



# Value of Avoided Airport Shutdowns

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Investing in Transportation Resilience

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# PORT AUTHORITY OF NEW YORK & NEW JERSEY

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# PANYNJ AIRPORT MULTI-DAY SHUTDOWNS

## Event

September 11, 2001

Northeast blackout (2003)

Superstorm Sandy (2012)



LaGuardia Airport, 2012

# DECISION SUPPORT FRAMEWORK

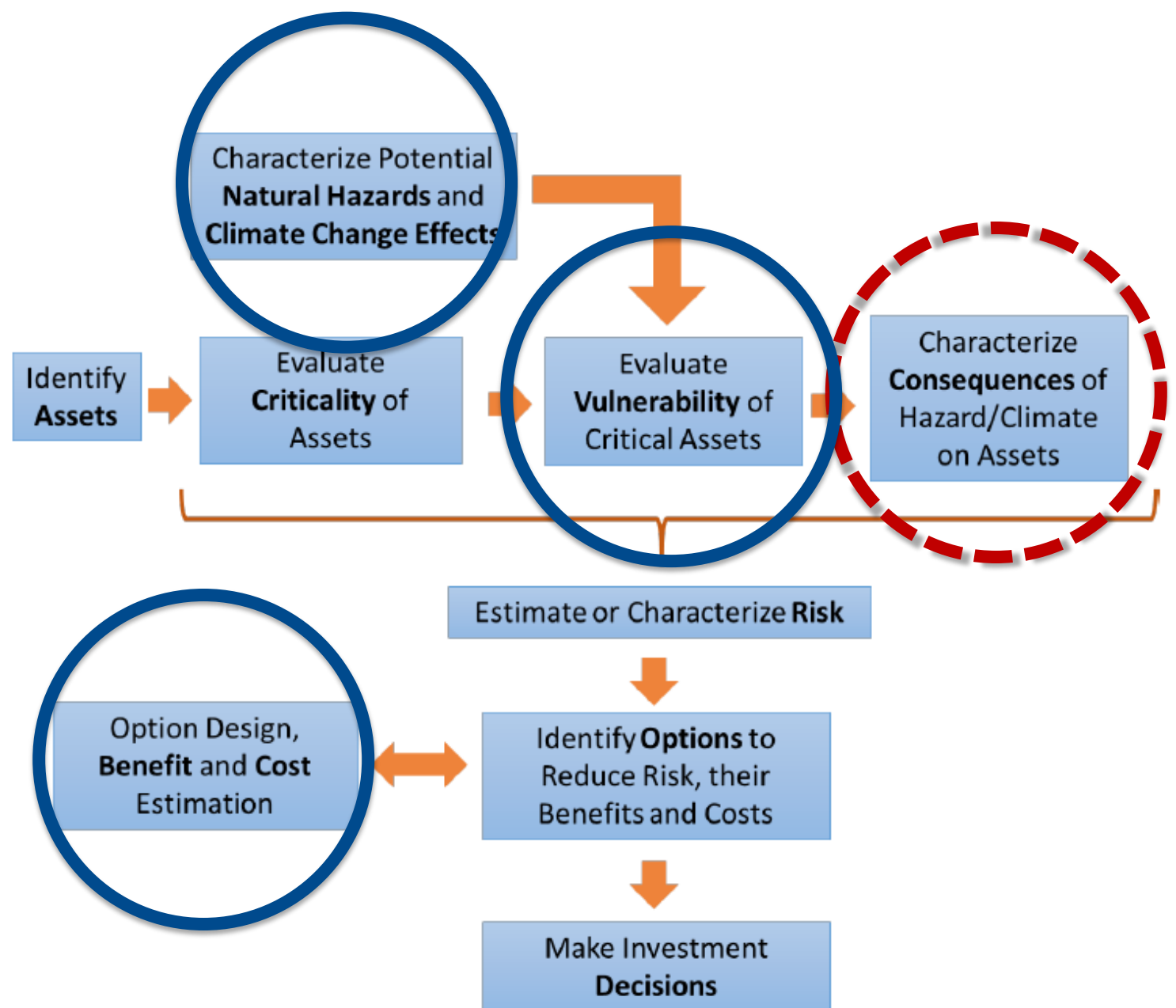
TRB Special Report 340

Existing analytical resources:

- Climate forecasts
- Flood maps
- Cost estimates

Missing:

- Consequences



# DECISION SUPPORT FRAMEWORK

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TRB Special Report 340

$$\text{Risk} = \text{Hazard Likelihood} \times \text{Vulnerability} \times \text{Consequences}$$

The benefit of a proposed resilience project is the reduction of this risk

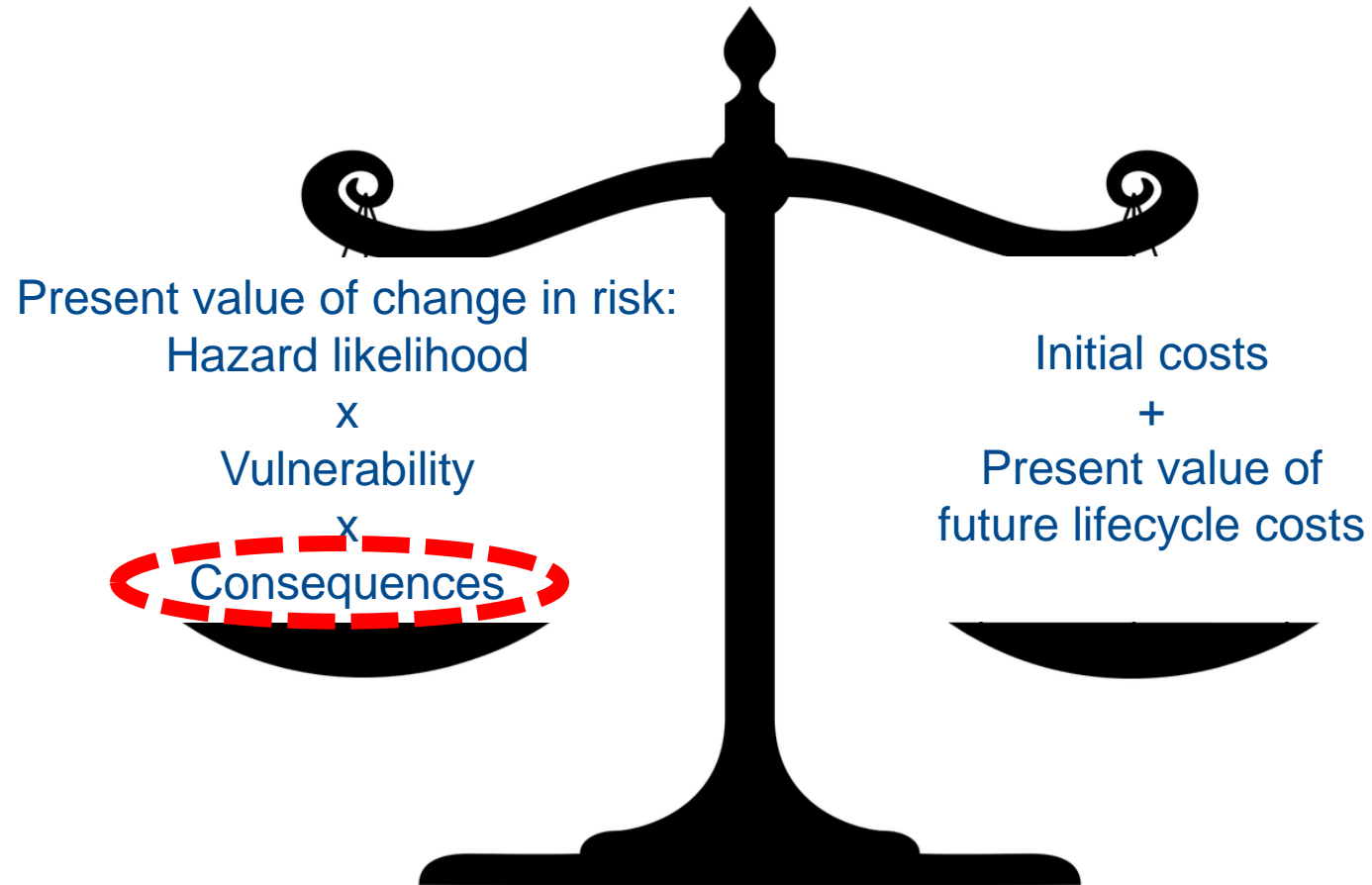
# BENEFIT-COST ANALYSIS

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# CONSEQUENCES OF AIRPORT SHUTDOWN

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Losses that won't be offset by gains at another time/place

## Which losses?

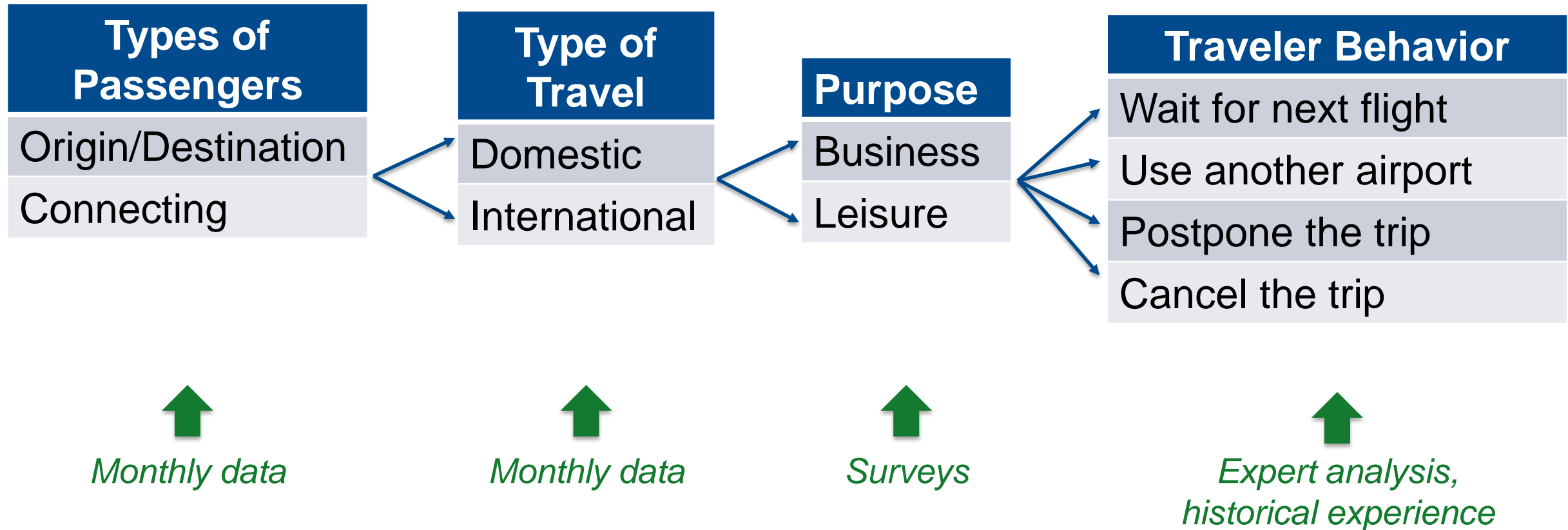
- Reduced productivity
- Lost leisure time
- Extra costs when stranded away from home
- Spoiled cargo
- Delayed cargo
- Trucking costs

## Whose losses?

- Port Authority
- Travelers
- Cargo owners
- Airlines
- Airport concessionaires



# EXAMPLE: PASSENGER SCENARIOS



# VALUING PASSENGER LOSSES

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1. Cancelled trip
  - Need to estimate net value of the trip
2. Loss of time, at work or leisure
  - Partial loss of trip's value
3. Extra costs when stranded
  - Based on hotel and per-diem costs
4. Postponed trip
  - A fraction of delay cost – otherwise, traveler would take the delay

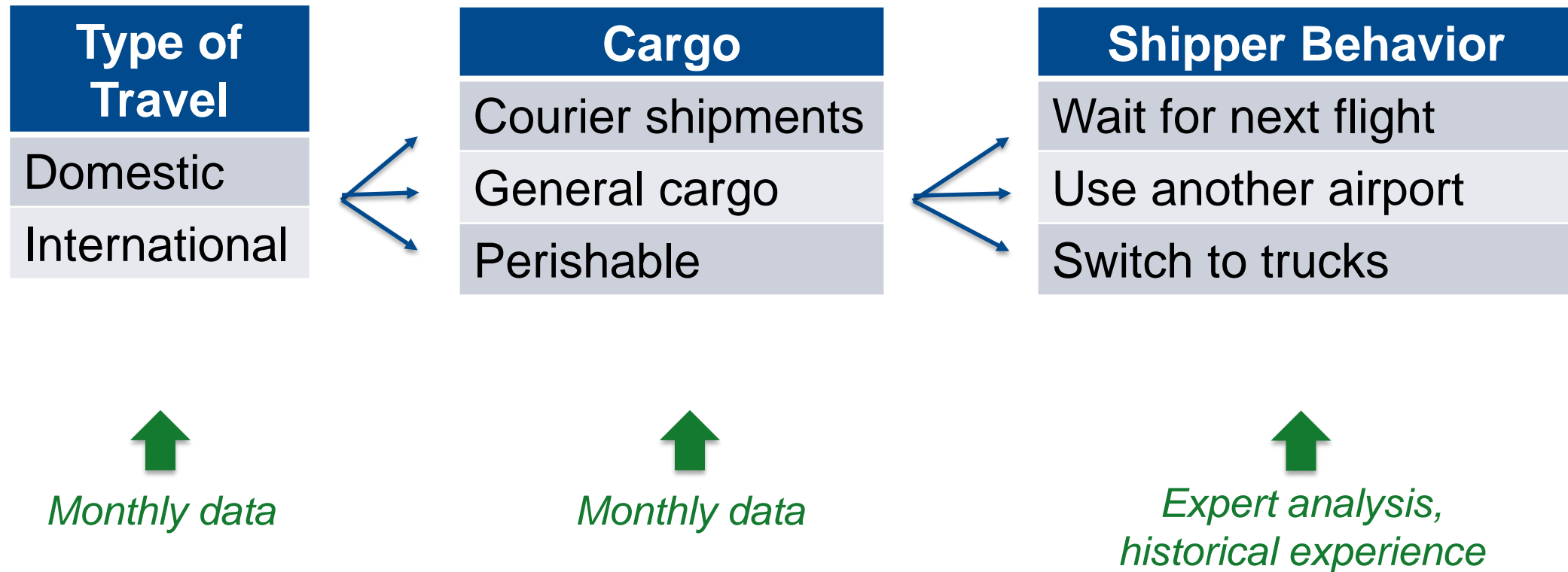
# HOW DO PASSENGERS VALUE TRAVEL?

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## Range of approaches

- Business surveys on value of travel
  - For every \$1 in spending, businesses earn \$3 to \$4
  - Credibility?
  - Business travel only  $\frac{1}{4}$  of PANYNJ trips
- Consumer surplus approach
  - Need elasticity of travel

# EXAMPLE: AIR CARGO SCENARIOS



# VALUING CARGO LOSSES



1. Delayed courier shipments
  - Valued based on premium paid over 2-day delivery
2. Delayed general cargo, including perishables
  - Loss varies by commodity
3. Rerouted via truck
  - Per-mile operating and societal costs



# RESULTS FOR ONE-DAY SHUTDOWN

- Rough estimates!
- Use a range  
(we estimated  
\$45 - \$108 million)
- Specific projects may  
provide other benefits,  
such as avoided damage

Summary	One-Day Shutdown of JFK Airport
Cancelled Trips	\$45,497,733
Passenger Delay	\$34,916,064
Cargo	\$3,575,084
Airline and PANYNJ Costs	\$9,003,385
<b>Total</b>	<b>\$92,992,266</b>

# WANTED! STANDARD METHODS

- Value of business and leisure trips
- Value of long delays
- Cargo value of time
  - Logistics implications
  - Perishability



Inventory cost approach only  
considers interest earned on  
money tied up in cargo



NYCDOT



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Extra slides (to be deleted)

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- Results are interesting to PANYNJ
  - Methodology may be of interest to some modeling airport of freight closures
  - More broadly relevant: the importance of taking the right approach
    - Not economic impact, but actual net losses
    - Development of scenarios with subject matter experts
    - Critical need for standard guidance on valuations



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- Diagram of TRB report's proposed framework & portion that this addresses
  - BCA recommendation
  - How can agency use this information?
    - Cost of project + PV of life cycle costs  
versus  
PV of (expected annual frequency of event  
x asset vulnerability  
x cost of shutdown)
  - Not economic impact (loss of wages & sales)
  - Use of “average” day scenario for airport shutdown – impacts actually vary widely by day of week and season
  - Only PANYNJ airports are affected (diversions are possible outside the region)