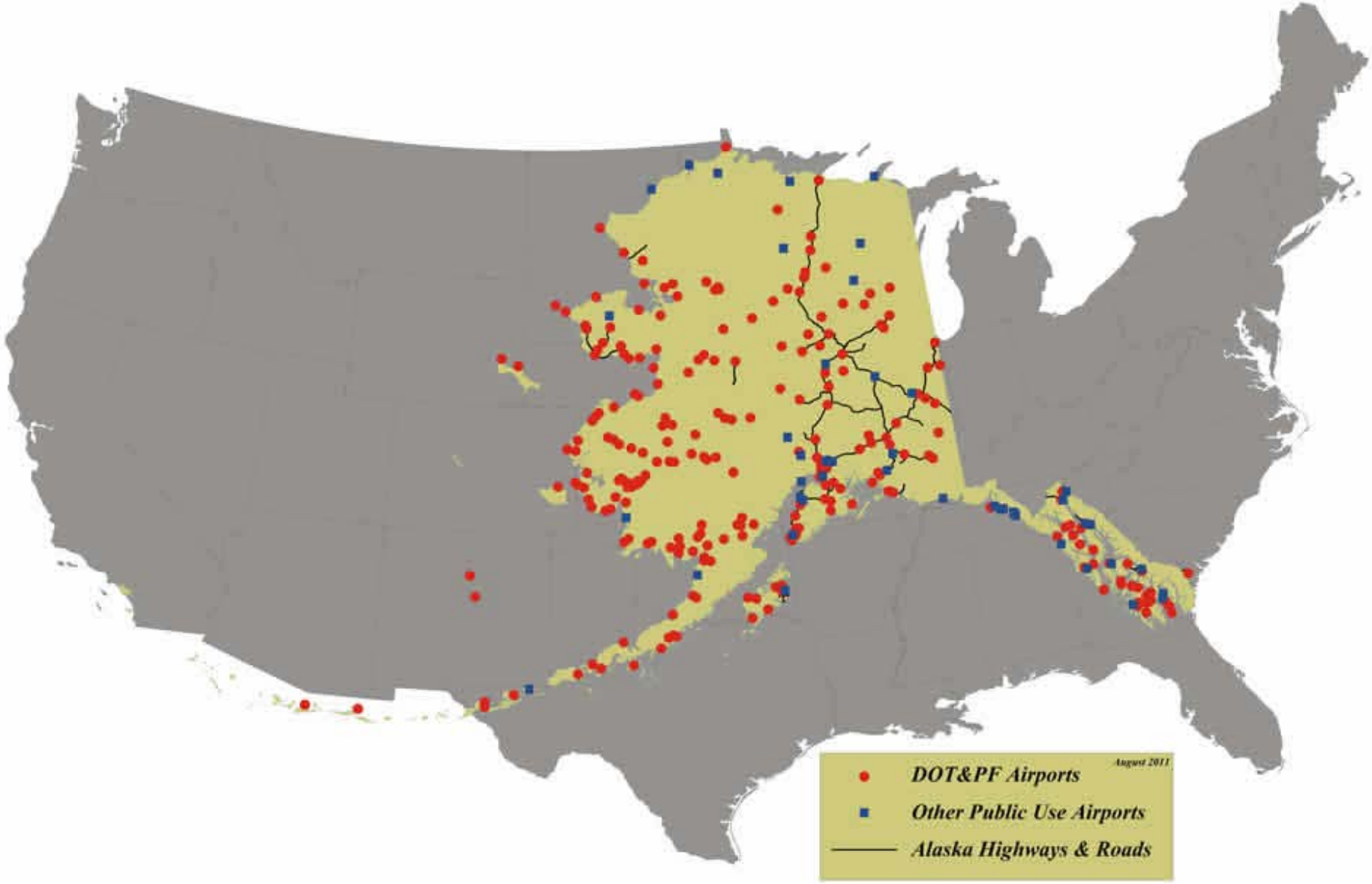
Comparing the Arctic and SE Florida

-The infrastructure perspective.

Alaska: The Land of Remote Infrastructure

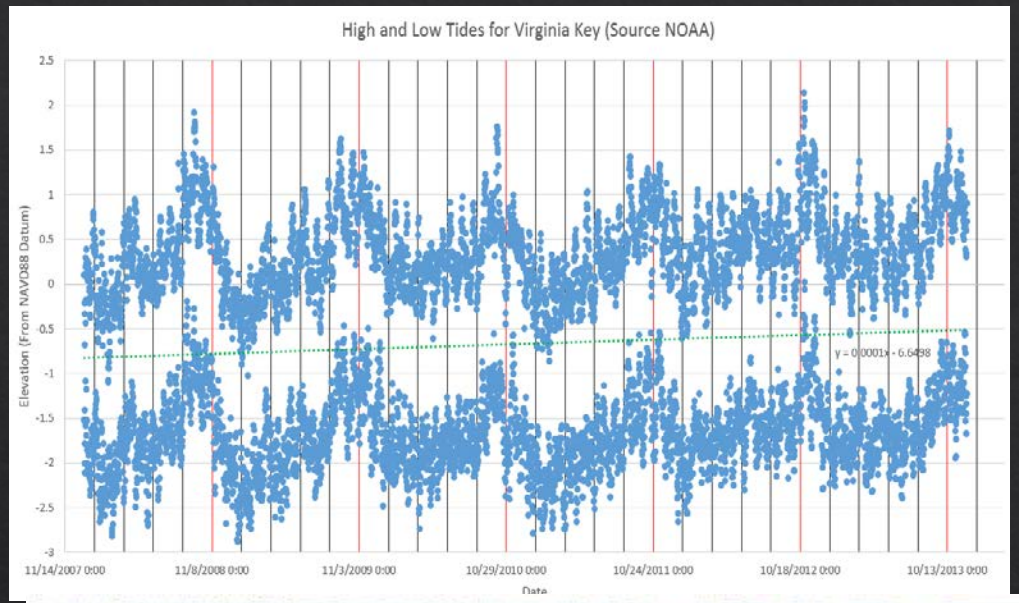


Storm surges and coastal erosion represent clear challenges

Sharply rising spring temperatures can cause damaging ice jam floods in interior rivers

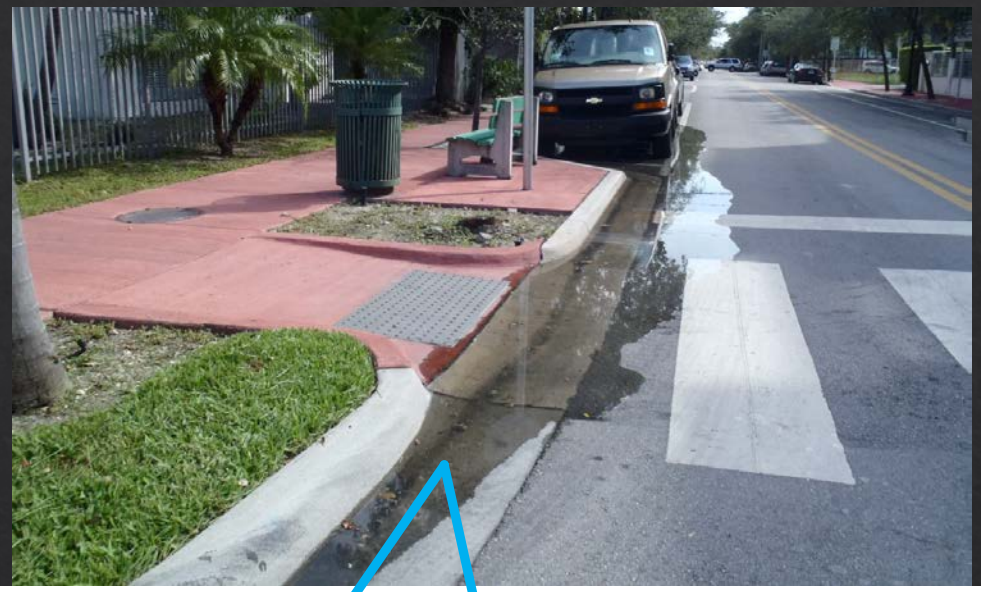
Adding to the challenge are the floods we don't quite understand

Water and sewer in rural AK are a challenge…with or without climate change

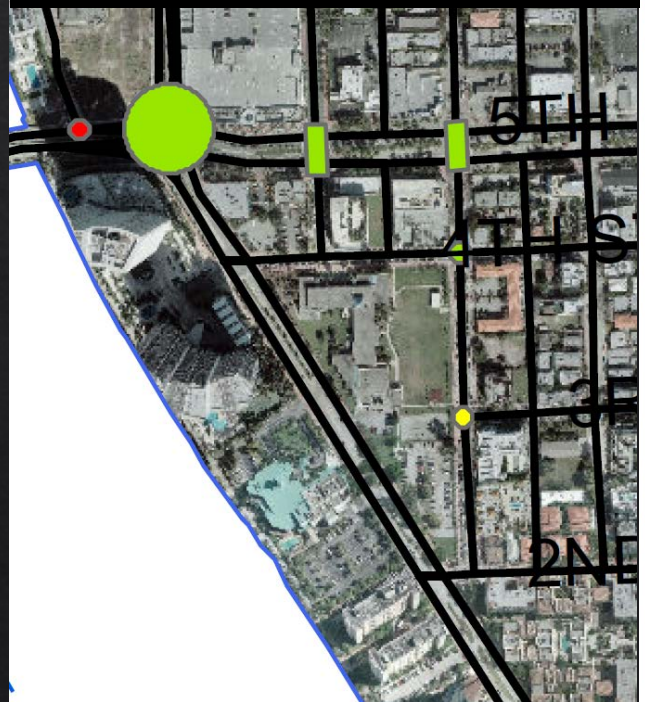


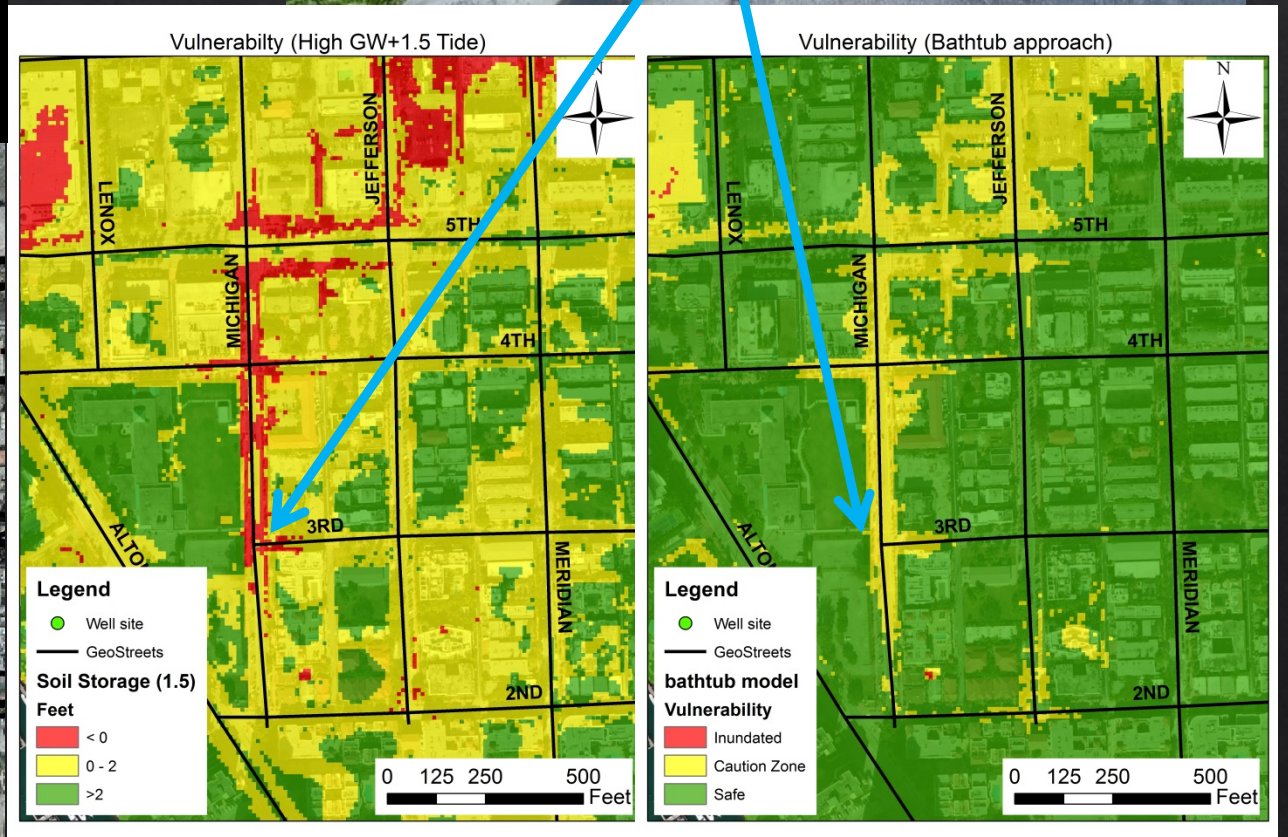
We See The Sea Rising Seasonally

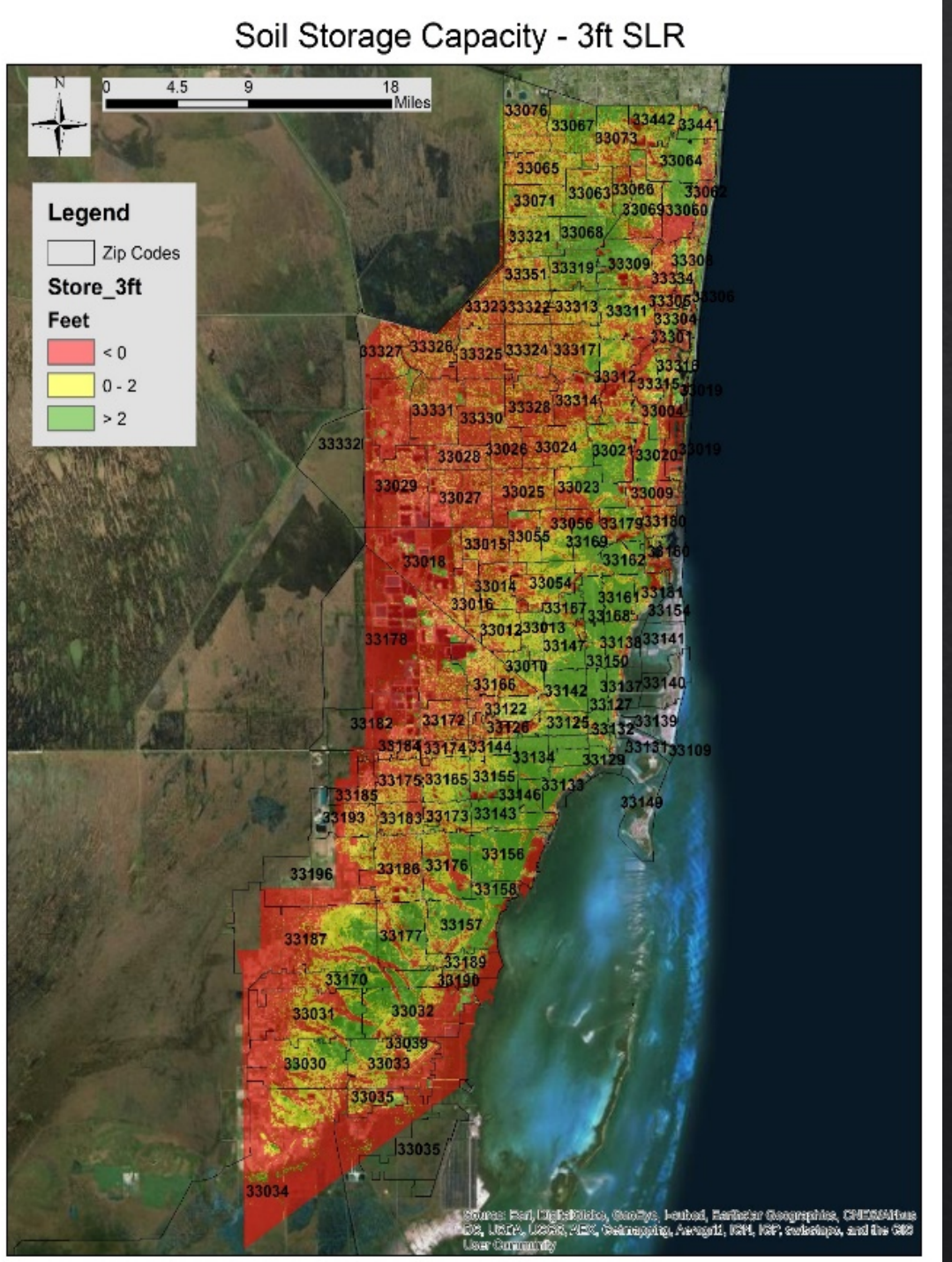
Flooding Can Be Predicted



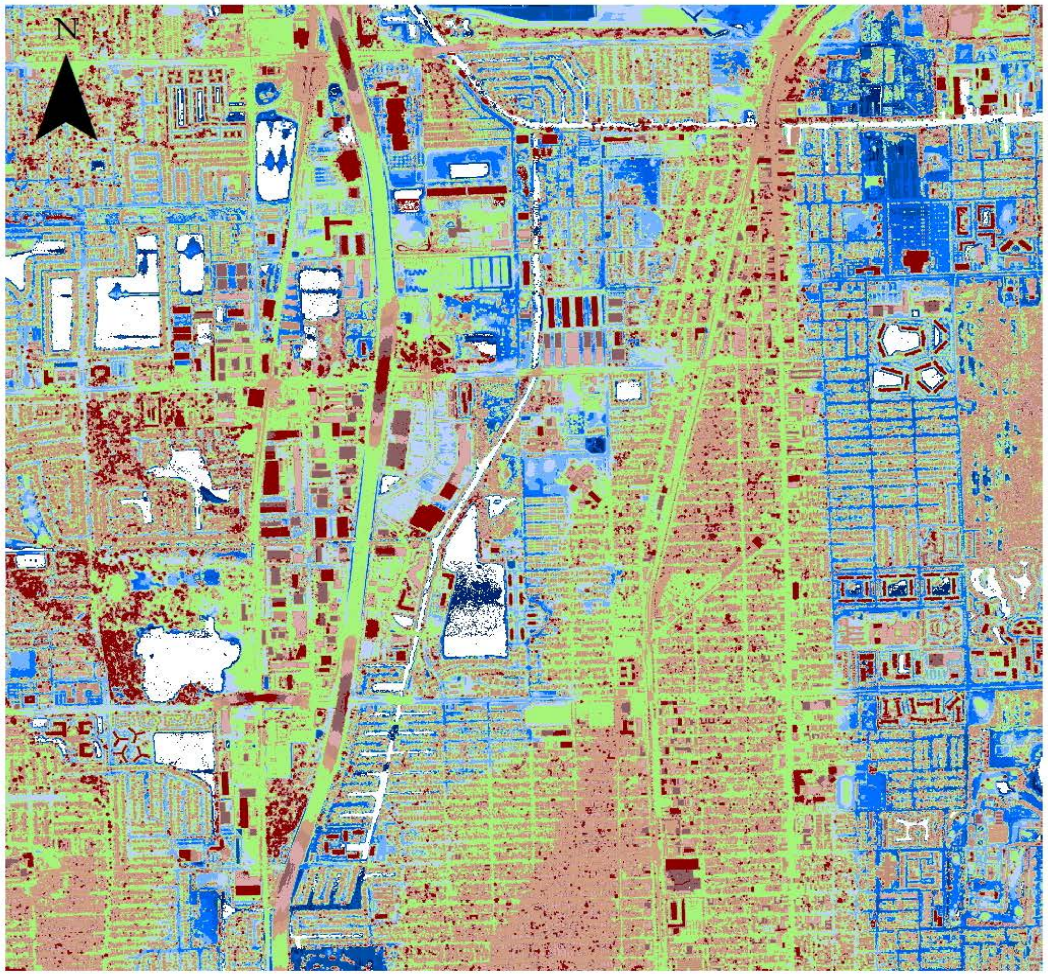
City indicated flooding map
Source: City of Miami Beach







Broward/Miami Dade County at 0, 1, 2, 3 ft SLR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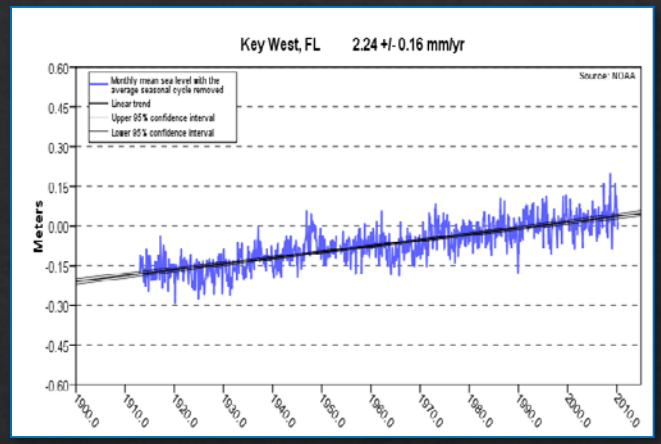
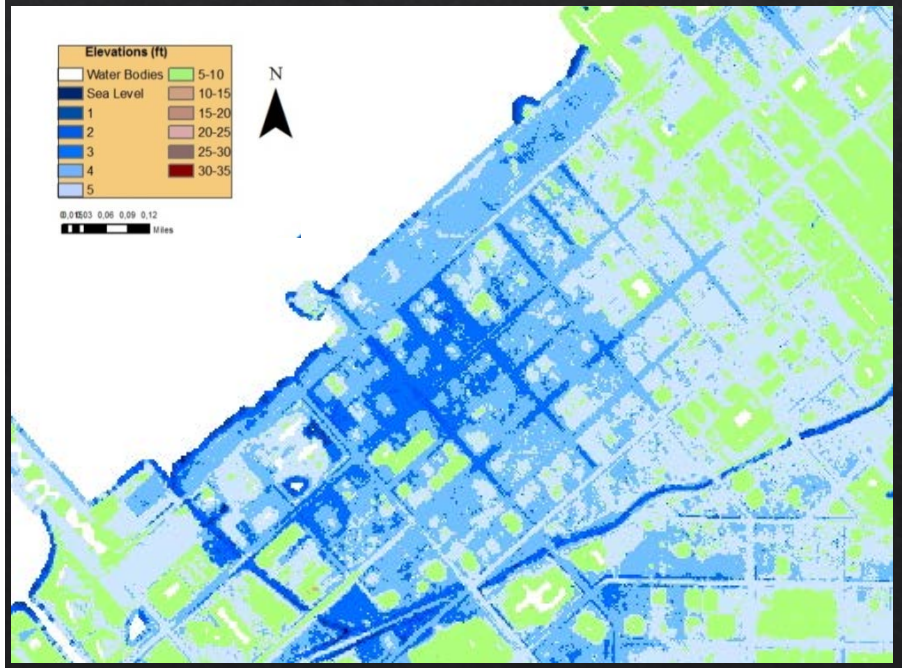
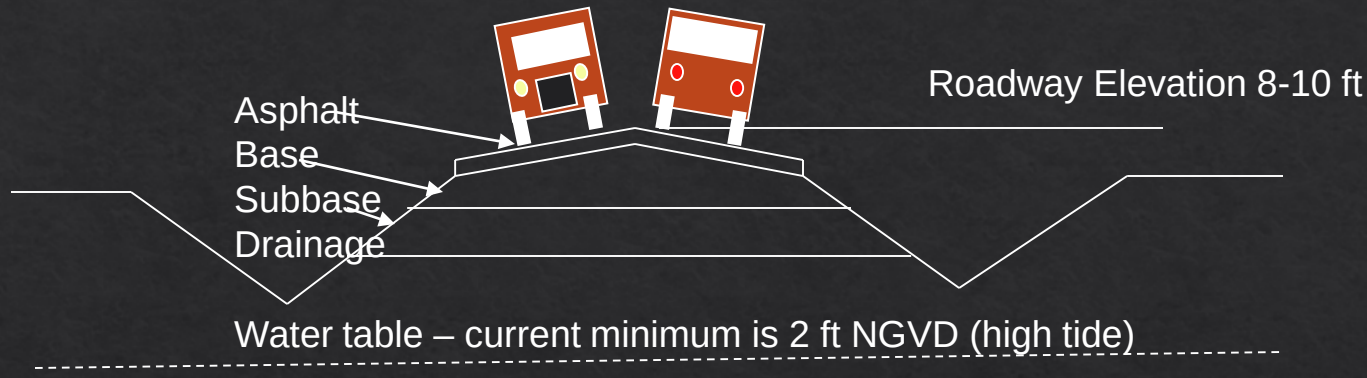

Key West, FL 2.24 +/- 0.16 mm/yr
Source: NOAA
Monthly mean sea level with the average seasonal cycle removed
Linear trend
Upper 95% confidence interval
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1900.0
1910.0
1920.0
1930.0
1940.0
1950.0
1960.0
1970.0
1980.0
1990.0
2000.0
2010.0

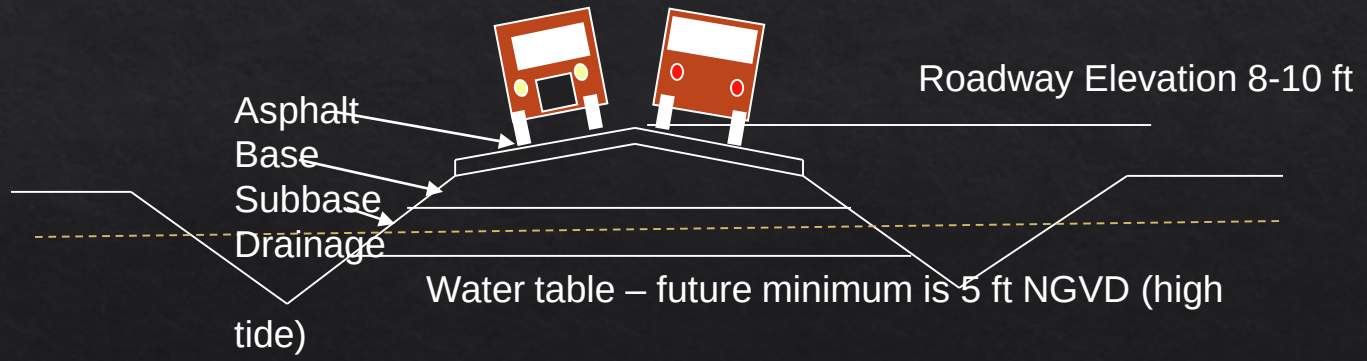

Elevations (ft)
Water Bodies
Sea Level
1
2
3
4
5
5-10
10-15
15-20
20-25
25-30
30-35
N
0,03 0,06 0,09 0,12
Miles

Elevations (ft)
Water Bodies
Sea Level
1
2
3
4
5
5-10
10-15
15-20
20-25
25-30
30-35
0
0,25
0,5
1 Miles

Roadways at Risk



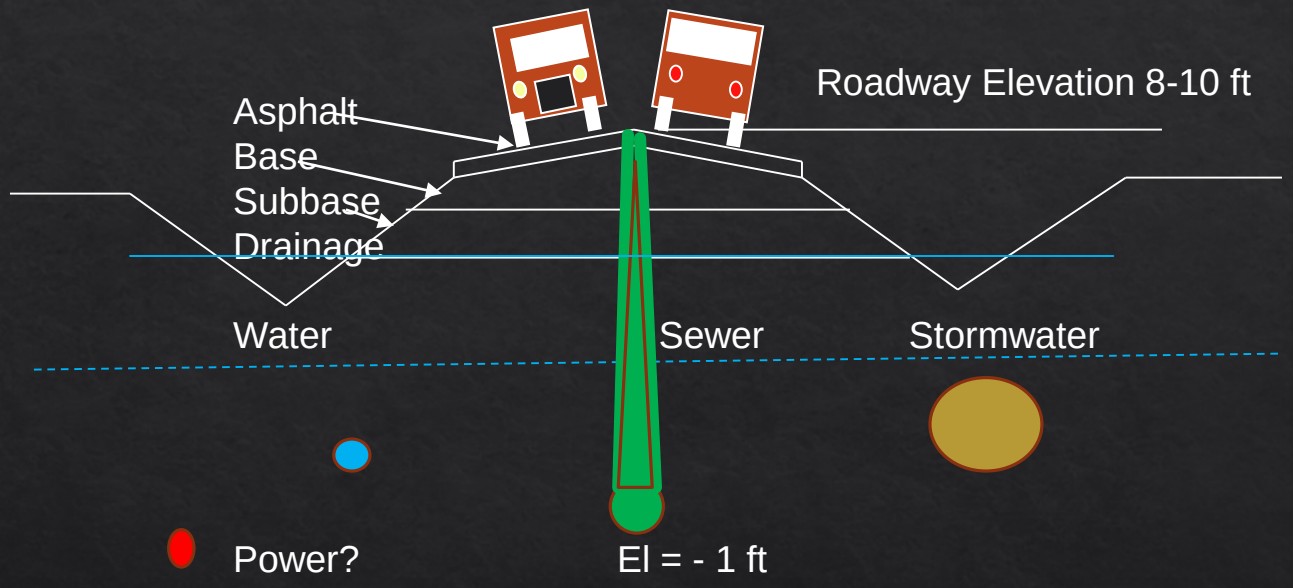
Current Base Condition for Low lying Roads



Future Condition for Low lying Roads

Base saturation = Failure

Under Roads



Buildings

Permafrost:

“Permanently” frozen soils

Photos by E. Stephani

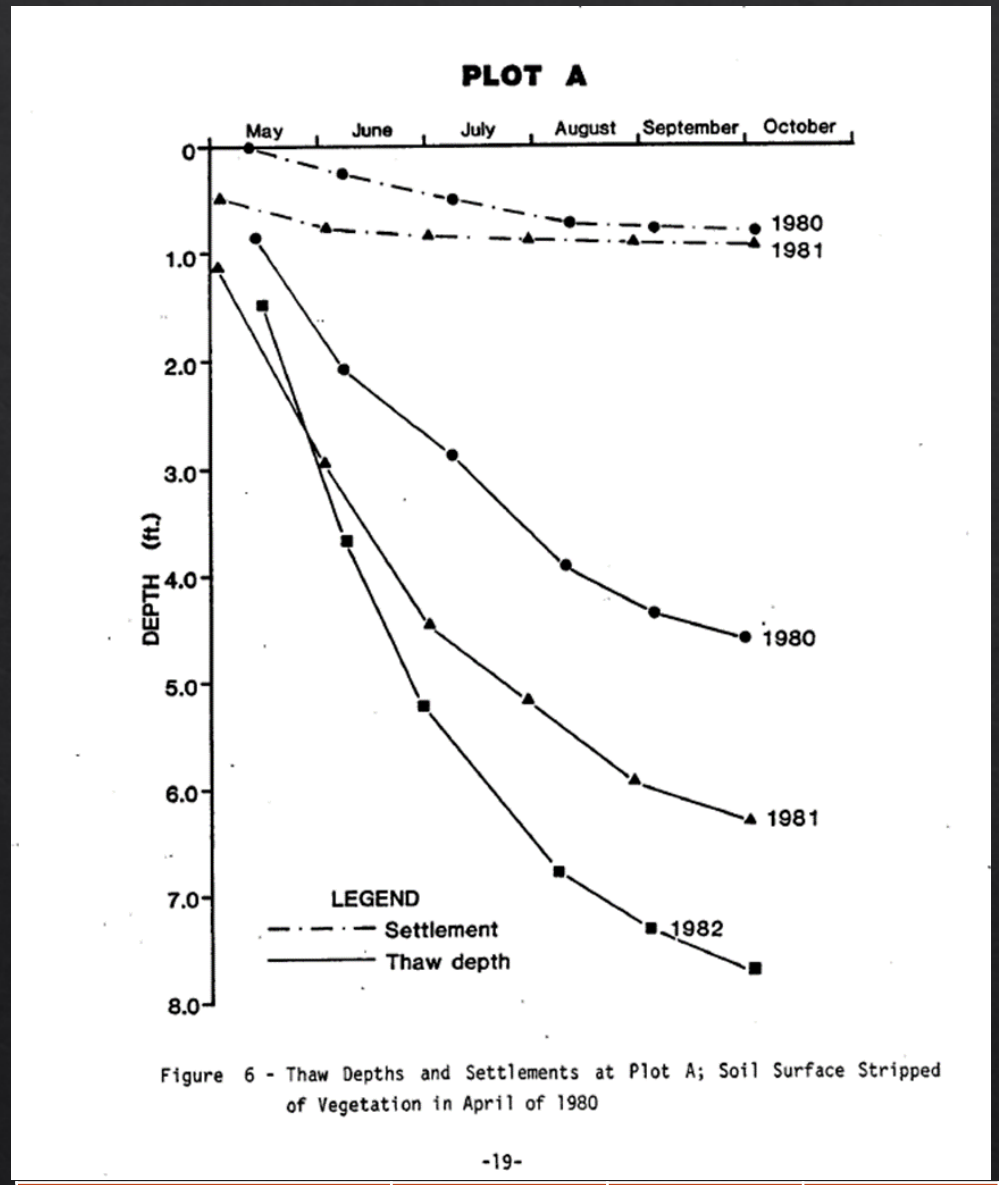
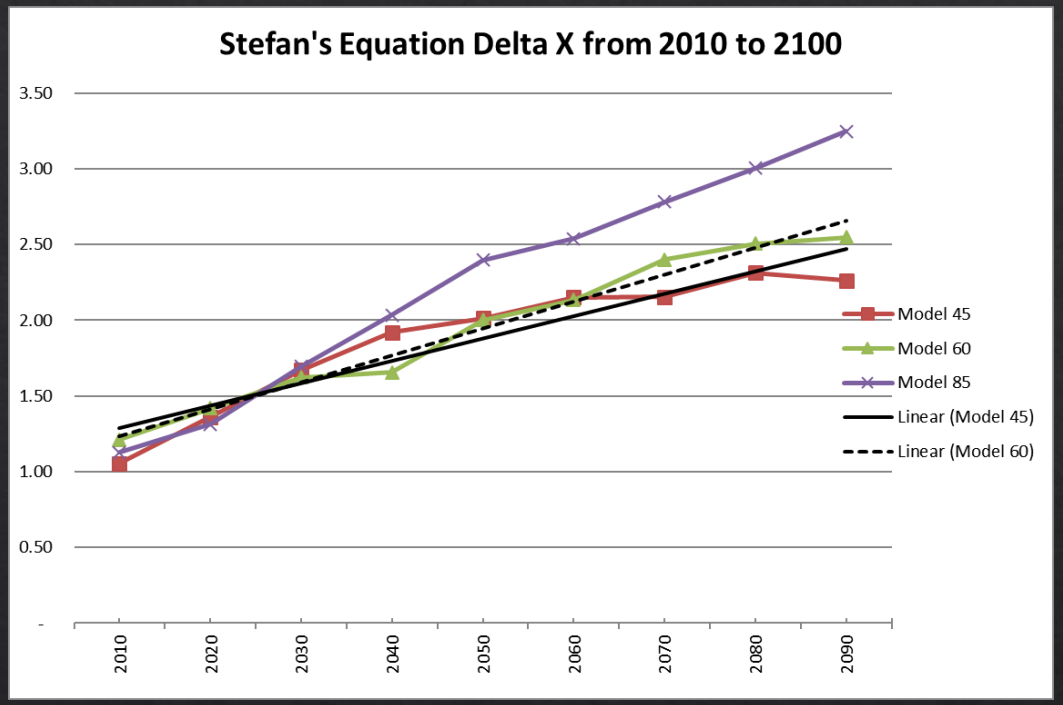


Figure 6 - Thaw Depths and Settlements at Plot A; Soil Surface Stripped of Vegetation in April of 1980

-19-

6/17 – 7/21/80	Stripped	Paved	Forest
Surface Temp	15.2 C	16.6 C	1.0 C



Constructing infrastructure on permafrost can cause severe thaw

Permafrost Thaw:

Transitioning from frozen to unfrozen soils can lead to undesirable outcomes…

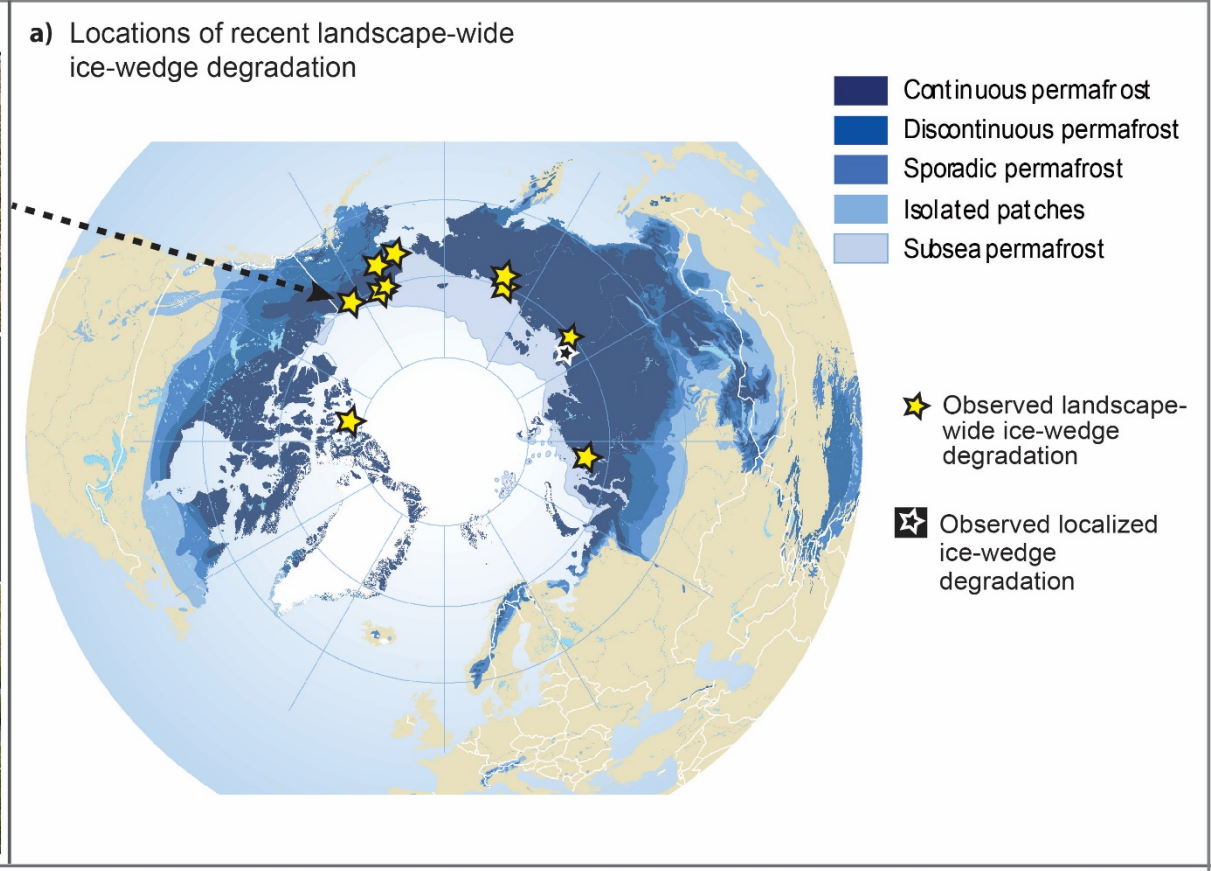
Cherskiy, Russia, Photo by V. Romanovsky

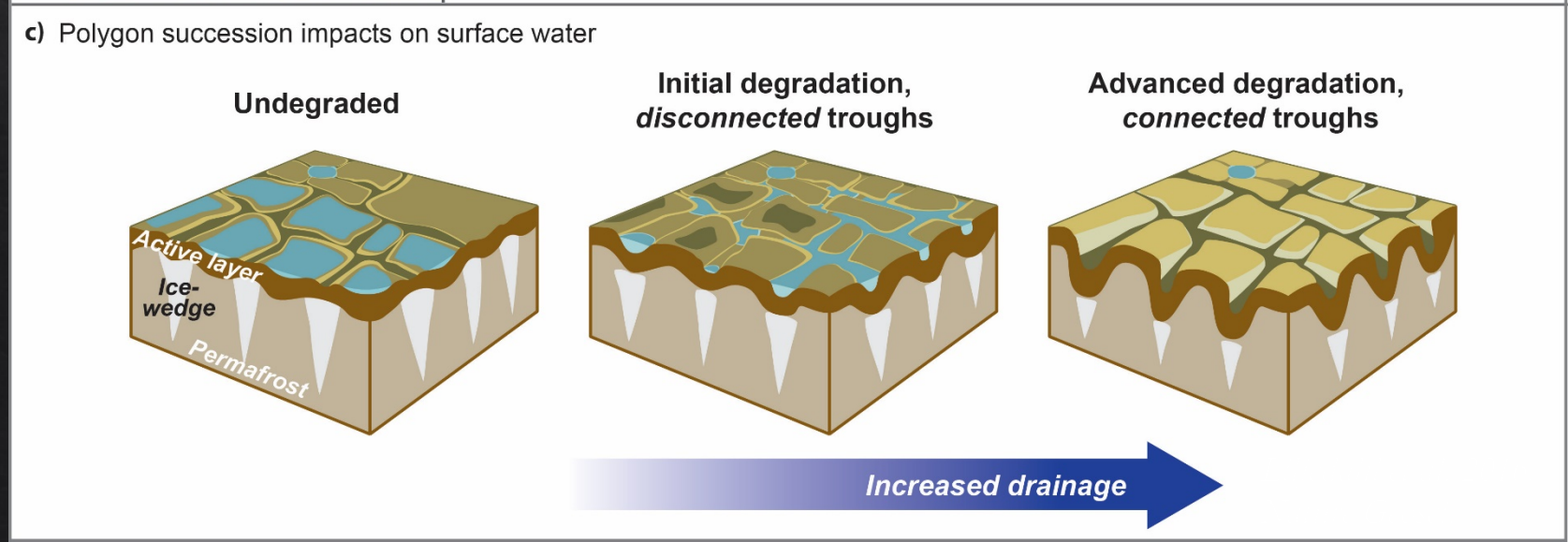
…but we can design for that.

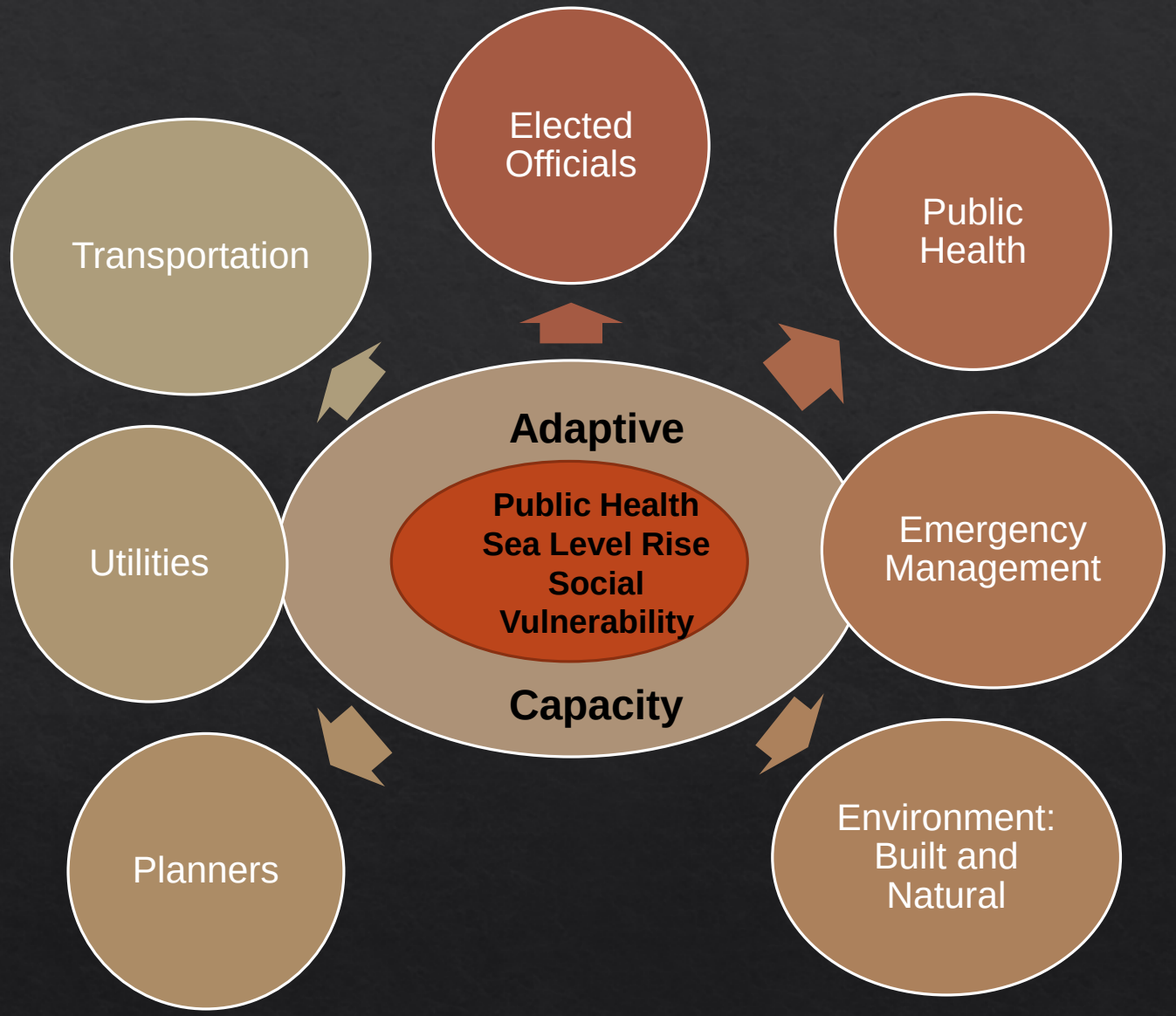
It is the unknown impacts that presents the greatest design challenges:

→ Ground subsidence
(sea level "rise"!)

→ Increased drainage
(less water stored on landscape)






Elected Officials
Transportation
Public Health
Adaptive
Utilities
Public Health
Sea Level Rise
Social Vulnerability
Emergency Management
Capacity
Planners
Environment: Built and Natural

We can design it…

- But what is the holistic vision?

Questions?