



Financial Planning for Disasters Workshop

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Introduction

Introduction

- ▶ Financial Resilience Training
 - Funded by Economic Development Administration (EDA)
 - Collaboration between
 - Northwest Georgia Regional Commission
 - National Association of Development Organizations
 - Rural Policy Research Institute

History

- ▶ Origins of Financial Resilience Program
 - Hurricane Gustav in Southeast Louisiana
 - Local governments unprepared for financial costs
 - Moral Hazard from Hurricanes Katrina and Rita
 - Local governments still facing financial challenges

History

- ▶ Evaluated fiscal capacity and vulnerability surrounding Hurricanes Katrina and Rita
 - Collection/analysis of audit statements of county/parish governments
 - Collection/analysis of Public Assistance (PA) program resources leveraged
 - Performed case studies
 - Tangipahoa Parish, LA
 - Calcasieu Parish, LA
 - Foley, AL

History

► Products

- Academic journal articles highlighting vulnerability/capacity (2012–2013)
- Workbooks (NADO) and Extension Manuals (LA, MS–AL Sea Grant) (2013–14)
- “Measuring Public Wealth...” chapter in *Rural Wealth Creation* (2014)

► Presentations

- NADO (Webinar), NACo (Webinar), NOAA, Extension Disaster Education Network (EDEN), Gulf Coast Sea Grant

Frequently Asked Questions

- ▶ Why are we here?
 - Improve financial planning for future disasters

- ▶ Who should care if local governments are financially prepared?
 - Residents
 - Businesses
 - Other local governments, state government, and federal government

Frequently Asked Questions

- ▶ What are the consequences of suboptimal financial preparation
 - Delayed physical recovery to at/near pre-disaster condition
 - Unhealthy long-term fiscal condition
 - Reduced delivery of recurring public services
 - Reduced social cohesion of residents
- ▶ Given these consequences, let's begin the process of becoming financially resilient to future disasters

Module 1

Identifying Natural Disasters

Disasters

- ▶ How might we classify an event as a disaster?
 - Impacts to individual people?
 - Impacts to individual places?
 - Impacts to natural environment?
 - Impacts to social networks?

Disasters

- ▶ From a financial perspective, we want to evaluate disasters along two dimensions
 - Frequency
 - Intensity (financial burden)
- ▶ Financial vulnerability includes both dimensions

Disasters

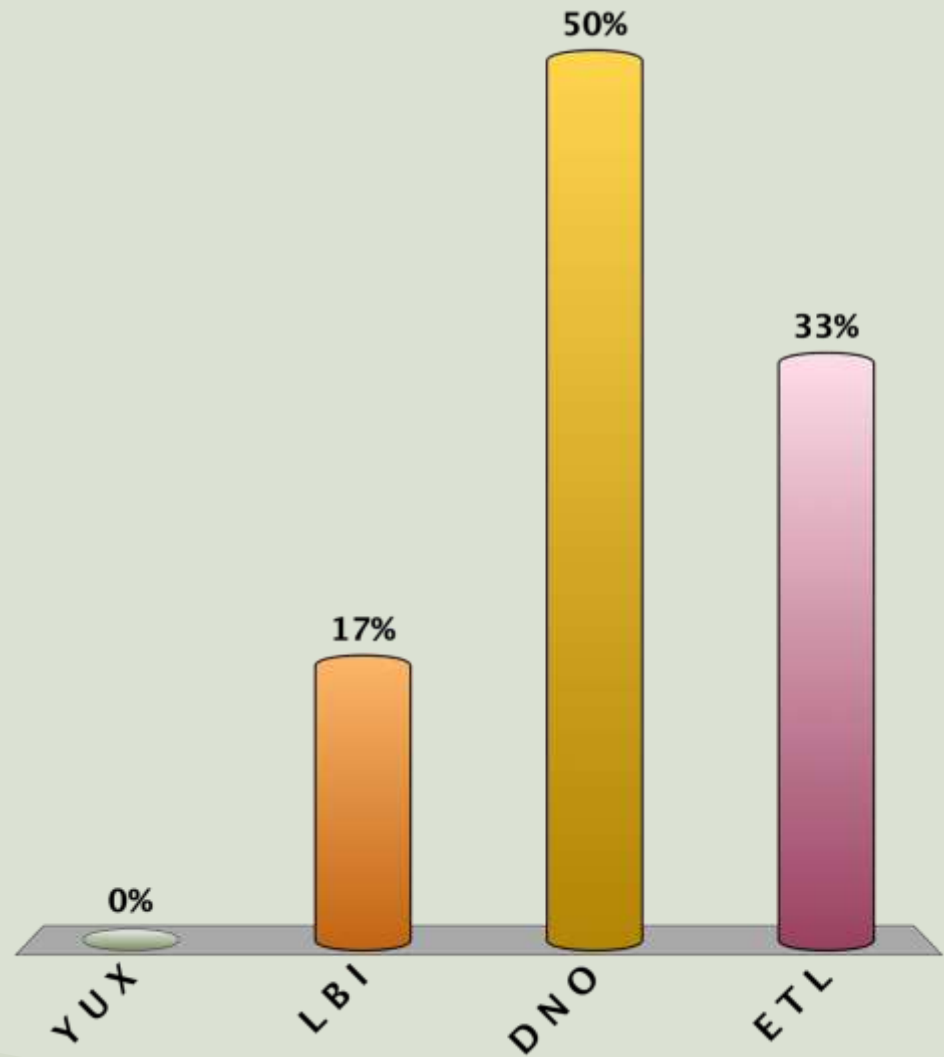
	Intensity		
		Low/Medium	High
Frequency	Low/Medium		
	High		

Interactive Exercise

- ▶ We will first practice using our clickers with some ice breakers

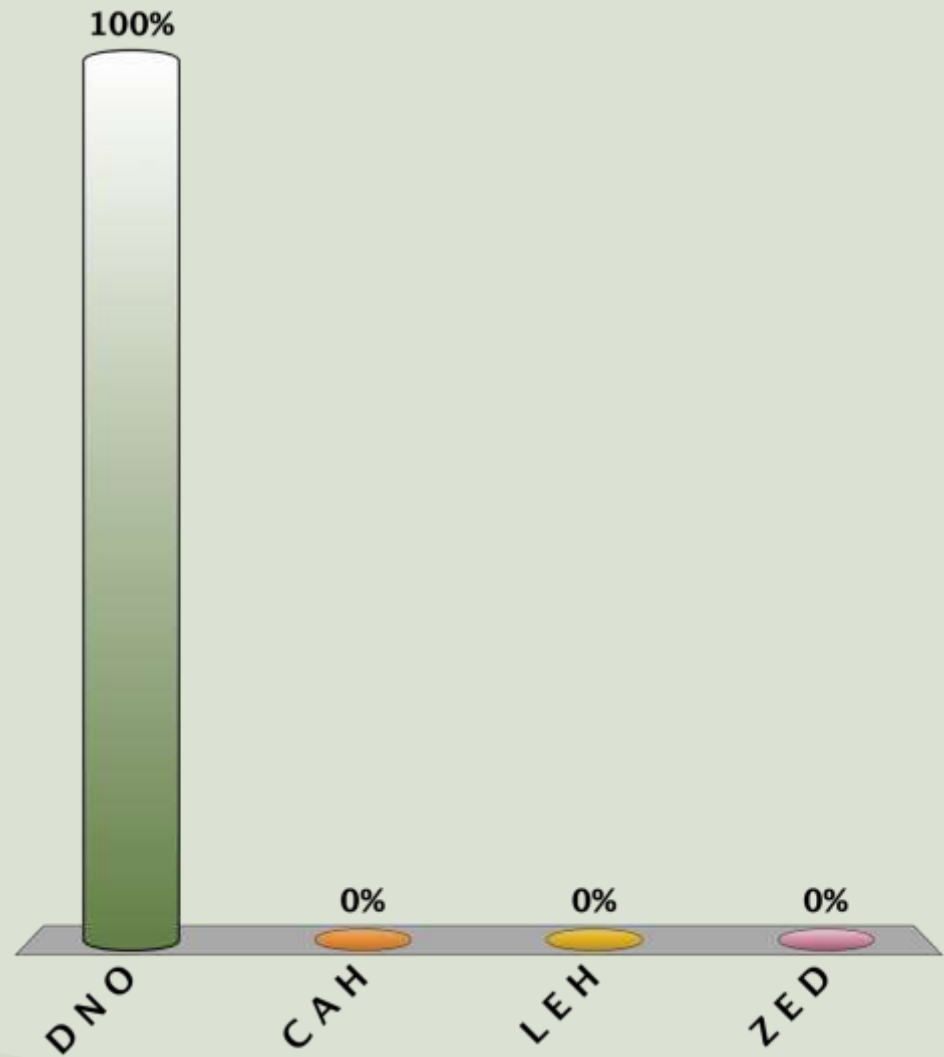
G_R_O_

- A. YUX
- B. LBI
- C. DNO
- D. ETL



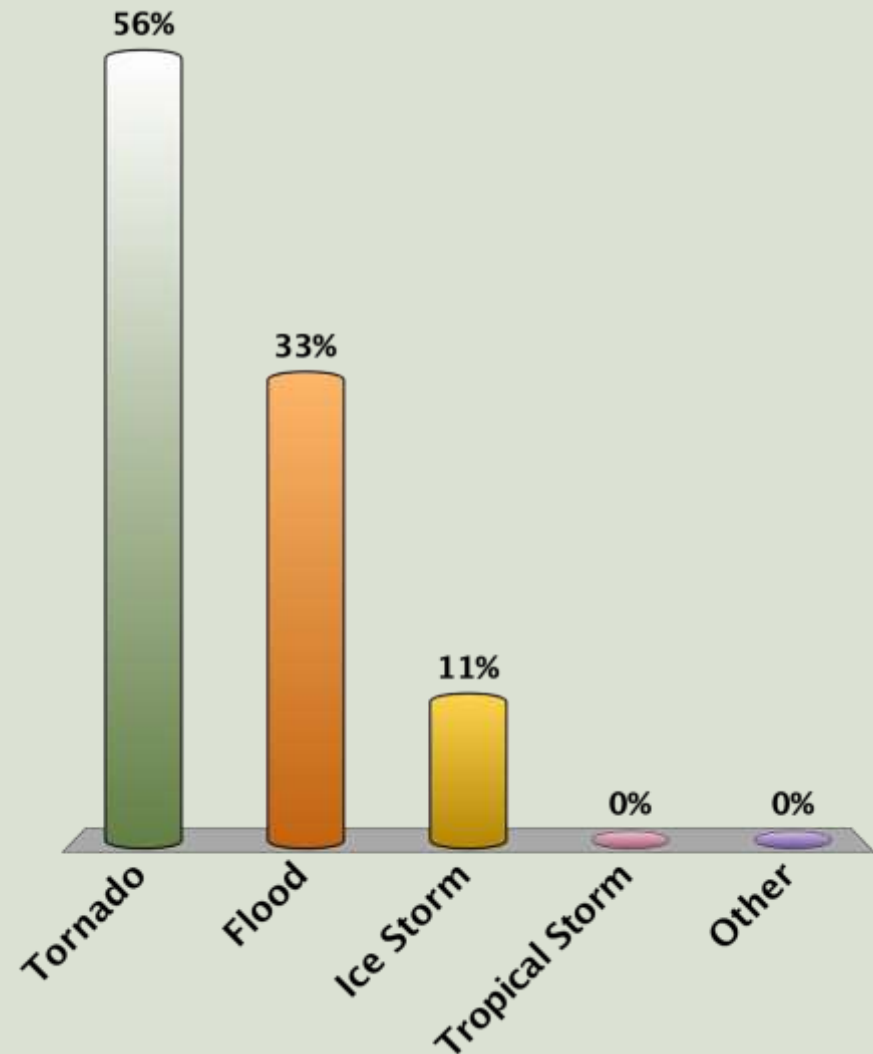
T_R_A_O

- A. D N O
- B. C A H
- C. L E H
- D. Z E D



Which disaster type is the most expensive to recover from in your community?

- A. Tornado
- B. Flood
- C. Ice Storm
- D. Tropical Storm
- E. Other

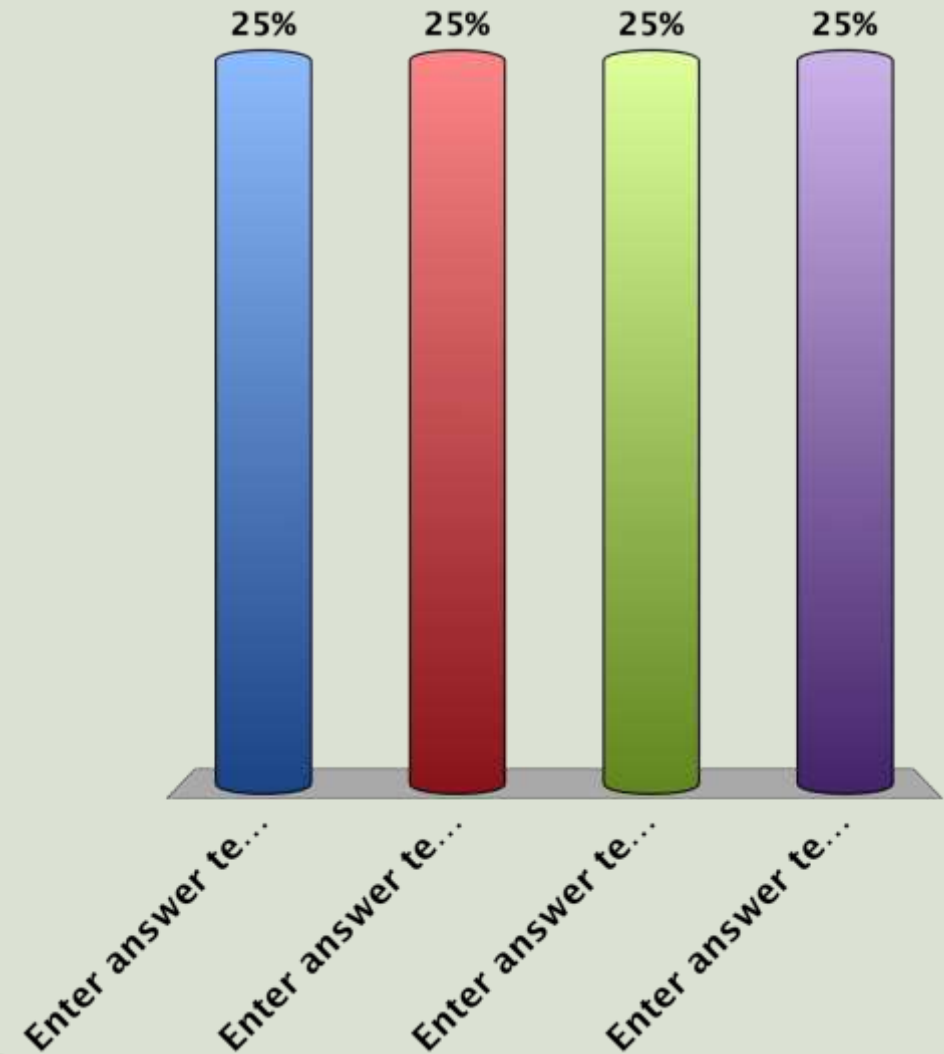


Which disaster type most frequently occurs in your area?

- A. Tornado
- B. Flood
- C. Ice Storm
- D. Tropical Storm
- E. Other

Which disaster type that impacts a neighboring community creates the greatest financial burden on your community?

- A. Tornado
- B. Flood
- C. Ice Storm
- D. Tropical Storm
- E. Other



Conclusion

- ▶ Identifying disaster to plan for important
- ▶ Choice based on severity/cost, frequency, and linkages to neighboring communities

Module 2

Local Government Financial Vulnerability

Risk and Vulnerability

- ▶ Each disaster event has a likelihood of occurring over a given period of time
- ▶ A region's planning horizon will be helpful in knowing how much financially to prepare for an event
- ▶ Further, probabilities of a disaster event occurring can change over time



Understanding Risk

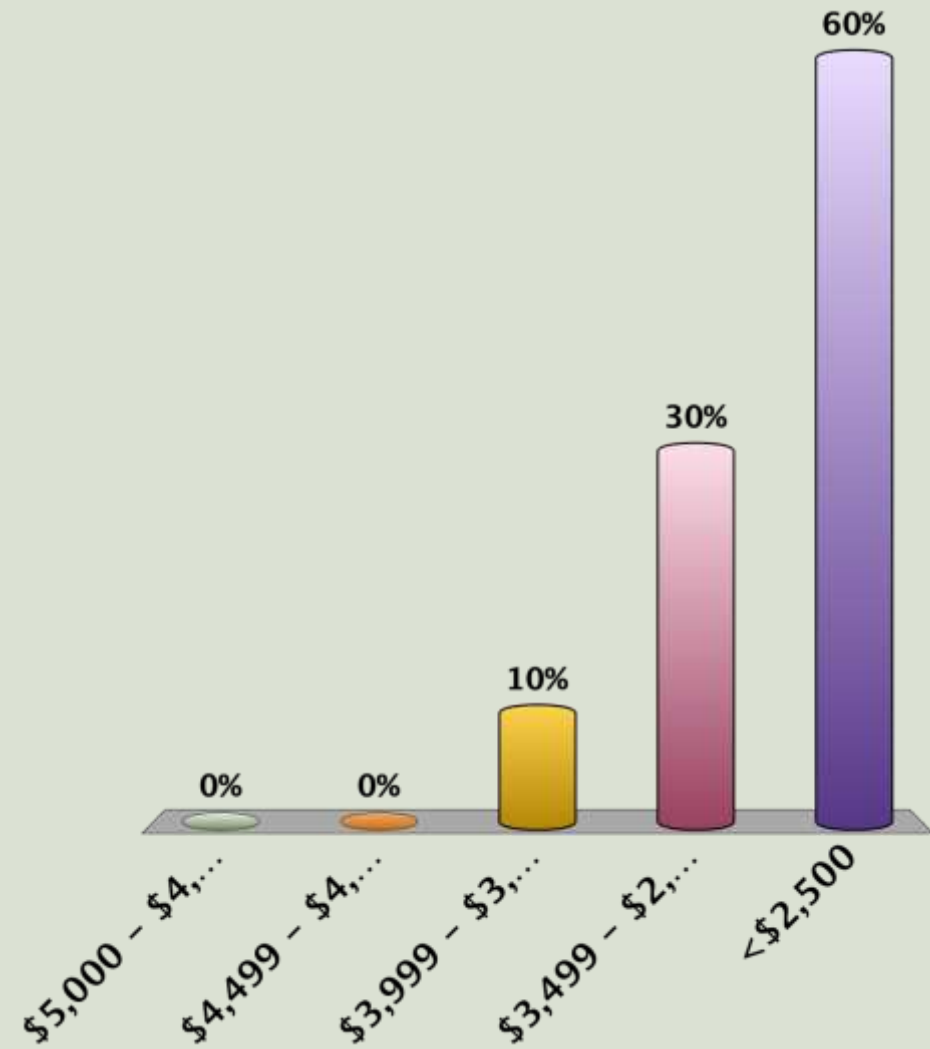
Activity

- ▶ You own a stock that must be sold at the end of the trading day tomorrow. Based on your own information, there is a 50% chance for each of two outcomes.
- ▶ A broker presents you with five “insurance options” options where you pay her to take on the next day’s risk. How much would you be willing to pay her for this “insurance”?

How much would you be willing to pay in insurance to avoid these potential outcomes for your stock?

50%: Lose \$5,000 50% Lose \$0

1. \$5,000 – \$4,500
2. \$4,499 – \$4,000
3. \$3,999 – \$3,500
4. \$3,499 – \$2,500
5. <\$2,500

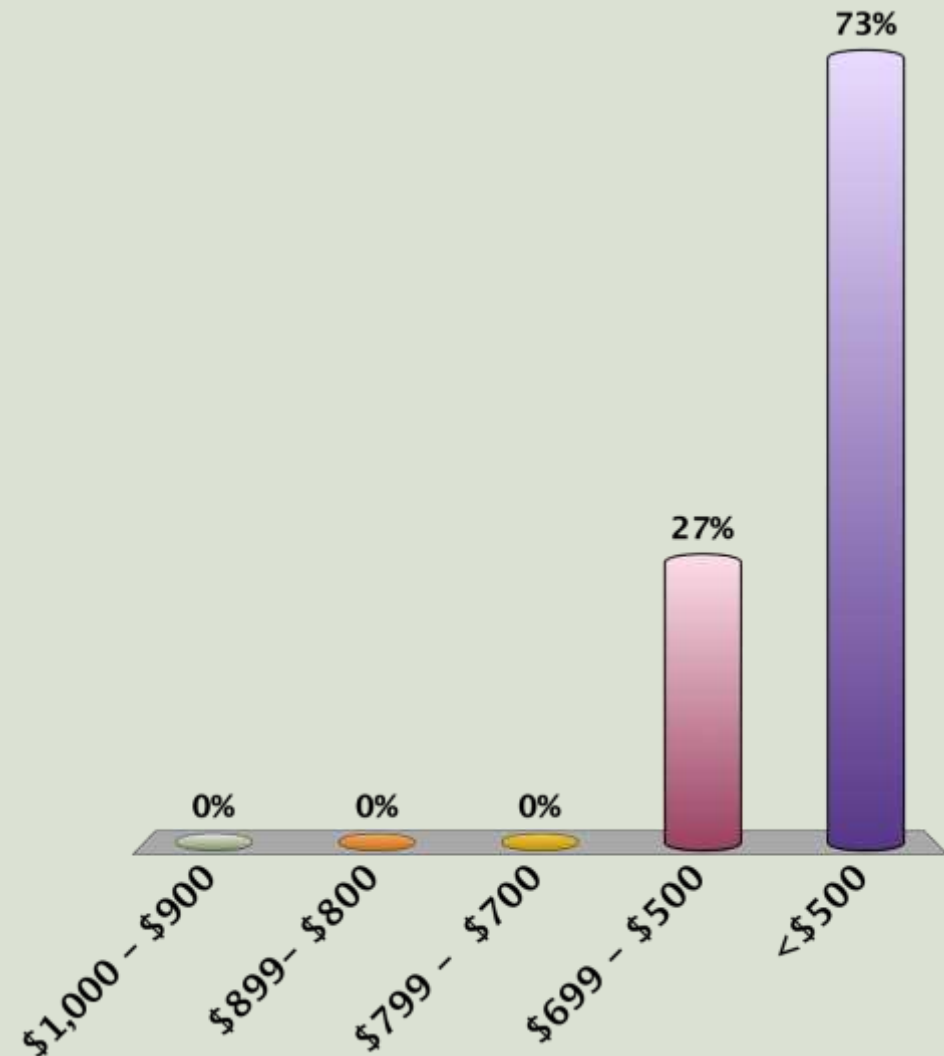


How much stock insurance would you pay to avoid the following potential outcomes?

50% Lose \$1,000

50% Lose \$0

1. \$1,000 – \$900
2. \$899– \$800
3. \$799 – \$700
4. \$699 – \$500
5. <\$500

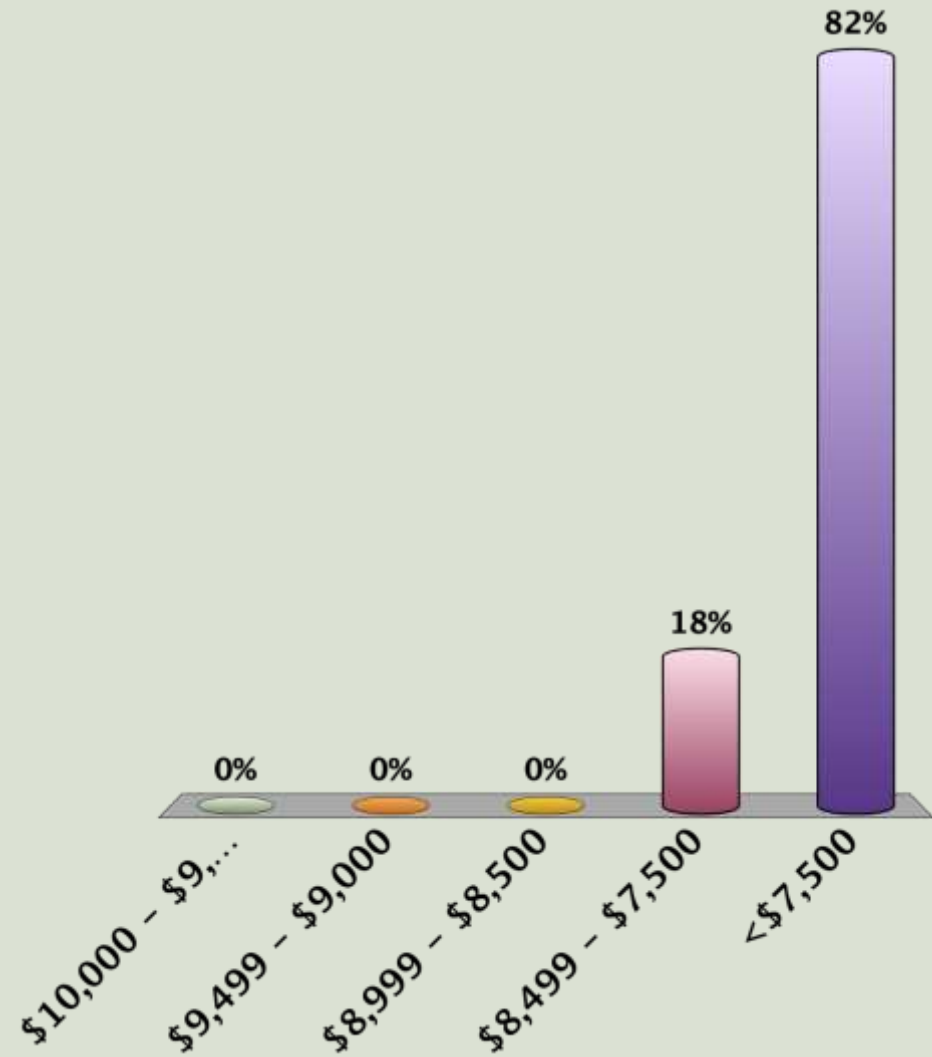


How much stock insurance would pay to avoid the following potential outcomes?

50% Lose \$5,000

50% Lose \$10,000

1. \$10,000 – \$9,500
2. \$9,499 – \$9,000
3. \$8,999 – \$8,500
4. \$8,499 – \$7,500
5. <\$7,500



Risk in Decision Making

- ▶ Did you ever hear one of these types of finance tips prior to the current economic recession?
 - If your mortgage rate is 6% and the average return on stocks is 10–12% historically, then you should invest extra savings in the stock market rather than paying on extra on your mortgage

Risk in Decision Making

- ▶ The “spread” on the interest rate suggests you earn 4%–6% more on your money by investing in the stock market
- ▶ BUT
- ▶ The “return” on your stock investment is “uncertain”
- ▶ However, if you pay early on a fixed rate mortgage, the return is guaranteed!

The “Cost” of Risk

- ▶ Imagine you have the opportunity to play a lottery by flipping a fair coin
 - If the coin lands heads, you win \$10,000; if the coin lands tails, you lose \$1,000.
- ▶ What is the expected value you would receive from playing this lottery?

The “Cost” of Risk

- ▶ The expected value of a lottery is basically the summation of the value of each potential outcome of the lottery times the probability of that outcome
- ▶ In our example
$$0.50 \times \$10,000 + 0.50 \times -\$1,000$$
$$= \$4,500$$

The “Cost” of Risk

- ▶ Would you be willing to play this lottery? Or would you be willing to pay someone to avoid playing this lottery?
- ▶ If so, how much? \$50, \$100, \$500?
- ▶ If you are willing to pay, you are considered being “risk averse”
- ▶ The additional amount you are willing to pay to avoid playing the lottery is called the “risk premium”

The “Cost” of Risk

- ▶ Suppose you play a different lottery
 - You have a 5% probability that you lose \$20,000, and a 95% chance that you lose nothing.
- ▶ How much would you pay not to play this lottery?
 - If you pay more than \$1,000, then you are risk averse

Risk Aversion

- ▶ When you can't afford for the negative outcome of a lottery to come up even after one flip, then paying someone to play makes sense to avoid the risk aversion

Risk Aversion

- ▶ If you are sufficiently wealthy, and are allowed to play the lottery several repeated times, you can either make money or pay out less than if you purchased insurance yourself.
- ▶ This is called “self-insuring”

Measuring Financial Risk from Disasters

- ▶ Measuring financial risk from disasters starts with measuring the risk associated with a disaster event occurring
- ▶ Will highlight tropical storms as an example to generalize to other types of disaster events

Measuring Financial Risk from Tropical Storm Events

- ▶ Measuring financial risk to a tropical storm is like playing a lottery
- ▶ First, you need to identify all possible “outcomes” and then assign odds to those outcomes
- ▶ We’ll deal with identifying the second question first – How might we assign odds to tropical storms?

Example: Measuring Odds of Tropical Systems

- ▶ Adopt US Landfall Hurricane Probability Project Approach
- ▶ Developed by Philip Klotzbach and William Gray, Colorado State University
- ▶ This is the same Dr. Gray that makes annual forecasts for the number of hurricanes to make landfall in the US each year

Measuring Odds of Tropical Storms

- They estimate the probability that a tropical system with sustained winds of a tropical storm, hurricane, or major hurricane will make landfall in a county

Measuring the Odds for Tropical Storms

- ▶ For Foley, AL, the historical probability of one tropical storm entering the city in a given year is 6.20%
- ▶ For a Cat 1 or 2 hurricane entering the city, it is 3.10%, and for a major hurricane (Cat 3+) entering the city, it is 0.6%
- ▶ Based on 127 years of climatological data

Measuring the Odds for Tropical Storms

- ▶ However, in other communities along Gulf Coast, residents believe the more recent past is a better predictor of future tropical events occurring
- ▶ We also apply more recent history to minor and major hurricanes to provide adjusted measure of risk

Tropical Event Probabilities

		Probability one tropical event will occur over time window				
Tropical Event	Climate History	1 Year	4 Years	10 Years	20 Years	50 Years
Named Storm	127 Years	6.20%	23.20%	48.40%	73.30%	96.30%
Minor Hurricane	127 Years	3.10%	12.00%	27.30%	47.10%	79.70%
Major Hurricane	127 Years	1.40%	5.50%	13.30%	24.80%	50.90%
Minor Hurricane	30 Years	6.36%	22.80%	49.08%	77.63%	99.00%
Major Hurricane	30 Years	2.80%	10.34%	24.24%	44.02%	84.09%

Measuring Risk: Other Disaster Types

▶ Tornados and Severe Storms

- <http://www.nssl.noaa.gov/projects/hazard/totalthreat.html>

▶ Floods

- Use 100 year and 500 year flood maps as proxies
- <http://www.fema.gov/floodplain-management/flood-zones>

- ▶ A good starting point for finding previous research for frequent events is a web search on “climatology probability *‘your disaster of choice’*”

Vulnerability

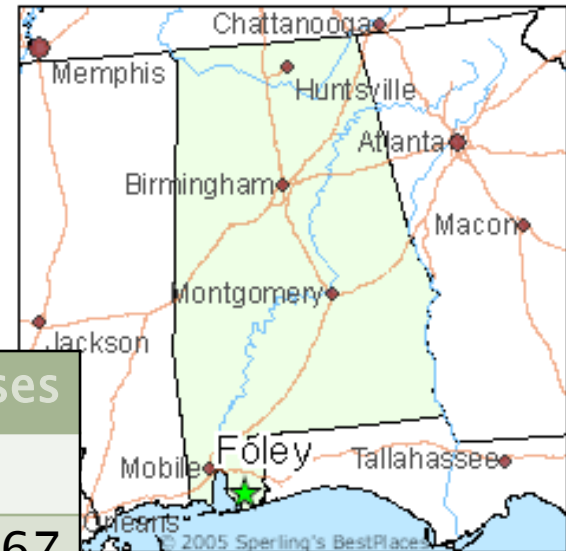
How do we measure potential financial losses of a disaster event?

- ▶ If frequent event in region, evaluate past financial losses of region's public sectors
 - *Previous costs of a major hurricane or ice storm*
- ▶ If frequent but not in region, identify financial relationships of other regions and adjust to your own region's characteristics
 - *Wildfire costs per dollar of assessed value*

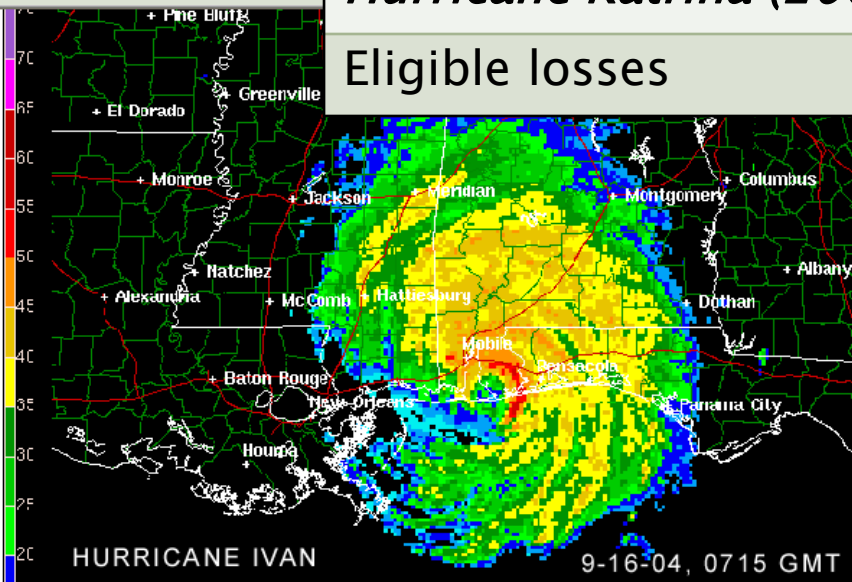


Vulnerability Example: City of Foley, AL

Alabama



Event	Losses
<i>Hurricane Ivan (2004)</i>	
Eligible losses	\$4,800,967
Non-eligible losses	\$235,679
<i>Hurricane Katrina (2005)</i>	
Eligible losses	\$318,735



Vulnerability

When disaster events are infrequent

- ▶ Simulations
 - Tsunami
 - Earthquakes
- ▶ Subjective assessments/expert opinion can be helpful when resources are limited and no preparation has previously occurred

Module 2: Worksheet 2

- ▶ Step 1: Frequency High or Low? *If Low then, Step 2*
- ▶ Step 2: Contact agency with modeling capacity to estimate disaster cost
- ▶ Step 3: Disaster occurred recently? *If Yes, then Step 4.*

Module 2: Worksheet 2

- ▶ Federally–Declared Disaster Example
- ▶ Line 1: Category A Costs: Debris Removal
\$_____
- ▶ Line 2: Category B Costs: Emergency Protective Measures
\$_____
- ▶ Line 3: Category C – Category G Costs¹:
\$_____
- ▶ Line 4: Local Cost Share Rate (10%, 25%, 100%)
_____%
- ▶ Line 5: Local Reimbursable Burden ((Line 1 + Line 2 + Line 3)* Line 4)
\$_____

Module 2: Worksheet 2

- ▶ Line 6: Total Deductibles and Co-Pays for insured losses \$ _____
- ▶ Line 7: Uninsured and other federal ineligible expenses \$ _____
- ▶ Line 8: Total Financial Vulnerability (Line 5 + Line 6 + Line 7) \$ _____
- ▶ Line 9: Inflation Factor to Current Dollars _____%
- ▶ Line 10: Total Financial Vulnerability in Today's Dollars
- ▶ (Line 8 times Line 9) \$ _____

Module 2: Worksheet 2

- ▶ Peer Local Government Example
- ▶ Line 1: Line 8 from Step 4 of Peer Government
\$ _____
- ▶ Line 2: Assessed Valuation of Peer Government Jurisdiction
\$ _____
- ▶ Line 3: Peer Costs per dollar of Assessed Valuation (Line 1 divided by Line 2) \$ _____
- ▶ Line 4: Local Government's Current Assessed Valuation
\$ _____
- ▶ Line 5: Local Government's Financial Vulnerability (Line 3 times Line 4)
\$ _____
- ▶ Line 6: Inflation Factor to Today's Dollars
_____ %
- ▶ Line 7: Total Financial Vulnerability in Today's Dollars
(Line 5 times Line 6)
\$ _____

Quantifying the Cost of Tropical Storms

- ▶ In addition, to using the probabilities of certain wind speed storms in deciding the strength of construction of buildings, it can be helpful in financial preparation of local governments
- ▶ We can calculate the expected cost in a given year from a tropical system based on the “expected valuation” approach

Quantifying the Cost of Tropical Storms

- ▶ We can simply take the probability that a given storm will make landfall in a given year times the loss that a storm would incur on the county if it occurred
- ▶ Challenges:
 - Identifying the appropriate probability
 - Identifying the appropriate loss incurred
- ▶ Approach will be highlighted in Module 3

Conclusion

- ▶ Risk should be taken into account when identifying returns and loss to individual and public decision making
- ▶ Risk aversion suggests paying someone else (e.g. insurance) to bear the risk
- ▶ Historical tropical storm activity helps to provide an estimate of risk which can be used to identify expected losses to the public sector

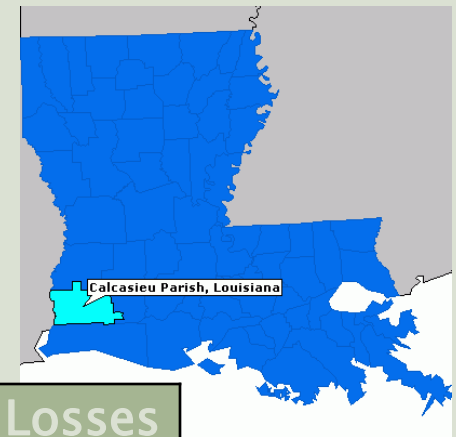
Module 3:

Measuring Financial Capacity of Local
Governments to Address Disasters

Capacity

- ▶ Capacity represents the financial resources available to address financial vulnerability
- ▶ Can be analyzed from financial resources in the budget and/or on the balance sheet
- ▶ Resources can be used in a variety of strategies to improve financial resilience

Vulnerability Example: Calcasieu Parish, LA



Event	Eligible Losses
Hurricane Rita (2005)	
Parish	\$7,279,858
Selected municipalities	\$33,916,827
Hurricane Ike (2008)	
Parish	\$1,643,340
Selected municipalities	\$3,748,650



Calcasieu Parish: Vulnerability vs Capacity Example (Hurricane Rita)

Jurisdiction:	Unreserved General Fund	Eligible Losses	% of U.G.F.	25% of U.G.F.
Dequincy	\$762,989	\$152,567	20.0%	5.0%
Lake Charles	\$23,388,617	\$10,203,902	43.6%	10.9%
Sulphur	\$8,330,709	\$1,940,658	23.3%	5.8%
Westlake	\$6,428	\$8,916,845	138,718.8%	34,679.7%
Iowa	\$1,085,550	\$157,093	14.5%	3.6%
Vinton	\$551,886	\$5,265,904	954.2%	238.5%
Parish unincorporated	\$4,540,905	\$7,279,858	160.3%	40.1%

Foley, AL: Capacity vs Vulnerability Example

Short-Term

- ▶ Vulnerability (Ivan Plus Katrina type)
 - \$6,712,469 (2013 dollars)
- ▶ Capacity (Unassigned General Fund Balance (September 30th, 2012))
 - \$16,921,540
- ▶ Capacity minus Vulnerability
 - \$10,209,071

Defining Capacity

- ▶ Financial Capacity comes in many forms
 - Undedicated resources
 - Dedicated resources
 - Financial instruments providing access to financial resources
- ▶ Use undedicated resources as a starting point for financial capacity
- ▶ Source: Unassigned general fund balance from audit statements

City of Foley, AL General Fund Balance, Sept 30, 2011

	General Fund (\$)
ASSETS	
Cash	16,773,595
Certificates of deposit	3,230,000
Receivables	
Utility tax equivalents	579,294
Gasoline excise tax	
Property and ad valorem taxes	25,236
Sales and other local taxes	903,909
Sanitation	21,197
Grants	82,266
Other	122,200
Due from other funds	5,597
Inventories	73,432
Prepaid expenses	104,779
Total Assets:	21,921,505

City of Foley, AL General Fund Balance, Sept 30, 2011

LIABILITIES AND FUND EQUITY	
Accounts payables	1,074,419
Accrued expenses	138,792
Due to other funds	123,890
Deferred revenue	38,000
Total liabilities:	1,375,101
FUND BALANCES	
Nonspendable	178,211
Restricted	257,992
Committed	
Assigned	3,221,132
Unassigned	16,889,069
Total fund balance:	20,546,404

Defining Capacity

- ▶ Line 1. Unassigned Fund Balance from General Fund Balance Sheet
\$ _____
- ▶ Line 2. Restricted Funds Available for Natural Disaster Expenses*
\$ _____
- ▶ Line 3. Total Financial Capacity of Local Government (Line 1 + Line 2)
\$ _____

Risk-Adjusted Fiscal Health

- ▶ The solvency and liquidity of a local government entity can be important in addressing the gap between vulnerability and capacity.
- ▶ By incorporating risk, we can adjust the fiscal health of a local government to assess their capacity to apply gap alternatives



Risk Adjusted Fiscal Health

- ▶ The “expected” cost from a disaster event occurring would be the financial loss if the event occurred times the probability of occurrence
 - Loss from hurricane if occurs: \$1 million
 - Probability over 10 year period of occurring: 20%
 - Expected loss:
 $\$1 \text{ million} \times 0.20 = \$200,000$

Risk Adjusted Fiscal Health

- ▶ Add expected losses to actual liabilities to identify risk adjusted liabilities
- ▶ Risk adjusted liabilities can be used to calculate risk adjusted net assets and other fiscal health indicators

Risk Adjusted Fiscal Health

▶ Solvency Indicator

- Debt to Asset Ratio (Total Liabilities / Total Assets)
- Healthy public sector ratio < 0.5

▶ Liquidity Indicator

- Current Ratio (Current Assets / Current Liabilities)
- Healthy public sector ratio > 2

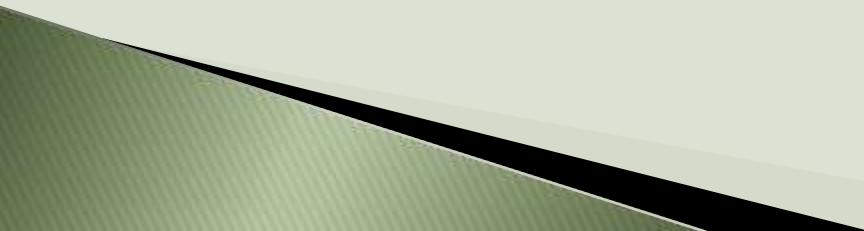
Example: Foley, AL

Storm Type	1 Year Prob.	4 Year Prob.	10 Year Prob.	20 Year Prob.	50 Year Prob.
<i>127 Year Data</i>					
Named Storm	6.2%	23.2%	48.4%	73.3%	96.3%
Minor Hurricane	3.1%	12.0%	27.3%	47.1%	79.7%
Major Hurricane	1.4%	5.5%	13.3%	24.8%	50.9%
<i>30 Year Data</i>					
Minor Hurricane	6.4%	22.8%	49.1%	77.6%	99.0%
Major Hurricane	2.8%	10.3%	24.2%	44.0%	84.1%

Example: Foley, AL

	Actual 2012	Risk Adjusted (127 Year)	Risk Adjusted (30 Year)
Debt to Asset Ratio	0.26	0.28	0.30
Debt to Marketable Asset Ratio	0.80	0.88	0.93
Current Assets	\$21,199,839	\$21,199,839	\$21,199,839
Current Liabilities	\$1,254,168	\$4,782,746	\$6,956,475
Current Ratio	16.90	4.43	3.05

Conclusion

- ▶ Understanding financial resources available for disaster planning important
 - ▶ Some resources may be available that local government does not realize
 - ▶ Incorporating risk through financial indicator analysis can provide revised snapshot of fiscal health
- 

Module 4

Identifying Strategies to Reduce Gap

Financial Resiliency

- ▶ When financial capacity $>$ financial vulnerability,
 - Local public sector entity is financially resilient!
- ▶ When financial capacity $<$ financial vulnerability,
 - Decisions should be made!

Reducing the Gap

- Strategy: Reduce Vulnerability
 - Building levees
 - Hurricane proofing buildings
 - Earthquake resistant infrastructure



Reducing the Gap: Capacity Strategies

- ▶ Strategy 1: Generating New Revenue
 - Taxes, Fees, etc.



Capacity Strategies

- ▶ Strategy 2: Reprioritize Existing Revenue/Spending
 - Creation of Dedicated Fund or Fund Balance Thresholds



Capacity Strategy: Example

***City of Foley Financial Capacity Strategy
Resolution 3649-09***

Undesignated fund balance must exceed a minimum of:

- **25% of budgeted operational expenditures PLUS**
- **One year's annual debt service payments**

Funding can only be spent on disaster-related expenses

Source: www.cityoffoley.org

Capacity

- Strategy 2 (Continued)
 - Available reserve funds are typically found on the balance sheets of most local governments in a region
 - Unreserved/Unassigned general funds from most audit statements can be used as conservative estimate
 - Depending on purpose, some restricted fund reserves may also be available
 - Road fund, solid waste fund, drainage fund, etc

Capacity Strategies

- ▶ Strategy 3: Borrowing
 - Borrow funds directly from financial institution (bank)
 - Sell bonds to cover large financial burdens
 - Use lines of credit to cover short-term gaps between payment of expenses and PA program reimbursement (assumes healthy fiscal condition)



Module 4: Worksheet 4

- ▶ Line 1 Financial Capacity (Module 3) \$_____ +
- ▶ Line 2 (Step 4) \$_____ +
- ▶ Line 3 (Step 5) \$_____ +
- ▶ Line 4 (Step 6) \$_____ +
- ▶ Line 5 (Step 7) \$_____ =
- Line 6 Total Financial Capacity \$_____
- ▶ MINUS
- Line 7 Financial Vulnerability (Module 2) \$_____(Line 1
– Line 7) = \$_____

Lagniappe

- ▶ Combine fiscal health with procurement strategies to reduce financial vulnerability
- ▶ Alternative 1: Pre-negotiate common emergency contracts with short payment terms
- ▶ Alternative 2: Use existing payroll and equipment for response and recovery

Conclusion

- ▶ Identify strategies to reduce vulnerability & increase capacity
- ▶ Depending on fiscal condition, some strategies on/off table
- ▶ Many strategies can be done with little additional burden (increased revenue demands/reduced public service delivery)
- ▶ Advanced planning key

Module 5

Identifying Regional Financial Vulnerabilities

Joint Vulnerability

- ▶ Many local/state governments are “tied to the hip” when dealing with disaster events
 - TX, LA, and MS for tropical disasters
 - Central and Outlying counties surrounding Atlanta with winter storms
- ▶ Interdependence identified around “physical” assets – but have financial implications as well

Joint Vulnerability

- ▶ Important to know who controls assets that create financial vulnerabilities
 - Individual city, county, or state
 - Jointly owned by multiple jurisdiction
 - Federally owned
- ▶ Who is financially responsible for maintenance/investment?

Strategies

- ▶ When financial vulnerability to one local government is mostly controlled by another local government, options include
 - Contractual arrangements
 - Change in ownership/control asset

Strategies

- ▶ When financial vulnerability to one local government is mostly controlled by another local government, options (continued)
 - Change rules of game through larger unit of government
 - “Outsource” to a special public service district that crosses jurisdictional boundaries

Module 5: Worksheet 5

Step 1.

- ▶ Identify political jurisdictions impacted financially by a joint physical vulnerability related to the disaster you identified for Modules 2–4, or in Step 3 of Module 1.
 - Local Government #1 _____
 - Local Government #2 _____

Module 5: Worksheet 5

Step 2.

- ▶ Identify what level of financial vulnerability each local government would incur by the physical vulnerability for the given disaster identified in Step 1.
 - Local Government #1 _____
 - Local Government #2 _____

Module 5: Worksheet 5

Step 3.

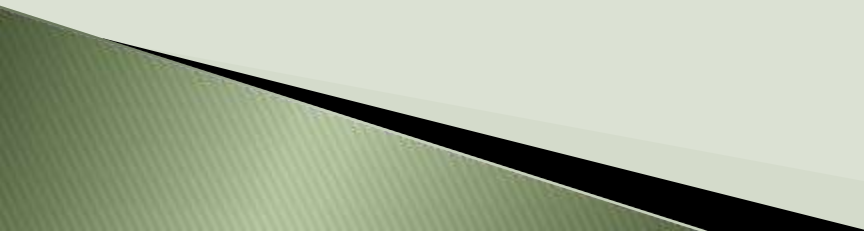
- ▶ Identify which local government (if either) has control over the physical asset that is creating the potential financial vulnerability. (Place an X next to the local government)
 - Local Government #1 _____
 - Local Government #2 _____
 - Other _____

Module 5: Worksheet 5

Step 4.

- ▶ Rank which of the following strategies best mitigates the physical vulnerability that creates the joint financial vulnerability:
 - Creation of new or modification of existing contractual arrangements to mitigate joint financial vulnerabilities.
 - Evaluation of alternative ownership arrangements of the physical assets between local governments.
 - Use higher level governmental units to create/modify laws, codes, rules and other regulations to generate local government behavior that mitigates joint financial vulnerabilities between jurisdictions.
 - Outsource through creation of a special purpose district

Conclusion

- ▶ Joint vulnerability of jurisdictions around disaster unavoidable
 - ▶ Management strategy key to reducing vulnerability/increasing capacity
 - ▶ Again planning ahead essential to mitigation
- 

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Questions / Comments

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