

# Apache County Public Health Services District

## Threat and Hazard Identification and Risk Assessment (THIRA)



Prepared by  
NOMAD Consulting  
For  
Apache County Public Health Services District

Version 2.1  
June 2013

Apache County Public Health Services District  
Threat and Hazard Identification Assessment (THIRA)

---

This Page Intentionally Left Blank

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

## Table of Content

Executive Summary	5
Introduction	7
Policy and Direction	8
Presidential Directives and Congressional Legislation	8
Department of Homeland Security (DHS)	8
National Preparedness System	
System Components	
Identifying and Assessing Risk	
Estimating Capability Requirements	
Building and Sustaining Capabilities	
Planning to Deliver Capabilities	
Validating Capabilities	
Reviewing and Updating	
Threat and Hazard Identification and Risk Assessment Guide	
Elements of the THIRA Process	
Identify Threats and Hazards of Concern	
Give Context to the Threats and Hazards	
Examine the Core Capabilities	
Set Capability Targets	
Department of Health and Human Service	10
Public Health Service Act of 1944	
Pandemic and All Hazard Preparedness Act (PAHPA, 2002; 2013)	
State of Arizona	11
Multi-Hazard Mitigation Plan, 2007	
Apache County	12
Multi-Jurisdictional Hazard Mitigation Plan, 2007 (2011)	
Apache County Emergency Management Plan, 2009 (2011)	
Public Health Threat and Hazard Identification Process	13
Step 1: Identify the Threats and Hazards of Concern	
Step 2: Give the Threats and Hazards Context	
Step 3: Examine the Core Capabilities Using the Threats and Hazards	
Step 4: Set Capability Targets	
Step 5: Apply the Results	
Appendix	
A. Acronyms and Definitions	22
B. Data Tables	33
Table 1-- Threat and Hazard Identification Comparison Chart	
Table 2-- Expenditures - State and Federally Declared Natural Hazard	
Table 3-- Losses - State and Federally Declared Events	
Table 4-- Losses – Apache County Historic Hazard Events	

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

Table 5-- Kiser Permanente Hazard Vulnerability Assessment Tool

Table 6-- Adjective Rating Summary

C. Programmatic Goals and Target Capabilities Worksheet – 2013 Status	36
D. Kiser Process - Hazard Vulnerability Assessment completed spreadsheets	39
Natural Hazard Category	
Human Hazard Category	
Environment Hazard Category	

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

## Executive Summary

Direction handed down from the Office of the President and by Congressional actions, lead to the development of the National Preparedness System. All Agencies and Departments at the Federal, State and County level, are implementing this direction in order to prepare emergency responders in advance of a disaster. The National Preparedness Goal, a key component of the National Preparedness System, has five mission areas: Prevention, Protection, Mitigation, Response and Recovery. The National Goal and mission areas promote consistent and reliable decision making, efficient resource allocation and a measure of community progress toward achieving local preparedness objectives. To achieve the integration of all the components of Mission Areas a planning cycle has been developed around the following tasks:

- Identifying and Assessing Risk
- Estimating Capability Requirements
- Building and Sustaining Capabilities
- Planning to Deliver Capabilities
- Validating Capabilities
- Reviewing and Updating

Apache County Public Health Services District (ACPHSD) has to some degree completed these components through plans prepared over the past 5 years. The purpose of this report is to review and validate the threats and hazards identified in the Arizona State Multi-Hazard Mitigation Plan of 2007 (amended 2010), the Apache County Multi-Hazard Mitigation Plan 2006 (amended 2010), the Apache County Emergency Management Plan 2009 (amended 2011) and review target capabilities and goals established in the Apache County Public Health Services District Employee Training and Development Plan 2011. A Threat and Hazard Identification and Risk Assessment (THIRA) framework and rating process was enhanced from previous reports to provide a progress measure consistent with the National Preparedness Goal for ACPHSD and to support updating the priority deliverables required in the 2013 Public Health Emergency Preparedness Deliverables (BP1) report.

The accumulated list of threats and hazards presented in prior reports as well as new and emerging threats, were analyzed for relative risk and priority using the Comprehensive Preparedness Guide (CPG 201), (aka Threat and Hazard Identification and Risk Assessment [THIRA] Guide); a component of the National Preparedness System. CPG 201 is organized around a five step process addressing the following areas:

- Identify the Threats and Hazards
- Give the Threats and Hazards Context
- Examine the Core Capabilities using the Threats and Hazards

## Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

- Set Capability Targets
- Apply the Results

Completion of the first four steps provided validation of the current state of preparedness of Apache County Public Health Services District. The top potential threats to Apache County were analyzed using the Hazard Vulnerability Assessment Tool (HVA) developed by Kiser Permanente Hospital. The application of this tool is dynamic and can be used time and time again to measure progress and achievements for disaster preparedness. The last step, “Applying the Results”, provides the Emergency Preparedness Division (PHEP) the opportunity to assess areas needing improvement, report accomplishments on deliverables and measure response capabilities.

This comprehensive hazard review and risk assessment is one more step toward achieving preparedness effectiveness, efficiencies in resource utilization and providing a consistent and reliable decision making process to benefit the people of Apache County.

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

## Introduction

The United States has made significant advancements in emergency management preparedness through the development of a consistent and reliable planning process. The National Preparedness System provides guidance to Communities facing a wide range of threats and hazards, including but not limited to, acts of terrorism, cyber-attacks, pandemics and catastrophic natural disasters. The National Preparedness Goal established five mission areas; Prevention, Protection, Mitigation, Response and Recovery, which were established to provide focus on community planning efforts.

Apache County addressed many of the mission areas identified in the National Preparedness Goal by completing a Multi-Jurisdictional Hazard Mitigation Plan (HMP) in 2006 and an All-Hazard Emergency Management Plan (EMP) in 2009. Both plans identified threats and hazards common to the County and provided planning direction for prioritizing mitigation activities. The HMP however did not address threats or hazards other than naturally occurring events (ie “Mother Nature”). The assessment of a much broader array of threats and hazards is the foundation of THIRA planning effort currently underway by the Public Health Services District. The objective of this planning effort is to review and validate the threats and hazards presented in the plans referenced above; complete a comprehensive risk assessment and set priorities to the top few hazards. The use of a “Relative Risk” assessment process provided a qualitative approach to placing a value on risk and vulnerability through professional judgment, historical context and surveillance data analysis. Many methodologies exist for assessing risk. Apache County has chosen the Kiser Permanente “Hazard and Vulnerability Assessment Tool”. The Kiser process was developed for the medical profession and follows a methodology where the probability of an event occurrence is used as a weighing factor against the events severity, where severity is a measure of magnitude minus mitigation. The formula for rating risk is: ***Risk = Probability x Severity***. This formula was used across the broader listed threats and hazards identified in previous plans and validated by a subject matter panel of experts. The expanded list of hazards were stratified into three hazard groups; Natural, Human, and Environment.

Risk is an unavoidable part of life. It affects all people and communities without exception and comes from a variety of threats and hazards that often are unknown to the individual. Avoidance of all hazards would significantly reduce risk to an imperceptible level making our daily activities free of unwanted outcomes, however such a desirable place is generally impossible to achieve. Collectively groups, communities and governments must identify the threats and hazards that would most likely be present and chose those that can be mitigated to a level of acceptable risk or at least improve our ability to respond to a disaster. This assessment process is a measure of the Counties current preparedness

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

capability and capacity and should be used to identify gaps for setting future planning, training and capacity improvement activities.

## Policy and Direction

### Presidential Directive and Congressional Legislation

*Presidential Policy Directive 8 (PPD-8)* establishes a National Preparedness Goal and describes a systematic approach to the Nation's core capabilities across five mission areas: Prevention, Protection, Mitigation, Response, and Recover. The National Preparedness System builds on continuous improvement efforts, many of which were established in: the *Disaster Mitigation Act of 2000 (DMA 2K)*; *Congressional Review of the September 11, 2001 terrorist attack on the Twin Towers*; and a revision of the *Homeland Security Act of 2002*, by the *Post-Katrina Emergency Management Reform Act of 2006*.

### Department of Homeland Security (DHS)

Recognition of threat and hazard identification, analysis of associated risks and assessment of vulnerable populations is well established in both Presidential Policy Directives and Congressional actions, framing the *2011 National Preparedness System (NPS)* and its six Mission Areas. The current National, State and Local planning efforts are focused on these Mission Areas, specifically towards improving emergency response capabilities through consistent and reliable decision making, improved resource allocation, and measurable progress toward the use of the *National Incident Management System (NIMS)*.

The following tasks identified by DHS help communities work through the planning process:

**Identifying and Assessing Risk** – This element provides direction to develop and maintain an understanding of the variety of risks that communities face and how to use this information to build and sustain preparedness. The risk assessment collects information regarding the threats and hazards including the projected consequences and impacts. This collective information, data and evaluations is the basis of the *Threat and Hazard Identification and Risk Assessment Guide (CPG 201)*, supplemented by state, territorial, tribal and local planning efforts.

**Estimating Capability Requirements** – Single threats as well as a full range of multiple threats shall be considered in order to fully understand a jurisdiction's capability requirement. Estimations are based on planning assumptions for typical incident response.

**Building and Sustaining Capabilities** – Developing the incident specific capability requires having trained staff to perform specific ICS functions, but also having enough staff to

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

sustain multiple operational periods. Existing and needed capacities are to be evaluated using a gap analysis, after the agency has determined its desired capability based on the type and number of incidents an agency will manage. The gaps should be prioritized commensurate with desired outcomes, risk exposure and potential shortfalls if the gaps are not addressed.

**Planning to Deliver Capabilities** – Utilizing existing guidance documents, such as the Comprehensive Preparedness Guide and the National Response Framework, a collective approach with common operating standards and terminology such as NIMS, will support the delivery of the core capabilities identified in the National Preparedness Goal. The National Response Framework provides focus on *low-probability, high-consequence* hazards, requiring national level coordination, while the THIRA process provides localized support on more likely threats and hazards.

**Validating Capabilities** – Training and exercises are used to test and validate plans and response capabilities per the guidance in the *National Exercise Program*. The Program emphasis is on highlighting strengths and revealing gaps that may have an effect on response preparedness and the allocation of scarce resources. Measuring community implementation progress is a component of the *Remedial Action Management Program (RAMP)* where reported information is used to identify and share lessons learned to support local improvement goals. A *Comprehensive Assessment System (CAS)* is used to measure and monitor progress of the whole community. The purpose of CAS is to:

- Identify capability targets and performance metrics
- Systemically collect and analyze data about capabilities
- Report progress on building and sustaining the required levels of capability

**Reviewing and Updating** – Changes in preparedness levels and identification of new threats and hazards, requires updating the Nation’s plans to insure continued security and resilience of the core capability goals. Such reviews should be completed at the local level based on the most recent risk assessments and utilization of information gathered during the validation process.

A *Threat and Hazard Identification and Risk Assessment (THIRA) Guide* prepared by DHS provides a comprehensive approach for identifying and assessing risks and associated impacts. Many methodologies exist to quantify risk and ultimately bring attention to gaps in training, internal response capabilities and leveraged external community resources. This “gap” is better known as vulnerability. Vulnerability exists in both the jurisdictions ability to achieve the mission areas identified in the National Preparedness Goal as well as the vulnerability of people who will be

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

impacted by an incident. Using the *THIRA* results as a strategic process can strengthen a jurisdiction's understanding of where improvements are needed and help focus their opportunity to leverage the expertise and capabilities of individuals, communities, the private and non-profit sectors, faith-based organizations and other levels of government to reduce risk/vulnerability.

The five basic elements of the *THIRA* process are:

- Identifying the Threats and Hazards of Concern. Based on past experience, forecasting, expert judgment, and available resources, identify a list of the threats and hazards of concern to the community.
- Give Threats and Hazards Context. Using the list of threats and hazards, develop context that shows how those threats and hazards affect the communities.
- Examine the Core Capabilities Using the Threats and Hazards. Using the threat and hazard context, identify impacts to the community through the lens of the core capabilities described in the Goal.
- Set Capability Targets. Looking across the estimated impacts to the community, in the context of each core capability and coupled with a jurisdiction's desired outcomes, set capability targets.
- Apply the Results. Plan for the ability to deliver the targeted level of capability with either community assets or through mutual aid, identify mitigation opportunities, and drive preparedness activities.

## Department of Health and Human Service

The US Department of Health and Human Services (HHS) follows in principle the National Response Framework and the National Preparedness Goals; however HHS is governed by a series of legal authorities that are specific to public health emergencies. The *Public Health Service Act of 1944* established the foundation for responding to public health emergencies. The Act as amended by the *Pandemic and All-Hazards Preparedness Act (2002; 2013)* directs the HHS Secretary to:

- Lead all Federal public health and medical response covered by the National Response Framework
- Declare a public health emergency and to take action
- Assist states in meeting health emergencies
- Control Communicable diseases
- Maintain a Strategic National Stockpile (SNS)
- Provide for the operation of the National Disaster Medical System
- Establish and maintain a Medical Reserve Corps

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

- Provide targeted immunity for covered countermeasures, as needed

Other Acts that provide direction and authority to HHS are the *Social Security Act*, *Federal Food, Drug and Cosmetic Act* and the *Robert T. Stafford Disaster Relief and Emergency Assistance Act*.

## State of Arizona

The Arizona State Division of Emergency Management (ADEM) completed a revision of the *Multi-Hazard Mitigation Plan of 2007 in 2010*, which reinforces the importance of mitigation planning.

The plan defines mitigation as any sustained action taken to identify threats and hazards; reduce loss of life; and minimize damage or losses of property. Increasing the capability of local jurisdictions to reduce the impacts of natural and human-caused hazards is directly related to minimizing risk and reducing severity. List of hazards were ranked by priority utilizing State-wide statistical data; prior knowledge of relative risks associated with a hazard; comparing existing local jurisdiction plans; and implementing the guidelines contained in national processes.

The Arizona State Department of Health Services (ADHS) maintains a Strategic Plan, 2010-2014, that provide public health programs guidance following four primary goals:

- Implement a population-based public health system
- Ensure a comprehensive, unified, high-quality behavioral health system
- Ensure the health and safety of all Arizonans through a comprehensive system of licensing, monitoring and technical assistance
- Deliver courteous, efficient, responsive, and cost-effective service to external and internal customers, stakeholders and key policymakers

The Departments six priority work areas are:

- Chronic diseases
- Health Disparities
- Behavioral Health
- Emergency preparedness
- Surveillance
- Regulatory System

The priority work area, “Emergency Preparedness”, is identified as a deliverable in the 2012-2013 Budget Years, Public Health Emergency Preparedness Deliverables Report. The deliverable is specific to community preparedness and risk assessment.

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

## Apache County

Apache County Department of Emergency Management completed the *Multi-Hazard Mitigation Plan (HMP)* in 2006 for the communities in South Apache County. In 2011, the plan was updated to respond to changes in National and State guidance. Included in the plan was a comprehensive risk assessment of natural threats and hazards, vulnerability to community-wide human and structural assets, a mitigation strategy, and a maintenance procedure. Apache County completed their comprehensive *Emergency Management Plan (EMP)* in 2009, expanding the identified threats and hazards contained in the *HMP* to include “All-hazards Incidents”. The *EMP* represents a consolidated plan between Apache County Department of Emergency Management and the Public Health Services District, therefore the list of identified threats and hazards were more comprehensive toward public health issues than previous planning efforts.

## Public Health Threat and Hazard Identification Process

Apache County began identifying potential hazards and assessing associated risks as early as 2006. The 2006 Multi-Hazard Mitigation Plan (ACHMP) and the 2009 Emergency Management Plan (ACEMP) are the primary document containing the identified hazards. The ACHMP Plan was reviewed and validated with the 2011 update. The ACEMP is due for review and update in 2013, although minor edits have been posted through 2011. These plans:

- Represent partial completion of a THIRA process where threats and hazards were identified, however a formal risk assessment was not completed
- Hazards were given context to their probability based on historical data and corporate memory
- A gap analysis was completed as part of the pre-work that went into the publishing of the Training and Employee Development Plan in 2011
- Target Capabilities were developed to increase the Public Health’s District emergency response capability and capacity by improving employee training



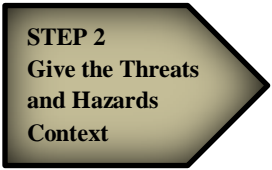
Using the five steps defined in the National Preparedness System, this report will continue the planning process by validating the threats and hazards contained in existing State and County plans and by completing a comprehensive risk assessment using a qualitative analytical tool.

The chosen tool is the “Kiser Permanente Hazard Vulnerability Assessment Tool”. The Kiser process will be discussed more detail in Step 3. During the development of the supporting plans referenced above, many threats and hazards were considered, however only those that were relevant to the State of Arizona and Apache County were assessed. Table 1 in Appendix B provides a summary of each plan

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

and comparison of the natural threats and hazards most commonly identified during the planning process. Those hazards highlighted are consistently rated as high potential and would be considered a top priority during preparedness planning. The most common threats identified to date, *only* focused on natural non-public health events leaving the remaining All Hazard and Public Health events yet to be analyzed. A panel of subject matter experts was convened to review Table 1, Appendix B and make recommendations for modification, deletions or additions to the list of potential threats and hazards facing Apache County.



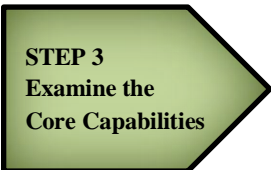
**STEP 2**  
Give the Threats  
and Hazards  
Context

The Common Threats identified in Table 1, Appendix B, represent a compilation of statistical data supporting the potential for these threats or hazards to be repeated in the future. Summary charts extracted from the ACHMP provide the context for these natural non-public health events and are shown in Tables 2 thru 4, Appendix B. The review and validation process used to update the ACHMP in 2011 screened each hazard identified in the 2006 Plan based on the following considerations:

- Professional knowledge of the relative risk associated with the hazard
- Documented historic context for damages and losses associated with past events, especially those that had occurred since the last planning cycle
- The ability/desire of the Planning Team to develop effective mitigation for the hazard
- Compatibility with the Arizona State Multi-Hazard Mitigation Plan of 2011
- Duplication of effects attributed to each hazard

The 2011 review included a revised historic hazard assessment of “*non-declared*” disaster events, however again did not address All Hazard or Public Health events. Supporting documentation summarized in the ACHMP came from the following sources and was used to determine hazard priorities.

- Emergency Declarations made by the AZ Governor, which Apache County was included
- Emergency Declarations made by the AC Board of Supervisors
- Fire history records provided by the US Forest Service
- Weather history records provided by the National Weather Service
- Seismic records provided by the US Geological Service
- Apache County demographic data provided by the US and AZ Department of Commerce



**STEP 3**  
Examine the  
Core Capabilities

The Core Capabilities; Prevention, Protection, Mitigation, Response and, Recovery, as defined in the National Preparedness Goal are the foundation of the National Preparedness System. The methodology to evaluate threats and

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

hazards against the Core Capabilities is complex and can best be achieved through a professional qualitative approach. An index that best reflects the collective progress of a community toward achieving the Preparedness Goal is “Relative Risk”. A qualitative approach to risk assessment was developed by Kiser Permanente, a member of the California Hospital Association, to respond to the diverse planning needs of a hospital/medical environment. Kiser Permanente states, “*Hospitals are required to conduct and annually review their Hazard Vulnerability Analysis (HVA). The HVA provides a systematic approach to recognizing hazards that may affect demand for the hospitals services or its ability to provide those services. The risks associated with each hazard are analyzed to prioritize planning, mitigation, response and recovery activities. A hazard vulnerability analysis is a process for identifying natural and man-made hazards and the direct and indirect effect these hazards may have on the hospital and community.*” Apache County Public Health Services District has chosen to use the Kiser Hazards Vulnerability Analysis (HVA) Tool to estimate the probability; evaluate the severity; and calculate the Relative Risk to the County and communities. The HVA form can be easily filled out following the instructions provided below. Individual events can be assessed as well as a qualitative county-wide risk assessment for each hazard category.

## **Kiser HVA instructions:**

- Prepare list of Threats/Events; determine the Hazard Category (ie Human, Natural, Environment, etc.)
  - Create Hazard Category worksheets as needed to stratify the Relative Risk to like Hazards
- Use the scoring scheme in the Probability Column to assign an individual Threat/Event value
  - Use professional judgment, historical data or other sources to determine value
- The next three columns measure Magnitude of the event. Enter the appropriate score as displayed in each column.
  - Consider both the chances of staff or public death, injury or exposure
  - Consider the property impacts as values to replace, repair or set up temporary facilities
  - Consider business impacts as interruptions to; employees unable to report to work; customers unable to reach the place of business; interruptions of business supply lines or distribution network
- The next three columns measure Mitigation the County has in place to counter the effects of the event. Enter the appropriate score as displayed in each column.
  - Preparedness considers the status of current plans; training status; availability of back-up systems/staffing; community resources

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

- Internal response considers the types of supplies on hand; volume of supplies needed in inventory; staff availability
- External response considers agreements with communities or agency partners; coordination protocols in place with local and state agencies; coordination with proximal health care facilities; coordination with other facilities to support mass care; coordination with NGO's
- The last three columns are self-populating and need no entry
- Use the Relative Adjective Rating Summary (Table 6) to assign each individual hazard or overall hazard category a rating for Probability, Severity and Risk

Table 5. HAZARD AND VULNERABILITY ASSESSMENT  
**Human Hazard Category**

Threat/Event	PROBABILITY Likelihood this will occur	SEVERITY = (MAGNITUDE - MITIGATION)						PROBABILITY (0-100%)	RELATIVE SEVERITY (0-100%)	RELATIVE RISK (0-100%) <i>The Threat to the Facility increases as the % increases</i>
		Magnitude			Mitigation					
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE			
		Possibility of death, injury, and exposure	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources	Community/Mutual Aid staff and supplies			
1=Unlikely 2=Possible 3=Likely 4=Highly Likely	0=Unlikely 1=Possible 2=Likely 3=Highly Likely	0=Unlikely 1=Possible 2=Likely 3=Highly Likely	0=Unlikely 1=Possible 2=Likely 3=Highly Likely	1=Maximum 2=High 3=Moderate 4=Low	1=Maximum 2=High 3=Moderate 4=Low	1=Maximum 2=High 3=Moderate 4=Low				
Aircraft Accident							0%	0%	0%	
Behavioral Health							0%	0%	0%	
Civil Disturbance							0%	0%	0%	
Explosion							0%	0%	0%	
HazMat							0%	0%	0%	
Mass Care							0%	0%	0%	
Mass Casualty							0%	0%	0%	
Radiation Exposure							0%	0%	0%	
Search & Rescue							0%	0%	0%	
Terrorism							0%	0%	0%	
COUNTYWIDE AVERAGE	0.00	0.00	0.00	0.00	0.00	0.00	0%	0%	0%	

After completion of the Kiser Assessment Tool, the following recommended uses of the Adjective Rating for Probability, Severity and Risk are for:

- Periodic review of progress toward achieving the National, State and County preparedness goals
- Applied as a measurable element of performance for individuals or departments
- Post incident review of severity and risk compared to actual response successes and failures relative to mitigation assumptions

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---



Target Capabilities (TC) have been addressed in the ACHMP, ACEMP and the PH Training and Employee Development Plan. A list of the Programmatic Goals and associated Target Capabilities are summarized below with a status review for each displayed in Appendix C.

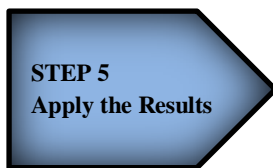
## ACPHSD Programmatic Goals (PG) and Target Capacities (TC):

- PG1 – NIMS Compliance and Proficiency
  - ✓ TC1 - Require NIMS training as part of New Employee Orientation
  - ✓ TC2 - Exercise Current Employees on a routine basis to maintain NIMS proficiency
  - ✓ TC3 - Continue to seek alternative funding
  - ✓ TC4 - Conduct internal training to reduce funding demands
  - ✓ TC5 - Revise HR & PH policy to require employees to participate during a response
- PG2 – ACEMP Awareness
  - ✓ TC6 - Develop an orientation package that can be delivered to all County Employees
  - ✓ TC7 - Include ACEMP topics in EM & PH in social networking opportunities
  - ✓ TC8 - Ensure that ACEMP components are visible during training/exercises
- PG3 – Just in Time Training (JIT)
  - ✓ TC9 - Prepare basic skill assessment for JIT
  - ✓ TC10 - Train to ACEMP Job Aids
  - ✓ TC11 - Utilize Standardization of Practices
  - ✓ TC12 - Emphasize JIT during exercise planning
- PG4 – External Partnerships
  - ✓ TC13 - Review and update approved agreements
  - ✓ TC14 - Draft New Agreements to promote interagency coordination & cooperation
  - ✓ TC15 - Utilize external partners in training and mentoring
- PG5 – Internal Relationships
  - ✓ TC16 - Review and update HR/PH policies addressing roles and responsibilities
  - ✓ TC17 - Establish Director meetings with all PH employees
  - ✓ TC18 - Publicize the Training and Development Strategy/Guide
  - ✓ TC19 - Develop Standardized Training and Develop Plans for all employees
  - ✓ TC20 - Conduct Team Building Seminars
  - ✓ TC21 - Explore Employee Wellness Opportunities
  - ✓ TC22 - Distribute Employee Questionnaire

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

- PG6 – Leadership
  - ✓ TC23 - Distribute Employee Questionnaire with specific questions on Leadership training
  - ✓ TC24 - Recommend Leadership training for all positions in Step 3 and above on the T&D Concept
  - ✓ TC25 - Utilize external partners in training and mentoring
  - ✓ TC26 - Identify personnel and positions that would require a “fast track” approach
- PG7 – Exercises
  - ✓ TC27 - Utilize Job Aids from the ACEMP; prepare new Aids where none exist; take advantage of existing “tool boxes”
  - ✓ TC28 - Participate in other jurisdictions exercises/incidents
  - ✓ TC29 - Solicit external partners for coaches to mentor planning and execution of exercises
- PG8 – After Action Reviews
  - ✓ TC30 - Develop a standardized AAR process to document and mitigate ICO’s
  - ✓ TC31 - Train employees on the AAR process
  - ✓ TC32 - Address AAR function and value during Leadership Training
- PG9 – Lessons Learned
  - ✓ TC33 - Establish an archive policy that aids in the recovery of lessons learned
  - ✓ TC34 - Incorporate the Lessons Learned into the planning process for exercises
  - ✓ TC35 - Utilize Lessons Learned as a performance improvement tool
- PG10 – Self Improvement
  - ✓ TC36 - Formalize the employee T&D process and incorporate with the Annual Employee Performance Review



A group of Subject Matter Experts (SME) identified two tasks needing completion for this step: 1) review the threats and hazards list contained in Table 1, Appendix A. validating their relevance to Apache County and 2) run the Kiser HVA Tool. The first task was completed resulting in minor changes and combinations to those threats and hazards being validated in Table 1. The final list of threats and hazards to be carried forward for risk assessment using the Kiser HVA Tool were divided into three categories as shown below:

## Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

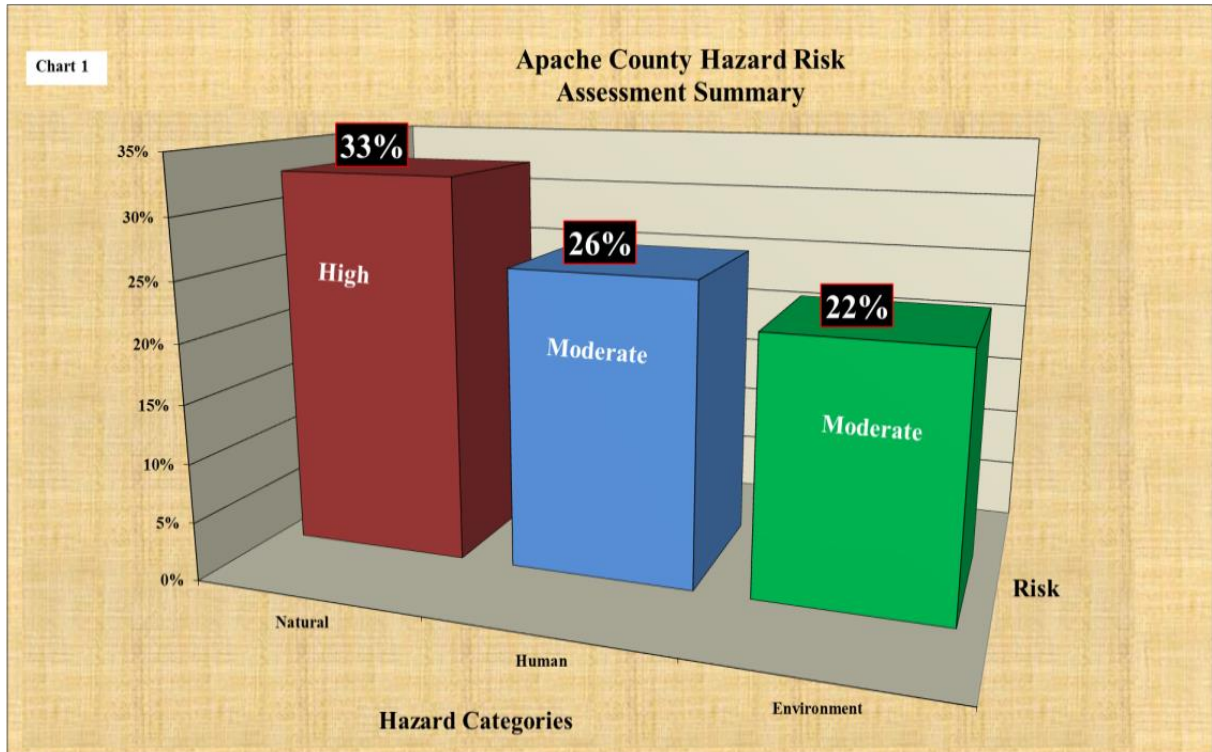
<u>NATURAL</u>	<u>HUMAN</u>		<u>ENVIRONMENT</u>	
Dam Breach	<b>Aircraft Accident</b>	Mass Care Event	Drinking Water	Hazardous Waste
Earthquake	Behavioral Health	Mass Casualty	Waste Water	Air Quality
<b>Flood/Flash Flood</b>	Civil Disturbance	Terrorism	Food-Borne	
<b>Severe Wind</b>	Explosion		Vector Animal to Human	
<b>Winter Storm</b>	<b>HazMat</b>		<b>Disease Epidemic</b>	
<b>Wildfire</b>			<b>Pandemic</b>	

The Kiser HVA Tool was processed by the SME group. The full spreadsheets are presented for review in Appendix D, using the hazards listed above. After the SME group completed their analysis of incident specific risks, individual threats were selected to represent those events that pose the greatest risk to the County. A summary of the top eight threats and hazards are listed in the table below. The value of this incident specific assessment is it allows the Public Health Emergency Preparedness Division (PHEP) an opportunity to evaluate their successes and gaps in planning and training. Such an evaluation is closely tied to the GAP Analysis found in the Training and Development Plan of 2011 and the Target Capabilities reported to the Arizona State Department of Emergency Management in 2012.

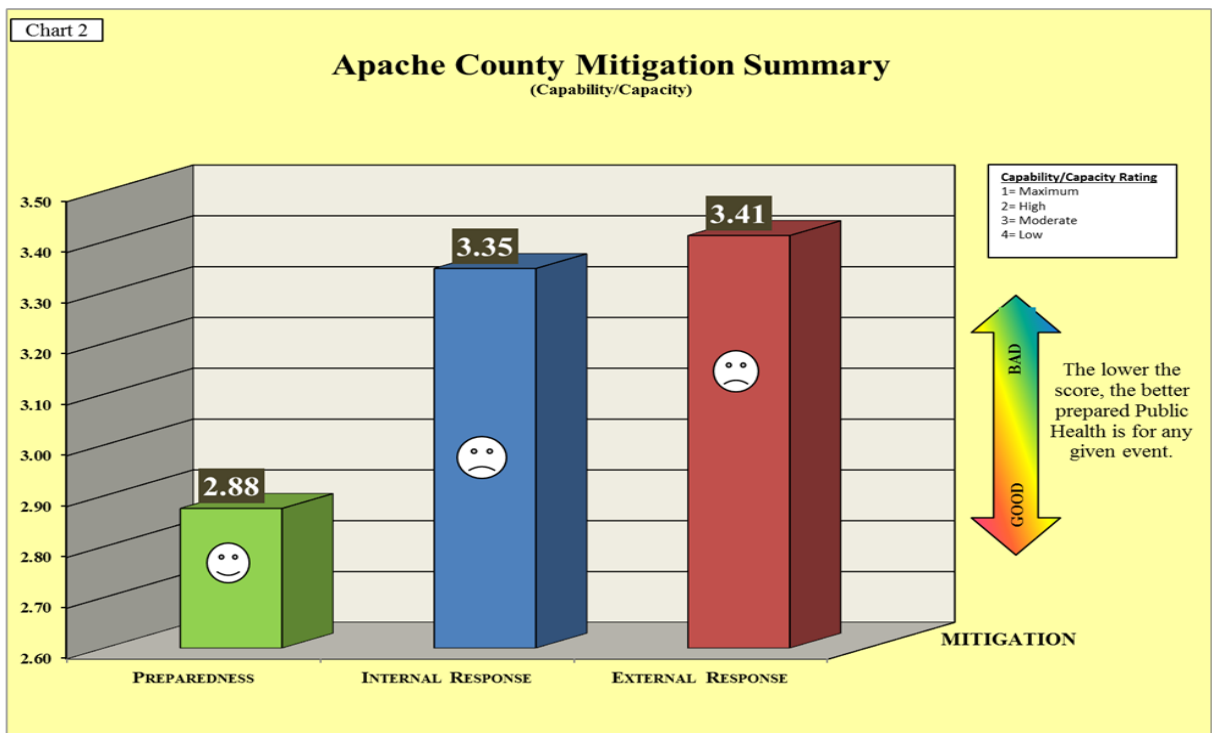
<u>THREAT/HAZARD</u>	<u>PROBABILITY</u>	<u>SEVERITY</u>	<u>RELATIVE RISK</u>
Severe Wind	Likely	Elevated - (67%)	High - (50%)
Wildfire	Likely	Elevated - (62%)	High - (46%)
Flood/Flash Flood	Likely	Elevated - (57%)	High - (43%)
Aircraft Accident	Possible	Acute - (76%)	High - (38%)
HazMat	Possible	Acute - (71%)	High - (36%)
Winter Storm	Possible	Elevated - (62%)	High - (31%)
Pandemic	Possible	Elevated - (62%)	High - (31%)
Disease Epidemic	Possible	Elevated - (57%)	Moderate - (29%)

A look at the overall average “Relative Risk” on a county-wide basis is another readiness matrix of Public Health’s response capability, because it offsets probability and magnitude by the level of effort the county has put into mitigation activities. The following charts summarize the relative risk exposure associated within the three county-wide hazard categories: Natural, Human and Environment. The accumulated risk rating for Apache County has been determined to be “High” for Natural Hazard events, with both Human and Environment Hazards falling in the range of “Moderate Risk”.

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

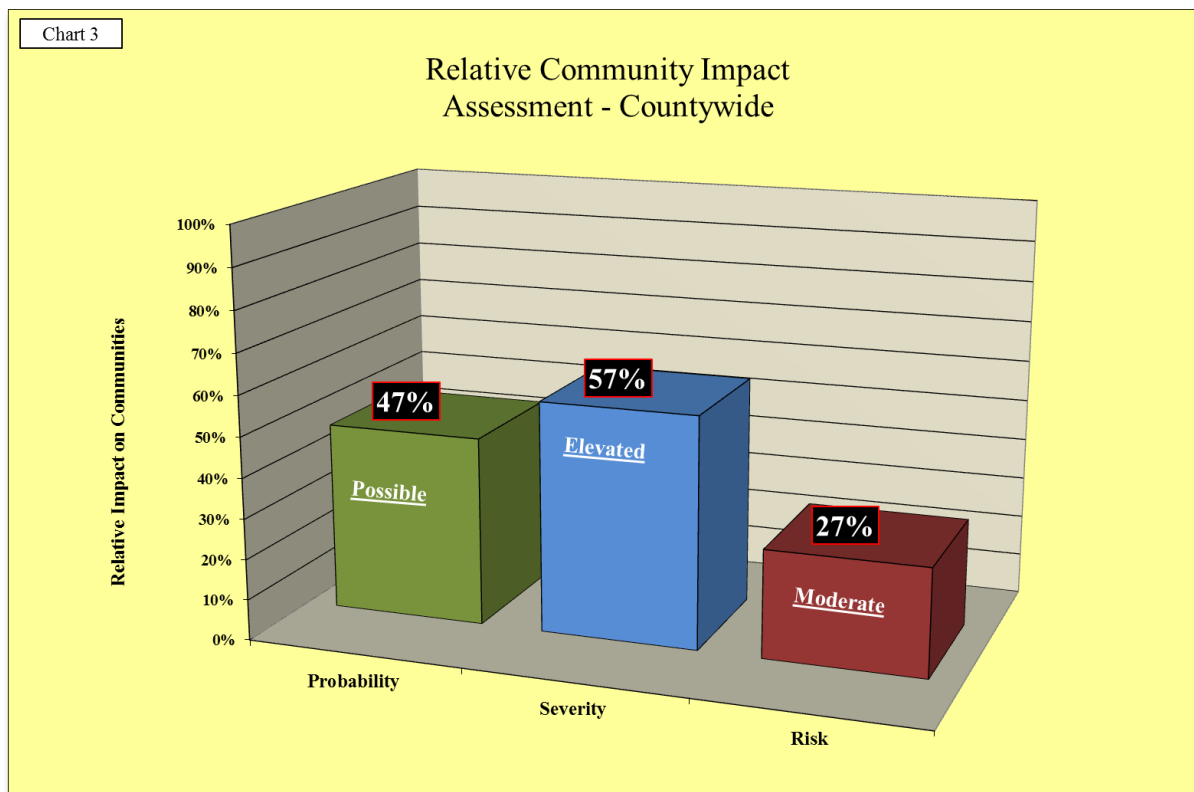


Continuing this broader view of readiness requires that we next look at Mitigation and its three interactive components: Preparedness, Internal Response capability and External Response capability. Chart 2 summarizes the level of preparedness efforts relative to the mitigation components as seen through the eyes of the SME's.



# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

Mitigation is defined as the actions taken to lessen the severity or intensity of an event. Measuring the level of effort taken by the Public Health District to mitigate undesirable outcomes provides managers a relative view of what is going well and what is not and where the mitigation efforts are being concentrated. As seen in Chart 2, Apache County is doing better in Preparedness (ie. Planning Activities) than they are in building Internal Response capability and developing External Response capacity. The higher values for Internal Response can be attributed to a fluctuating workforce. It is difficult to maintain trained personnel when the turnover rate is high. The higher values seen in the External Response category is directly related to lack of seeking out and building relationships with partner agencies and NGO's that could provide additional staffing during an emergency response. The last area requiring a broad approach is looking at the overall assessment of vulnerable populations. In a rural area such as Apache County the citizens are relatively independent and accustomed to isolation. This social acceptance of isolation is a benefit to emergency management planners in the fact that people are generally self-sufficient for 24-48 hours. For the top eight listed threats and hazards, Apache County citizens are for the most part relatively immune to any localized event. This can be seen in Chart 3 by a relatively low Probability of any major event occurring; slightly elevated Severity for the known



hazards, and a moderate level of Risk on the vulnerability to communities and infrastructure. Utilizing the Kiser HVA Tool on a periodic basis following completion of mitigation activities can provide an additional snapshot of before and after capability or capacity improvements. Such

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

comparative analysis is invaluable to measuring progress toward the goals and mission areas established in the National Preparedness System.

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

## APPENDIX A

The following acronyms and definitions are extracted from the Arizona State 2010 Hazard Mitigation Plan and the Apache County 2011 Multi-Jurisdictional Hazard Mitigation Plan. Not all are represented in this plan but represent the possibility of terms indicative of the Emergency Management and Hazard Identification and Risk Assessment environment.

### ACRONYMS

A/P.....	Mitigation Action/Project
ADEM.....	Arizona Division of Emergency Management
ADEQ.....	Arizona Department of Environmental Quality
ADWR.....	Arizona Department of Water Resources
AGFD.....	Arizona Game and Fish Department
ARS.....	Arizona Revised Statutes
ASCE.....	American Society of Civil Engineers
AZSERC.....	Arizona State Emergency Response Commission
ASLD.....	Arizona State Land Department
ASU.....	Arizona State University
AZGS.....	Arizona Geological Survey
BLM.....	Bureau of Land Management
CAP.....	Central Arizona Project
CAP.....	Community Assistance Program
CFR.....	Code of Federal Regulations
CRS.....	Community Rating System
CWPP.....	Community Wildfire Protection Plan
DEMA.....	Arizona Department of Emergency and Military Affairs
DFIRM.....	Digital Flood Insurance Rate
DMA 2000.....	Disaster Mitigation Act of 2000
DOT.....	Department of Transportation
EHS.....	Extremely Hazardous Substance
EPA.....	Environmental Protection Agency
EPCRA.....	Emergency Planning and Community Right to Know Act
FEMA.....	Federal Emergency Management Agency
FMA.....	Flood Mitigation Assistance Grant Program
GIS.....	Geographic Information System

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

HAZMAT.....	Hazardous Material
HAZUS-99.....	Hazards United States 1999
HAZUS-MH.....	Hazards United States Multi-Hazard
IFCI.....	International Fire Code Institute
LEPC.....	Local Emergency Planning Committee
MJHMP.....	Multi-Jurisdictional Hazard Mitigation Plan
MMI.....	Modified Mercalli Intensity
NCDC.....	National Climate Data Center
NDMC.....	National Drought Mitigation Center
NESDIS.....	National Environmental Satellite, Data and Information Service
NFIP.....	National Flood Insurance Program
NFPA.....	National Fire Protection Association
NHC.....	National Hurricane Center
NIBS.....	National Institute of Building Services
NID.....	National Inventory of Dams
NIST.....	National Institute of Standards and Technology
NSF.....	National Science Foundation
NOAA.....	National Oceanic and Atmospheric Administration
NRC.....	National Response Center
NWCG.....	National Wildfire Coordination Group
NWS.....	National Weather Service
PSDI.....	Palmer Drought Severity Index
RL.....	Repetitive Loss
SARA .....	Superfund Amendments and Reauthorization Act
SRLP .....	Severe Repetitive Loss Properties
SRL .....	Severe Repetitive Loss
SRP .....	Salt River Project
UBC .....	Uniform Building Code
USACE .....	United States Army Corps of Engineers
USDA .....	United States Department of Agriculture
USFS .....	United States Forest Service
USGS .....	United States Geological Survey
VA .....	Vulnerability Analysis
WUI .....	Wildland Urban Interface

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

### **DEFINITIONS**

The following terms and definitions are provided for reference and are taken from the 2010 State Plan with a few minor modifications.

Dam Failure - A dam failure is a catastrophic type of failure characterized by the sudden, rapid and uncontrolled release of impounded water. Dam failures are typically due to either overtopping or piping and can result from a variety of causes including natural events such as floods, landslides or earthquakes, deterioration of foundation or compositional materials, penetration by vegetative roots or animal burrows, fissures or improper design and construction. Such a failure presents a significant potential for a disaster as significant loss of life and property would be expected in addition to the possible loss of power and water resources.

Drought - A drought is a deficiency of precipitation over an extended period of time, resulting in water shortage for some activity, group or environmental sector. "Severe" to "extreme" drought conditions endanger livestock and crops, significantly reduce surface and ground water supplies, increase the potential risk for wildland fires, increase the potential for dust storms, and cause significant economic loss. Drought may not be constant or predictable and does not begin or end on any schedule. Short term droughts are less impacting in the southwest due to a reliance on irrigation and groundwater.

Earthquake - An earthquake is a naturally-induced shaking of the ground, caused by the fracture and sliding of rock within the Earth's crust. The magnitude is determined by the dimensions of the rupturing fracture (fault) and the amount of displacement that takes place. The larger the fault surface and displacement the greater the energy released during an event. In addition to deforming the rock near the fault, this energy produces the shaking and a variety of seismic waves that radiate throughout the Earth. Earthquake magnitude is measured using the Richter Scale and earthquake intensity is measured using the Modified Mercalli Intensity Scale.

Fissure - Earth fissures are tension cracks that open as the result of subsidence due to severe overdrafts (i.e., pumping) of groundwater, and occur about the margins of alluvial basins, near exposed or shallow buried bedrock, or over zones of differential land subsidence. As the ground slowly settles, cracks form at depth and propagate towards the surface, hundreds of feet above. Individual fissures range in length from hundreds of feet to several miles, and from less than an inch to several feet wide. Rainstorms can erode fissure walls rapidly causing them to widen and lengthen suddenly and dangerously, forming gullies five to 15- feet wide and tens of feet deep.

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

Flooding - Flooding is an overflowing of water onto normally dry land and is one of the most significant and costly of natural disasters. Flooding tends to occur in Arizona during anomalous years of prolonged, regional rainfall (typical of an El Nino year), and is typified by increased humidity and high summer temperatures.

Flash Flooding - Flooding caused by excessive rain falling in a small area in a short time and is a critical hazard in Arizona. Flash floods are usually associated with summer monsoon thunderstorms or the remnants of a tropical storm. Several factors contribute to flash flooding: rainfall intensity and duration, topography, soil conditions, and ground cover. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area and can occur within a few minutes or hours of excessive rainfall, or a quick release from a dam or levee failure. Thunderstorms produce flash flooding, often far from the actual storm and at night when natural warnings may not be noticed.

Landslide/Mudslide - Landslides like avalanches are massive downward and outward movements of slope-forming materials. The term landslide is restricted to movement of rock and soil and includes a broad range of velocities. Slow movements, although rarely a threat to life, can destroy buildings or break buried utility lines. A landslide occurs when a portion of a hill slope becomes too weak to support its own weight. The weakness is generally initiated when rainfall or some other source of water increases the water content of the slope, reducing the shear strength of the materials. A mud slide is a type of landslide referred to as a flow. Flows are landslides that behave like fluids: mud flows involve wet mud and debris.

Levee Failure / Breach - Levee failures are typically due to either overtopping or erosive piping and can result from a variety of causes including natural events such as floods, hurricane/tropical storms, or earthquakes, deterioration of foundation or compositional materials, penetration by vegetative roots or animal burrows, fissures, or improper design, construction and maintenance. A levee breach is the opening formed by the erosion of levee material and can form suddenly or gradually depending on the hydraulic conditions at the time of failure and the type of material comprising the levee.

Severe Wind - Thunderstorms are characterized as violent storms that typically are associated with high winds, dust storms, heavy rainfall, hail, lightning strikes, and/or tornadoes. The unpredictability of thunderstorms, particularly their formation and rapid movement to new locations heightens the possibility of floods. Thunderstorms, dust/sand storms and the like are most prevalent in Arizona during the monsoon season, which is a seasonal shift in the winds that causes an increase in humidity capable of

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

fueling thunderstorms. The monsoon season in Arizona typically is from late-June or early-July through mid-September.

Tornadoes – Weather events with violently rotating columns of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds in excess of 250 mph. Damage paths can exceed a mile wide and 50 miles long. The damage from tornadoes is due to high winds. The Fujita Scale of Tornado Intensity measures tornado / high wind intensity and damage.

Tropical Storms - Weather events in which the maximum sustained surface wind ranges from 39-73 mph. Tropical storms are associated with heavy rain and high winds. High intensity rainfall in short periods is typical. A tropical storm is classified as a hurricane when its sustained winds reach or exceed 74 mph. These storms are medium to large in size and are capable of producing dangerous winds, torrential rains, and flooding, all of which may result in tremendous property damage and loss of life, primarily in coastal populated areas. The effects are typically most dangerous before a hurricane makes landfall, when most damage occurs. However, Arizona has experienced a number of tropical storms that caused extensive flooding and wind damage.

Subsidence - Land subsidence in Arizona is primarily attributed to substantial groundwater withdrawal from aquifers in sedimentary basins. As the water is removed, the sedimentary layers consolidate resulting in a general lowering of the corresponding ground surface. Subsidence frequently results in regional bowl-shaped depressions, with loss of elevation greatest in the center and decreasing towards the perimeter. Subsidence can measurably change or reverse basin gradients causing expensive localized flooding and adverse impacts or even rupture to long-baseline infrastructure such as canals, sewer systems, gas lines and roads. Earth fissures are the most spectacular and destructive manifestation of subsidence-related phenomena.

Wildfire - An uncontrolled fire in an area of combustible vegetation that occurs in the countryside or wilderness areas, usually characterized in terms of the cause of ignition, their physical properties such as rate of spread, fuel type present and the effect of weather on the fire. Wildfires present a significant potential for disaster in the Southwest, a region of relatively high temperatures, low humidity, low precipitation, and during the spring moderately strong daytime winds. The inclusion of the term Urban Interface denotes an area of intermix between the relatively unpopulated countryside and communities.

Winter Storm - winter storms are generally associated with snowfall and frequently have freezing rain and sleet. Sleet is defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes. These pellets of ice usually bounce after hitting the ground or other hard

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

surfaces. Freezing rain begins as snow at higher altitudes and melts completely on its way down while passing through a layer of air above freezing temperature, then encounters a layer below freezing at lower level to become super cooled, freezing upon impact of any object it then encounters. Because freezing rain hits the ground as a rain droplet, it conforms to the shape of the ground, making one thick layer of ice. Snow is generally formed directly from the freezing of airborne water vapor into ice crystals that often agglomerates into snowflakes. Average annual snowfall in Arizona varies with geographic location and elevation, and can range from trace amounts to hundreds of inches. Severe winter storms can affect transportation, emergency services, utilities, agriculture and basic subsistence supply to isolated communities. In extreme cases, snow loads can cause significant structural damage to under-designed buildings.

### GENERAL PLAN TERMS

Asset - Any natural or human-caused feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Building - A building is a structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Critical Facilities and Infrastructure - Systems or facilities whose incapacity or destruction would have a debilitating impact on the defense or economic security of the nation. The Critical Infrastructure Assurance Office (CIAO) defines eight categories of critical infrastructure, as follows:

- Telecommunications infrastructure: Telephone, data services, and Internet communications, which have become essential to continuity of business, industry, government, and military operations.
- Electrical power systems: Generation stations and transmission and distribution networks that create and supply electricity to end-users.
- Gas and oil facilities: Production and holding facilities for natural gas, crude and refined petroleum, and petroleum-derived fuels, as well as the refining and processing facilities for these fuels.
- Banking and finance institutions: Banks, financial service companies, payment systems, investment companies, and securities/commodities exchanges.

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

- Transportation networks: Highways, railroads, ports and inland waterways, pipelines, and airports and airways that facilitate the efficient movement of goods and people.
- Water supply systems: Sources of water; reservoirs and holding facilities; aqueducts and other transport systems; filtration, cleaning, and treatment systems; pipelines; cooling systems; and other delivery mechanisms that provide for domestic and industrial applications, including systems for dealing with water runoff, wastewater, and firefighting.
- Government services: Capabilities at the federal, state, and local levels of government required to meet the needs for essential services to the public.
- Emergency services: Medical, police, fire, and rescue systems.

Disaster Mitigation Act of 2000 (DMA2K) - A law signed by the President on October 30, 2000 that encourages and rewards local and state pre-disaster planning, promotes sustainability as a strategy for disaster resistance, and is intended to integrate state and local planning with the aim of strengthening statewide mitigation planning.

Emergency Preparedness and Response (EPR) Directorate – EPR is one of five major DHS Directorates, which builds upon the formerly independent Federal Emergency Management Agency (FEMA). EPR is responsible for preparing for natural and human- caused disasters through a comprehensive, risk-based emergency management program of preparedness, prevention, response, and recovery. This work incorporates the concept of disaster-resistant communities, including providing federal support for local governments that promote structures and communities that reduce the chances of being hit by disasters.

Emergency Management Plan - The EMP is a document that contains information on the actions that may be taken by a governmental jurisdiction to protect people and property before, during, and after a disaster.

Federal Emergency Management Agency (FEMA) - Formerly independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery. As of March 2003, FEMA is a part of the Department of Homeland Security's Emergency Preparedness and Response (EPR) Directorate.

Flood Insurance Rate Map (FIRM) - Map of a community, prepared by FEMA that shows the special flood hazard areas and the risk premium zones applicable to the community.

Frequency - Is a measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

years on average, and would have a 1% chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.

Geographic Information Systems (GIS) - A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.

Hazard - Hazards are the source of potential danger or adverse condition. Hazards include both natural and human-caused events. A natural event is a hazard when it has the potential to harm people or property and may include events such as floods, earthquakes, tornadoes, tsunamis, coastal storms, landslides, and wildfires that strike populated areas. Human-caused hazard events originate from human activity and may include technological hazards and terrorism. Technological hazards arise from human activities and are assumed to be accidental and/or have unintended consequences (e.g., manufacture storage and use of hazardous materials). While no single definition of terrorism exists, the Code of Federal Regulations defines terrorism as “...unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.”

Hazard Event - A specific occurrence of a particular type of hazard defines an event.

Hazard Identification - Identifying a hazard is the process of identifying hazards that threaten an area.

Hazard Mitigation - Cost effective measures taken to reduce or eliminate long-term risk associated with hazards and their effects.

Hazard Profile - A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent

HAZUS - A GIS-based nationally standardized earthquake, flood and high wind event loss estimation tool developed by FEMA.

Mitigate - To cause to become less harsh or hostile; to make less severe or painful. Mitigation activities are actions taken to eliminate or reduce the probability of the event, or reduce its severity, either prior to or following a disaster/emergency.

Mitigation Plan - A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in a defined geographic area, including a description of actions to minimize future vulnerability to hazards.

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

100-Hundred Year Floodplain - Also referred to as the Base Flood Elevation (BFE) and Special Flood Hazard Area (SFHA), is an area within a floodplain having a 1% or greater chance of flood occurrence in any given year.

Planning - The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit.

Probability - A statistical measure of the likelihood that an event will occur.

Promulgation - Make public and put into action the Hazard Mitigation Plan via formal adoption and/or approval by the governing body of the respective community or jurisdiction (i.e. – Town or City Council, County Board of Directors, etc.).

Q3 Data - The Q3 Flood Data product is a digital representation of certain features of FEMA's Flood Insurance Rate Map (FIRM) product, intended for use with desktop mapping and Geographic Information Systems technology. The digital Q3 Flood Data are created by scanning the effective FIRM paper maps and digitizing selected features and lines. The digital Q3 Flood Data are designed to serve FEMA's needs for disaster response activities, National Flood Insurance Program activities, risk assessment, and floodplain management.

Risk - The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage beyond a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Substantial Damage - Damage of any origin sustained by a structure in a Special Flood Hazard Area whereby the cost of restoring the structure to its before-damaged condition would equal or exceeds 50% of the market value of the structure before the damage.

Vulnerability - Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power—if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

# Apache County Public Health Services District

## Threat and Hazard Identification Assessment (THIRA)

---

Vulnerability Analysis – Defines the extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability analysis should address impacts of hazard events on the existing and future built environment.

Vulnerable Populations - Any segment of the population that are subject to the effects of hazards due in part to: lack of mobility, sensitivity to environmental factors, or physical abilities. These populations can include, but are not limited to, senior citizens and young children.

Goals - General guidelines that explain what you want to achieve. Goals are usually broad statements with long-term perspective.

Objectives - Defined strategies or implementation steps intended to attain the identified goals. Objectives are specific, measurable, and have a defined time horizon.

Actions/Projects - Specific actions or projects that help achieve goals and objectives.

Implementation Strategy - A comprehensive strategy that describes how the mitigation actions will be implemented

### GENERAL HAZARD TERMS

Fujita Scale of Tornado Intensity - Rates tornadoes with numeric values from F0 to F5 based on tornado wind speed and damage sustained. An F0 indicates minimal damage such as broken tree limbs or signs, while an F5 indicates severe damage sustained.

Liquefaction - The phenomenon that occurs when ground shaking (earthquake) causes loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength.

Modified Mercalli Intensity Scale - The Modified Mercalli Intensity Scale is commonly used in the United States by seismologists seeking information on the severity of earthquake effects. Intensity ratings are expressed as Roman numerals between I at the low end and XII at the high end. The Intensity Scale differs from the Richter Magnitude Scale in that the effects of any one earthquake vary greatly from place to place, so there may be many Intensity values (e.g.: IV, VII) measured from one earthquake. Each earthquake, on the other hand, should have just one Magnitude, although the several methods of estimating it will yield slightly different values (e.g.: 6.1, 6.3).

Monsoon - A monsoon is any wind that reverses its direction seasonally. In the Southwestern U.S., for most of the year the winds blow from the west/southwest. Arizona is located on the fringe of the

## Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

---

Mexican Monsoon which during the summer months turns the winds to a more south/southeast direction and brings moisture from the Pacific Ocean, Gulf of California, and Gulf of Mexico. This moisture often leads to thunderstorms in the higher mountains and Mogollon Rim, with air cooled from these storms often moving from the high country to the deserts, leading to further thunderstorm activity in the desert. A common misuse of the term monsoon is to refer to individual thunderstorms as monsoons.

Richter Magnitude Scale - A logarithmic scale devised by seismologist C.F. Richter in 1935 to express the total amount of energy released by an earthquake. While the scale has no upper limit, values are typically between 1 and 9, and each increase of 1 represents a 32-fold increase in released energy.

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

## APPENDIX B

Threat/Hazard	Arizona State HMP 2006 <i>(Natural Events Only)</i>	Apache County HMP 2006 <i>(Natural Events Only)</i>	Apache County EMP 2009 <i>(All Hazard &amp; Public Health)</i>	Common Threats <i>(Natural Events Only)</i>
Aircraft Accident			X	
Bioterrorism			X	
Chemical Terrorism			X	
Civil Defense			X	
Dam Breach/Levee	X	X	X	Dam Breach
Disease Epidemic			X	
Earthquake	X		X	
Explosion			X	
HazMat			X	
Mass Casualty			X	
Radiological			X	
Emergency			X	
Search & Rescue	X	X	X	Winter Storm
Winter Storm			X	
Epidemiology			X	
Pandemic			X	
Mass Care			X	
Mass Fatality			X	
Behavioral Health				
Drought	X			
Extreme Heat	X			
Fissure				
Flood/Flash Flood	X	X	X	Flood/Flash Flood
Landslide/mudslide	X			
Severe Wind	X	X	X	Severe Wind
Subsidence	X			
Wildfires	X	X	X	Wildfires
Environmental			X	
*Drinking Water				
*Wastewater				
*Food-borne				
*Vector Sur/Cont				
*Rabies				
*Rodents/Fleas				
*Tick-borne				
*Haz Waste				
*Air Quality				
*Radiation Exposure				

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

Table 2. State and Federally Declared *Natural Hazard Events* That Included Apache County  
**Expenditures** - February 1966 to August 2010

2010 State HMP Hazard Categories	Arizona Declared Events that Included Apache County January 1966 to August 2010		
	No. of Events	Total Expenditures	
		State	Federal
Drought	7	\$211,499	-
Dam Failure	3	\$349,451	-
Flooding/Flash Flooding	7	\$38,352,317	\$322,023,270
Wildfire	17	\$5,719,192	-
Winter Storm	4	\$2,418,419	\$5,109,724
NOTES:			
*Damage Costs are reported as is and no attempt has been made to adjust costs to current dollar value			
*Only a portion of the reported expenditures were spent in the subject county			
*Flood/Severe Wind – this category included for declarations that have both elements			
Source: ADEM – Recovery Section, October 2010		<i>(This chart extracted from the AC HMP 2011)</i>	

Table 3. State and Federally Declared *All Hazard Events* That Included Apache County  
**Losses** - January 1966 to August 2010

2010 State HMP Hazard Categories	Recorded Losses			
	No. of Events	Total Expenditures		
		Fatalities	Injuries	Damage Costs (\$)
Drought	7	0	0	\$300,000,000
Dam Failure	3	0	0	-
Flooding/Flash Flooding	7	36	1087	\$894,650,000
Wildfire	17	0	0	-
Winter Storm	4	0	0	\$5,109,724
Source: ADEM, FEMA, USDA <span style="float: right;"><i>(This chart extracted from the ACHMP 2011)</i></span>				

Table 4. Apache County Historic *All Hazard Events*  
**Losses** - December 1916 to July 2011

Hazard	Recorded Losses			
	No. of Events	Total Expenditures		
		Fatalities	Injuries	Damage Costs (\$)
Earthquake	2	0	0	-
Flooding/Flash Flooding	12	0	0	\$1,000
Severe Wind	25	0	0	-
Wildfire	26	1	1	\$75,000
Aircraft Accident**	6	6	0	\$10,000,000
NOTES:				
*Damage Costs are reported as is and no attempt has been made to adjust costs to current dollar value				
*Only a portion of the reported expenditures were spent in the subject county				
*Flood/Severe Wind – this category included for declarations that have both elements				
**Aircraft Accidents reported at St. Johns and Springerville Airports				
Source: ADEM, FEMA, USDA, NTSB		<i>(This chart extracted from the ACHMP 2011 with Aircraft Accidents and Wallow Fire added)</i>		

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

Table 5. **HAZARD AND VULNERABILITY ASSESSMENT**  
**Human Hazard Category**

Threat/Event	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						PROBABILITY (0-100%)	RELATIVE SEVERITY (0-100%)	RELATIVE RISK (0-100%) <i>The Threat to the Facility increases as the % increases</i>
		Magnitude			Mitigation					
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE			
		Likelihood this will occur	Possibility of death, injury, and exposure	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources			
	1= Unlikely 2= Possible 3= Likely 4= Highly Likely	0= Unlikely 1= Possible 2= Likely 3= Highly Likely	0= Unlikely 1= Possible 2= Likely 3= Highly Likely	0= Unlikely 1= Possible 2= Likely 3= Highly Likely	1= Maximum 2= High 3= Moderate 4= Low	1= Maximum 2= High 3= Moderate 4= Low	1= Maximum 2= High 3= Moderate 4= Low			
Aircraft Accident								0%	0%	0%
Behavioral Health								0%	0%	0%
Civil Disturbance								0%	0%	0%
Explosion								0%	0%	0%
HazMat								0%	0%	0%
Mass Care								0%	0%	0%
Mass Casualty								0%	0%	0%
Radiation Exposure								0%	0%	0%
Search & Rescue								0%	0%	0%
Terrorism								0%	0%	0%
<b>COUNTYWIDE AVERAGE</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>

Table 6. **Relative Adjective Rating Summary**

%	Probability	%	Relative Severity	Relative Risk
25	Remote	< 15	Negligible	Low
50	Possible	16-30	Normal	Moderate
75	Likely	31-69	Elevated	High
100	Certain	>70	Acute	Extreme

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

## APPENDIX C

### ACPHSD Programmatic Goals (PG) and Target Capacities (TC)

Programmatic Goal		Target Capability		2013 Status
PG1	NIMS Compliance and Proficiency	TC1	Require NIMS training as part of New Employee Orientation	This element is on-going with policies in place to require employees to have completed classes within the first 6 months
		TC2	Exercise Current Employees on a routine basis to maintain NIMS proficiency	Employees are encouraged to attend exercises however currency policies have not been developed yet. Considerations are being discussed to add a qualifications maintenance requirement as new policy.
		TC3	Continue to seek alternative funding	On-going
		TC4	Conduct internal training to reduce funding demands	Courses that are available locally are sought out or instructors are brought in to minimize travel expenses.
		TC5	Revise HR & PH policy to require employees to participate during a response	Policies are in place to require employees support an emergency response to the level of their knowledge, skills and abilities.
PG2	ACEMP Awareness	TC6	Develop an orientation package that can be delivered to all PH County Employees	Completed and delivered monthly for FY-2012/13; Revisions in progress with deliveries planned for FY-2013/14 monthly
		TC7	Include ACEMP topics in EM & PH in social networking opportunities	Neither complete nor active due to staffing vacancies. PIO hired and in training to assume the social media management duties
		TC8	Ensure that ACEMP components are visible during training/exercises	On-going with all training opportunities commensurate with the nature of the plan section and exercise
PG3	Just in Time Training (JIT)	TC9	Prepare <u>basic skill assessment</u> for JIT; <b>include all employees and volunteers in an assessment to know where the skill base lies in the District</b>	No assessment of basic skills has been completed; however individual exercises and incident activation did contain basic skill sets required for employees and volunteers. An assessment needs to be completed for all employees to establish a baseline of skills.
		TC10	Train to ACEMP Job Aids	Training to the jobs aids is not on going. Staffing shortfalls require JIT for exercises and incident activation to be the job aid itself. The training program is reacting to State required training and behind due to Staffing vacancies
		TC11	Utilize Standardization of Practices	The training program currently is reactive in nature with stylized training in lieu of standardized training packages. The desire to achieve standardized training is built in the Training and Development Plan 2011
		TC12	Emphasize JIT during exercise planning	On-going and a major component of each exercise
PG4	External Partnerships	TC13	Review and update approved agreements	Undone. Agreement are out of date and limited in scope and number
		TC14	Draft New Agreements to promote interagency	No new agreements have been drafted since the last review in 2011

## Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

			coordination & cooperation	
		TC15	Utilize external partners in training and mentoring	New relationships have been forged with local chamber of commerce through the AVERT program; CPR/First Aid/Mental Health Training provided by external partners; This section is weak for identifying external sources to bring training and mentorship to PH employees
PG5	Internal Relationships	TC16	Review and update HR/PH policies addressing roles and responsibilities during an emergency response or exercises	This has not been done yet, but is planned for FY-13/14 as it relates to roles and responsibilities during an emergency response
		TC17	Establish Director meetings with all PH employees	On-going with 2 scheduled annually
		TC18	Publicize the Training and Development Strategy Guide	Not done. The training program is reactionary to State demands with limited PH staff. NEEDS Attention.
		TC19	Develop Standardized Training and Develop Plans for all employees	Those employees wanting training have been allowed to attend standardized training, however Employee Development Plans have not been started, but areas of interest have been explored with individual employees
		TC20	Conduct Team Building Seminars	TRUE COLORS Training has been completed. No others scheduled. Social events have played a significant role to engage employees internally. Coordinator meetings have been used as a way to share information to gain a better awareness of each Divisions workload and responsibilities
		TC21	Explore Employee Wellness Opportunities	Currently embedded in PH policy; PH Wellness Ambassador to the Countywide Wellness Program
		TC22	Distribute Employee Questionnaire	<b>Recommendation for Deletion</b>
PG6	Leadership	TC23	Distribute Employee Questionnaire with specific questions on Leadership training	This has been completed through verbal interest queries and department wide emails
		TC24	Recommend Leadership training for all positions in Step 3 and above on the T&D Concept	Those employees identified with the KSAs and interest, have been sent to advanced training. This TC has limited application to move to Step 3 and beyond because of Staffing Turnover
		TC25	TC25 - Utilize external partners in training and mentoring	No leadership training or mentor from external partners has occurred
		TC26	Identify personnel and positions that would require a "fast track" approach	Specific positions and individuals were identified to receive accelerated training in C&G positions during FY-2012/13
PG7	Exercises	TC27	Utilize Job Aids from the ACEMP; prepare new Job Aids where none exist; take	Used the Job Aids from the EMP and created new Job Aids for Volunteer Reception Center Mgr.; Need to consider

## Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

			advantage of existing “tool boxes”	availability of existing tool boxes such as NACCHO.
		TC28	Participate in other jurisdictions exercises/incidents	On-going and increasing as partners are fostered
		TC29	Solicit external partners for coaches to mentor planning and execution of exercises	Assisting external partners on a routine basis to work on others planning and coaching. Need to bring in externals to assist PH on developing PH exercises
PG8	After Action Reviews	TC30	Develop a standardized AAR process to document and mitigate ICO’s	HSEEP process is standardized in PH as part of all incidents, however it has not been pushed as a standardized process that can be utilized by all employees
		TC31	Train employees on the AAR process	This has not been completed as a general rule, however consideration should be for all IC; C&G positions
		TC32	Address AAR function and value during Leadership Training	Employees receive the AAR training and discuss the value to improving response actions, however Leaders are not part of this process
PG9	Lessons Learned	TC33	Establish an archive policy that aids in the recovery of lessons learned	<b>Not being done</b>
		TC34	Incorporate the Lessons Learned into the planning process for exercises	Utilization of AAR findings and lessons learned is on-going however it is an informal process without any retrieval mechanism
		TC35	Utilize Lessons Learned as a performance improvement tool	The current performance improvement and review process does not lend itself to using lessons learned to measure performance
PG10	Self-Improvement	TC36	Formalize the employee T&D process and incorporate with the Annual Employee Performance Review	<b>Not Completed</b>

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

## APPENDIX D

The following spreadsheets represent the outcome of the Subject Matter Experts (SME) input to rating the Relative Risk for both incident specific hazards and an overall risk rating for Apache County based on its mitigation activities.

### Natural Hazards

Threat/Event		SEVERITY = (MAGNITUDE - MITIGATION)										PROBABILITY (0-100%)	RELATIVE SEVERITY (0-100%)	RELATIVE RISK (0-100%) <i>The Threat to the Facility increases as the % increases</i>	
		Magnitude					Mitigation								
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS				INTERNAL RESPONSE
	PROBABILITY Likelihood this will occur	Possibility of death, injury, and exposure	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources	Community/Mutual Aid staff and supplies	0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	1 = Maximum 2 = High 3 = Moderate 4 = Low	1 = Maximum 2 = High 3 = Moderate 4 = Low			
<b>Dam Breach</b>	1	0	0	0	4	4	4	0	4	4	4	4	25%	57%	14%
<b>Earthquake</b>	1	0	0	0	4	4	4	0	4	4	4	4	25%	57%	14%
<b>Flood/ Flash Flood</b>	3	0	1	1	3	3	3	1	3	3	4	4	75%	57%	43%
<b>Severe Wind</b>	3	1	2	1	3	3	3	1	3	3	4	4	75%	67%	50%
<b>Wildfire</b>	3	2	1	0	3	3	3	0	3	3	4	4	75%	62%	48%
<b>Winter Storm</b>	2	1	1	1	3	3	3	1	3	3	4	4	50%	62%	31%
<b>COUNTYWIDE AVERAGE</b>	2.17	0.67	0.83	0.50	3.33	3.33	3.33	0.50	3.33	3.33	4.00	4.00	54%	60%	33%

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

## Human Hazards

### HAZARD AND VULNERABILITY ASSESSMENT Human Hazard Category

Threat/Event	PROBABILITY Likelihood this will occur 1= Unlikely 2 = Possible 3 = Likely 4 = Highly Likely	SEVERITY = (MAGNITUDE - MITIGATION)					PROBABILITY (0-100%)	RELATIVE SEVERITY (0-100%)	RELATIVE RISK (0-100%) <i>The Threat to the Facility increases as the % increases</i>
		Magnitude							
		HUMAN IMPACT Possibility of death, injury, and exposure 0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	PROPERTY IMPACT Physical losses and damages 0 = Unlikely 1 = Possible 2 = Likely 3 = Highly/Likely	BUSINESS IMPACT Interruption of services 0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	PREPAREDNESS Preplanning 1 = Maximum 2 = High 3 = Moderate 4 = Low	INTERNAL RESPONSE Time, effectiveness, resources 1 = Maximum 2 = High 3 = Moderate 4 = Low			
<b>Aircraft Accident</b>	2	3	2	1	3	3	50%	76%	38%
<b>Behavioral Health</b>	2	1	0	0	3	3	50%	48%	24%
<b>Civil Disturbance</b>	1	0	0	0	4	4	25%	38%	10%
<b>Explosion</b>	2	1	1	1	2	4	50%	52%	26%
<b>HazMat</b>	2	1	1	1	4	4	50%	71%	36%
<b>Mass Care</b>	2	0	0	0	2	3	50%	38%	19%
<b>Mass Casualty</b>	2	3	0	0	2	3	50%	52%	26%
<b>Terrorism</b>	1	3	3	3	3	3	25%	90%	23%
<b>COUNTYWIDE AVERAGE</b>	<b>1.75</b>	<b>1.50</b>	<b>0.88</b>	<b>0.75</b>	<b>2.63</b>	<b>3.38</b>	<b>44%</b>	<b>58%</b>	<b>26%</b>

# Apache County Public Health Services District Threat and Hazard Identification Assessment (THIRA)

## Environment Hazards

### HAZARD AND VULNERABILITY ASSESSMENT Environment Hazard Category

Threat/Event	PROBABILITY Likelihood this will occur	SEVERITY = (MAGNITUDE - MITIGATION)						PROBABILITY (0-100%)	RELATIVE SEVERITY (0-100%)	RELATIVE RISK (0-100%) The Threat to the Facility increases as the % increases
		Magnitude			Mitigation					
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE			
		Possibility of death, injury, and exposure	Physical losses and damages	Interruption of services	Preplanning	Time, effectiveness, resources	Community/ Mutual Aid staff and supplies			
		0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	0 = Unlikely 1 = Possible 2 = Likely 3 = Highly Likely	1 = Maximum 2 = High 3 = Moderate 4 = Low	1 = Maximum 2 = High 3 = Moderate 4 = Low	1 = Maximum 2 = High 3 = Moderate 4 = Low			
Drinking water	1	1	0	3	2	3	3	25%	57%	14%
Waste water	1	1	0	1	2	3	3	25%	48%	12%
Food-borne	1	1	0	1	2	3	3	25%	48%	12%
Vector Insect to Human	2	1	0	0	3	4	3	50%	52%	26%
Vector Animal to Human	2	1	0	0	3	3	3	50%	48%	24%
Disease Epidemic	2	1	0	1	3	4	4	50%	62%	31%
Pandemic	2	1	0	1	3	3	4	50%	57%	29%
Hazard Waste	2	1	0	0	3	4	2	50%	48%	24%
Air Quality	2	1	0	1	3	3	3	50%	52%	26%
<b>COUNTYWIDE AVERAGE</b>	<b>1.67</b>	<b>1.00</b>	<b>0.00</b>	<b>0.89</b>	<b>2.67</b>	<b>3.33</b>	<b>3.11</b>	<b>42%</b>	<b>52%</b>	<b>22%</b>