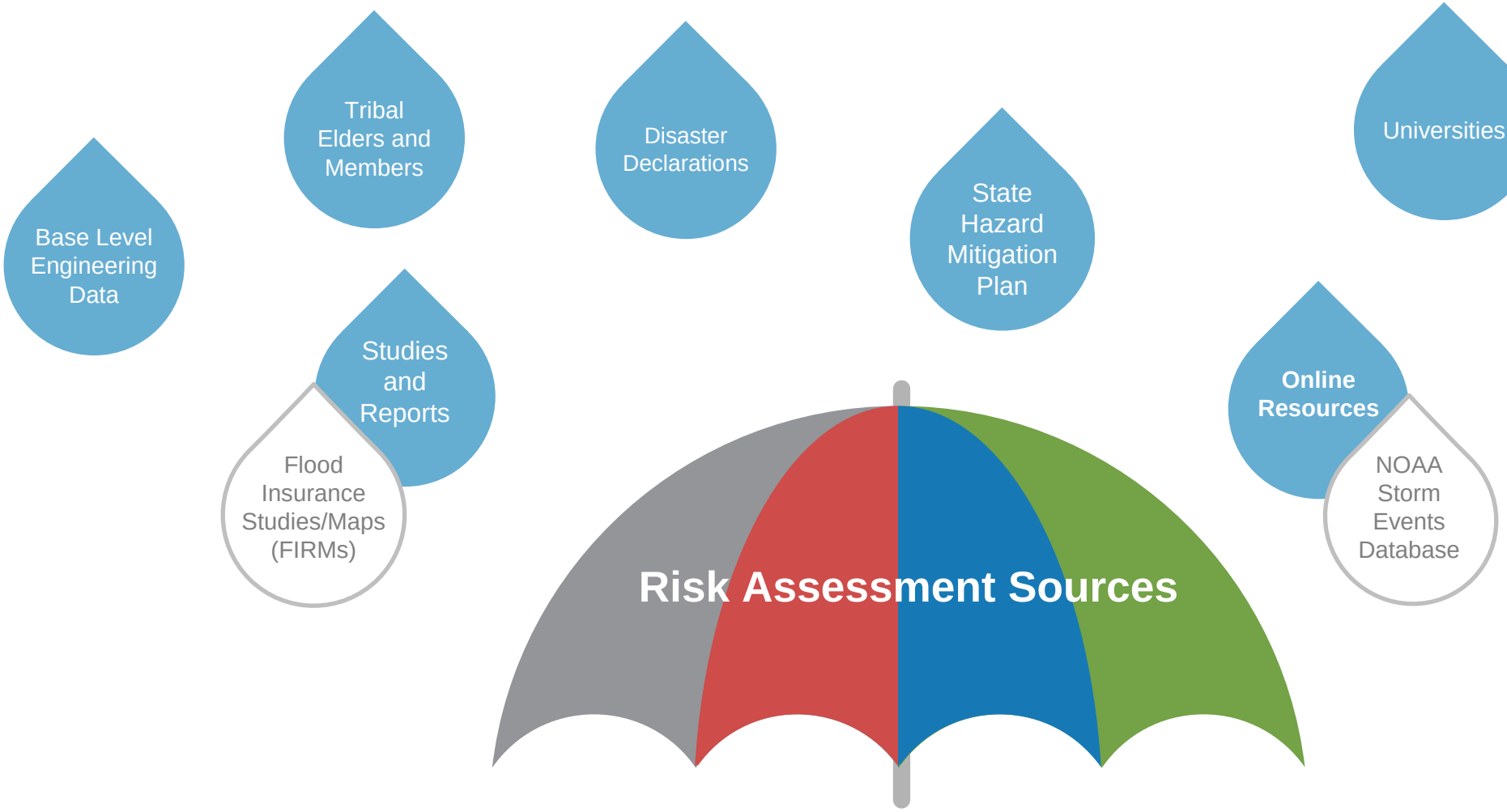
Questions?

2 Identify your hazards

Hazard Identification Goal

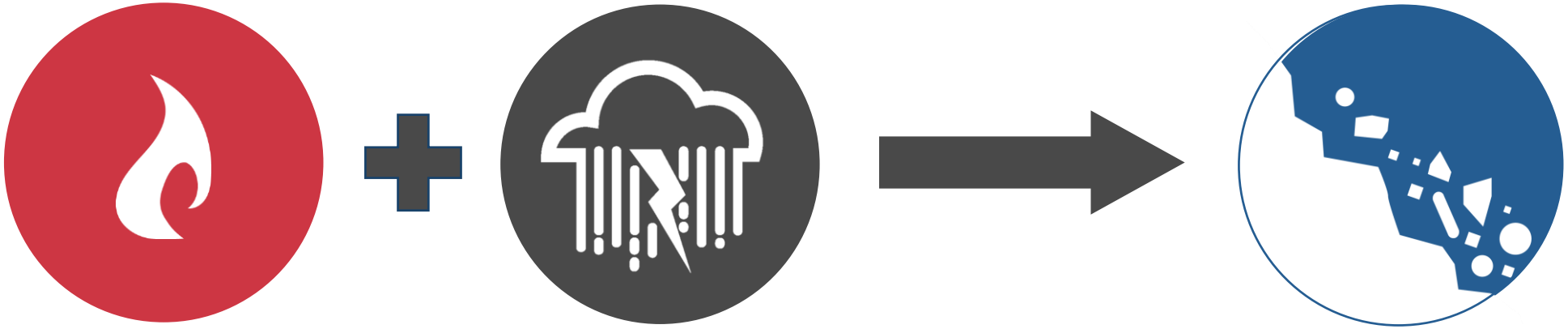
- Generate a complete list of the types of natural events that threaten the planning area

Sources of Hazard Information



Secondary Hazards

- Some hazards can produce another, separate hazard

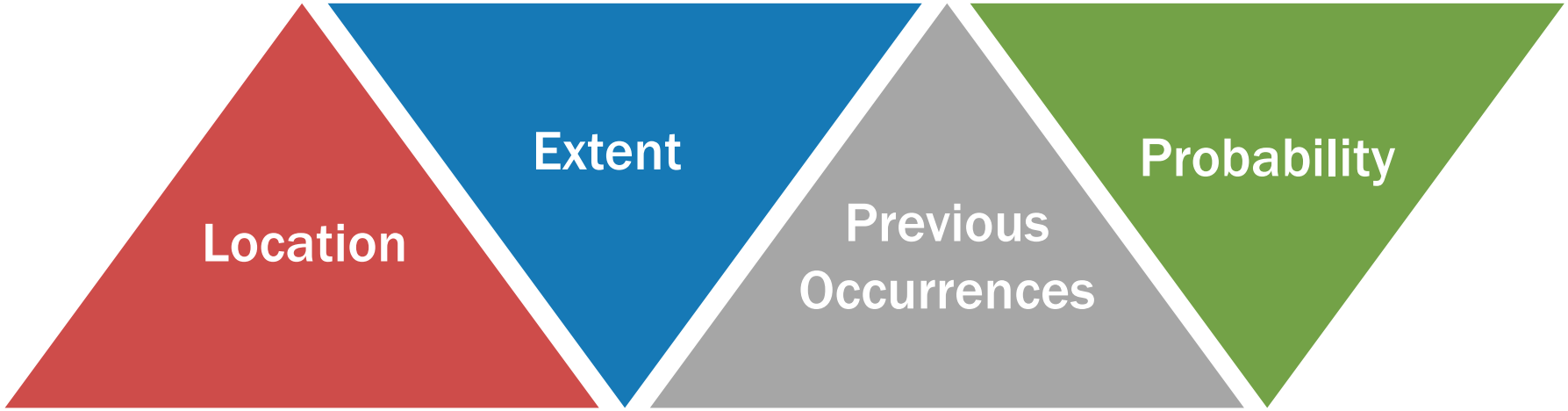


Hazard Identification Summary

Hazard	Yes/No	Decision to Profile Hazard
Avalanche	No	The Tribe's topography is not likely to produce avalanches; no instances of avalanches have been observed in the Tribe's planning area.
Earthquake	Yes	Designated as a hazard in Alaska's All-Hazard Risk Mitigation Plan. Community members remember feeling the 1964 earthquake. However, no earthquakes have been felt since 1964.
Erosion	Yes	Designated as a hazard due to an extensive history of erosion.

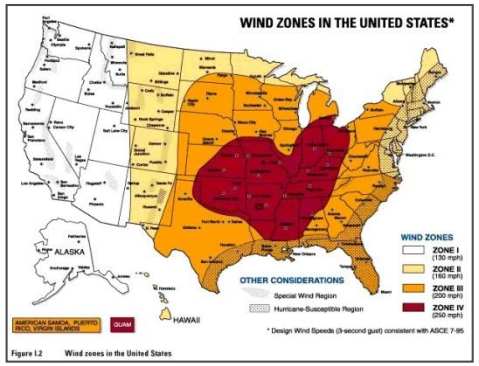
Example excerpt from *City of Shaktoolik/Shaktoolik Tribal Council, Alaska* Multi-Jurisdictional Hazard Mitigation Plan

Hazard Descriptions

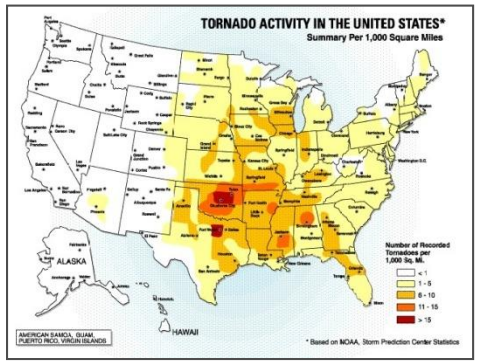


Location

- Clearly identify areas vulnerable to damage by each natural event
- If possible, show locations using maps



Source: FEMA, Taking Shelter from the Storm (2008)



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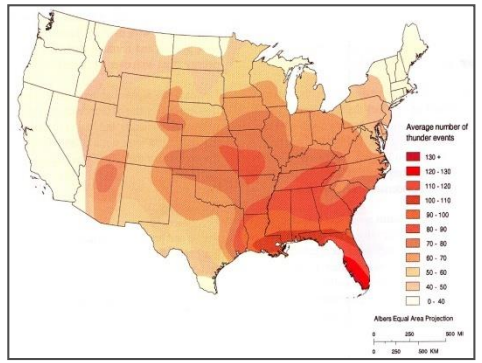
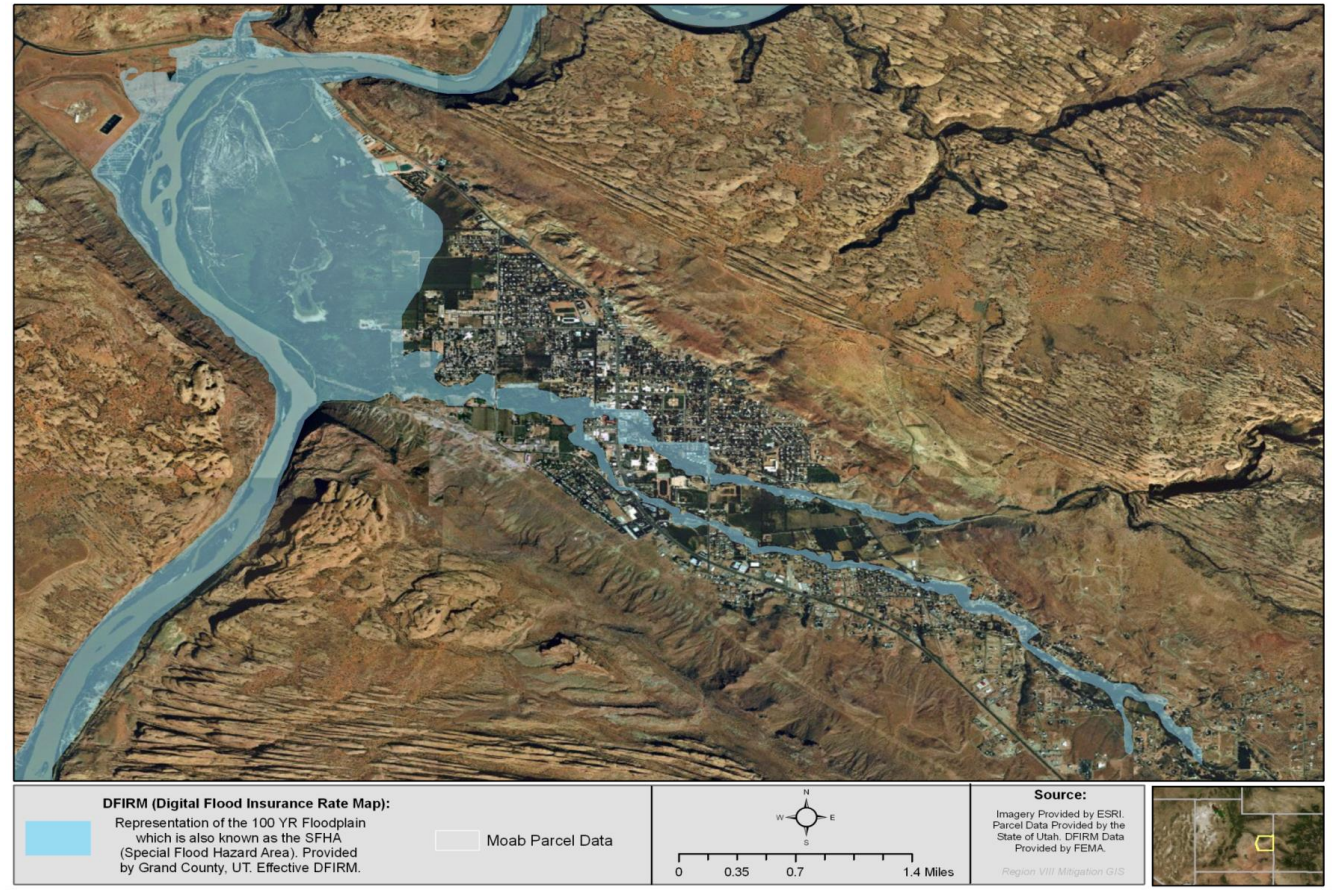


Source: FEMA, Multi-Hazard Identification and Risk Assessment (MHIRA) (1997)

Location Example

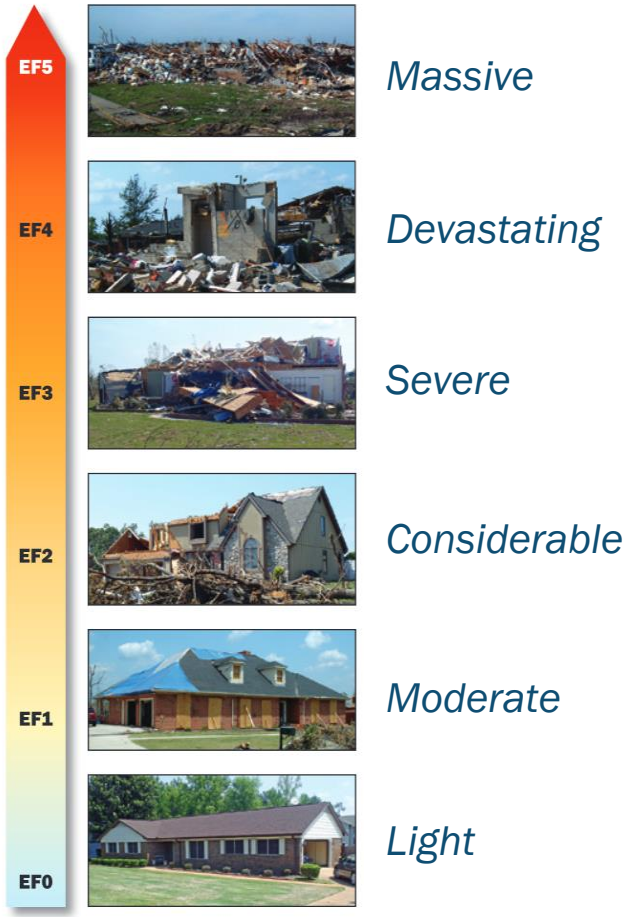
Utah: Moab

Colorado River (DFIRM)



Extent

Enhanced Fujita Scale (EF-Scale)



- Extent is the anticipated severity and/or magnitude of a hazard
- Measure of a hazard event's strength
  - Value on an established scientific scale or measurement system
  - Other measures of magnitude, such as water depth or wind speed
- Speed of onset of a hazard event
- Hazard event duration

Extent vs. Impact

Extent

- The potential magnitude of a hazard
- Think of the Enhanced Fujita Scale or the Richter Scale
- This does not refer to the geographic location!

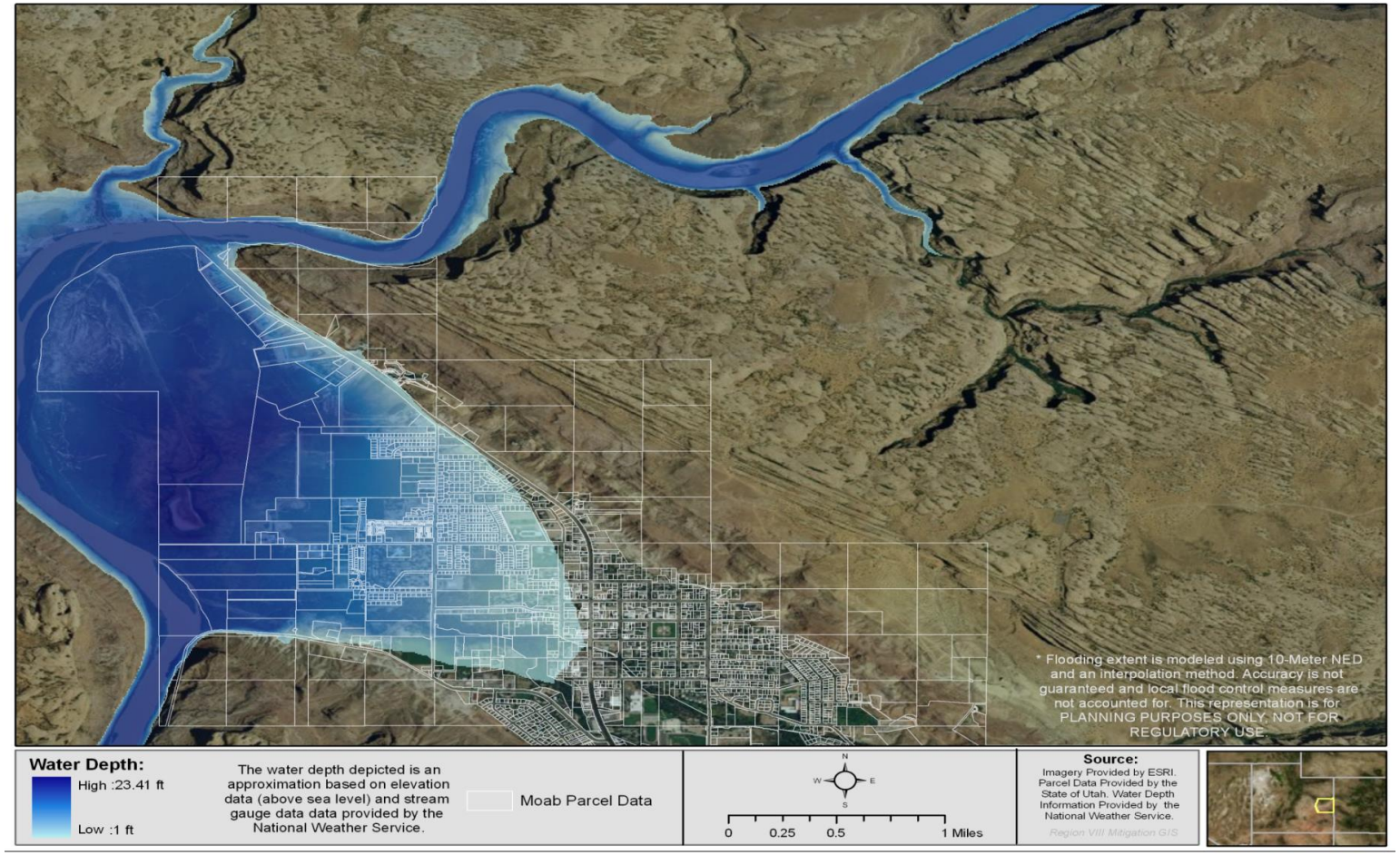
Impact

- Refers to the effect of a hazard on the people and property in the community, for example:
- Injuries and deaths
- Percent of property damaged

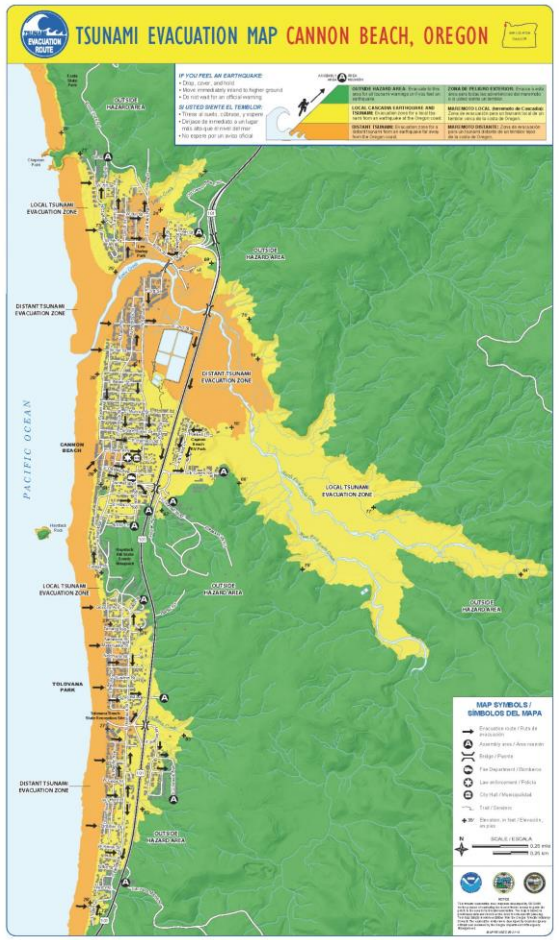
Extent (Flood Depth)

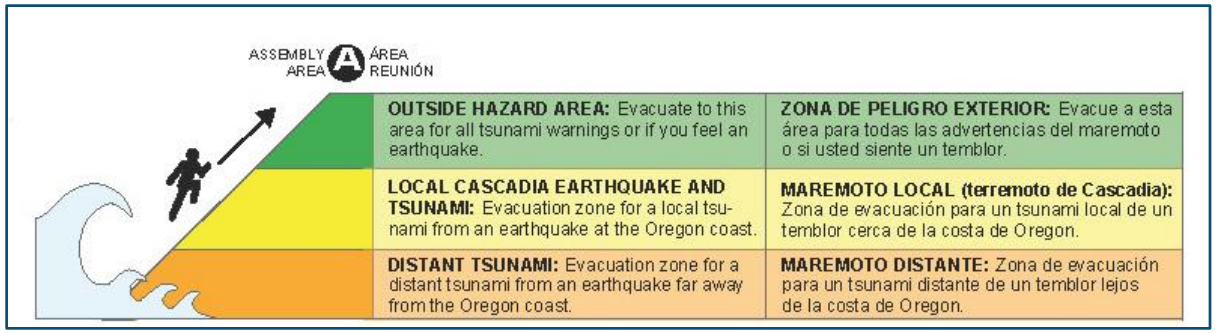
Utah: Moab (North Western)

Colorado River, Major Flood Stage (23ft)



Extent (Local vs. Distant Tsunami)

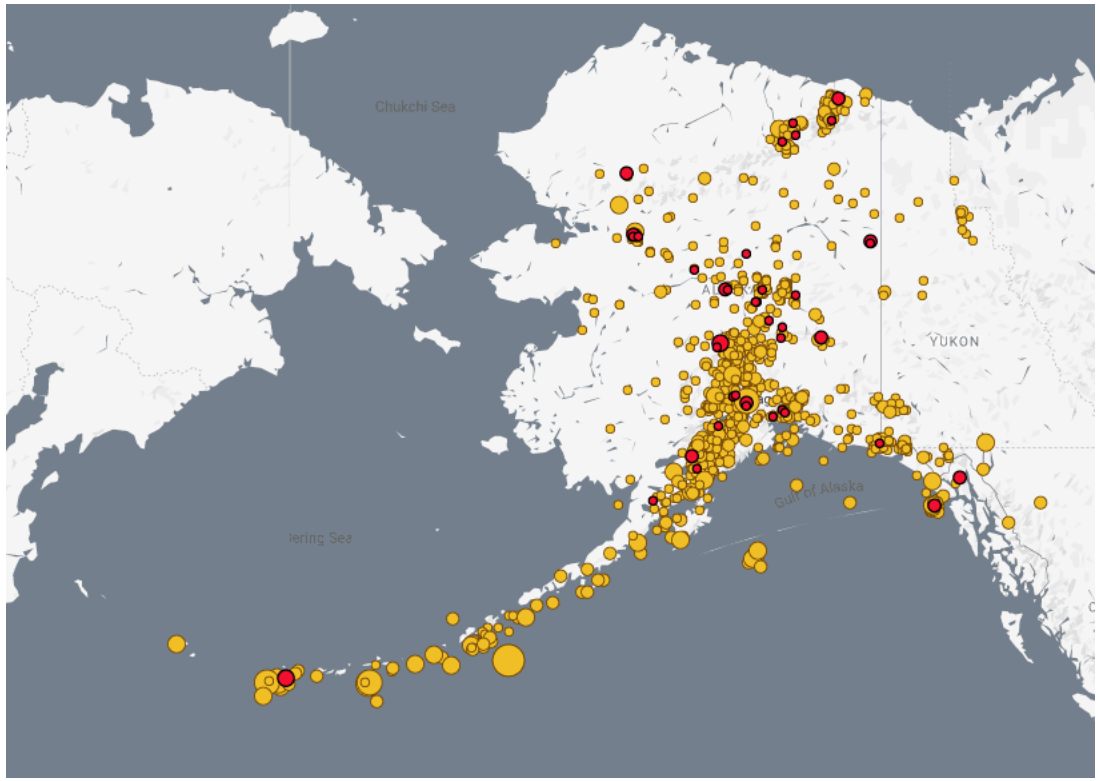




Source: Oregon Department of Geology and Mineral Industries, Evacuation Brochure for Cannon Beach, OR

Previous Occurrences

- Describe how each hazard has affected the Tribe in the past
- Examples can include:
  - Dates of events
  - Description of the damage that occurred
  - Duration of each event
  - Include Presidential Emergency and Disaster Declarations



Previous Occurrences

Year	Event Type	Estimate Magnitude	Reported Damage
2015	Riverine Flood	Heavy rain caused flooding on the Big Rock Creek, forcing road closures	Flood damage to homes and commercial facilities in Big Rock with estimated losses totaling $3 million
2008	Thunderstorm	Abnormally heavy precipitation caused flash flood in the area surrounding Lodge	Damage to hiking and camping area. Damage to cultural sites (including medicinal herb gathering areas)
2002	Thunderstorm	Extended period of rain and flooding along Big Rock Creek and its tributaries	Damage to homes and commercial buildings in Big Rock estimated at $2 million. Crop damages and loss of livestock estimated at $1.5 million
1997	Thunderstorms – Flash Flood	Heavy rain, thunderstorms caused a flash flood on Big Rock Creek	The wastewater management facility was inoperable for 1 week. Nearly half of the homes along Big Rock Creek were damaged, and a few were destroyed

Probability of Future Occurrences

- Qualitative Approach
- Regional Data Approach
- Down-scaled Data Projections Approach
- Historical Analysis Approach

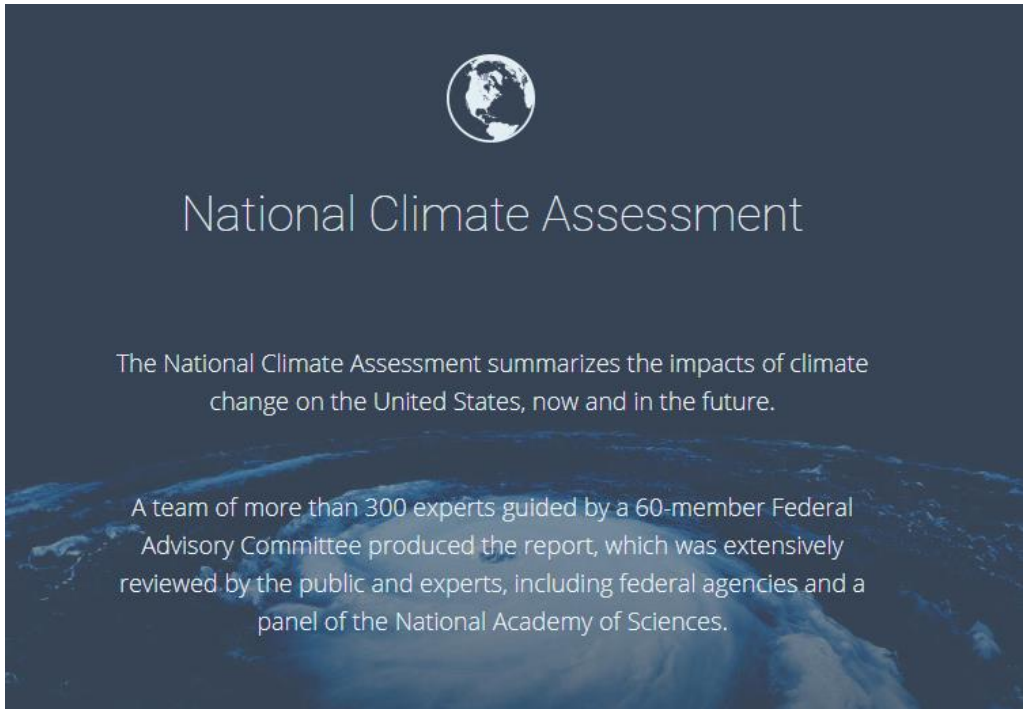
! Probability must also account for future climate and weather patterns. As climate patterns shift, some hazards and vulnerabilities will change.

Qualitative Approach

- Descriptions based on Tribal knowledge
- Can use general descriptors

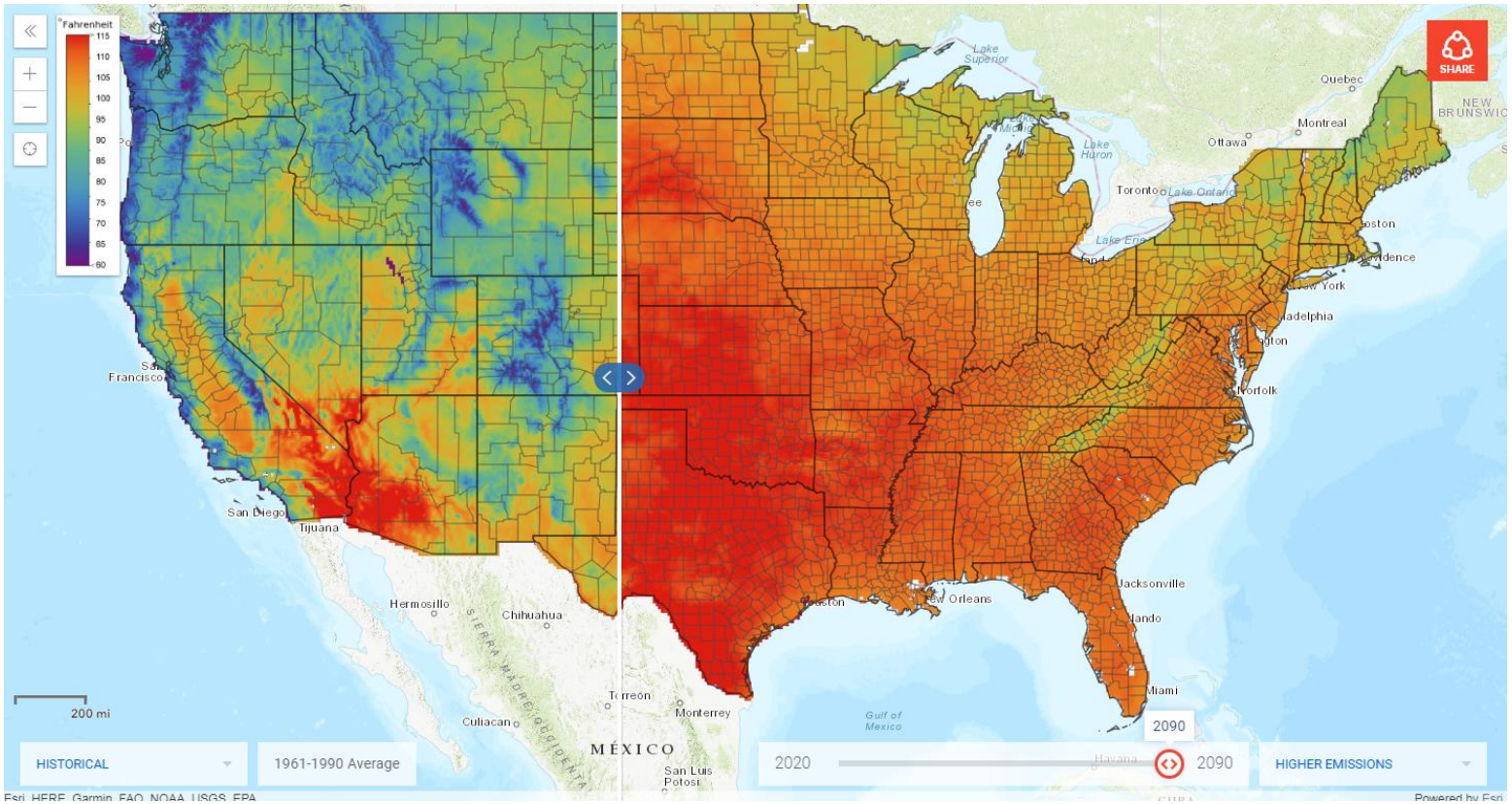
Regional Data Approach

- Use National or Regional data to identify probability
- Look at trends affecting the Nation at large



Down-scaled Data Projections Approach

- Uses more localized data to identify trends



Historical Analysis Approach

- Uses historical data to indicate the likelihood of future events
- Use as a last resort

$$\frac{\text{Hazard occurs } \mathbf{20} \text{ times}}{\text{Over } \mathbf{50} \text{ years}} = \mathbf{40\%} \text{ annual chance}$$

EXERCISE 4

- Who are the groups that might be most vulnerable to hazards?
- Consider the following:
  - Children and elders
  - Those living below the poverty line
  - Critical economic drivers, such as local businesses, colleges, and tourist sites
  - Sensitive environmental areas

Questions?

3 Explain hazard impacts

Natural Hazards, Tribal Community Assets, and Risk

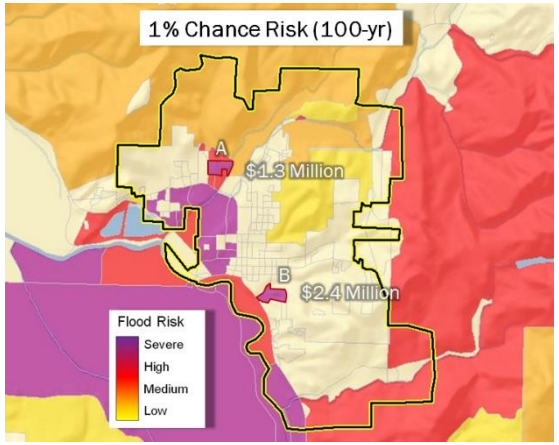
Note: Modified from U.S. Geological Survey and Oregon Partnership for Disaster Resilience Models.

Assess Impacts and Vulnerability

- Look at the impacts for each hazard:
  - Analyze your risk
  - Assess potential impacts
  - Estimate future potential losses
  - Provide an overall summary of the community's assets, populations, and greatest vulnerabilities

Methods for Analyzing Risk

Start with your past



Overlay your assets

Ask yourself “what if?”

! No matter how you decide to describe impacts, remember to describe the impacts for each hazard that can affect the planning area.

Start with your past

- Based on past events, what are potential future impacts and losses?
  - Use for higher-frequency events where lots of data on past events is easily accessible
  - Consider the vulnerability of future development
  - Incorporate future projections/climate data when possible

Hazards Often Suitable for Historical Analysis

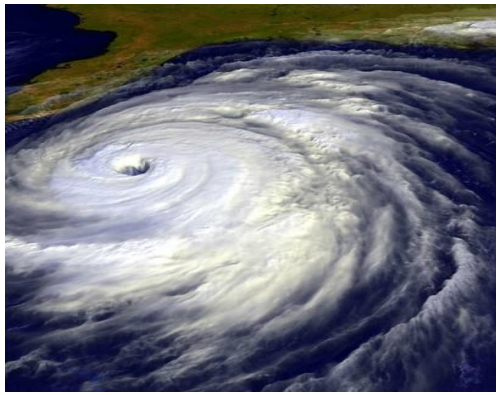
Drought

Flooding

Severe Weather

Tornado

Wildfire



Hurricane

Overlay your assets

- What assets are located in hazard-prone areas?
  - Quantify number, type, and value of assets
  - Estimate possible future development in hazard-prone areas
  - Consider magnitude of the hazard or event (high vs. moderate wildfire hazard areas)
  - Use maps and Geographic Information System (GIS) data for analysis if the information is available

Land exposed to erosion damage

Damage Category	Quantity	Total Value (50 years)	Net Present Value ($)	Average Annual Value ($)
Land (acres)	44.84	$448,000	$179,000	9,200
Residential	18	3,766,000	673,000	34,700
Commercial	4	1,216,000	450,000	23,300
Public Buildings	4	4,807,000	1,234,000	63,700
Infrastructure	--	10,561,000	3,583,000	185,000
Environmental	--	2,318,000	1,326,000	68,500
Total Damages	**--**	**23,117,000**	**7,445,000**	**384,400**

Excerpt from City of Shaktoolik/Shaktoolik Tribal Council, Alaska Multi-Jurisdictional Hazard Mitigation Plan

Ask yourself “What if?”

- What are the potential impacts and losses if a particular event occurs?
  - Monetary costs, casualties, down time, damage, etc.
  - Consider a scenario analysis for low-frequency, high-consequence events (e.g., earthquake)
  - Use modeling tools, such as Hazus

Summarizing Vulnerabilities

- The Risk Assessment generates lots of information about your people, structures, and lands at risk
- Summarize this information to clearly describe the most significant vulnerabilities

Develop Problem Statements

- To communicate vulnerabilities, develop problem statements that:
  - Are clear and concise
  - Are easily understood by the whole community
  - Identify key issues or problems
  - Are based on the results of the risk assessment
  - Pertain to specific community assets or hazards

Example Problem Statements

- Residents of the village describe ground failure impacts such as some homes and facilities sinking on their pilings, particularly in the downtown “old town” area.
- Three homes have been relocated as a result of ground failure.
- The boardwalk to the new school, which is used for evacuation, has ground failure damage.
- In addition, the community’s marine fuel header has begun to sink into the ground and slant to one side.

Example excerpts from Village of Kongiganak Draft Hazard Mitigation Plan

Considerations for Updating the Risk Assessment

- Many changes can occur in the plan's 5 -year cycle
  - Hazards
    - Example: recent Tribal or State disaster declarations
  - Community assets gained or lost
  - Community priorities
  - Vulnerability
  - New available data to address previously identified data gaps

EXERCISE 5

- Risk assessment data is available from a variety of sources. What are the most important hazards to profile in your community, and where can you get data?

Risk Assessment Summary

- Captures a description of the Tribe in the context of hazard mitigation
- Describes location, extent, past events, and the probability of future events
- Helps the Tribe identify hazards that pose the biggest threats
- Identifies what in the community is most vulnerable and needs protection
- Problem statements help communicate the results of the Risk Assessment

Risk Assessment Review

Questions?