



Smart Management for  
Small Water Systems

## Determining the Risk: Asset Management Risk Analysis Discussion and Available Tools

Webinar presented by Dawn Nall  
August 24, 2016



Southwest  
Environmental  
Finance  
Center

This program is made possible under a  
cooperative agreement with EPA.

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All phones/microphones are muted for the duration of the webinar.

Toggle between full screen/window screen view

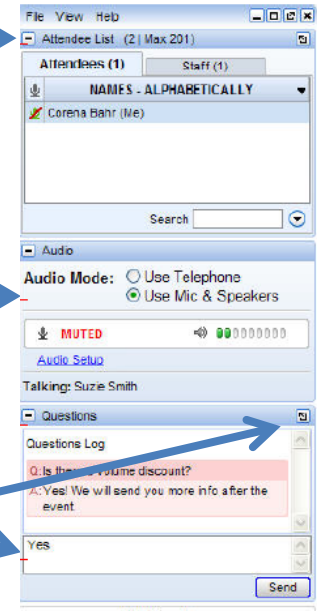


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## About the Environmental Finance Center Network (EFCN)

The Environmental Finance Center Network (EFCN) is a university-based organization creating innovative solutions to the difficult how-to-pay issues of environmental protection and improvement. The EFCN works with the public and private sectors to promote sustainable environmental solutions while bolstering efforts to manage costs.

## The Smart Management for Small Water Systems Program

This program is offered free of charge to all who are interested. The Project Team will conduct activities in every state, territory, and the Navajo Nation. All small drinking water systems are eligible to receive free training and technical assistance.

## What We Offer

Individualized technical assistance, workshops, small group support, webinars, eLearning, online tools & resources, blogs



## The EFCN Project Team

- Environmental Finance Center at The University of North Carolina at Chapel Hill
- EFC West
- Environmental Finance Center at Wichita State University
- New England Environmental Finance Center at University of Southern Maine
- Southwest Environmental Finance Center
- Syracuse University Environmental Finance Center







## Areas of Expertise

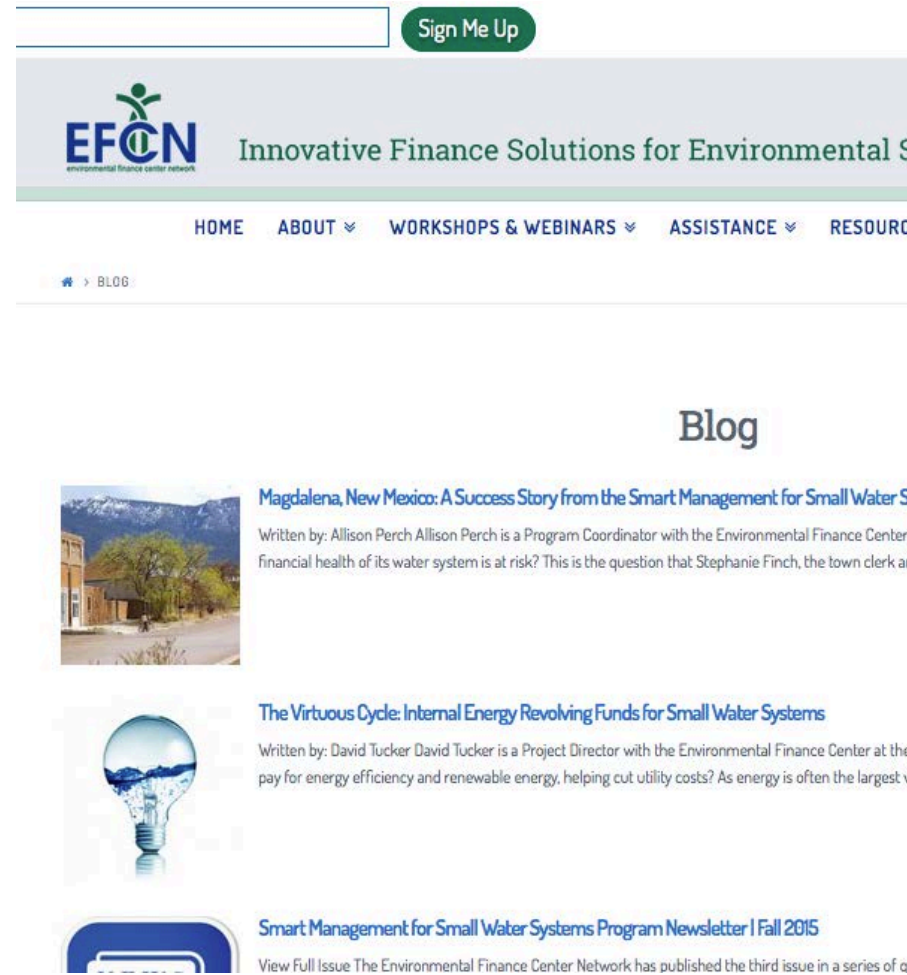
- Asset Management
- Energy Management Planning
- Financial Management
- Leadership Through Decision-making and Communication
- Managing Drought
- Water Loss Reduction
- Collaborating with Neighboring Communities
- Multi-funding
- Water Conservation
- Management and Finance 101
- Climate Resiliency
- Workforce Development

# Small Systems Blog

Learn more about water finance and management through our Small Systems Blog! Blog posts feature lessons learned from our training and technical assistance, descriptions of available tools, and small systems “success stories.”

## Common Blog Topic Areas

- Asset Management
- Energy Management
- Enhancing Regulatory Compliance
- Fiscal Planning & Rate Setting
- Funding Coordination
- Managerial & Financial Leadership
- Water Loss Reduction
- Water System Collaboration



[efcnetwork.org/small\\_systems\\_blog/](http://efcnetwork.org/small_systems_blog/)



# Polling Question 1

What kind of water utility do you represent?

- For-Profit
- Municipality
- Not-for-Profit
- Special Purpose District
- Not a Water or Sewer Utility



## Polling Question 2

What size water system does your utility operate (by number of people served)?

- Very Small (500 or fewer people served)
- Small (501 to 3,300 people served)
- Medium (3,301 to 10,000 people served)
- Large or Very Large (10,001+ people served)
- Not a Water or Sewer Utility



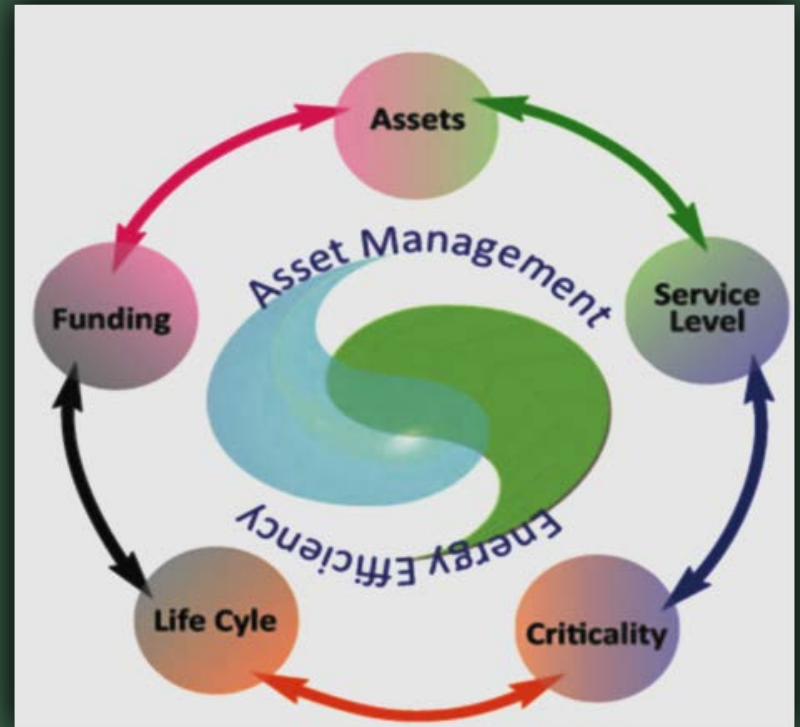


# Asset Management The 5 Core Components

## A Quick Review

Asset management helps you determine how, where, and when to spend your money

Asset management is first and foremost a process to help **you** run **your** systems in a better way





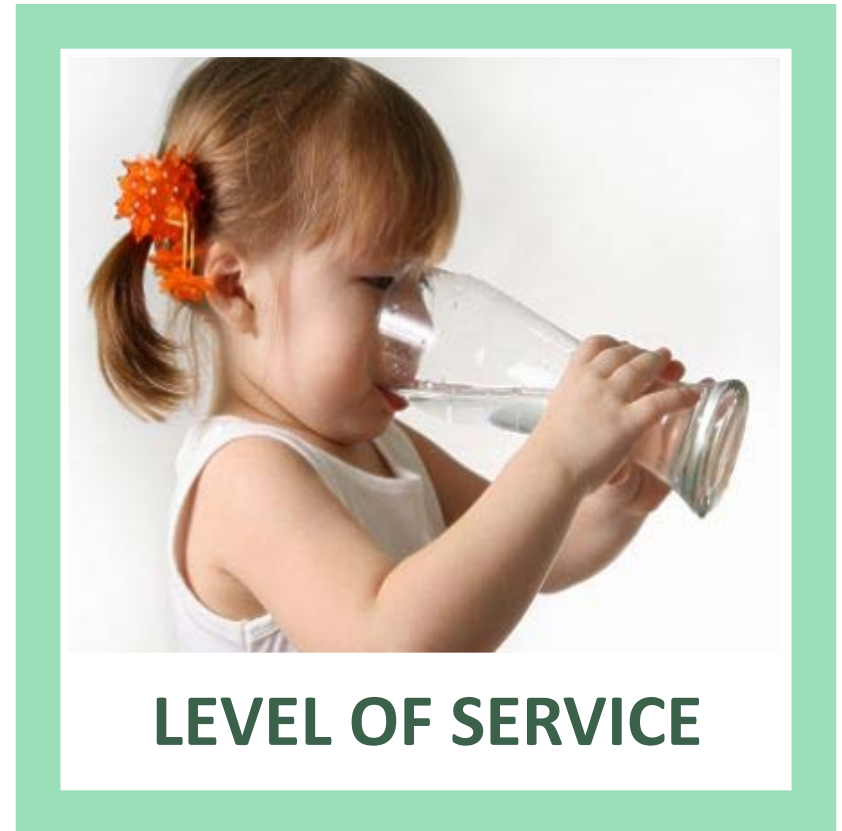
# THE AM THOUGHT PROCESS CONSISTS OF 5 CORE COMPONENTS



CURRENT STATE OF THE ASSETS



# THE AM THOUGHT PROCESS CONSISTS OF 5 CORE COMPONENTS

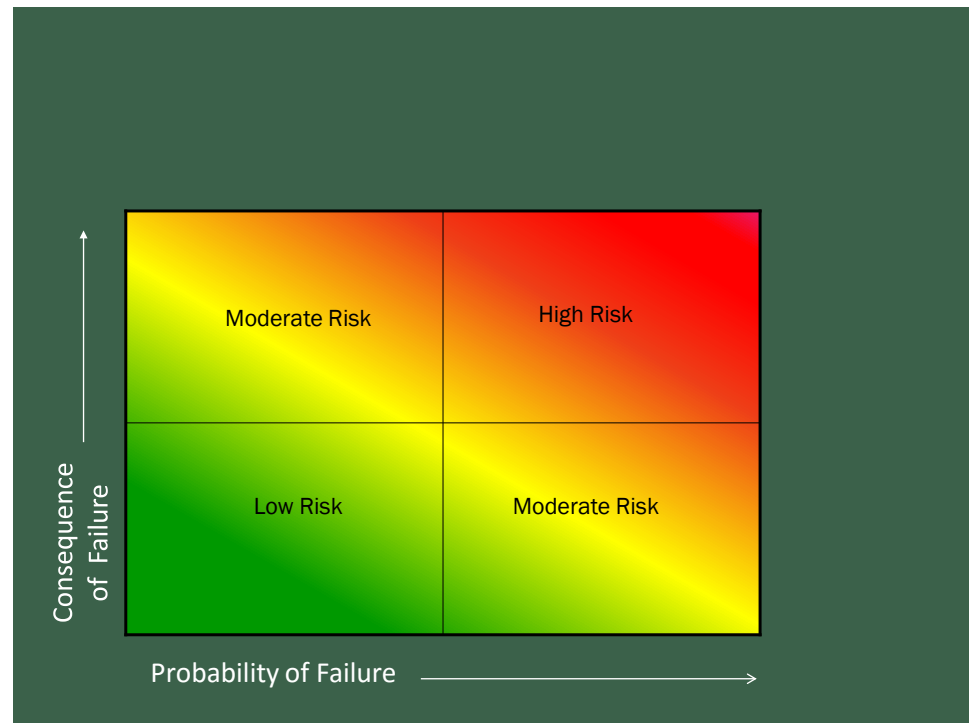


**LEVEL OF SERVICE**





# THE AM THOUGHT PROCESS CONSISTS OF 5 CORE COMPONENTS



## CRITICALITY



# THE AM THOUGHT PROCESS CONSISTS OF 5 CORE COMPONENTS



LIFE CYCLE  
COSTING



# THE AM THOUGHT PROCESS CONSISTS OF 5 CORE COMPONENTS



## FUNDING





# Risk Analysis Discussion





Item #	Category	Detail	Carl
1	PM Checklist	Be able to perform all the duties on the rooms PM checklist	
2	Bldg	Replace door closures	
3	Bldg	Repair Window treatments	
4	Bldg	Install Misc Wall Mountings	
5	Bldg	Install sound tape on doors	
6	Bldg	Adjust door closures	
7	Bldg	Furniture touch up	
8	Bldg	Minor paint touch up	
9	Bldg	Minor vinyl repairs	
10	Bldg	Caulk tubs, sinks and toilets	
11	Bldg	Replace windows in guest rooms	
12	Bldg	Read electric meters	
13	Electrical	Locate and reset circuit breakers	
14	Electrical	Replace fuses	
15	Electrical	Replace GFI outlets	
16	Electrical	Replace ends on extension cords	
17	Electrical	Rewire power boxes	
18	Electrical	Repair vacuums	
19	Electrical	Replace ballasts in a light fixture	
20	Electrical	Use a voltage meter	
21	Electrical	Replace dimmer switches	
22	Electrical	Replace light switches	
23	Electrical	Replace electrical outlets	
24	Electrical	Replace light fixtures	
25	Electrical	Replace light bulbs	
26	Electrical	Replace emergency light bulbs	
27	Electrical	Replace sockets and switches in l	
28	Electrical	Know how to test single phase	
29	Electrical	Tell the difference between	
30	Electrical	Knowledge of correct	
31	Electrical	Trace circuits	
32	Electrical	Replace break	
33	Electrical	Replace c	
34	Electrical	Repla	
35	Electrical	Re	
36	Electrical	Re	
37	Electrical	Repl	
38	Electrical	Replace	
39	Electrical	Replace i	
40	Electrical	Wire motor	
41	Electrical	Replace photo	
42	FLS	Knowledge on how to test the fresh water supply	
43	FLS	How to check and test the pumps in the waste treatment plant	

How do you pick?



You must determine  
which of your assets are  
most critical.

But how?

Risk Analysis



# Critical Assets - Risk Analysis

What is the likelihood that an asset will fail?

What is the consequence if the asset does fail?





# Probability of Failure

Mortality

Level of  
Service

Capacity

Financial  
Inefficiency



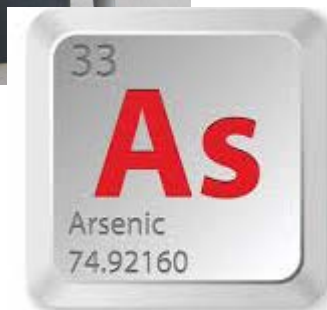


# Failure Type - Mortality





# Failure Type – Level of Service





# Failure Type - Capacity







# Failure Type – Financial Inefficiency

More to fix than to  
replace







# Consequence of Failure

## Triple Bottom Line

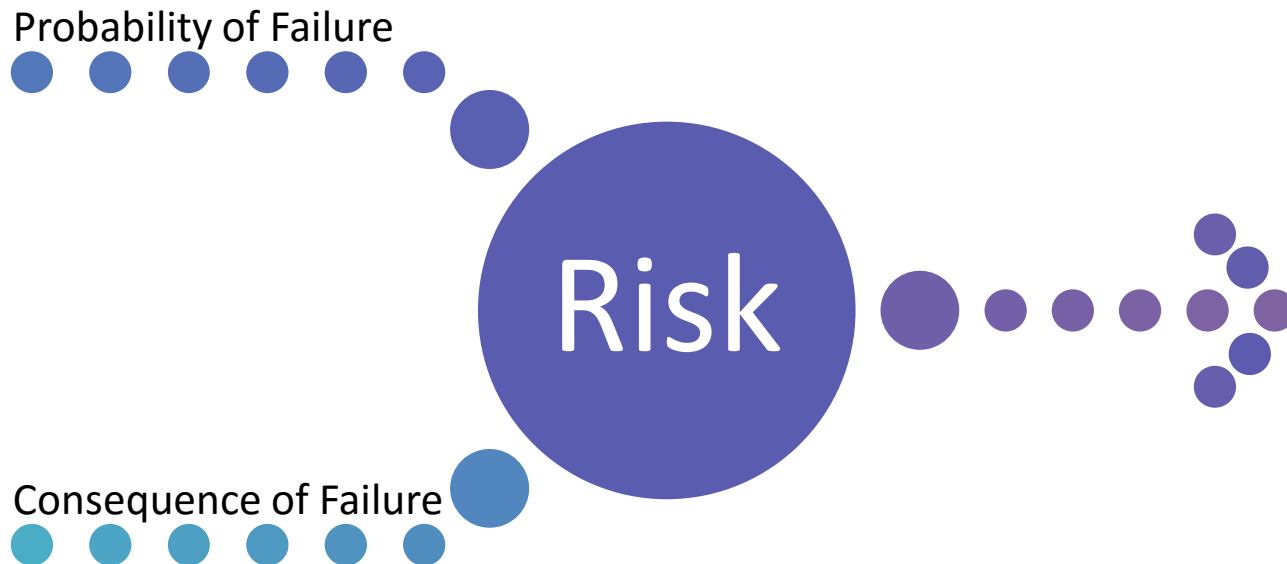
Financial

Environmental

Social



# Calculating the Risk





# Reducing the Risk

Routine &  
Preventative  
Maintenance

Redundancy

Spare Parts

Specialized  
Training

Replace Assets  
Early

Monitoring



# Calculating the Risk

Probability of Failure



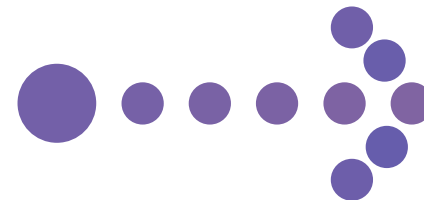
Consequence of Failure



Risk Reduction Factor  
(Redundancy)



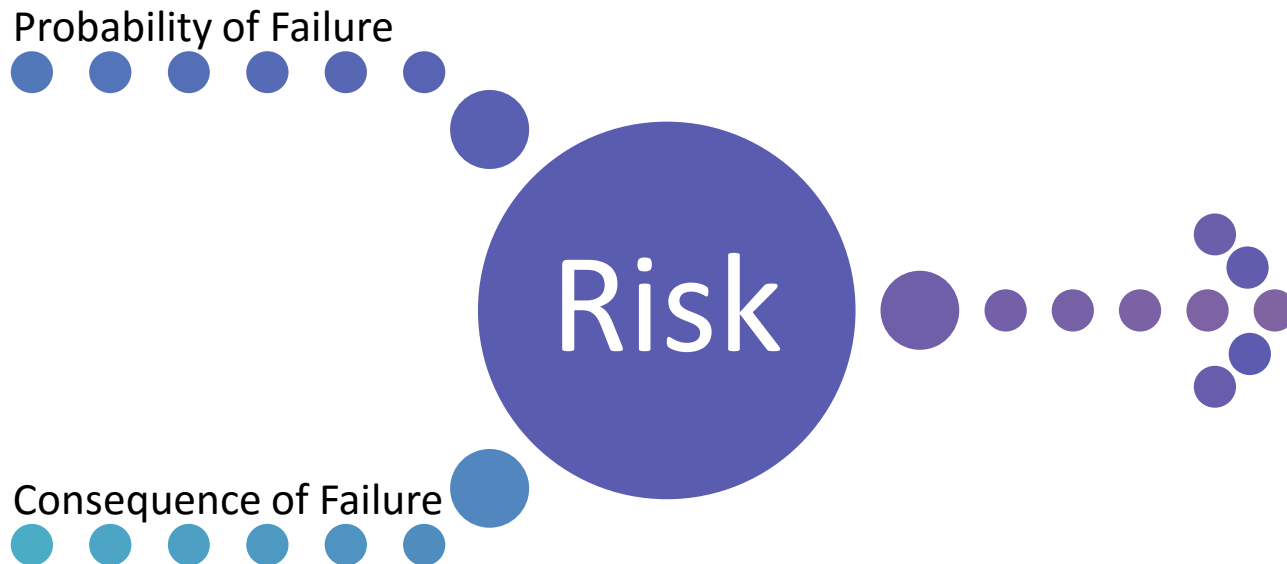
Risk





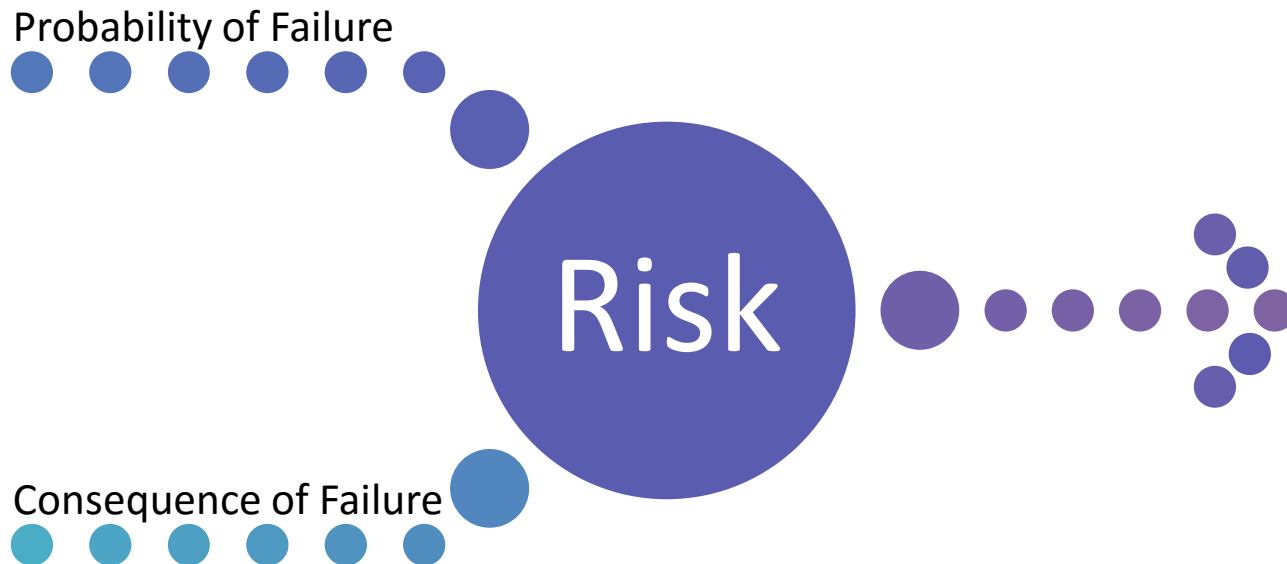


# Calculating the Risk



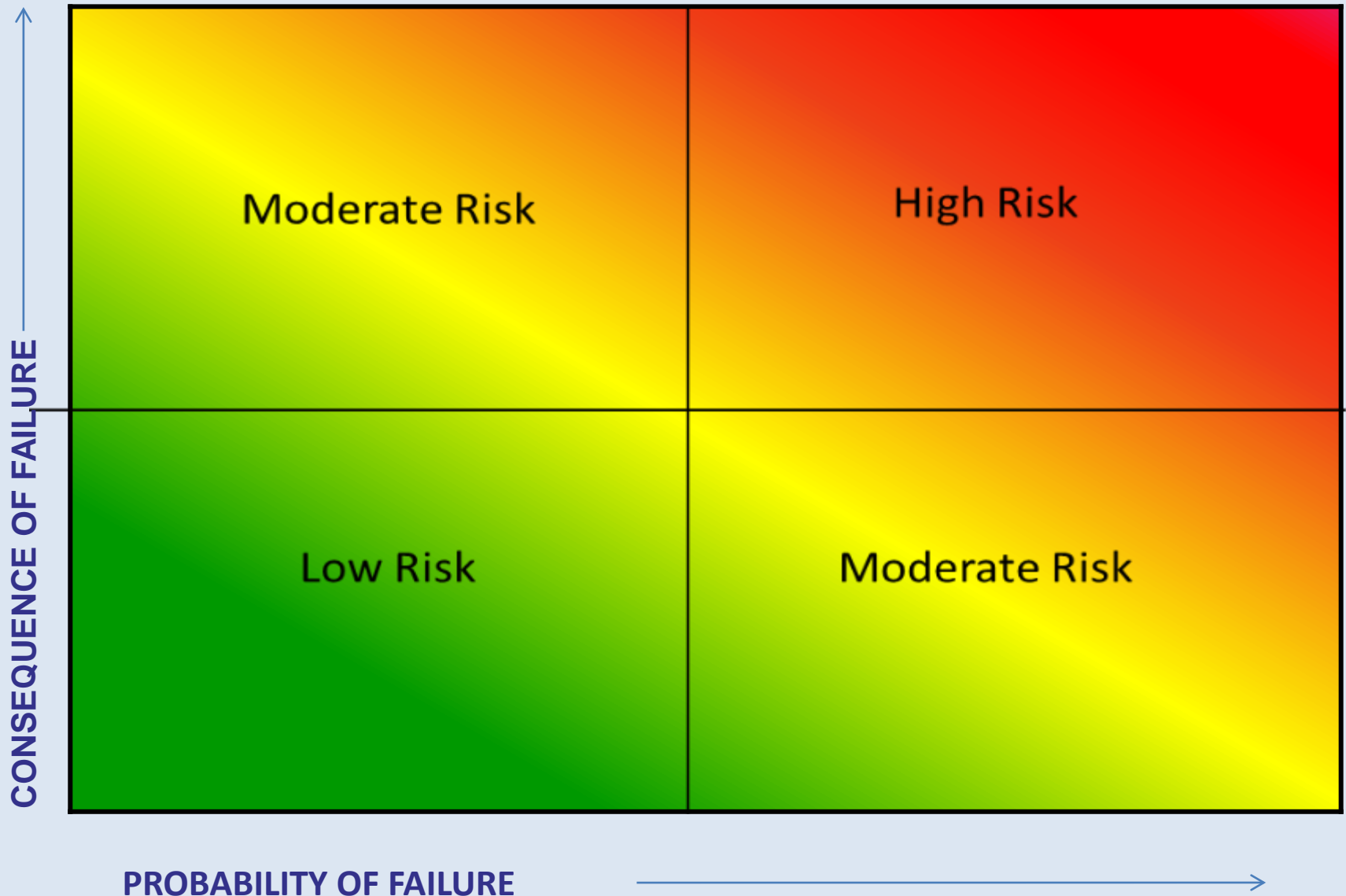


# Calculating the Risk



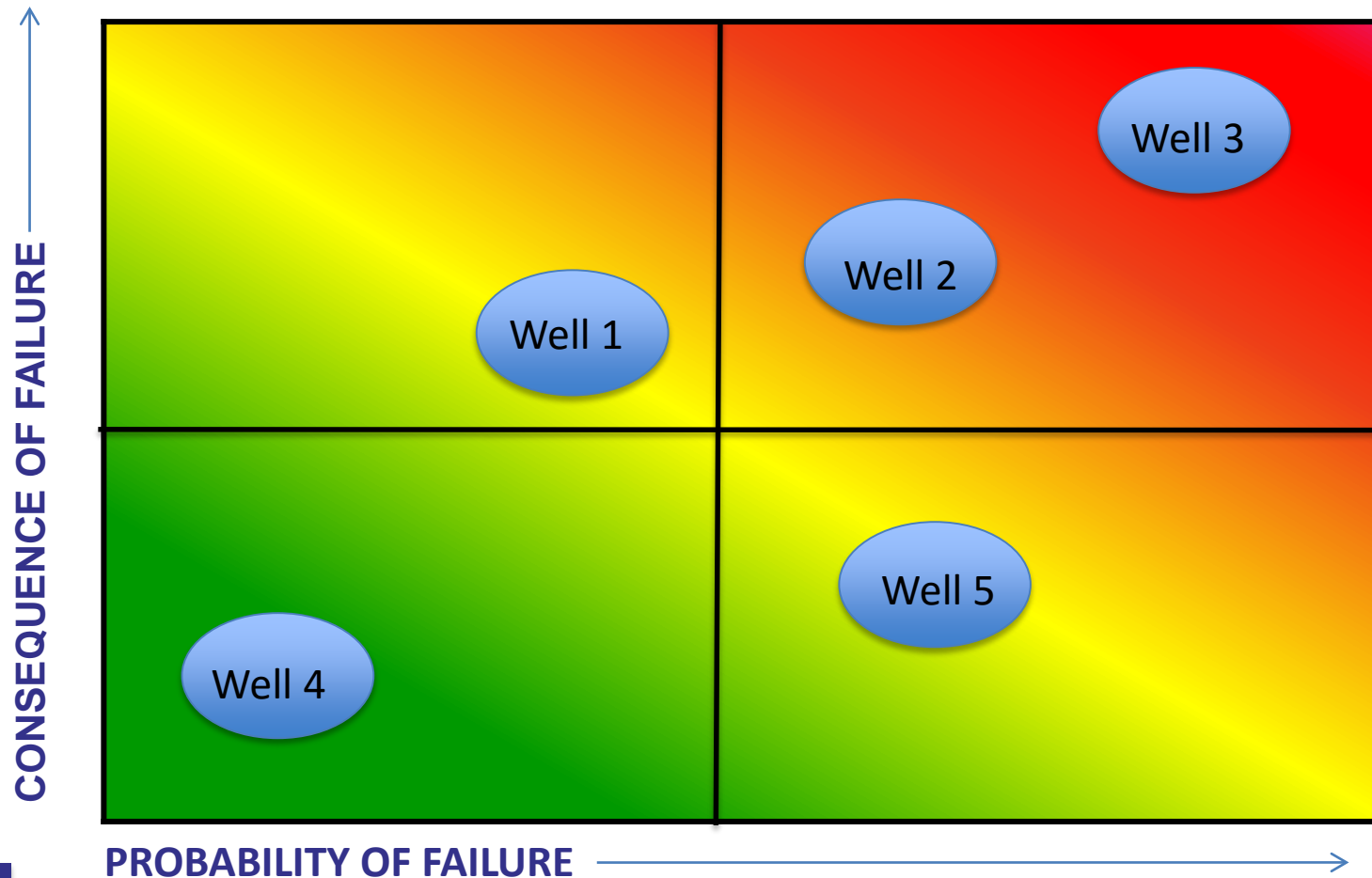


# Asset Risk





# What does it all mean?







# Risk Analysis Guides Decision Making





# Available Tools



# A.M. KAN WORK!

An Asset Management and Energy Efficiency Manual



Helping Water and Wastewater Utilities Achieve Sustainability  
Through Sound Management Practices

Sponsored by:



<http://www.kdheks.gov>

Prepared by:



NEW MEXICO  
ENVIRONMENTAL  
FINANCE CENTER  
<http://www.efcnet.org>

NEXT



Asset: \_\_\_\_\_

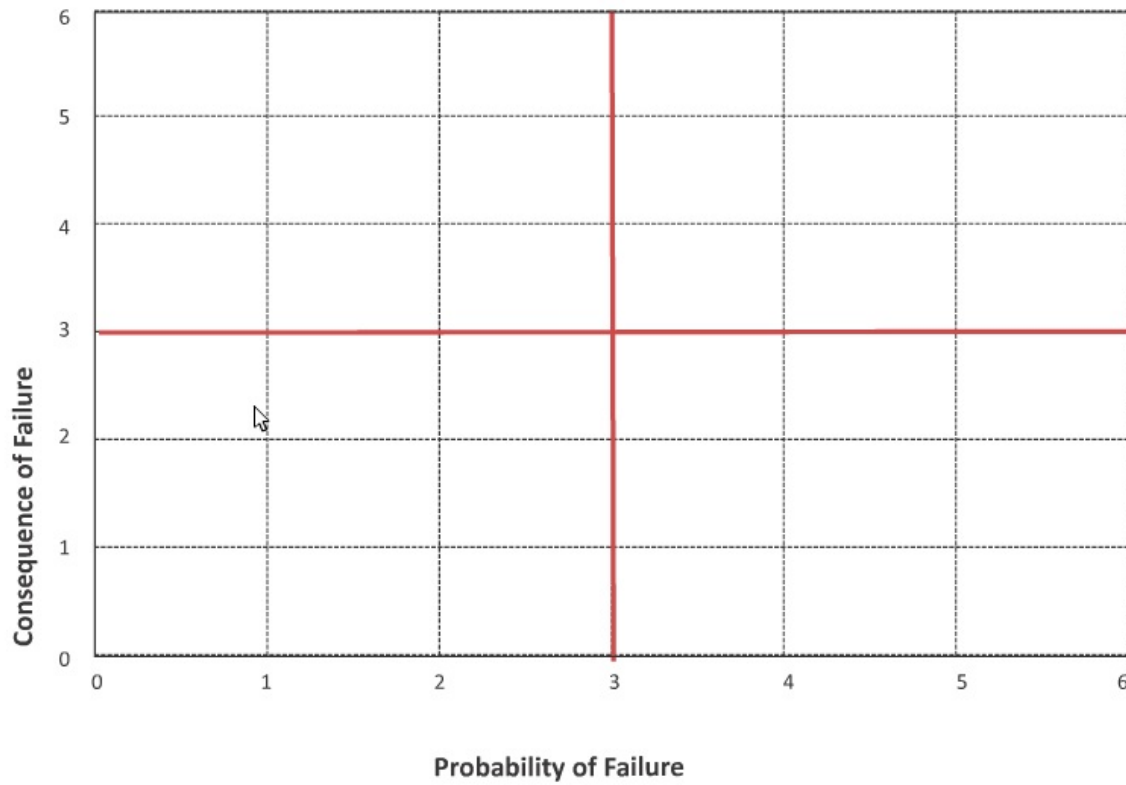
Date: \_\_\_\_\_

<b>Consequence (Cost) of Failure</b>	<b>5</b>	5	10	15	20	25
	<b>4</b>	4	8	12	16	20
	<b>3</b>	3	6	9	12	15
	<b>2</b>	2	4	6	8	10
	<b>1</b>	1	2	3	4	5
Multiplied		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	Probability of Failure					





### Critical Assets - Risk Analysis





# New Tool Available

- “Reference Guide For Asset Management Inventory and Risk Analysis”
- The guide provides **suggestions** on the type of information to be collected by asset category when completing an asset inventory. Following the inventory table, there is a table providing **suggestions** for factors that could be considered when defining what impacts Probability of Failure and Consequence of Failure when determining an asset’s criticality (or risk).



# Factors Affecting PoF and CoF

## Risk - Hydrants

Probability of Failure	Consequence of Failure
Age	Water damage to nearby structures
Condition - rusting, corrosion, leaking seal?	Inability to properly flush system - health concerns
Frequency of Use - is it opened annually as part of a flushing or testing program?	Inability to fight a fire - loss of property, loss of life
Routine maintenance completed?	Level of Service Failures
Pipe size connected to - less than 6 inch may cavitate	
Tools needed to open readily available to fire department and water department?	



# Risk Factors to Consider

Risk - Pipe (Asbestos Concrete (AC), Cast Iron, Concrete, Ductile Iron (DI), Polyvinyl Chloride (PVC), Steel, Transmission Main)

## Probability of Failure

- Age
- Condition
- Bedding
- Vibration
- Temperature change
- Depth of Bury
- Soil corrosivity
- Electrolisis

## Consequence of Failure

- Water Loss
- Damage to structures (buildings, pavement, etc.)
- Damage to environment (sink holes, chlorinated water entering a natural waterway, etc.)
- Revenue Loss
- Level of Service Failures
- Cost of the failure
- Number and type of customers impacted





# Where you can find it

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# Questions?

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