Risk and Reserves

How Much is the Right Amount for Your Fund Balances?

How so we select our reserve policy level?

Typical Response:

- GFOA Best Practices
- Rating agency guidelines
- Comparisons to benchmark agencies
- Historical trends
- Cash flows
- Gut instinct

But are our risks similar to our neighbors?

- Authoritative guidance is generally intentionally vague
- Agencies have similar characteristics but may have unique and varied vulnerability to certain risks:
  - Revenue volatility and economic cycles
  - Obligations
  - Geography
  - Weather
  - Natural events
  - Infrastructure

Engaged Consultant to Assess Risks

- Understand primary and secondary risk factors
- Better understand probabilities of perceived risks
- Build model to run simulations
- Measure range of potential outcomes
- Explore methods to mitigate risks
- Allow governing body to express their appetite for risk and weigh cost benefit of mitigation options in visual manner

About Risk and Probability

A Reserve is a Hedge Against Risk

But how much is enough?

A Complete Definition of Risk*

The probability and magnitude of a loss, disaster, or other undesirable event

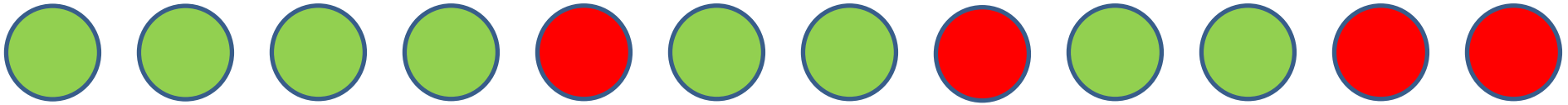
*Definitions on this and previous slide from Doug Hubbard in *The Failure of Risk Management*

Why We Need Probabilities

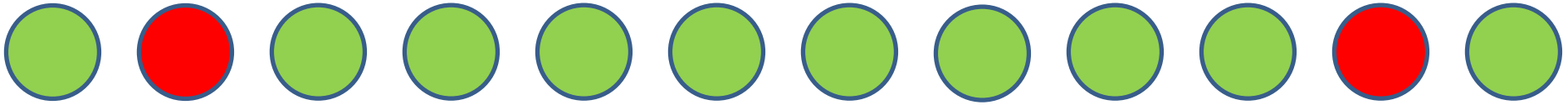
"Without numbers, there are no odds and no probabilities; without odds and probabilities, the only way to deal with risk is to appeal to the gods and the fates. Without numbers, risk is wholly a matter of gut."

-Peter Bernstein, *Against the Gods: The Remarkable Story of Risk*

Why Not Go With the Gut?



What will the next color be?



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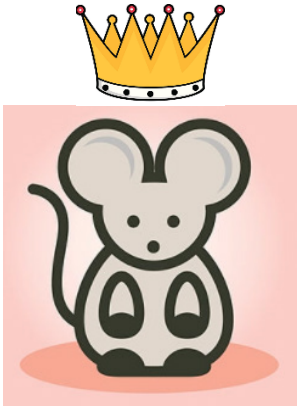


Cognitive Biases

- **Overconfidence bias.** We are overconfident in our predictions and underestimate uncertainty. Research shows we usually underestimate uncertainty by around 50%.

- **Availability bias.** Details that are more easily recalled are overweighed when assessing risk.
  - Example: Flood insurance

- **Confirmation bias.** Random patterns will be taken as evidence if they match an expectation.

Beware the “Flaw of Averages”*

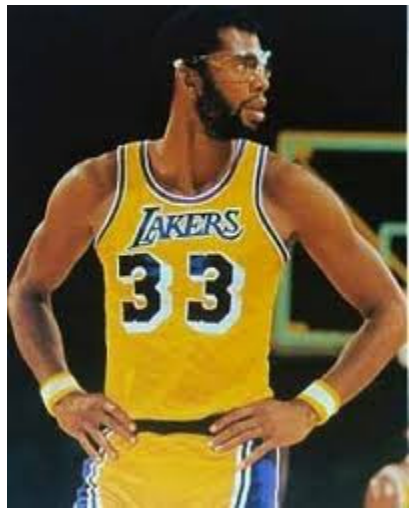
- Averages condense down a range of possibilities into a “convenient” single number
- This obscures the variation you are subject to
- Variation is a source of uncertainty
- Understanding uncertainty is key to understanding risk

*See Sam Savage, *The Flaw of Averages*, 2009

The Normal Distribution

Average
5’ 9”

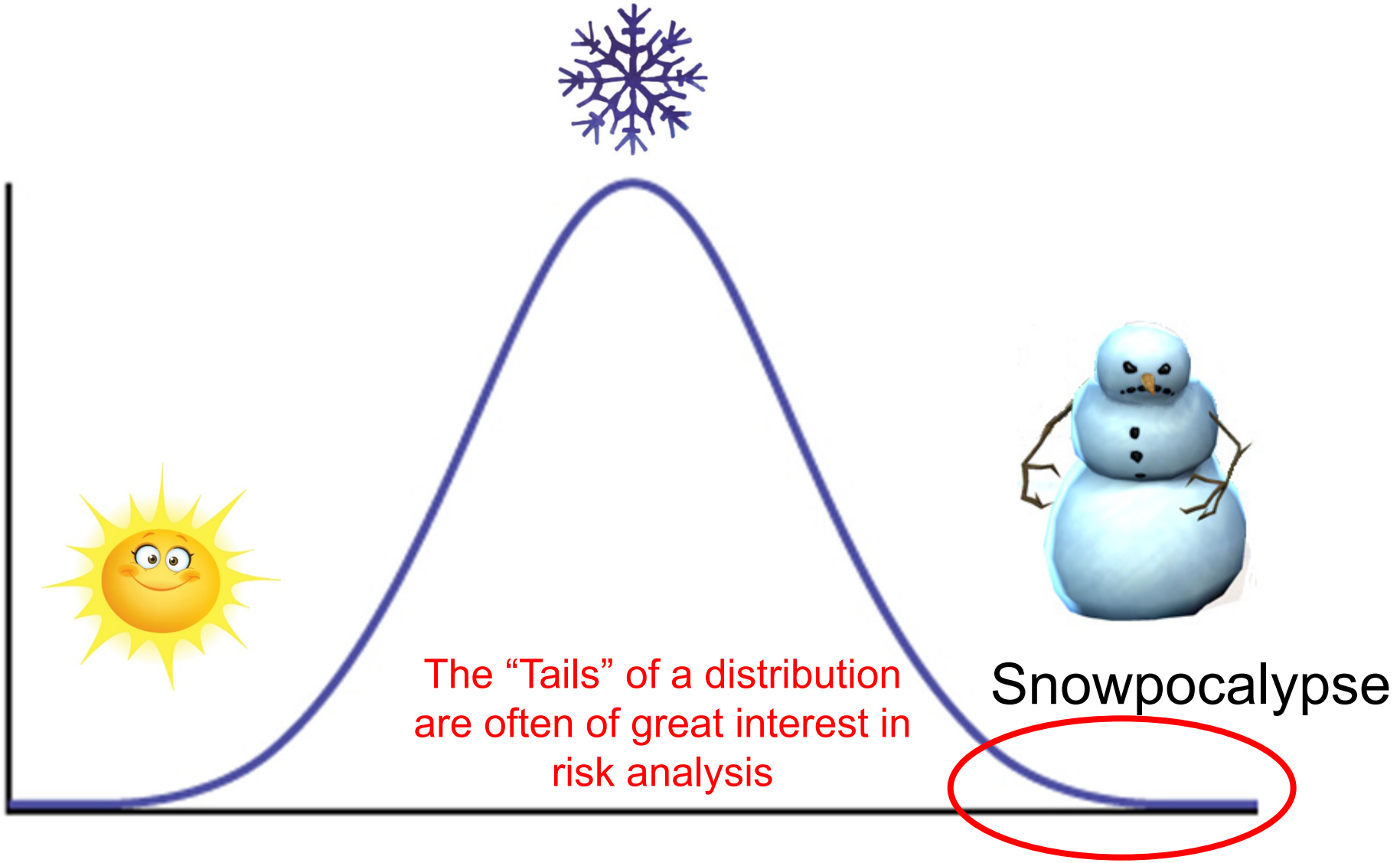
4’ 5”



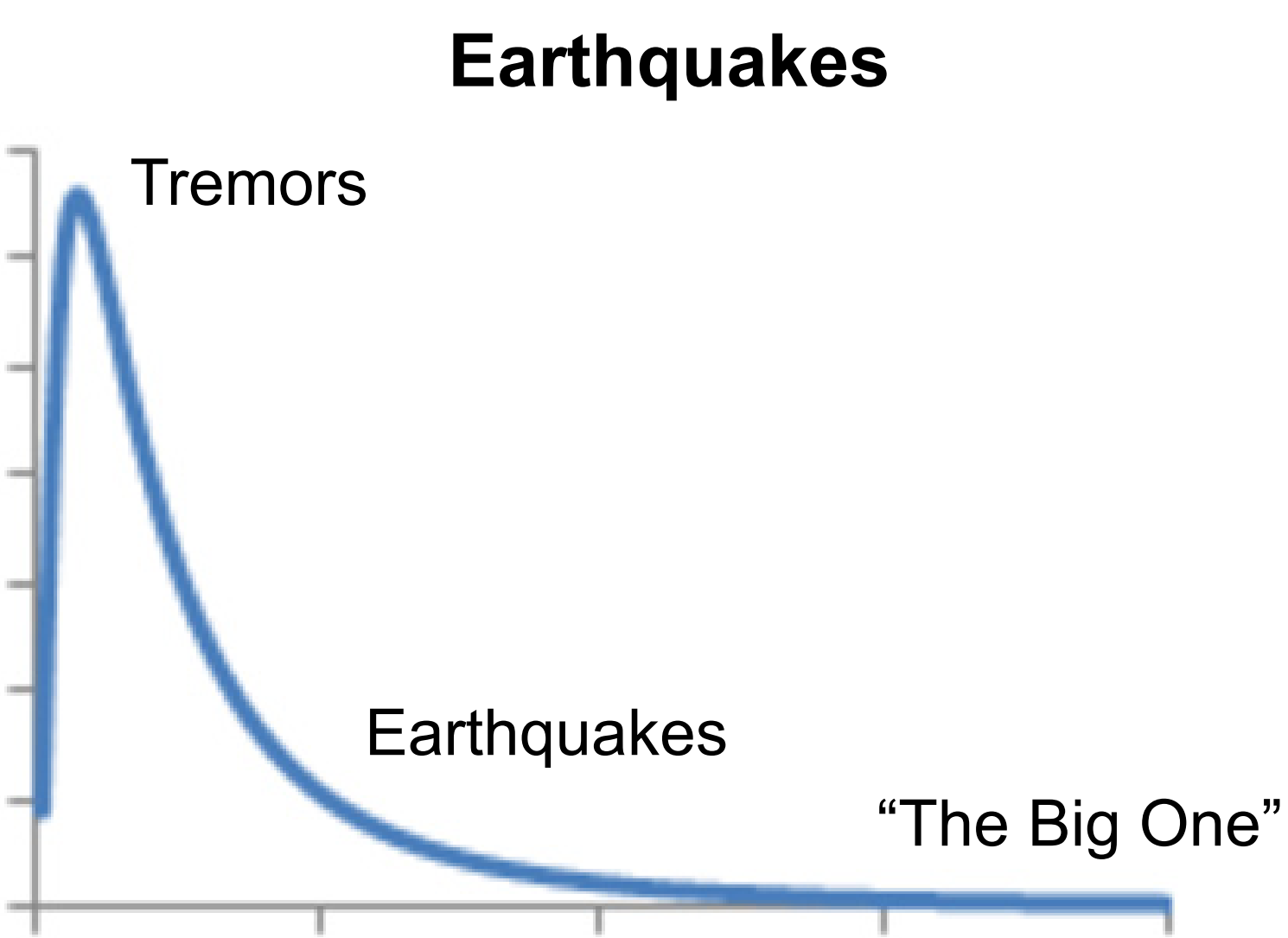
7’ 2”

Height →

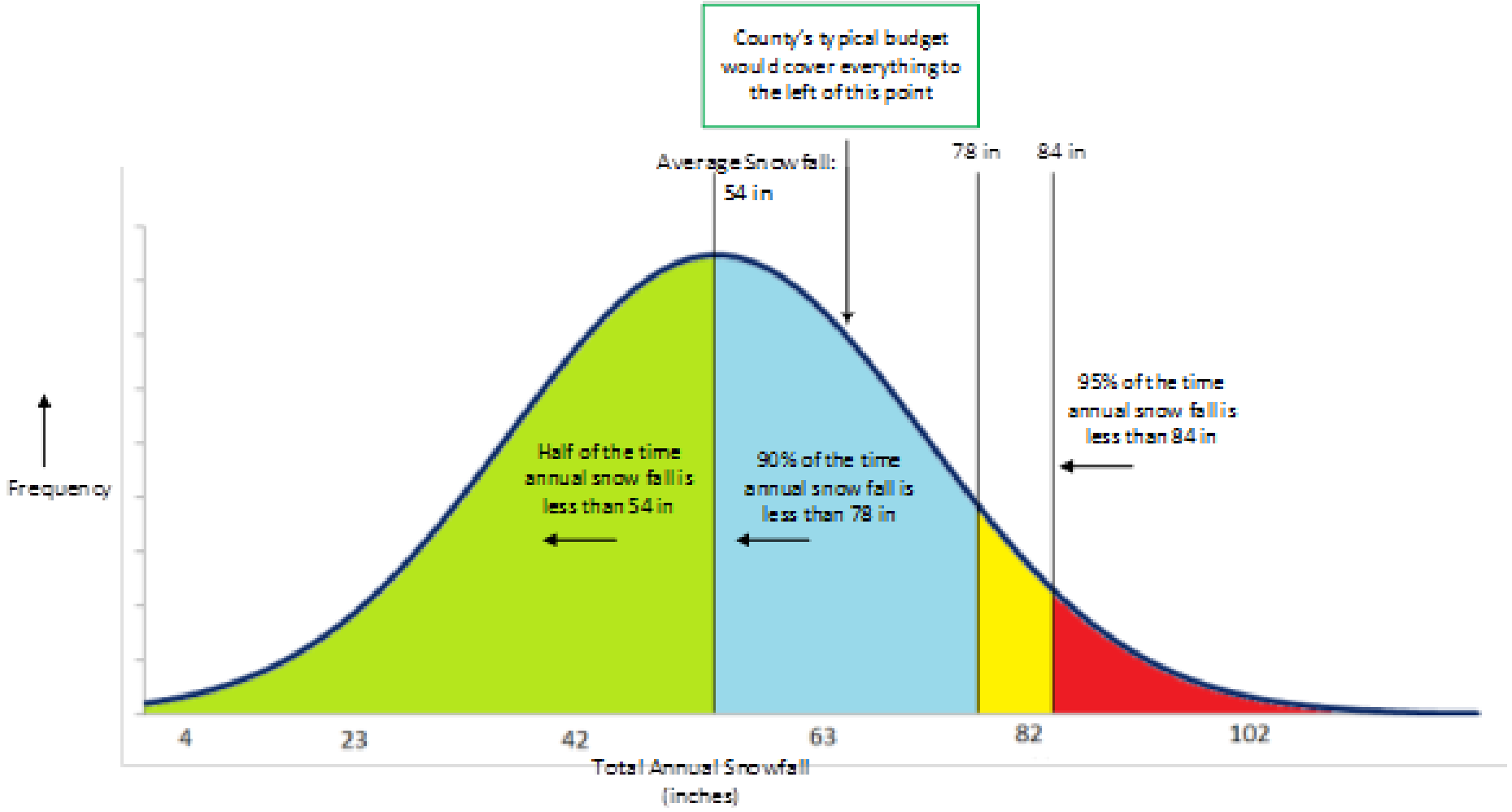
Normal Distribution in Cities



Asymmetrical Distribution

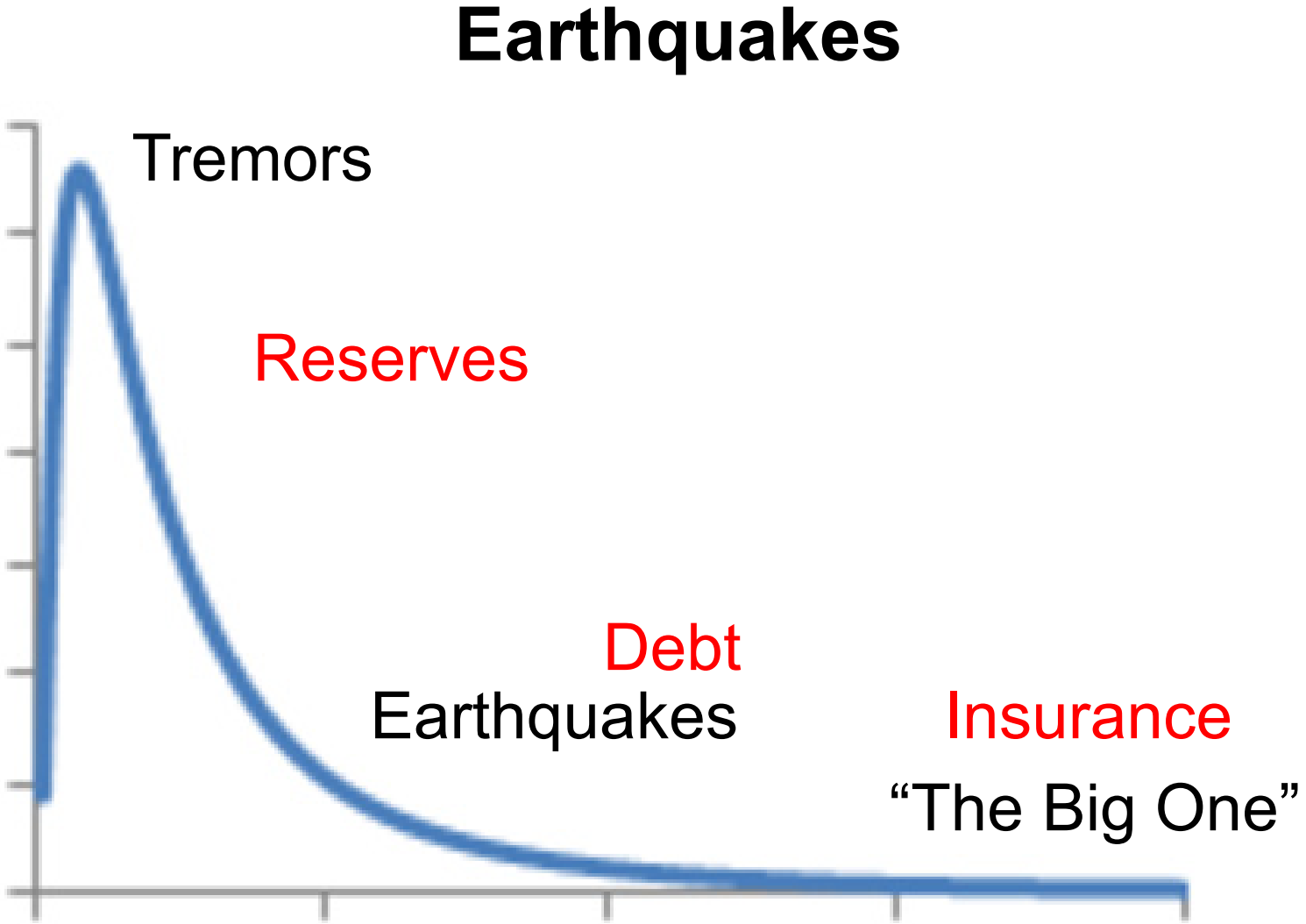


“Subway” Uncertainty*



*Terminology from Spyros Mikridakis, et al. *Dance with Chance*

“Meteorite” Uncertainty



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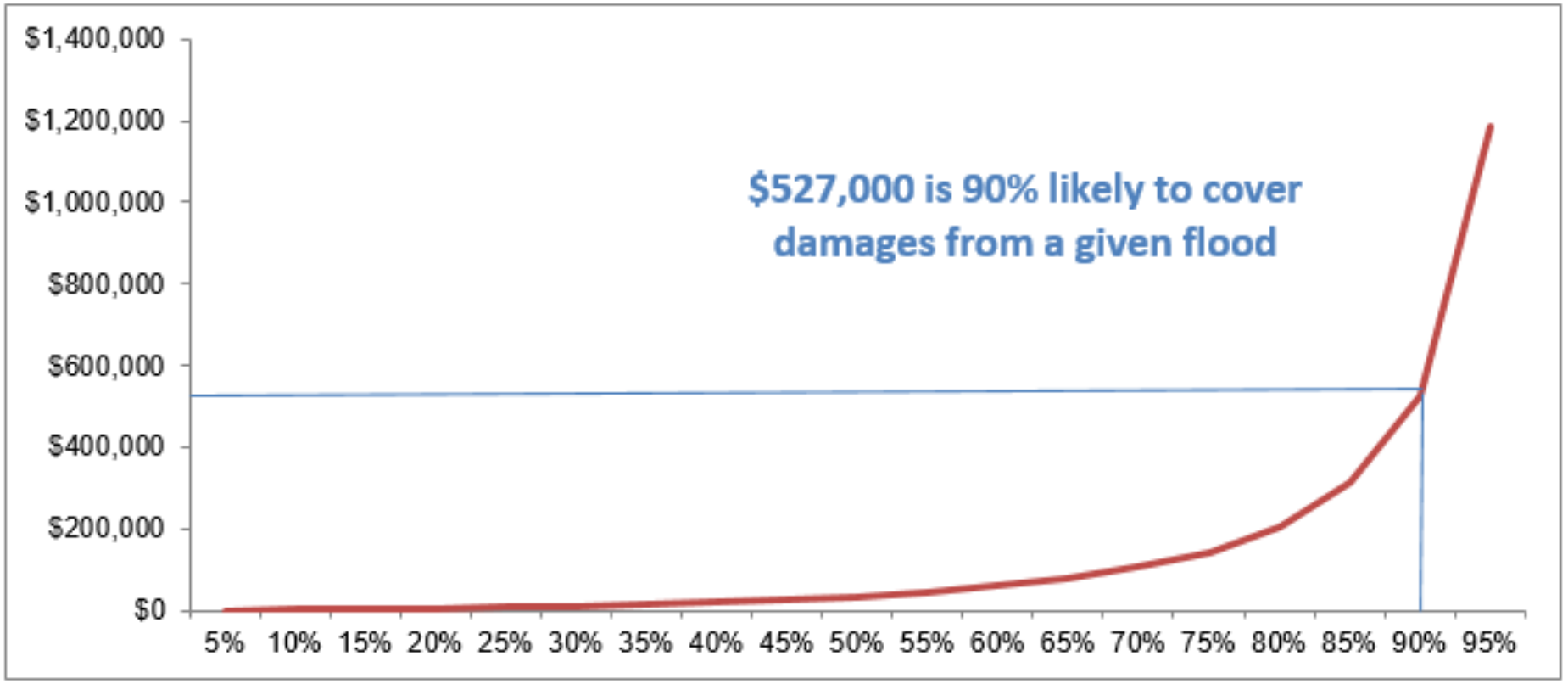
Cumulative Probability Chart

Floods



Risks aren't Additive

Likelihood of covering the extreme event	Hazardous Materials	Wildfires	Total (New Distribution of Total Risk)	Total (Simple Sum of Individual Risks)
90%	$3.1 million	$2.5 million	$4.7 million	$5.6 million
95%	$3.5 million	$2.8 million	$5.2 million	$6.3 million
99%	$4.1 million	$3.2 million	$6.1 million	$7.3 million

Probability of Extreme Events over Various Time Horizons

Poisson Distribution

		Time Horizon				
		1 year	2 Years	3 Years	4 Years	5 Years
Number of Extreme Events that Occur	0	81.9%	67.0%	54.9%	44.9%	36.8%
	1	16.4%	26.8%	32.9%	35.9%	36.8%
	2	1.6%	5.4%	9.9%	14.4%	18.4%
	3	0.1%	0.7%	2.0%	3.8%	6.1%
	4	0.0%	0.1%	0.3%	0.8%	1.5%
	5	0.0%	0.0%	0.0%	0.1%	0.3%

The Method

Triple-A Approach to Uncertainty

- Accept
  - Uncertainty is inevitable
- Assess
  - Find potential impact, using reference cases – historical or analogues
- Augment
  - Uncertainty will usually be underestimated!

Probability Management

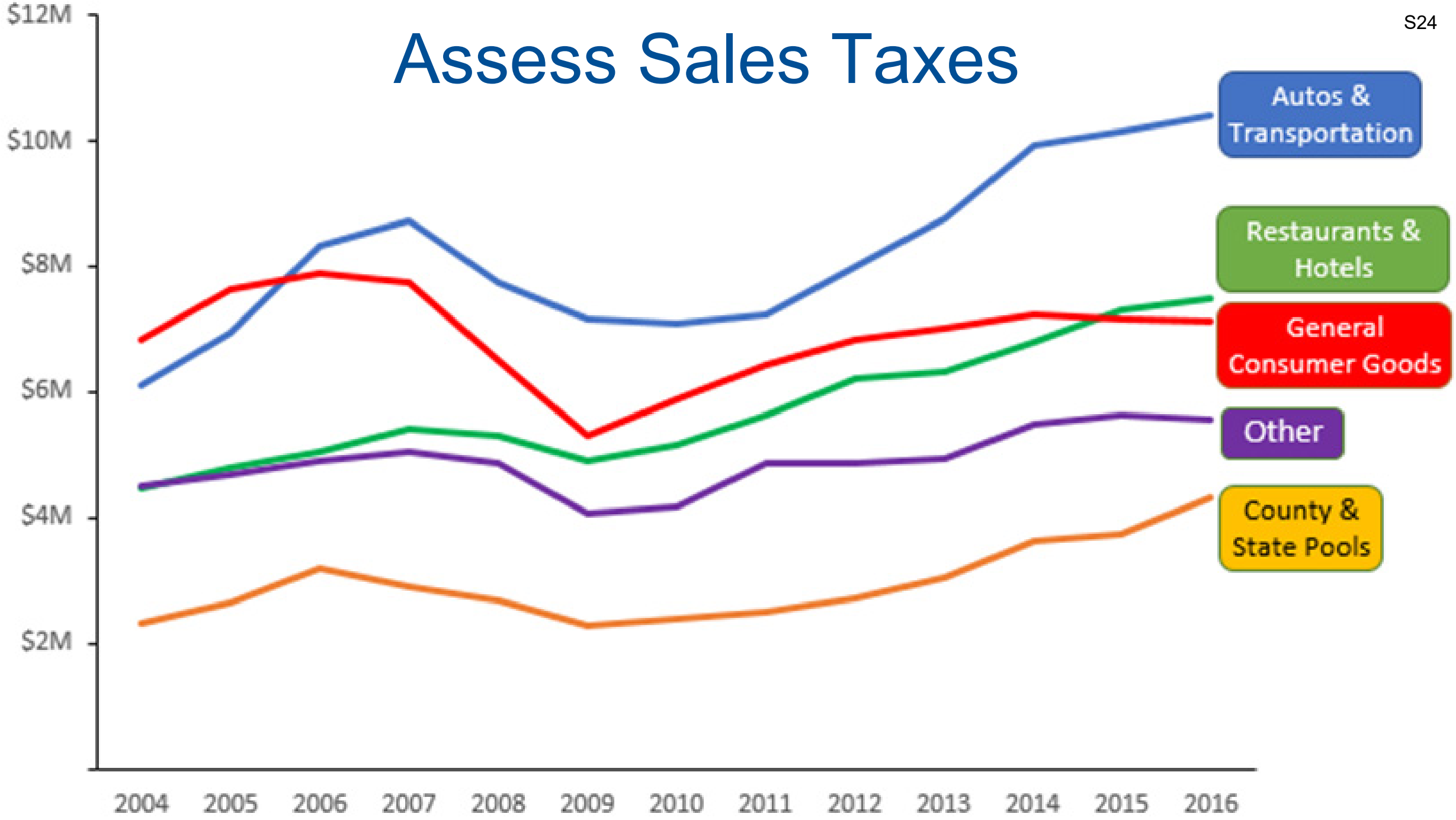
- Open-source standard for probabilistic analysis
- Works in 100% native Microsoft Excel
  - Free set of tools gives you shortcuts
- Makes “Monte Carlo” analysis more accessible than ever before

Probability Management

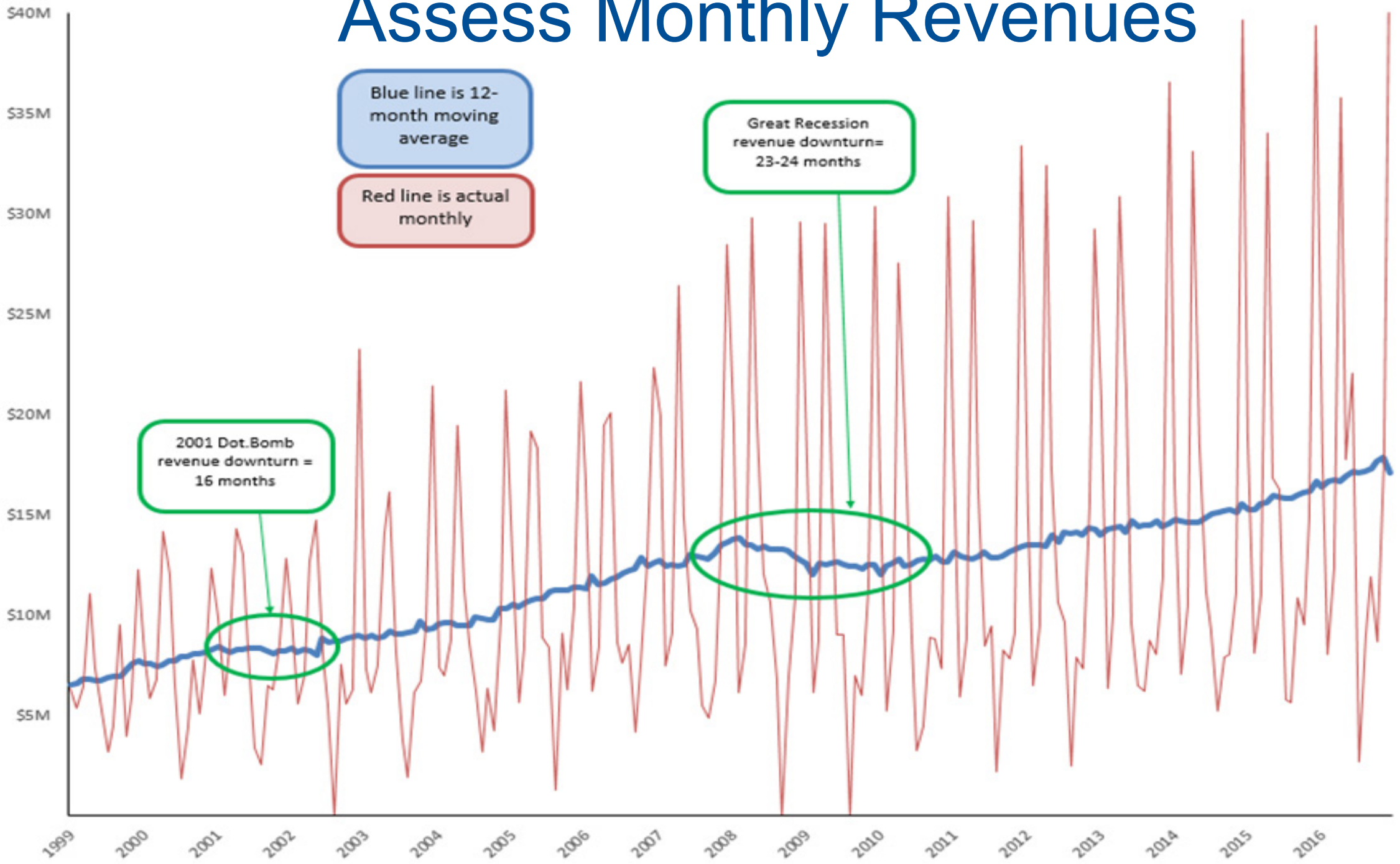
Monte Carlo Analysis

- Computerized equivalent of developing your own custom set of dice to represent the likelihood of an undesirable event, and then rolling them thousands of times to see what happens

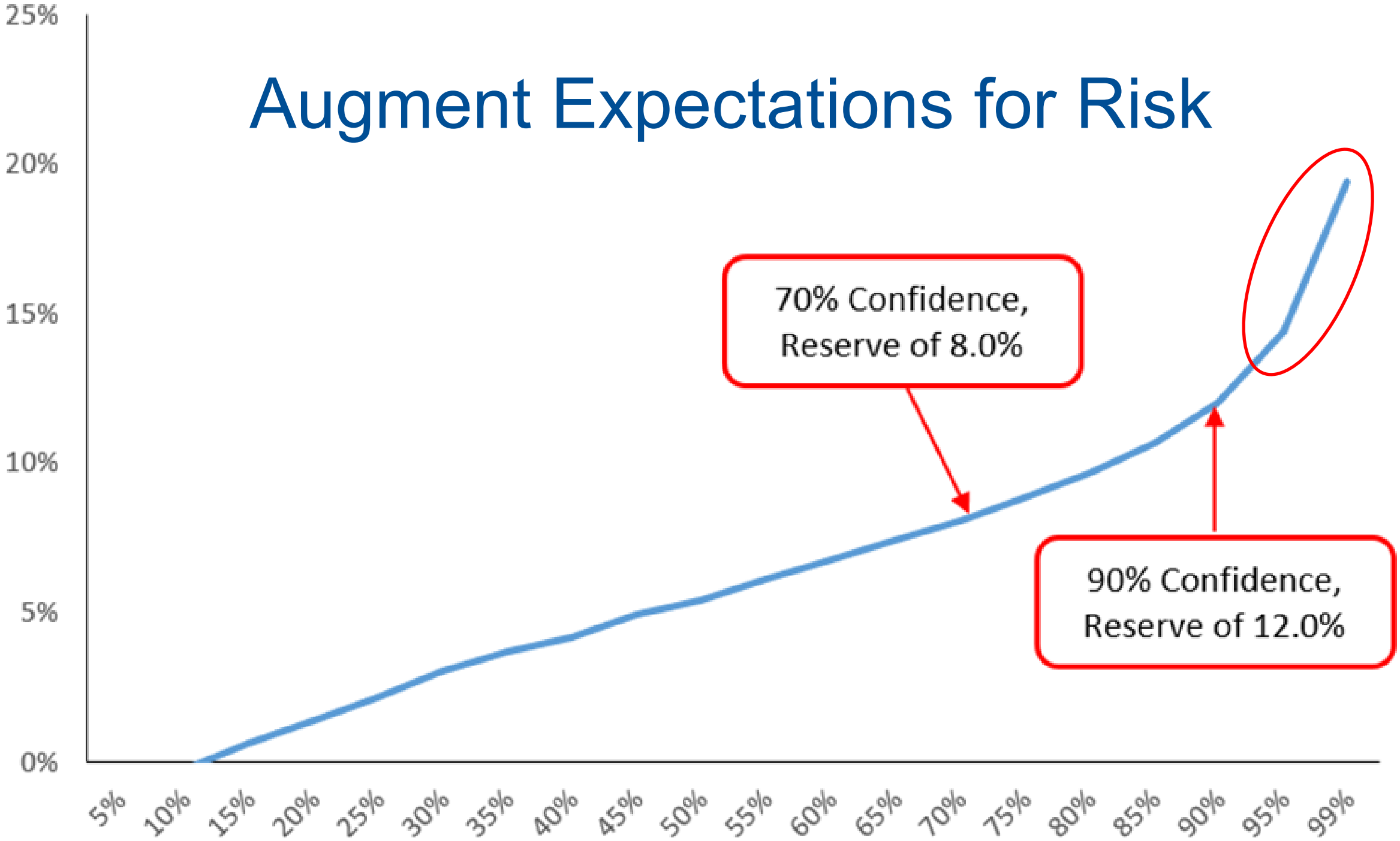
Assess Sales Taxes



Assess Monthly Revenues



Augment Expectations for Risk



Newport General Fund Risks Studied

Primary Risk Factors

- Earthquakes
- Floods
- Fires
- High Winds
- Revenue Volatility due to Economic Downturn

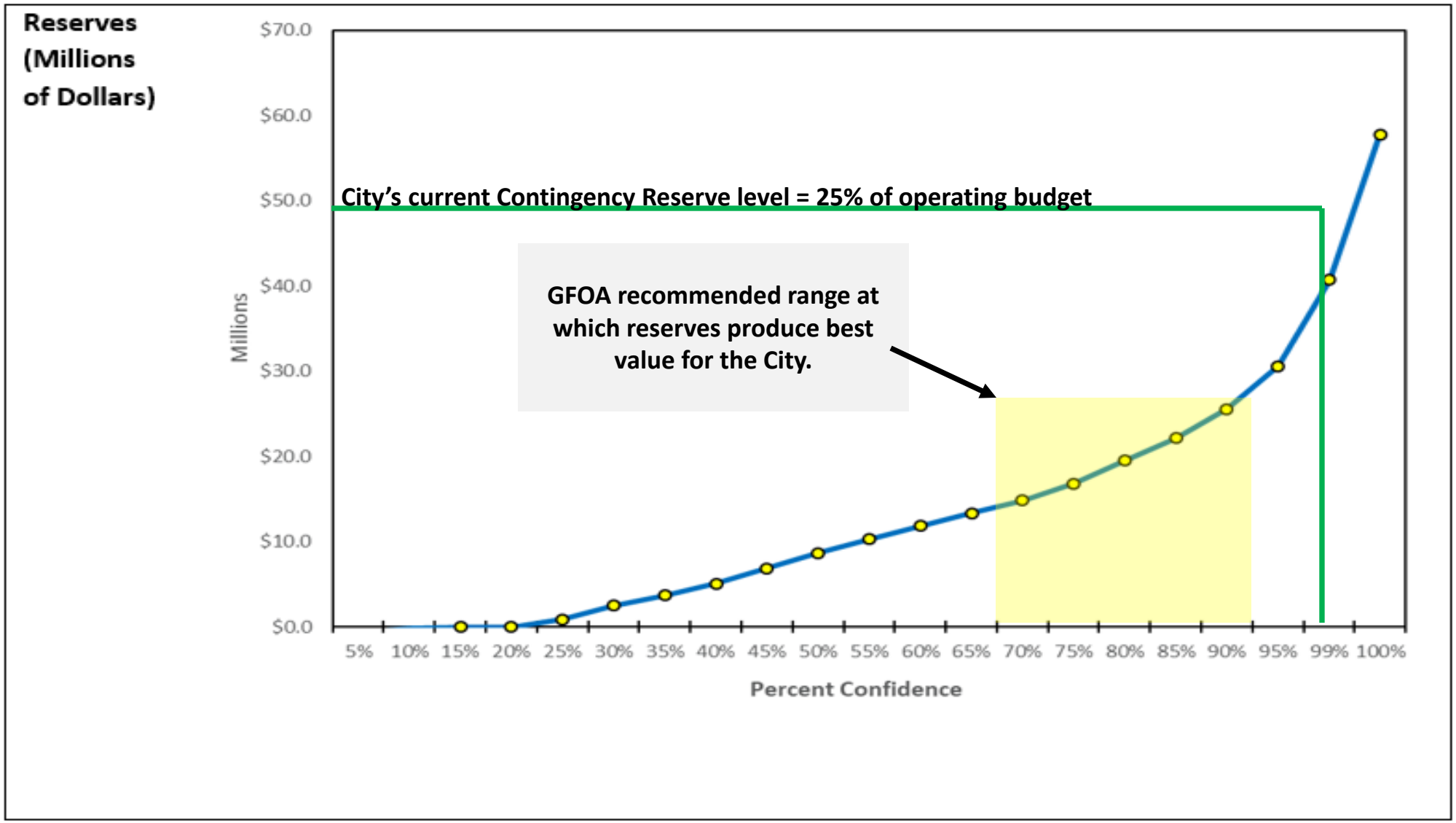
Secondary Risk Factors

- Increased Pension costs due to underperforming assets
- Expenditure spikes

Results

GFOA calculated the probability that the City would experience risks over a ten-year period as expressed through a ten-year cumulative probability chart. This chart produces a curve that shows the level of confidence the City can have that a given level of General Fund Contingency Reserves will prove sufficient over a ten-year period to cover the extraordinary costs incurred by these risks.

Exhibit 7.2 – Confidence that a Given Level of General Fund Reserves will be Sufficient over 10 Years



Other Factors that Informed Reserve Level

- According to the GFOA, the adequacy of the General Fund unreserved fund balance should be assessed based upon a government's own specific circumstances.
- Still Cognizant that credit rating agencies consider an adequate level of "fund balance" to be a credit strength because the level of fund balance measures the flexibility of an issuer to meet essential services during transitionary periods.

Other Factors that Informed Reserve Level

- In 2014, staff conducted a survey of cities in California similar to Newport Beach, and found contingency reserve requirements mostly in excess of 15% and in the range of 20% to 25% of operating budget.
- GFOA analysis is not inclusive of every risk the City could possibly face. Market volatility can exacerbate pension funding requirements, naturally occurring events such as sea-level rise, and other unforeseeable events could have a major financial impact.

Other Factors that Informed Reserve Level

- Staff is concerned that current pension benefit levels combined with pension losses incurred subsequent to 2008 have significantly eroded the City's financial flexibility for years to come.
- Until the City is able to regain its financial capacity, staff believes it is prudent to retain significant cash reserves (25% of General Fund operating expenditures) to preserve financial flexibility when recessionary pressures inevitably return and equity markets cycle back downward.

In Summary

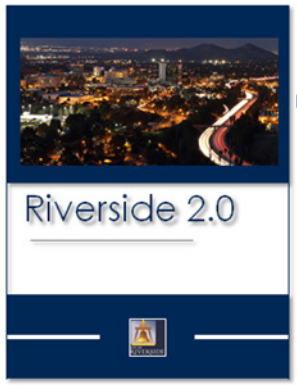
- Since we accept that we cannot identify all risks, we left a margin for adverse results and unknowns by maintaining current reserve level.
- Governing body preferred the security of having a larger reserve level.
- Governing body found comfort that we now have some analytical science to help fortify our reserve recommendation.

CASH RESERVE POLICY DEVELOPMENT

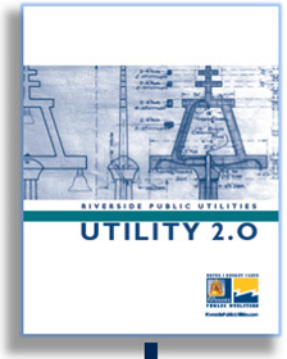
TOPICS

- Utility 2.0 Planning Process
- Importance of Reserve Policy
- Policy Development
- Reserve Level Calculations
- Summary

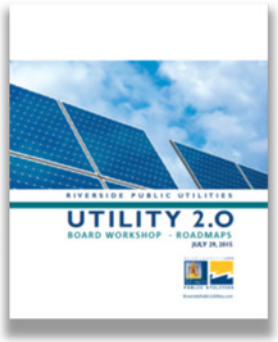
UTILITY 2.0 PLANNING PROCESS



adopted 4/28/2015



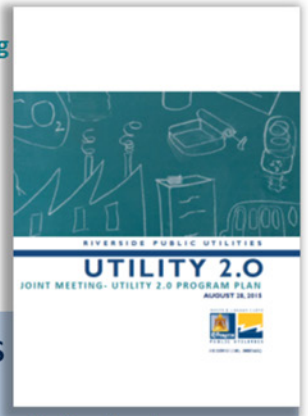
Joint meeting
5/7/2015



Board Workshops
7/13/2015
7/29/2015

x 2 =

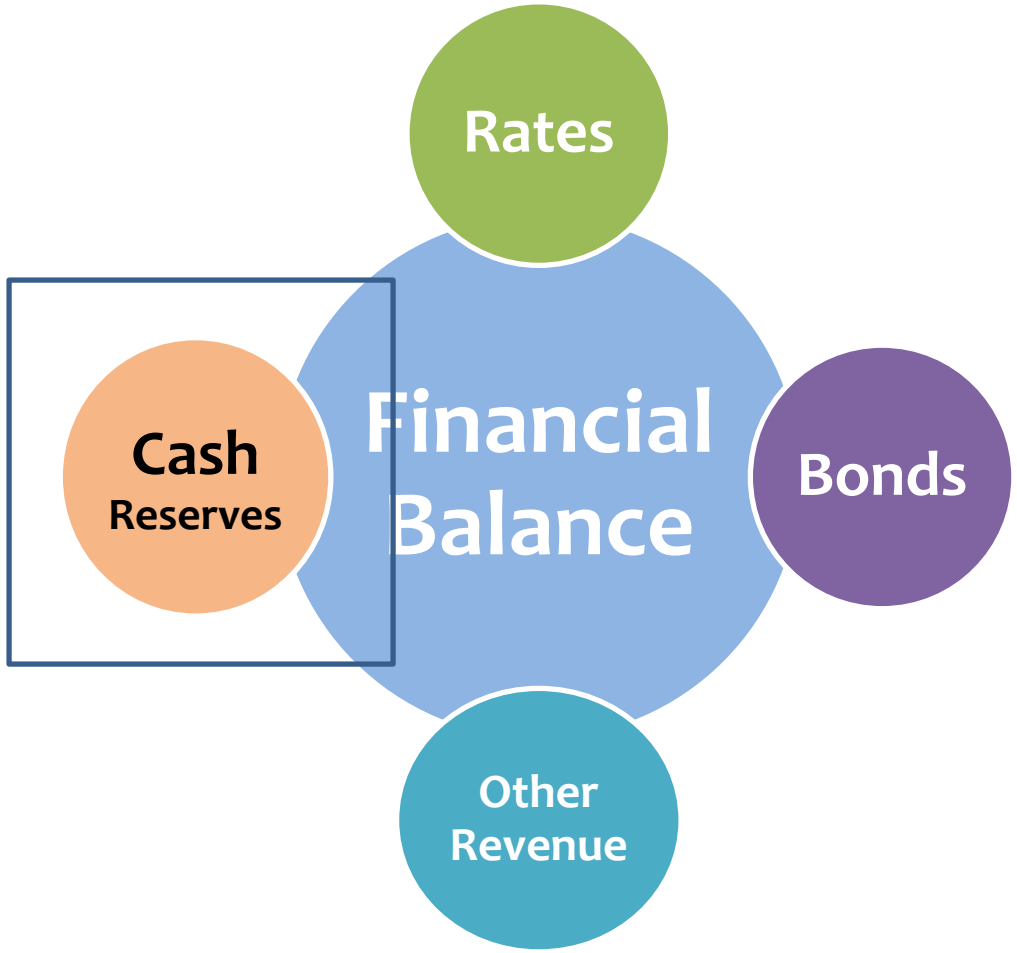
Joint meeting
8/28/2015



UTILITY 2.0 - ACTION ITEMS
(proposed)

- Make significant investment toward Infrastructure Improvement Projects over the next 10 years.
- Ensure Water Supply remains resilient and sustainable.
- Ensure reliable Electric Supply consistent with regulatory requirements.
- Implement Workforce Development Plan.
- Implement Fiber Business Plan.
- Implement customer-focused technology projects.
- Utilize 10 year Financial Pro Forma to reduce impact to ratepayers.

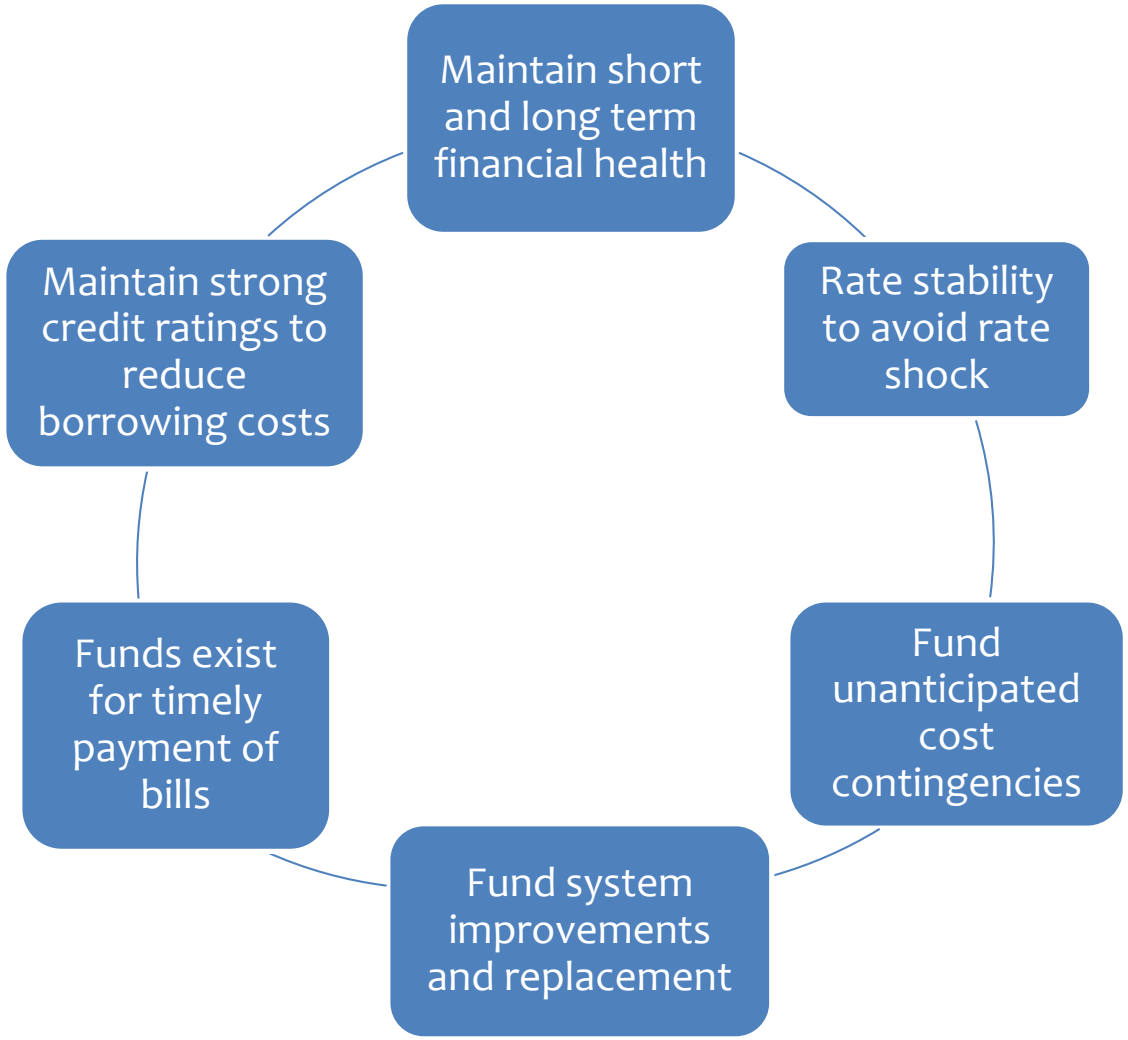
PUTTING IT ALL TOGETHER



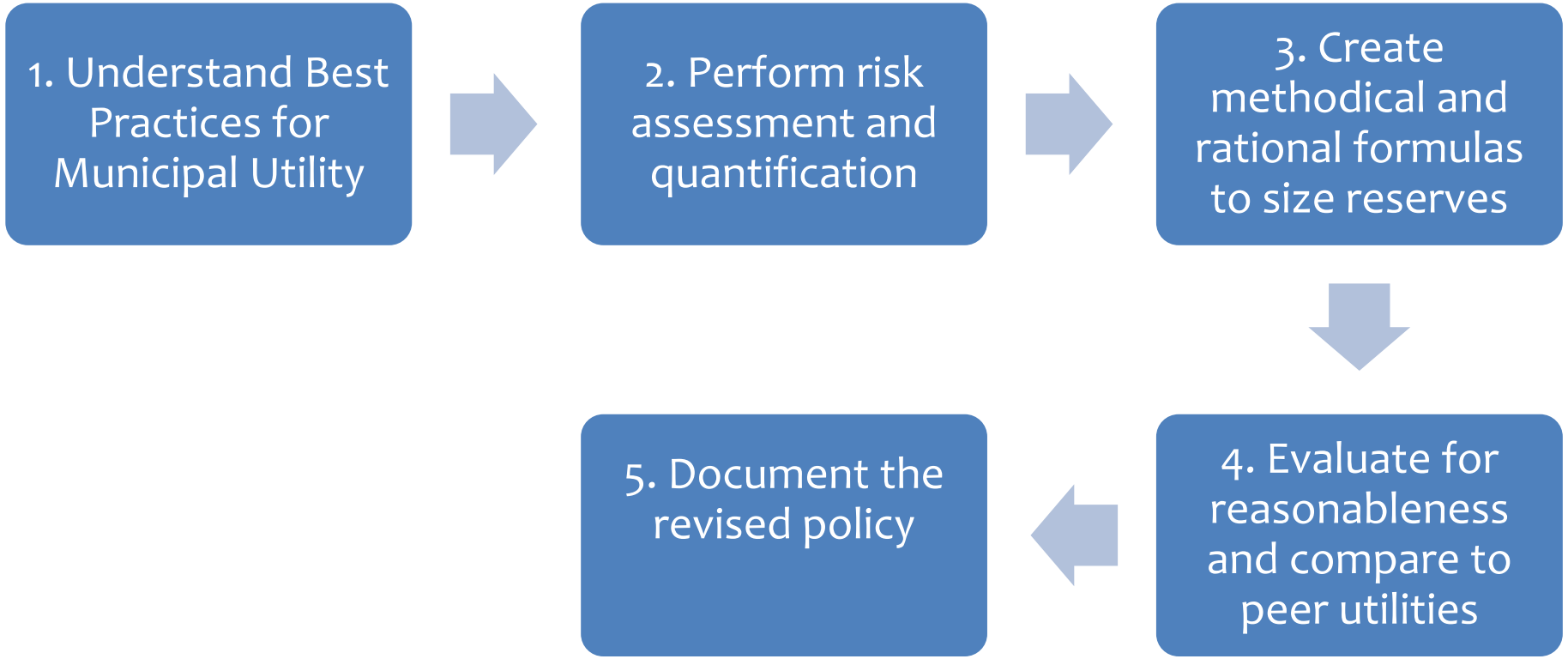
PRUDENT RESERVES PROVIDE LONG-TERM BENEFITS TO RATEPAYERS

- Reserves protect against emergencies and other contingencies
- Reserves are a strong credit positive, leading to lower borrowing costs
- Reserves mitigate future rate increases due to market disruptions and weather events
- Reserves help reduce the probability of rate shocks

RESERVE POLICY GOALS AND OBJECTIVES



PROCESS OF CREATING NEW POLICY



RISK ASSESSMENT & QUANTIFICATION

- Utility industry is complex. California is more complex than other states.
- Significant number of environmental, market and regulatory issues (Local, State, National).
- Fiscal responsibility requires anticipating and preparing for both foreseen and unforeseen events.
- Prudent financial planning ensures sufficient funding for both.

RPU RISK FACTORS

1. Potential reduction in customer demand
2. The loss of one or more large customers
3. Wholesale market disruption that impacts financial results
4. New regulatory or environmental regulations having a significant impact on costs

RPU RISK FACTORS (CONTINUED)

5. Operational events that could dramatically increase costs
6. A financial market disruption that increases borrowing costs
7. An unanticipated increase in other operational costs (chemicals, fuel, etc.)

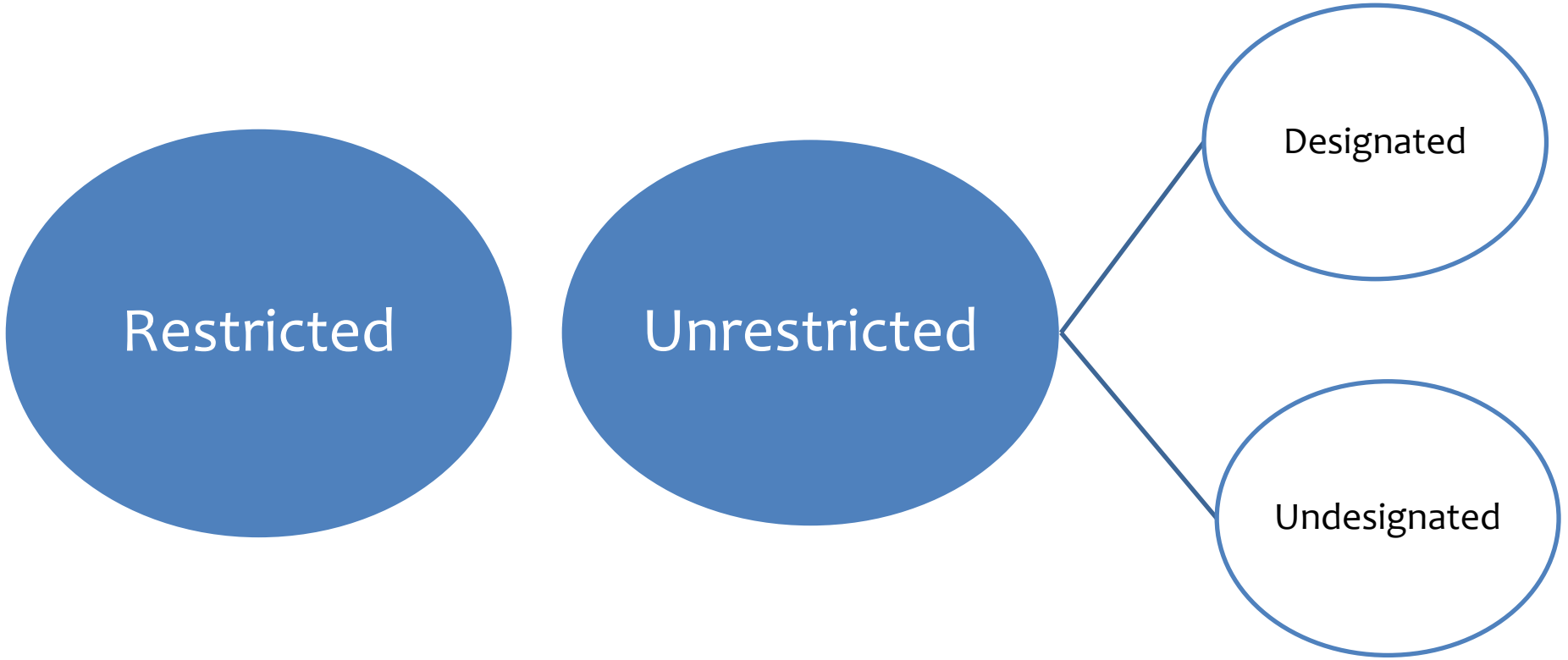
RISK QUANTIFICATION PROCESS

Outlined and quantified major risk factors

Risk factors evaluated in conjunction with designing the reserve policy

Factors were considered and utilized in determining minimum and maximum levels

TYPES OF RESERVES



UNRESTRICTED – UNDESIGNATED RESERVES

- **Unrestricted reserves may be used for any lawful purpose and have not been designated for specific capital or operating purposes.**
  - The Cash Reserve Policy addresses the levels, use and replenishment of undesignated reserves.

UNRESTRICTED, UNDESIGNATED RESERVE POLICY

- **Maintaining undesignated reserves for the following areas:**
  - Working Capital – Operations & Power Supply
  - Rate Stabilization
  - Capital Expenditures (both emergency and planned system improvements)
  - Debt Service

OPERATING RESERVES

Type	Purpose	Target (Minimum) Calculation	Rationale	Electric	Water
Working Capital – Operations & Maintenance, including Power Supply Costs	To ensure sufficient resources to pay operating, maintenance and power supply expenses, recognizing the timing difference between payment of expenses and receipt of revenues.	Equal to 60 days of operating expenditures	Billing and collection cycle is 60 days – difference between delivery of service and receipt of payment	√	√

RATE STABILIZATION

Type	Purpose	Target (Minimum) Calculation	Rationale	Electric	Water
Rate Stabilization	Mitigate rate shock due to temporary and transitional regulatory changes, loss of major resource, sharp demand reduction or market volatility	10% of Operating Revenues	Based on risk quantification which evaluated power cost uncertainty due load reduction, market energy price fluctuations, unit contingencies, transmission costs, and regulatory mandates.	√	
		7% of Operating Revenues	Based on historic fluctuation of retail sales from year to year due to unforeseen events (ie recession, drought)		√

CAPITAL EXPENDITURES

Type	Purpose	Target (Minimum) Calculation	Rationale	Electric	Water
Capital - Emergency	Provide funds to ensure ability to repair system after a natural disaster such as a flood, earthquake or major windstorm	1% of depreciable capital assets	Consistent with APPA guidelines for emergency reserves. Provides funds to pay for needed expenditures to be reimbursed by FEMA or other sources	√	√
Capital – System Improvements	Provide funds to ensure continuity of construction over fiscal years to be reimbursed by bond proceeds or other resources	6 months of the following year's approved Capital Improvement expenditures (CIP)	Provides sufficient funding to meet planned capital expenditures – recognizing that there is a significant time lag in raising rates or issuing bonds to fund capital infrastructure.	√	√

DEBT SERVICE

Type	Purpose	Target (Minimum)	Rationale	Electric	Water
Debt Service	Ensure ability to make debt service payments in an extreme event that may impact RPU's ability to deliver power and water, thus impacting revenues at a time critical infrastructure repairs are needed to restore systems.	Maximum debt service payment (semi-annual) in the upcoming fiscal year.	Prevent an event where RPU would be unable to pay its debt service.	√	√

TARGET (MINIMUM) RESERVES VS. MAXIMUM

Type	Target (Minimum)	Maximum
Working Capital – O&M and Power Supply	60 days of operating expenses	90 days of operating expenses
Rate Stabilization	Electric: 10% of Operating Revenues Water: 7% of Operating Revenues	Electric: 20% of Operating Revenues Water: 15% of Operating Revenues
Capital – Emergency	1% of depreciable capital assets	2% of depreciable capital assets
Capital – System Improvements	6 months of annual CIP	9 months of annual CIP
Debt Service	Maximum debt service payment (semi-annual) in the upcoming fiscal year.	Same as minimum

POLICY IS PRUDENT AND CONSISTENT WITH INDUSTRY PRACTICE

- "One size does not fit all" – GFOA
- Reserve policy recognizes the unique risks that Riverside must face
- Reserve policy is developed to mitigate rate increases and provide long-term benefits to all ratepayers
- Reserve policy is consistent with best practices