

RISK INFORMED DECISION MAKING FOR SEA LEVEL RISE ADAPTATION

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PUBLIC PERCEPTION

Are flood events really becoming worse?



NATIONAL GEOGRAPHIC

Hurricanes Have Doubled Due to Global Warming, Study Says



PBS **NEWSHOUR**

Why the strongest storms are getting stronger

theguardian

Extreme weather becoming more common, study says

FERNANDINA BEACH SEA LEVEL TREND

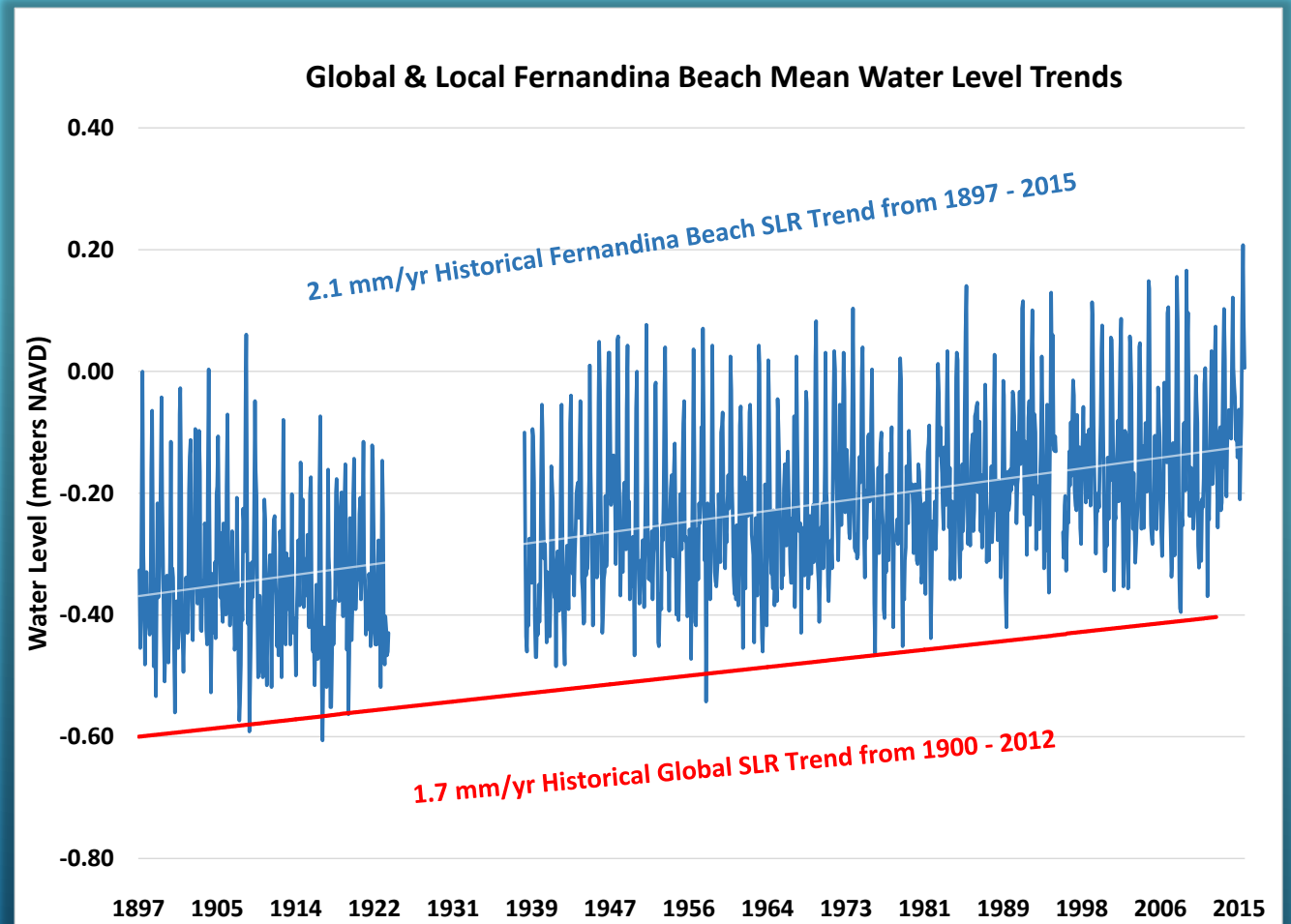
How much is the sea level rising?

Global Sea
Level Rise

1.7 mm/yr
since 1900

Local Sea
Level Rise
in Fernandina
Beach

2.1 mm/yr
since 1897

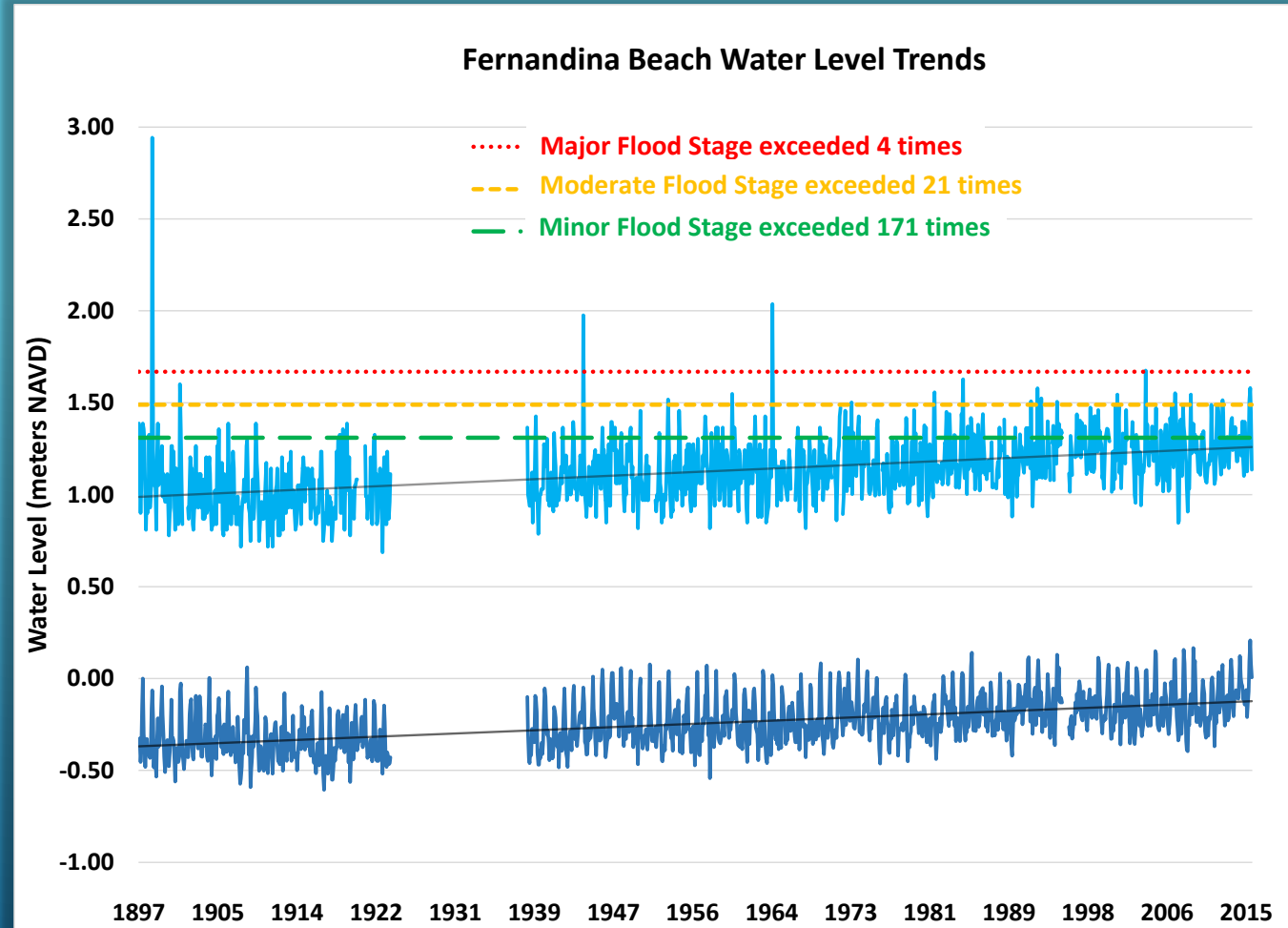


Both trends have been increasing over the past two decades.

FERNANDINA BEACH SEA LEVEL TREND

Are coastal flood events increasing in severity?

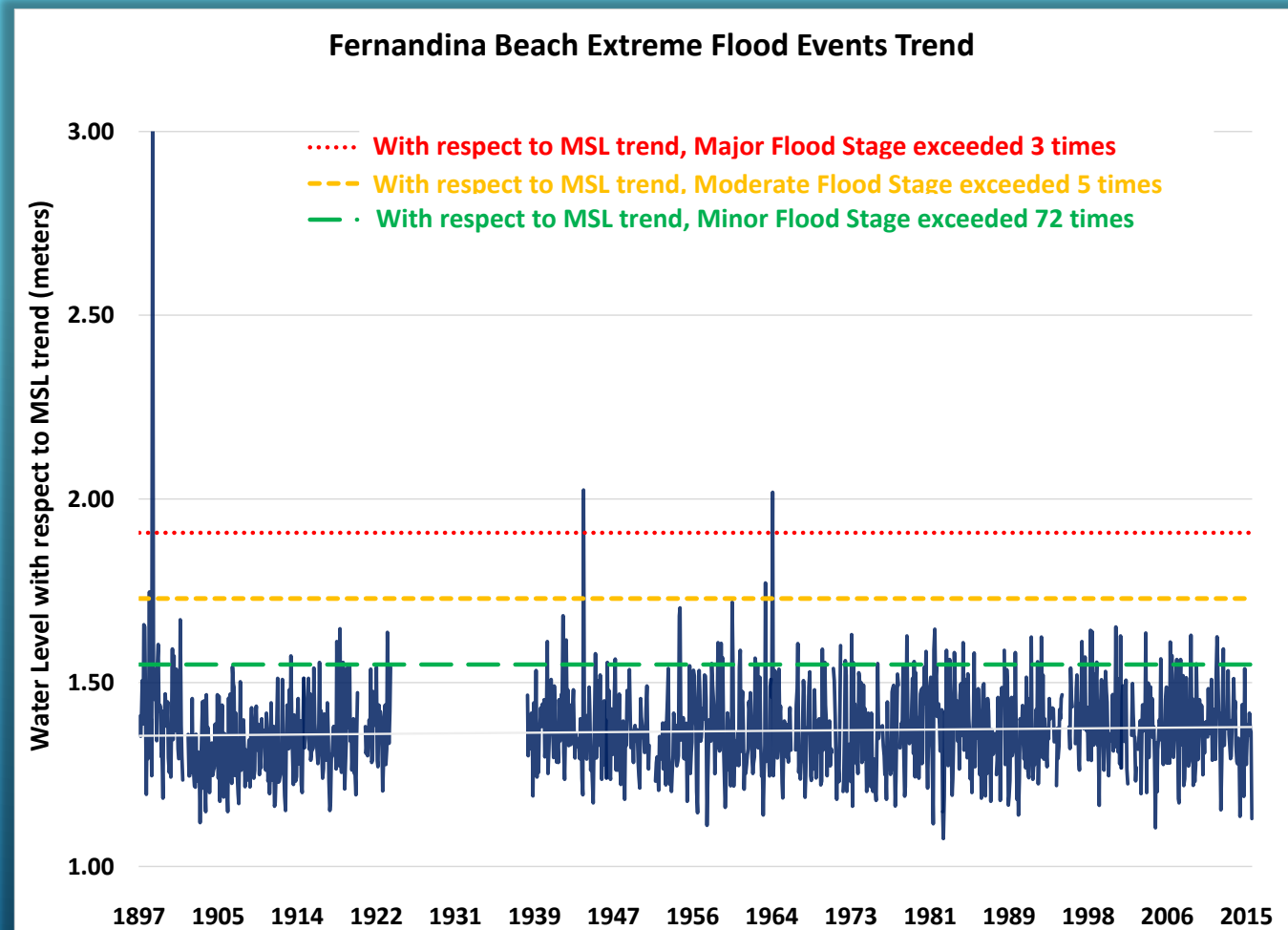
- Analyze historic monthly water level data
- Tidal gauge is located on St. Mary's River
- Compare to Flood Stages



SEA LEVEL RISE INFLUENCE

What if the effects of sea level rise are negated?

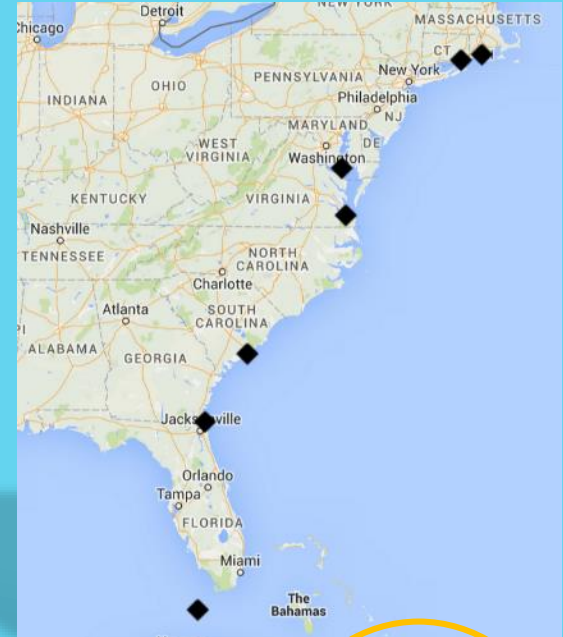
- Subtract the monthly mean from the monthly max water level
- Residual shows Extreme Flood Events
- Compare to Flood Stages



STUDY OF SEVERAL EAST COAST SITES

How much is the sea level rising?

How does sea level rise
affect flood events?



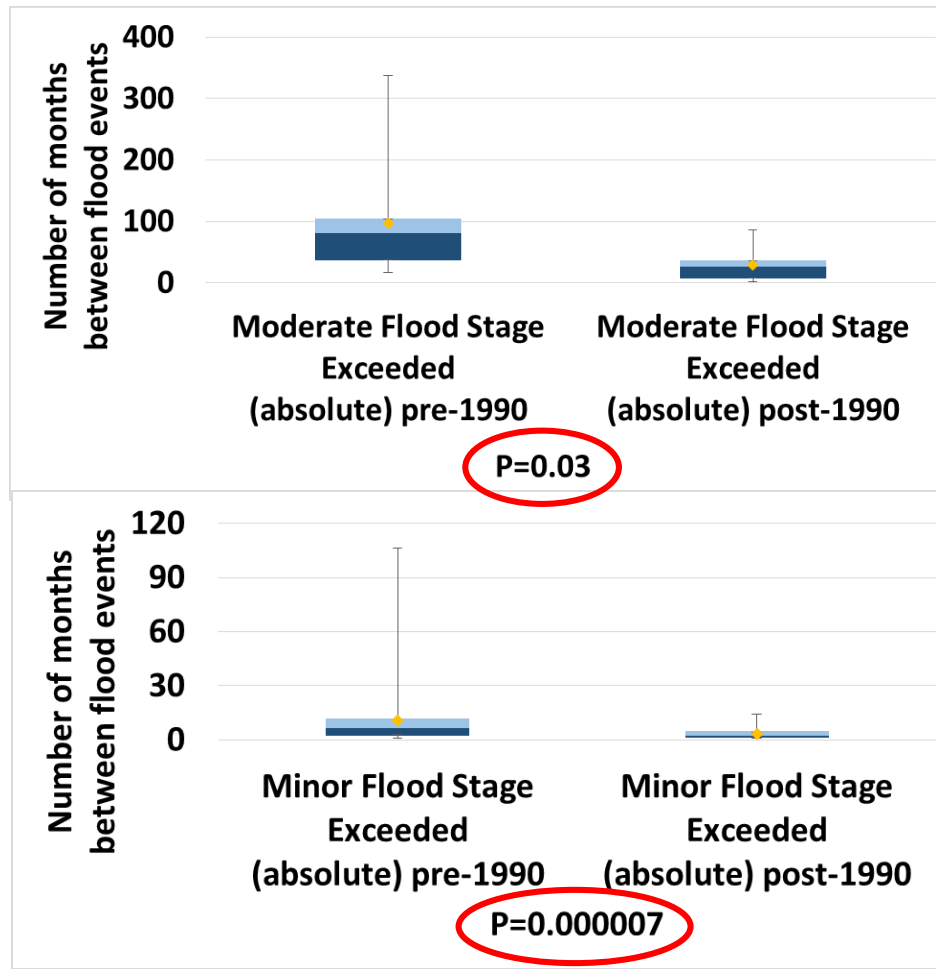
Location	Date Range	Number of Data Points	Maximum Water Level Trend (mm/yr)	Mean Water Level Trend (mm/yr)	Extreme Flood Events Trend (mm/yr)
Newport, RI	1930 - 2014	843	2.64	2.73	-0.08
New London, CT	1938 - 2014	885	1.98	2.58	-0.44
Solomon's Island, MD	1937 - 2014	898	3.53	3.78	-0.25
Norfolk, VA	1928 - 2014	1041	4.43	4.60	-0.16
Charleston, SC	1921 - 2014	1119	3.55	3.17	0.38
Fernandina Beach, FL	1897 - 2014	1168	2.27	2.04	0.22
Key West, FL	1913 - 2014	1141	2.45	2.36	0.08

ANOVA COMPARISON OF FLOOD EVENTS

Are coastal flood events increasing in frequency?

- Conducted variety of statistical analyses
- Compared frequency between flood events
- Floods which exceeded Flood Stages

Analysis of Variance (ANOVA) for Frequency of Months Between Flood Events in Fernandina Beach (Absolute)

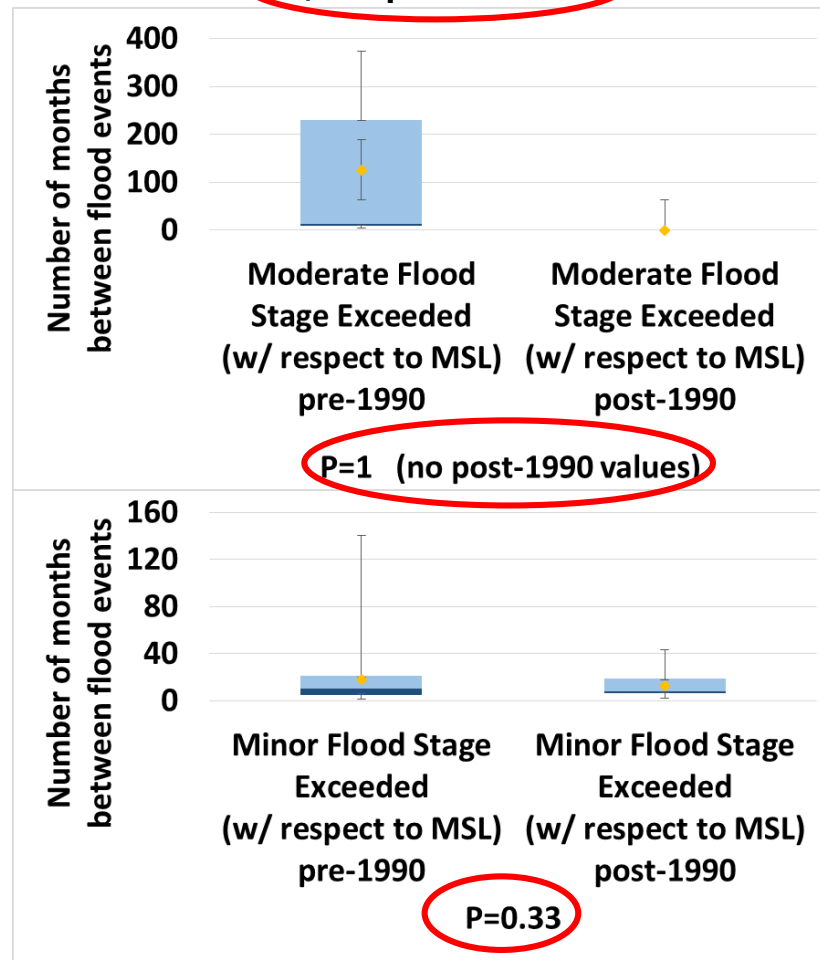


ANOVA COMPARISON OF FLOOD EVENTS

Are coastal flood events increasing in frequency?

- Compared flood frequency with and without Sea Level Rise
- With SLR, significant increase in frequency
- Without SLR, no change in frequency

Analysis of Variance (ANOVA) for Frequency of Months Between Flood Events in Fernandina Beach
(w/ respect to MSL)



MIDWAY SUMMARY

Initial conclusions

- Coastal flood events are not increasing in severity or frequency when Sea Level Rise is negated
- Coastal flooding appears worse due to:
 - Sea Level Rise
 - Increased coastal development
 - Increased total flood damage costs

ADAPTATION

How do coastal communities adapt to Global SLR?

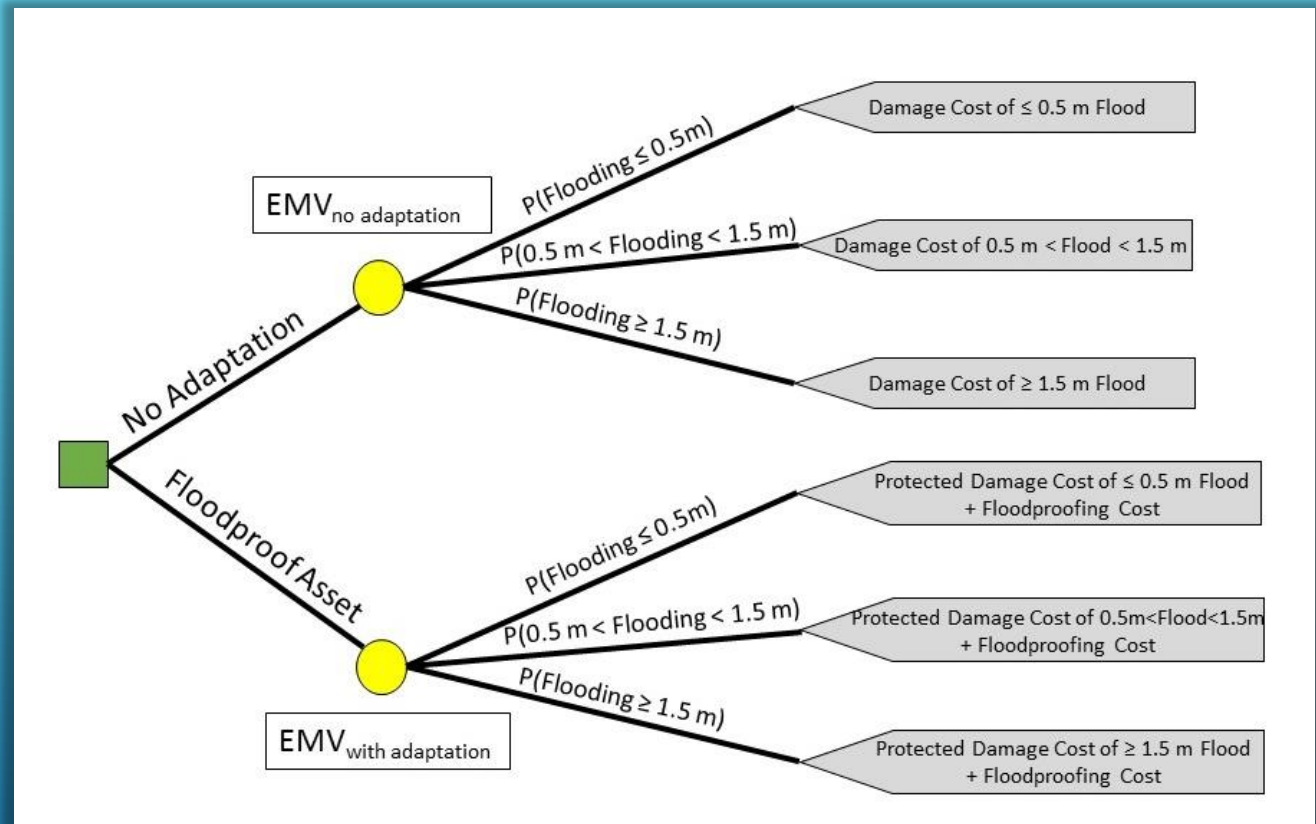
- More flood events due to Global SLR
- Flood damage costs exceed budgeted costs
- Adaptation costs less over time than future flood damage



DECISION TREE ANALYSIS

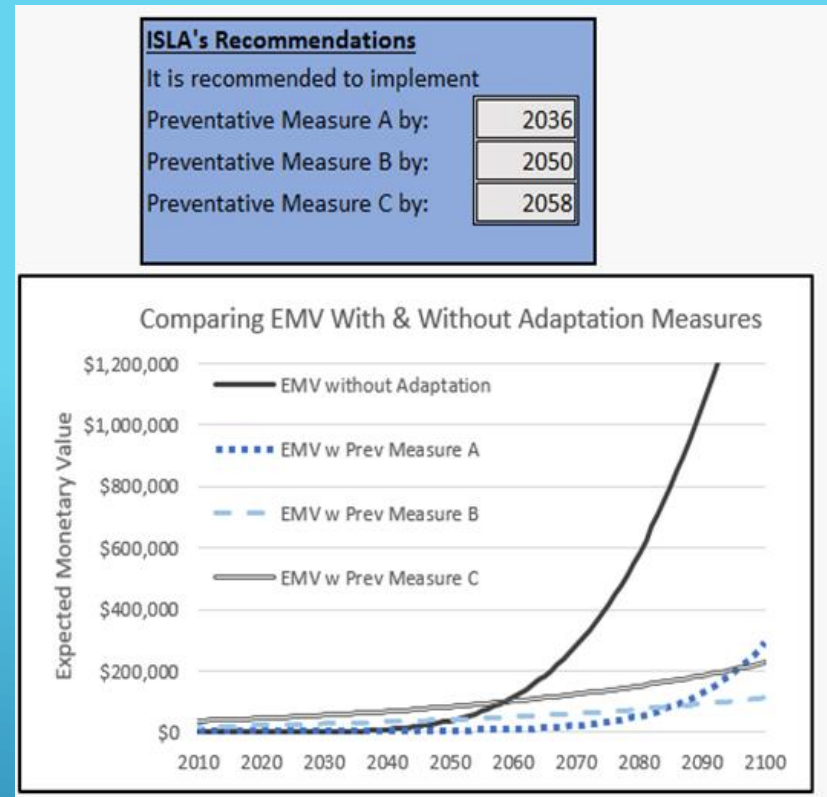
How to quantify the economic effects of SLR?

- Probability of future flood events
- Multiplied by flood damage costs
- Find EMV (Expected Monetary Value)
- Compare EMV's with and without flood protection



IMPLEMENTING SEA LEVEL ADAPTATION (ISLA) TOOL

- Helps the user select the best course of action for adaptation to sea level rise for a vulnerable asset and location
- Gives feedback of which adaptation measure to select and when to implement it
- Quantifies economic impact of different options
- Contact Angela Schedel for a site specific analysis for your location



QUESTIONS?

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