



RCAP/AWWA Small Systems Risk and Resilience Assessment Worksheet

The information in the worksheet addresses the basic elements of a risk and resilience assessment for small systems to comply with America’s Water Infrastructure Act of 2018. The information can be used to support the inputs necessary for the Vulnerability Self-Assessment Tool (VSAT) which follows the ANSI/AWWA J100 Standard for Risk and Resilience Management.

Section 1: Utility Information

A. UTILITY NAME and PWSID: _____

B. DATE OF ASSESSMENT: _____

C. CONTACT PERSON: _____

D. UTILITY PHYSICAL ADDRESS: _____

E. UTILITY PHONE: _____

F. CONTACT EMAIL: _____

G. WATER WASTEWATER BOTH (Circle one)

H. UTILITY MISSION: _____

I. UTILITY DESCRIPTION (include water source, length of pipe, storage, treatment type, MGD, population served, connections, etc.):

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Section 2: Potential Critical Assets

An asset is critical if, without it, a Utility cannot meet its mission (typically to provide safe water and fire flow). Circle any assets that apply to your utility.

Source Water

- surface water (e.g. river, lake, reservoir)
- groundwater
- purchased water
- raw water transmission or conveyance systems

Monitoring Practices

- water quality sensors
- laboratory resources
- sampling capabilities
- data management equipment and systems
- security cameras
- access control systems

Physical Barriers (these are mitigation measures that protect other assets)

- fencing, bollards, and perimeter walls
- gates and facility entrances
- intrusion detection sensors and alarms
- access control systems (e.g., locks, card reader systems)
- hardened doors, security grilles, and equipment cages

Pipes and Constructed Conveyances, Water Collection and Intake

- intake structures and associated pumps and pipes
- aqueducts
- bridge or riverbed crossings
- other conveyances

Pretreatment and Treatment

- treatment plant
- sedimentation basins
- filtration
- disinfection process
- flocculation basins
- backwash system
- raw water pumps
- chemical use, storage, and handling

Storage and Distribution Facilities

- distribution system
- pump stations
- finished water clearwell, tanks, & reservoirs
- valves/appurtenances (e.g. air release and pressures release)
- booster stations
- meters

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

**Electronic, Computer, or Other
Automated Systems**

- SCADA system
- AMR/AMI
- GIS mapping
- monitors and other interfaces
- related IT hardware and software and communications
- IT hardware & software
- telemetry and communications systems
- HVAC system
- generators

**Financial Infrastructure and Other
Assets**

- customer billing & accounting systems
- human resources/employee information system
- third parties used for the above services
- admin computer systems

Using the information above and your Field Assessment, list out other assets your utility should consider:

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Section 3: Potential Threats

Evaluate the likelihood of each of the following threats occurring to your system. You may base your evaluation on your knowledge of sources such as:

- Past history of incidents
- Law enforcement information
- Industry known threats
- Local jurisdiction’s natural hazard mitigation plan (updated every 5 years)

Consider these definitions to assign an estimated likelihood to the threats in Table 3-1:

Almost Certain	Expected to occur at least once in a given year
Likely	Could occur at least once every 10 years
Possible	It is conceivable that this could happen, but only expected infrequently
Unlikely	It is conceivable that this could happen, although only in unusual circumstances
Rare	It is not conceivable that this could occur

TABLE 3-1

Threat (Intentional or Accidental)	Notes	Estimated Likelihood
Malevolent acts/Human-caused events		
Active Assailant	Assault on Utility Staff (e.g. Active shooter)	
Contamination of Source Water- Intentional	Any type of contamination to source water introduced purposely by a human	
Contamination of Source Water- Accidental	Consider potential upstream sources of contamination to a source water that may occur through an accidental release (e.g. chemical or fuel storage facility, pipeline, transportation accident)	
Contamination of Finished Water- Intentional	Any type of contamination of water in the distribution system introduced purposely by a human	
Contamination of Finished Water- Accidental	Any type of contamination of water that occurs accidentally (e.g. back flow at a hydrant or commercial facility)	
Theft or Diversion- Physical	Steal or divert information, dangerous substances, valuable resources, etc., such as copper theft	

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Threat (Intentional or Accidental)	Notes	Estimated Likelihood
Sabotage- Physical	Physical attack on utility infrastructure, such as sledgehammer to a power panel or arson	
Cyberattack - Business Enterprise Systems	Cause harm by damaging, disabling, or destroying business software systems	
Cyberattack - Process Control Systems	Cause harm by damaging, disabling, or destroying process control systems	
Weaponized Transportation	Attack from a vehicle, boat or aircraft	
Other:		
Other:		
Natural Hazards		
Flood	Damage potential based on FEMA flood zones for 100-year or greater floods	
Earthquake	Damage from an earthquake	
Tornado	Destruction assumed in area hit by tornado	
Ice Storm/Winter weather	Winter weather affecting an asset	
Drought	Systematic drought conditions that cause your utility to implement policy changes. For drought information, visit drought.gov	
Wildfire	Fire that may affect or engulf an asset	
Hurricane	Destruction assumed in area impacted by hurricane	
Other:		
Other:		
Dependency and Proximity Hazard Reference Threat Scenarios		
Utilities	e.g. power, communication, etc.	
Key Suppliers	Service interruption for the number of days set as the supplier resilience standard	
Key Customers	Unable to take production for the number of days set as the customer resilience standard	
Key Employees	Unable/unwilling to come to work for the number of days set as the employee resilience standard	
Transportation	Facilities into and/or out of the site are inoperable (e.g. can't receive chemical supply because bridge is washed out)	

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Threat (Intentional or Accidental)	Notes	Estimated Likelihood
Proximity	Nearby assets that could impact utility operations (e.g. underground storage tanks affecting groundwater; chemical storage area nearby that can affect Utility asset)	
Other:		
Other:		

List ten of the most important threats that could affect your Utility and circle the top five you think could cause the most significant disruption to your system’s mission:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Section 4: Potential Consequences

Consider consequences of losing each asset if a particular threat occurs. Use these definitions for consequence of loss of an asset:

Insignificant	No expected injury or damages
Minor	Acceptable risk. The asset can probably still function with the identified threats, but the threats must be observed to monitor changes that could increase the risk level.
Moderate	Moderate risk. The asset might or might not function properly when this threat occurs. The threat must be monitored on a regular basis, with consideration of whether additional measures may be necessary to ensure operations continue.
Major	This is an unacceptable risk level. The asset unlikely to function properly if the threat occurs and potential for injuries. Mitigative actions are needed to reduce the risks of the threat to the asset.
Severe	This is an unacceptable risk level to asset/function and may result in one or more fatalities. Requires prompt action to mitigate risk.

Using the Estimated Threat Likelihood from Table 3-1, match it to the Consequence of Loss in Table 4-1 for each asset to determine the Risk for each Threat-Asset Pair. Risk is shown in the colorful boxes as Low, Medium, High or Extreme.

TABLE 4-1

		Consequence of Loss of an Asset				
		Insignificant	Minor	Moderate	Major	Severe
Estimated Threat Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	Extreme	Extreme
	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

In Table 4-2, write the consequence, in words, if the threat were to occur and affect the asset.

The example is shown in italics. Repeat this table as needed to complete all Assets and top Threats. For each Threat-Asset Pair, circle its risk to the Utility as Low, Medium, High or Extreme based on the information in Table 4-1.

TABLE 4-2

	Threat: <i>Intentional Contamination</i>	Threat:	Threat:	Threat:	Threat:
Asset: <i>Groundwater Well</i>	<i>50% of population served may become sick or die</i>				
	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:					
	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:					
	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:					
	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:					
	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

	Threat: <i>Intentional Contamination</i>	Threat:	Threat:	Threat:	Threat:
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>
Asset:	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>	<i>Low Med High Extreme</i>

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Section 5 Choose Mitigation Measures for Critical Assets:

Assets at Greatest Risk and Consequence of losing them (in words) from Table 4-2	Potential Mitigation Measures
<p><i>EXAMPLE: Groundwater Well</i> 50% of population served may become sick or die</p>	<i>Lock wellheads</i>
	<i>Monitor water quality</i>
	<i>Place cameras onsite to detect intruders</i>

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Assets at Greatest Risk and Consequence of losing them (in words)	Potential Mitigation Measures

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Assets at Greatest Risk and Consequence of losing them (in words)	Potential Mitigation Measures

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

Section 6: Additional AWIA Requirements

a) Describe any monitoring practices of the system (e.g. CCTV, alarms, water quality monitoring, etc.) and any changes/suggestions to improve resiliency

b) Describe the Financial Infrastructure (to back up data in case it is lost for any reason) and any changes/suggestions to improve resiliency

c) Describe use, storage, or handling of various chemicals on site (include chemical delivery procedures) and any changes/suggestions to improve resiliency

The Use, Storage, or Handling of Chemicals

Encompasses the chemicals and associated storage facilities and handling practices used for chemical disinfection and treatment. Assessments under this asset category should focus on the risk of uncontrolled release of a potentially dangerous chemical like chlorine where applicable.

RCAP/AWWA SMALL SYSTEMS
RISK AND RESILIENCE ASSESSMENT WORKSHEET

d) Describe the operation and maintenance practices of the system and any changes/suggestions to improve resiliency

e) List any capital improvement projects needed to improve resiliency

f) List any operational/maintenance needs to improve resiliency

g) List any changes/improvements to procedures to improve resiliency