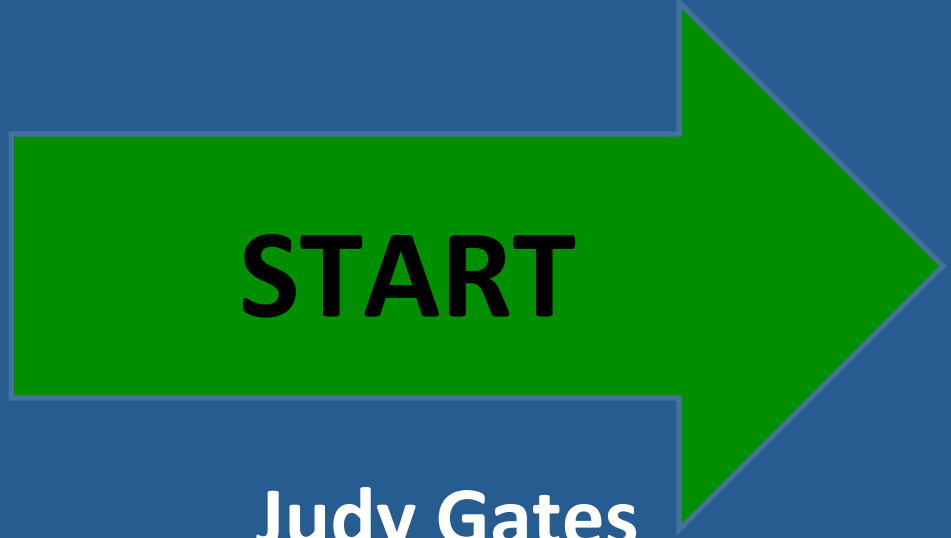
Climate Tag:
a game of risk & reward



Judy Gates
Environmental Office
(with acknowledgements to Liz Hertz)

MaineDOT
Integrity ~ Competence ~ Service

The Players

M **Marie Municipality**…has an independent streak, works hard to keep the neighborhood running smoothly, comes from a frugal background

S **Stewart State**……owns/manages a lot of assets and information, public safety and resource obligations, has capacity, part of a large family, doesn't always see eye-to-eye with Marie

F **Francine Federal**….likes to think she can manage everyone's household, has lots of stories to tell from the extended family, asks lots of questions, hungry for data all the time

N **Niles NGO**……has a laser-like focus on his interests, very energetic, likes to have lots of friends, might have a rich uncle

M S

START

OH NO!

Extreme weather hits Maine!

M

S

You have aging infrastructure, incomplete data, and….it's raining, windy and a king tide!

Opt for FEMA-funded replacement in-kind.

Go back to START

IT DOESN'T FEEL LIKE A CHOICE

M S

Doing

over and

ove

ecting

START

WATCH OUT!

Asset is at the end of its lifespan!

WHAT IF YOU DID HAVE A CHOICE?

M S

You can choose to…

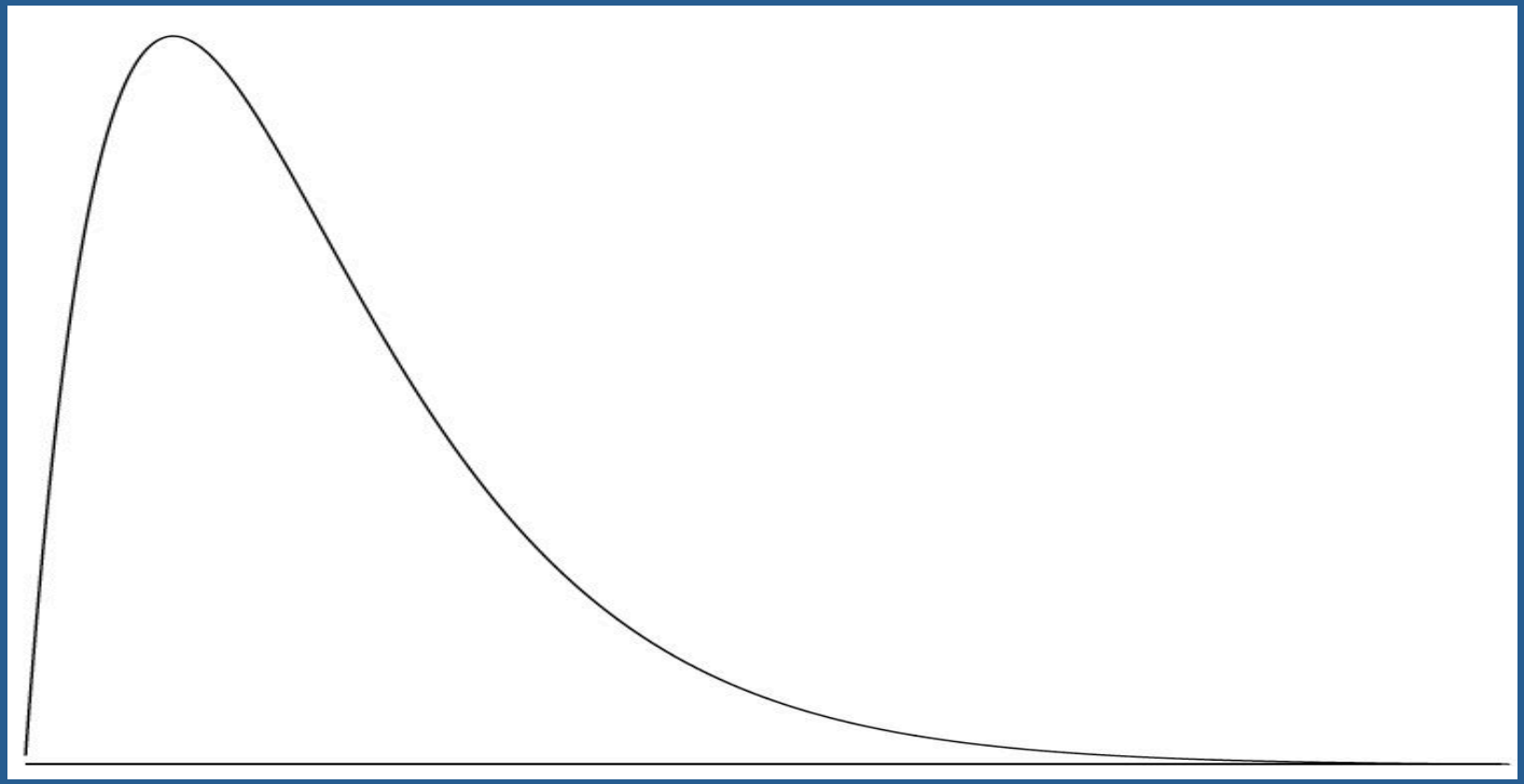
TOLERATE or TREAT

IF YOU TOLERATE…

You plan for "norms" by using historical data to replace asset.

Go back to START

Planning for the “norms”



If you choose to…

TREAT

Plan for change by using projected climate & precipitation trends to replace asset.

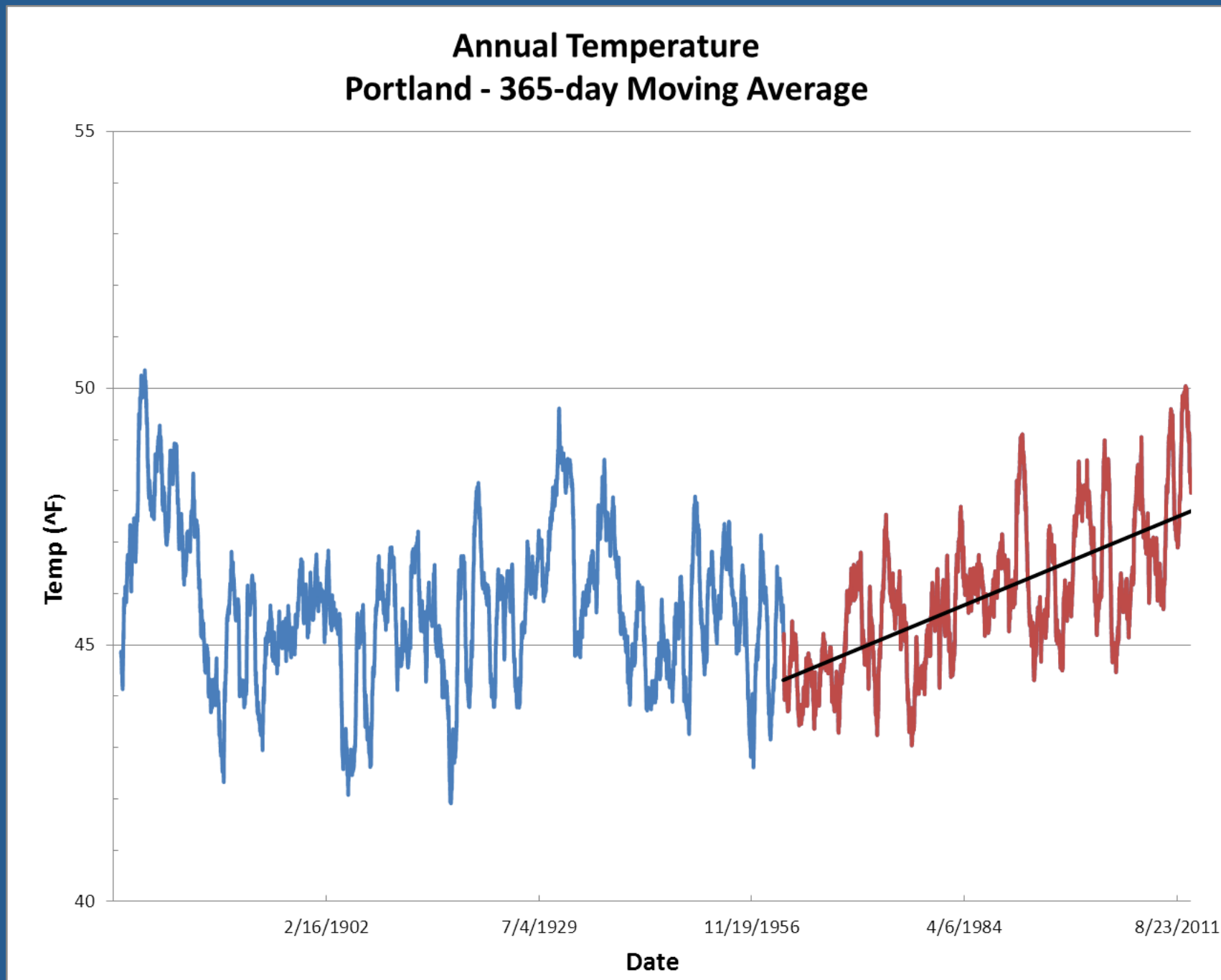
Move ahead **2**

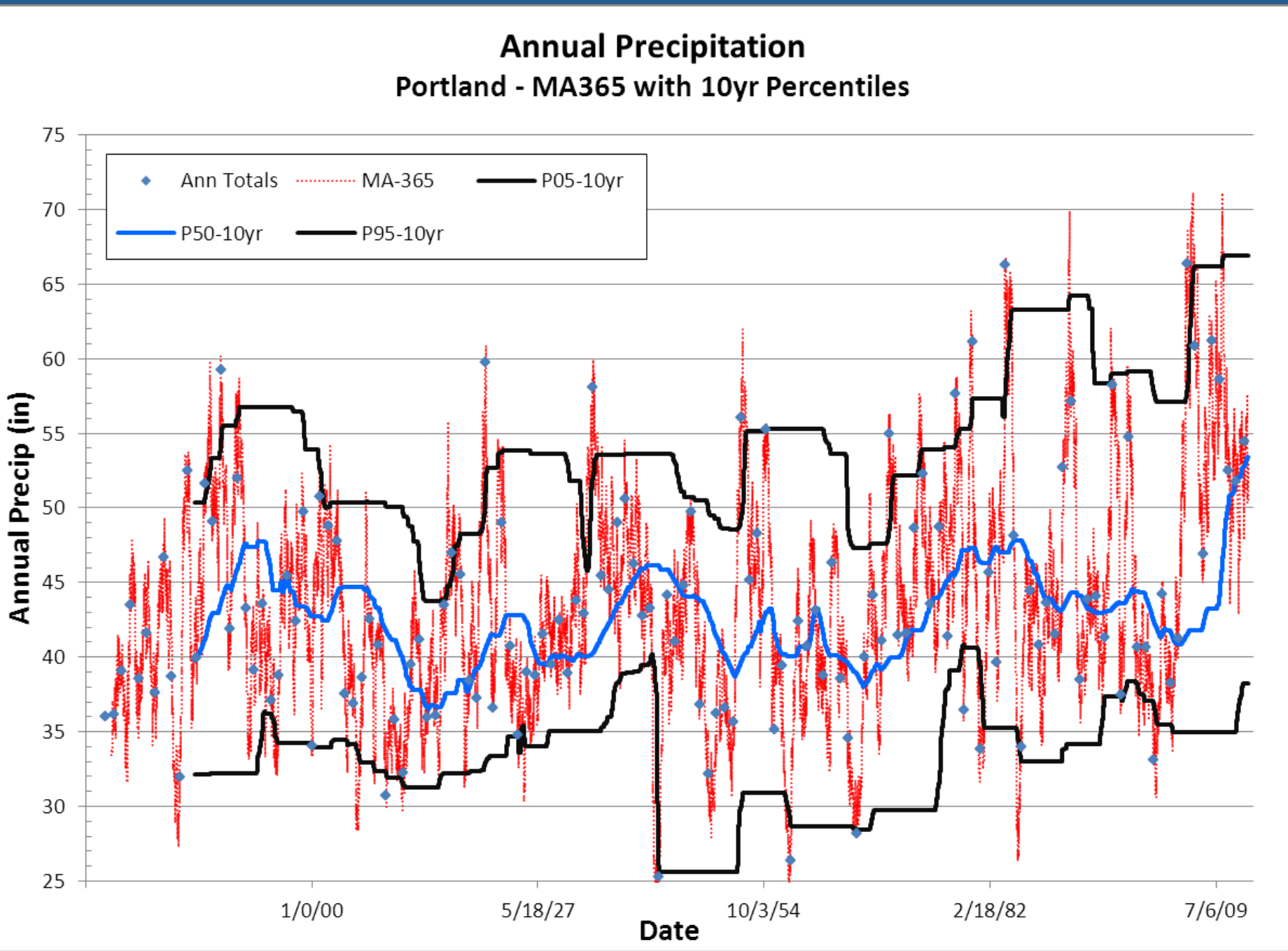
M S

Popular Expectation of How to Respond to Climate Change

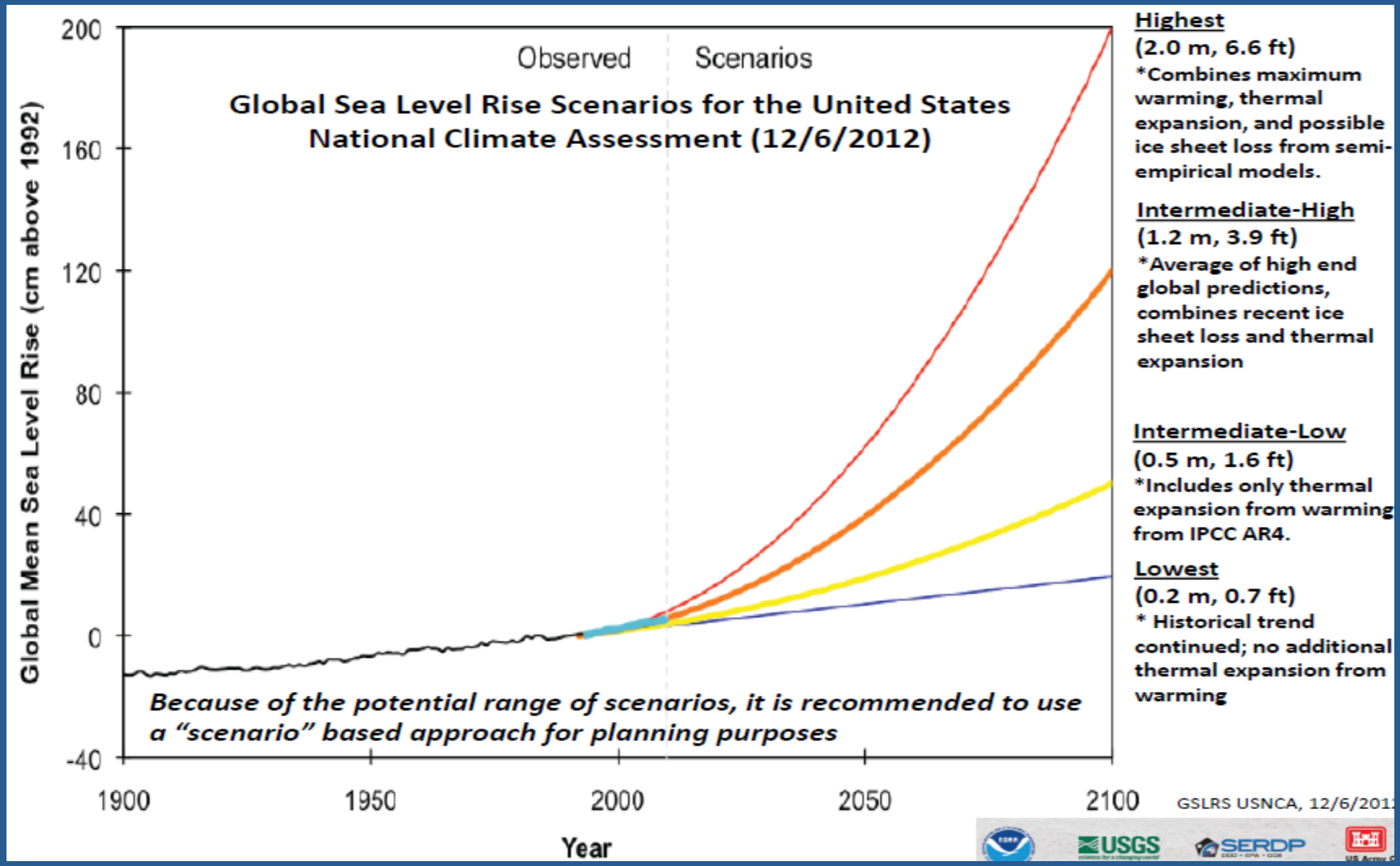
- Choose climate scenario
- Collect predictions of precipitation, SLR, peak flows
- Design for these predicted climate variables

NOT SO FAST !!!


Annual Temperature
Portland - 365-day Moving Average
55
50
45
40
Temp (^F)
2/16/1902
7/4/1929
11/19/1956
4/6/1984
8/23/2011
Date


Annual Precipitation
Portland - MA365 with 10yr Percentiles
Ann Totals
MA-365
P05-10yr
P50-10yr
P95-10yr
Annual Precip (in)
75
70
65
60
55
50
45
40
35
30
25
1/0/00
5/18/27
10/3/54
2/18/82
7/6/09
Date

SLR Scenario Predictions

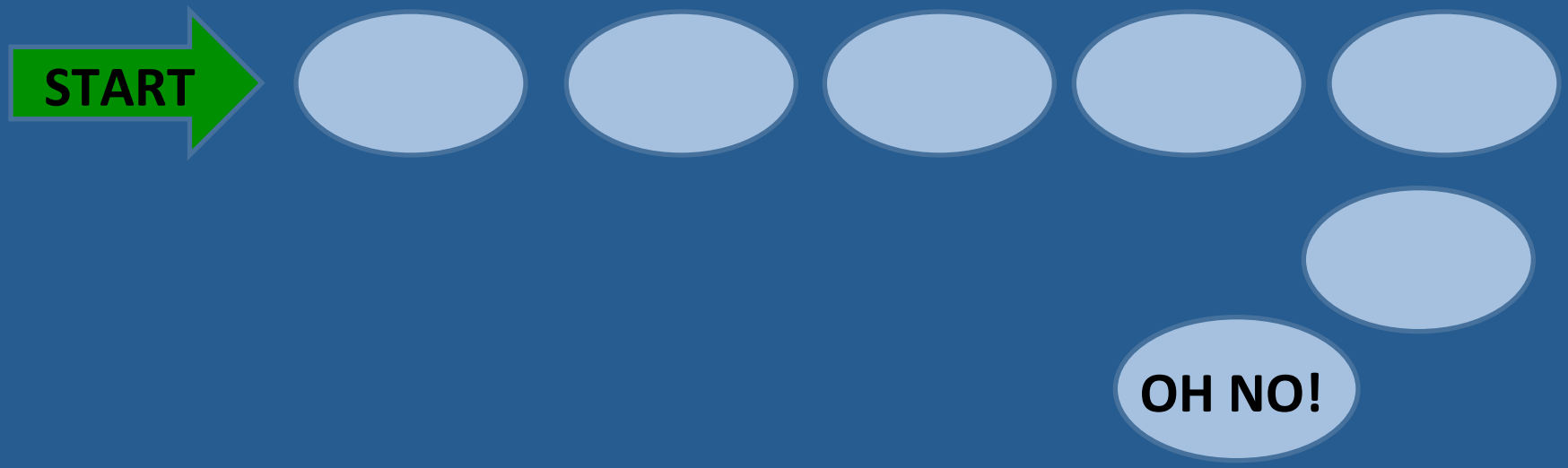


From Slovinsky 2014

Choosing a Scenario

- Change Scenario drives everything
- Ideally receive Federal guidance on identifying a reasonable scenario
- Not currently forthcoming

AHHHHHH!!!!



You designed for a Megastorm! You've just spent your entire public works budget on one asset.

Go back **1**

M S

START

TA DA!

You found a partner!

Move ahead **3**

START

Municipal ... blem.
State has the info ... capacity
Something ... ng!

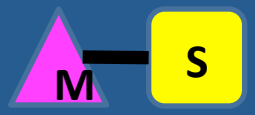
M S

START

TA DA!

You found another partner!

Federal partners focusing on funding 3 “Rs”



Move ahead 1

The Three Rs

Redundancy

Robustness

Resiliency

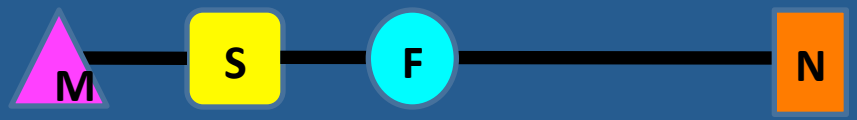
“All hazards approach”

FHWA, March 2013

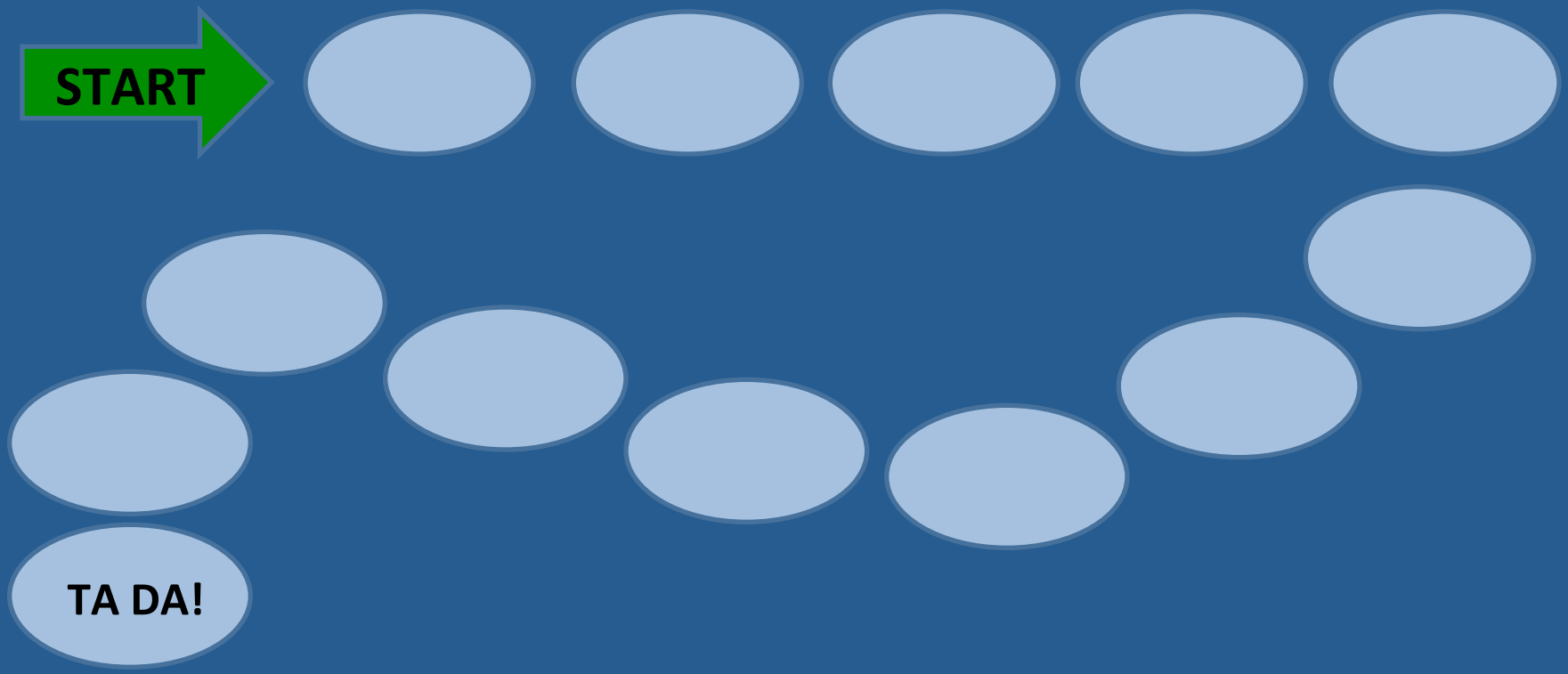
START

HEY!

They look familiar…you found another partner!



Move ahead **2**



You are in the process of shifting from a disaster-response approach to a risk-management approach.

Move ahead **3**

In "risk management speak"

Vulnerability

exposure + sensitivity + adaptive capacity

Criticality

Function

(emergency evacuation, activity level, commerce)

+

Physical Characteristics

(condition ratings, corridor priority,replacement cost)

FHWA Climate Change Initiative Grant

- Six towns included are already part of an EPA-funded Project of Special Merit, which will map three sea level rise scenarios and model effects on marsh migration.
- COAST v 2.0 broadly applicable

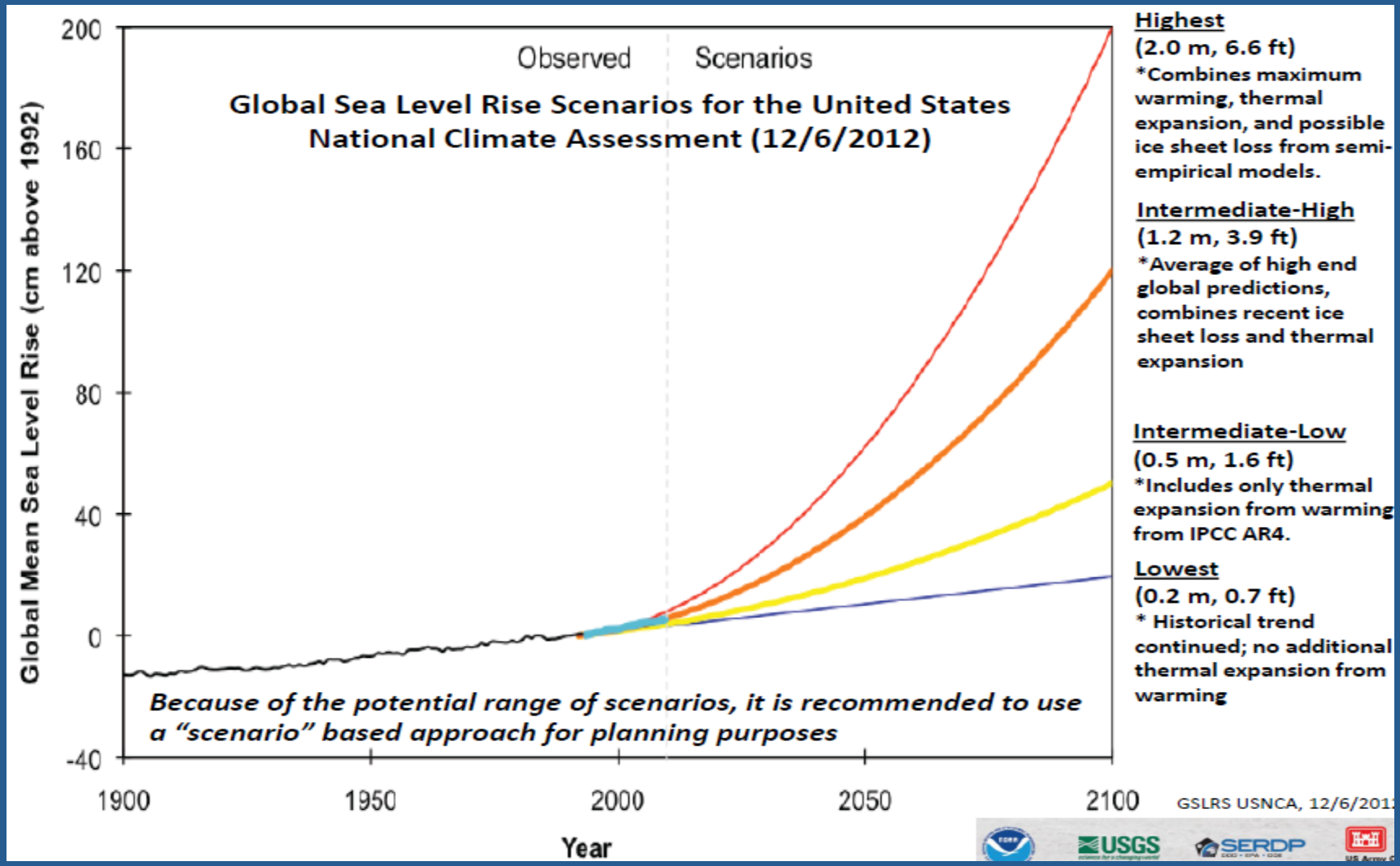
- Local-State Partnering

- "Desk top" methodology allows integration into planning process.
- Natural Resource-Infrastructure Partnering

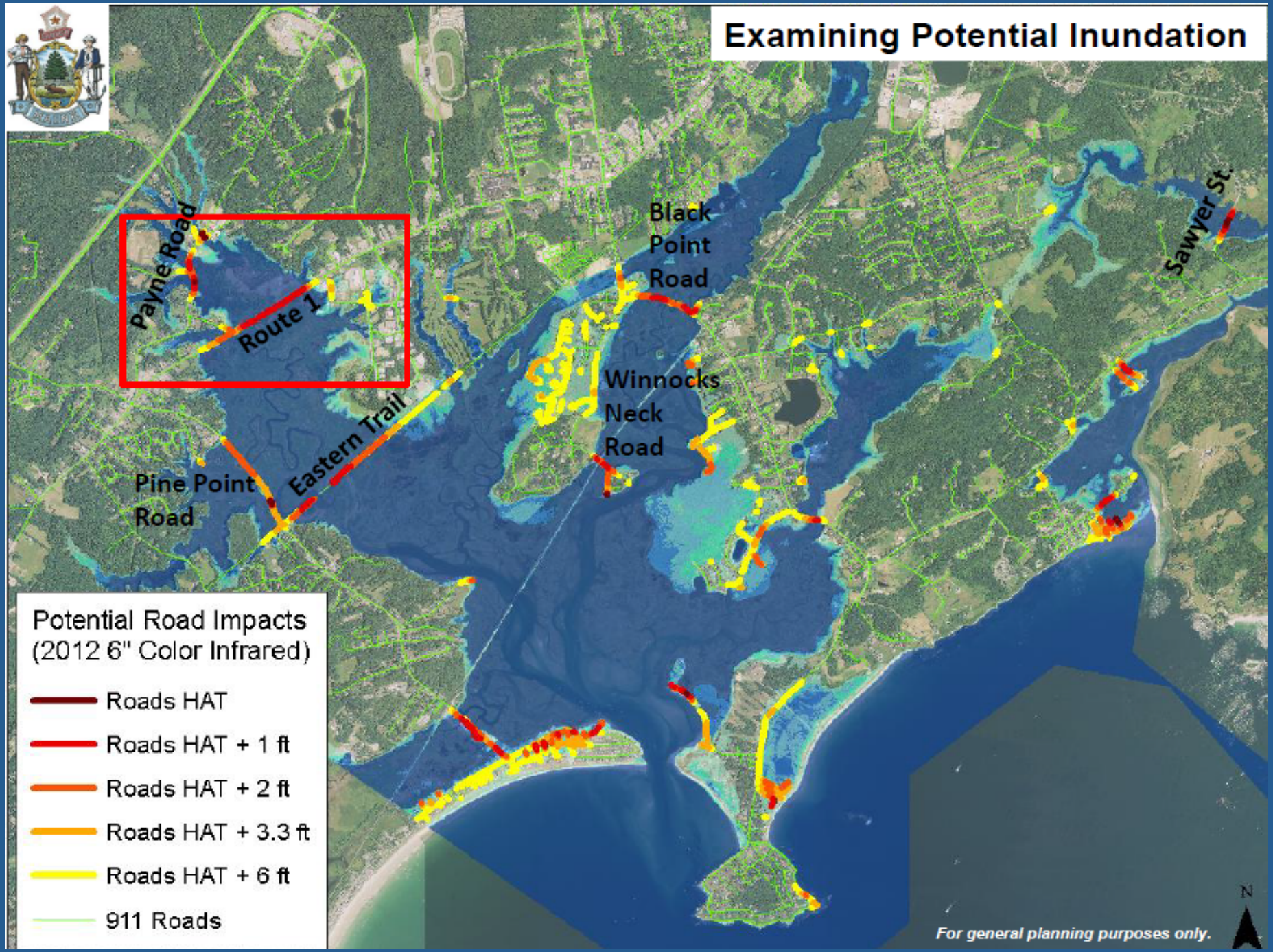
FHWA Climate Change Initiative Grant

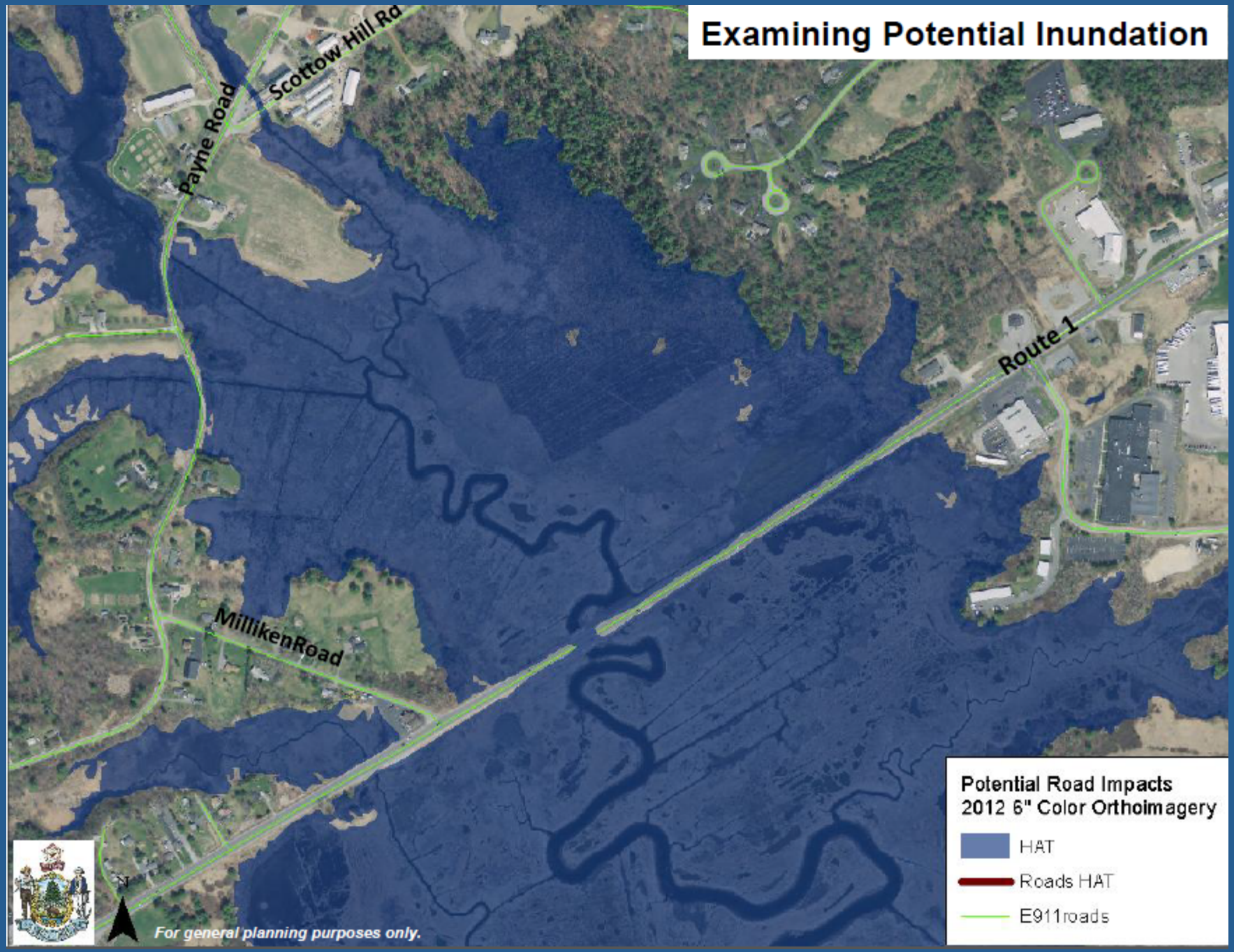
1. Apply three sea level rise scenarios developed via Project of Special Merit to identify vulnerable state transportation assets;
2. Use Decision Support Tool to rate criticality of vulnerable assets;
3. Compare DST results to "I remember when…";
4. Develop design options for selected asset in each town…in-kind versus adaptation;
5. Apply depth-damage function to estimate costs of no action versus adaptation;
6. Assess feasibility of applying analysis in MaineDOT asset management process.

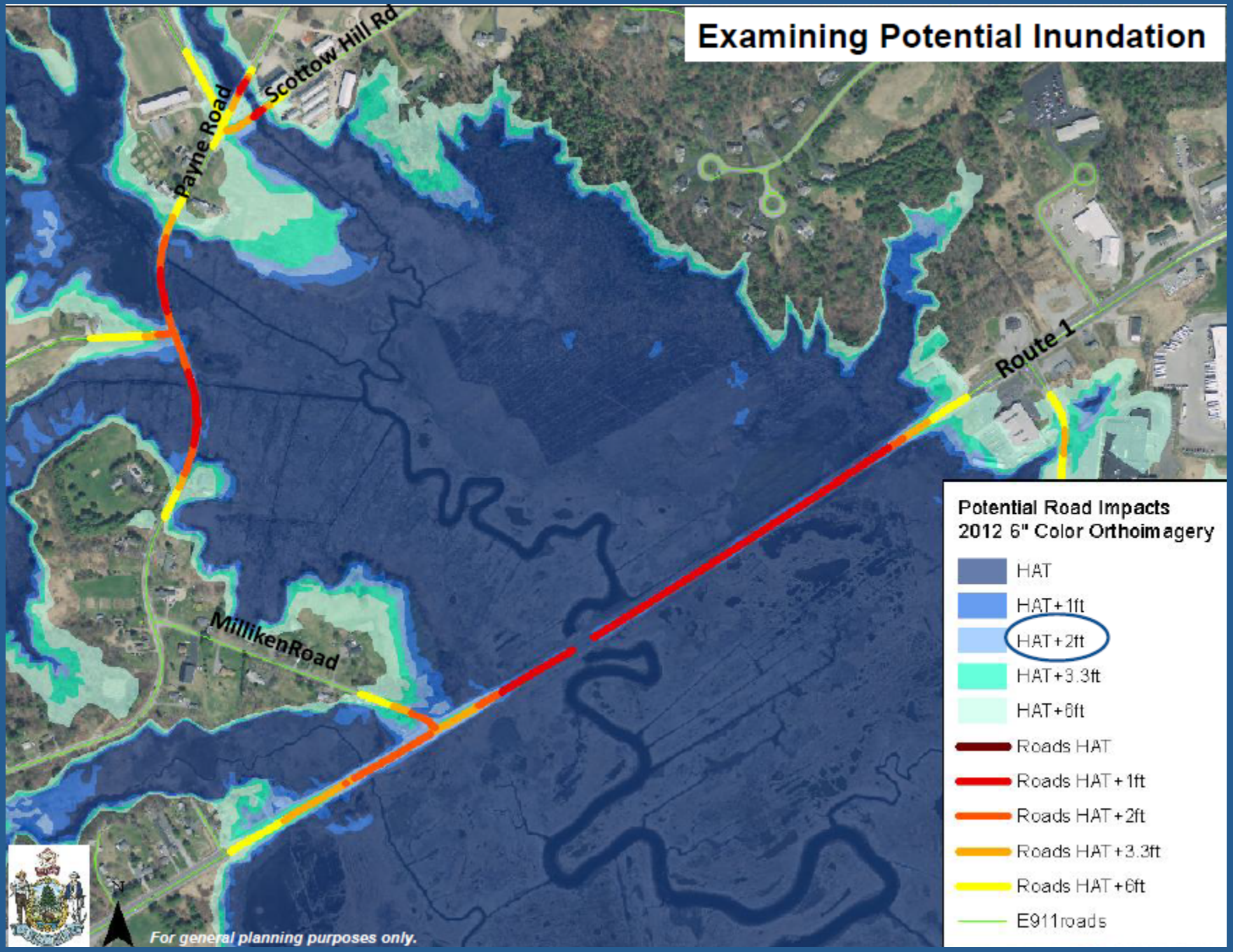
SLR Scenario Predictions

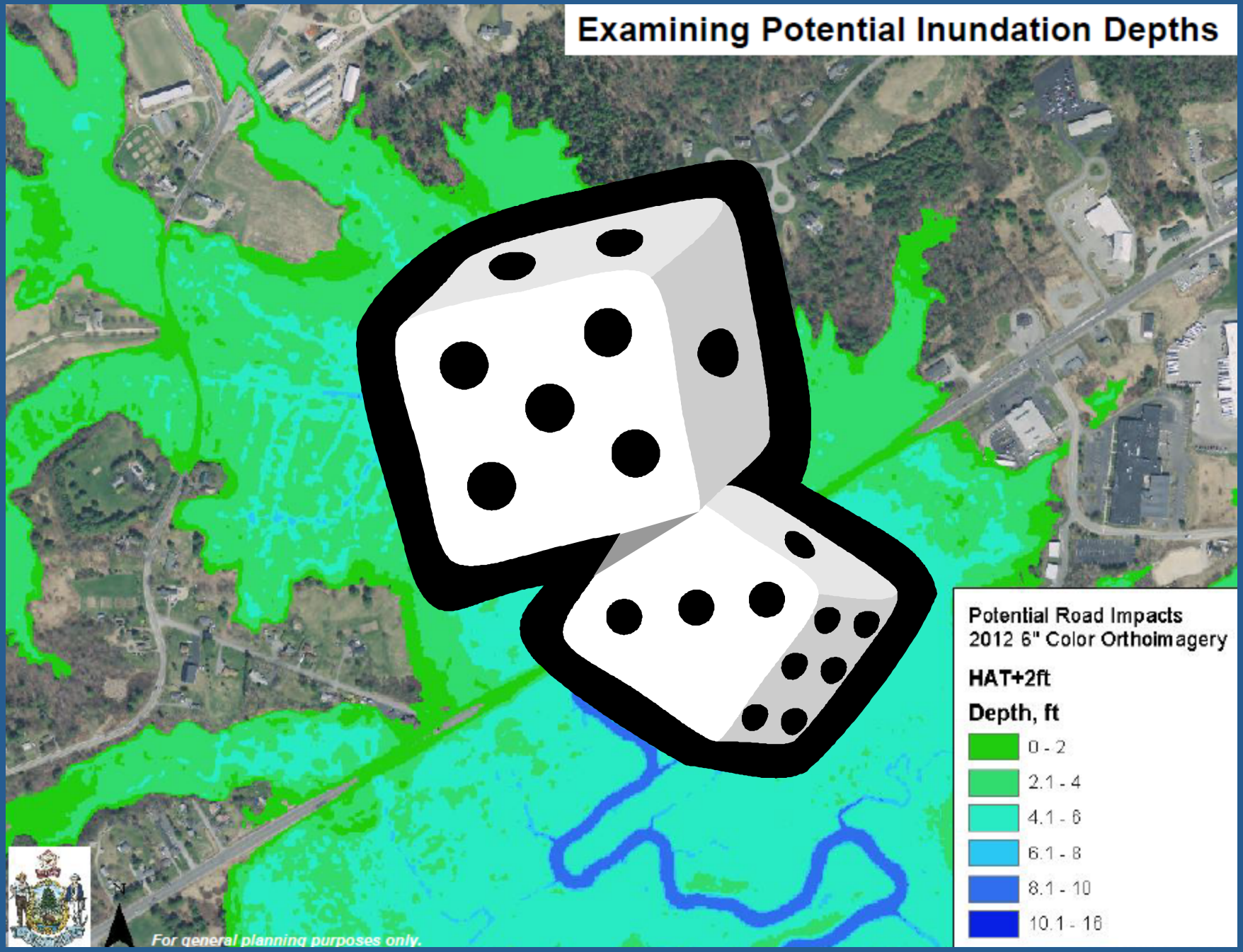


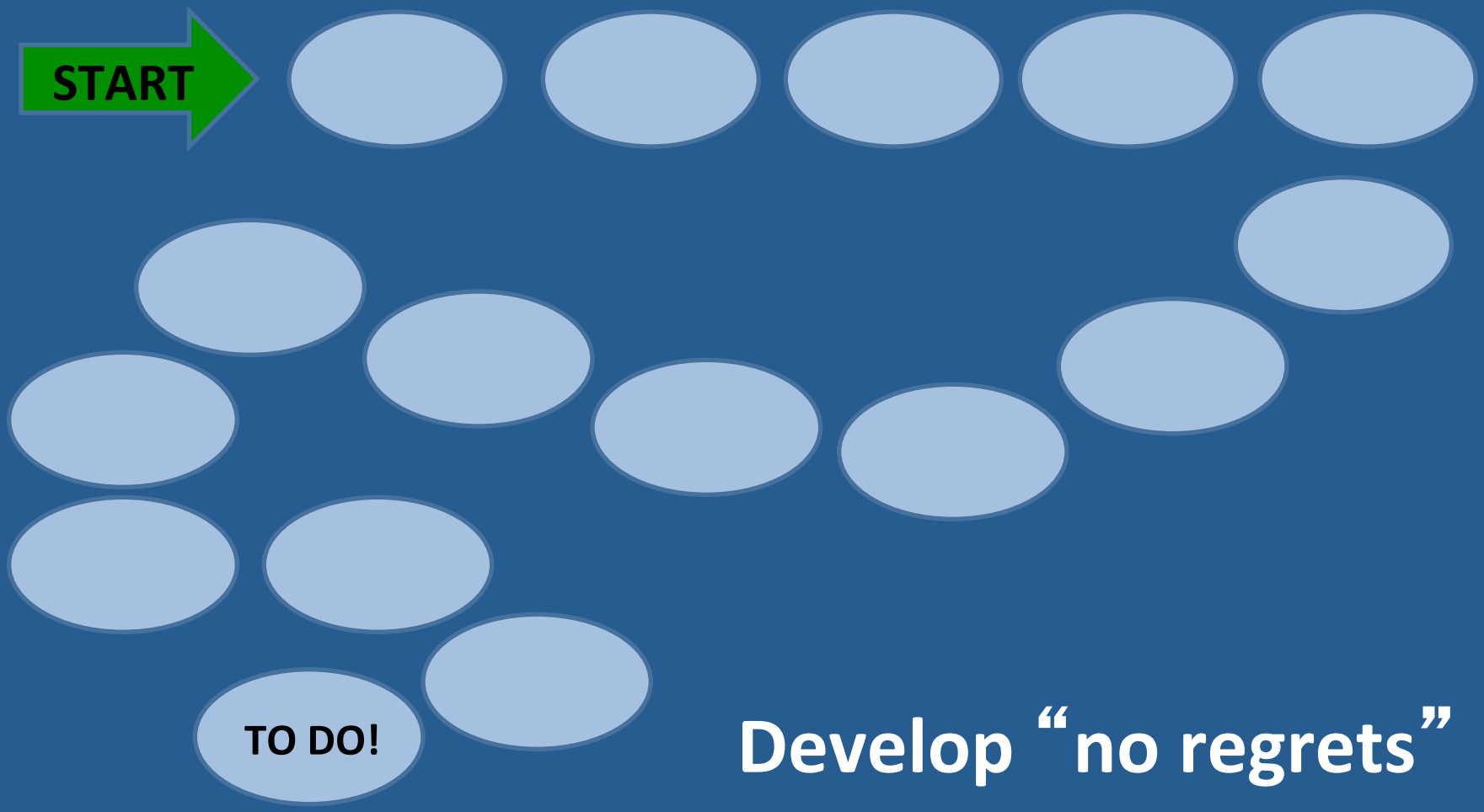
From Slovinsky 2014


Examining Potential Inundation
Payne Road
Route 1
Black Point Road
Winnocks Neck Road
Eastern Trail
Pine Point Road
Sawyer St.
Potential Road Impacts
(2012 6" Color Infrared)
Roads HAT
Roads HAT + 1 ft
Roads HAT + 2 ft
Roads HAT + 3.3 ft
Roads HAT + 6 ft
911 Roads
N
For general planning purposes only.


Examining Potential Inundation
Payne Road
Scottow Hill Rd
Route 1
MillikenRoad
Potential Road Impacts
2012 6" Color Orthoimagery
HAT
Roads HAT
E911roads
N
For general planning purposes only.


Examining Potential Inundation
Scottow Hill Rd
Payne Road
Route 1
MillikenRoad
Potential Road Impacts
2012 6" Color Orthoimagery
HAT
HAT+1ft
HAT+2ft
HAT+3.3ft
HAT+6ft
Roads HAT
Roads HAT+1ft
Roads HAT+2ft
Roads HAT+3.3ft
Roads HAT+6ft
E911roads
N
For general planning purposes only.

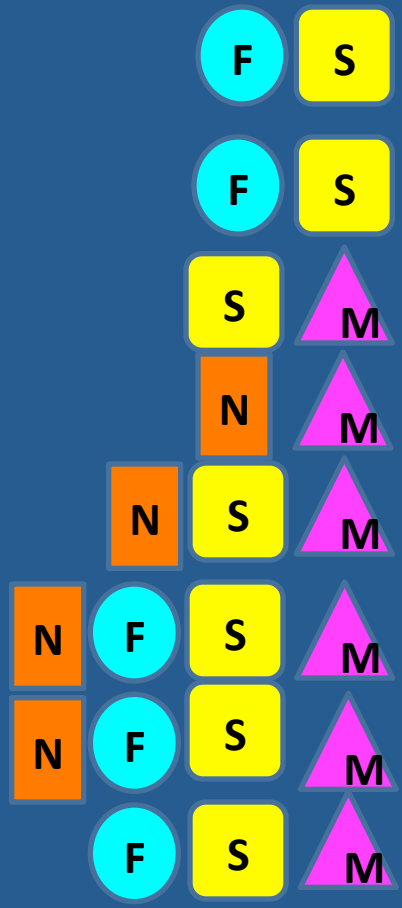

Examining Potential Inundation Depths
Potential Road Impacts
2012 6" Color Orthoimagery
HAT+2ft
Depth, ft
0 - 2
2.1 - 4
4.1 - 6
6.1 - 8
8.1 - 10
10.1 - 16
N
For general planning purposes only.



Develop "no regrets" strategies for infrastructure.

M S F N

"No regrets" strategies for infrastructure

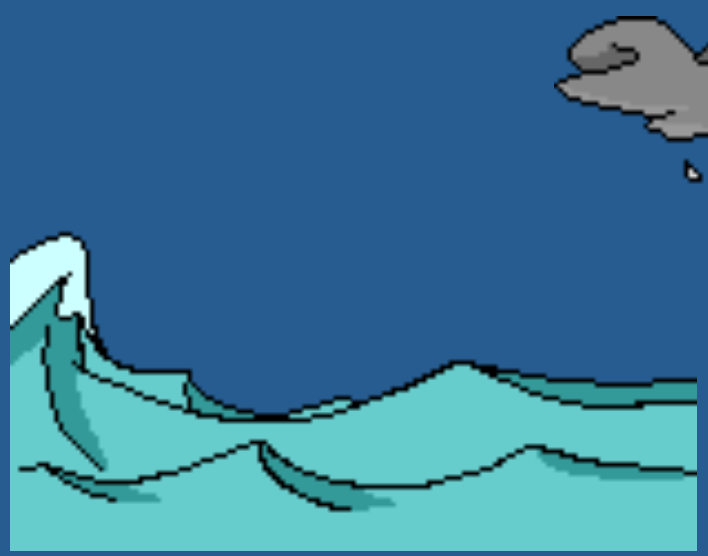


- Updated design standards
- Improved event forecasting
- Increased inspection protocols
- Coordinated land development
- Localized climate change projections
- Improved asset inventory data
- Identified at-risk infrastructure
- Prioritized storm event risks

FHWA, March 2013

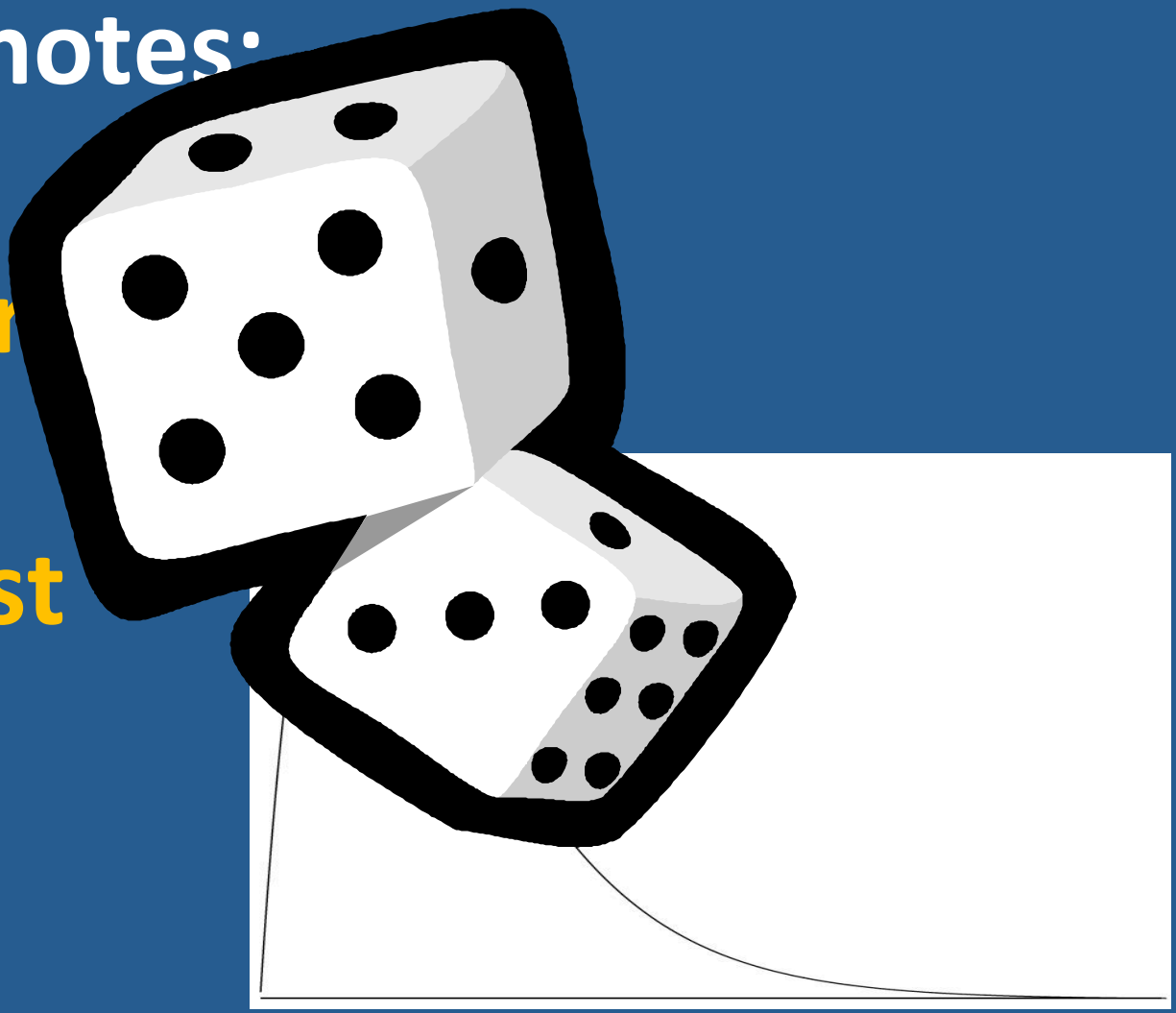
“No regrets” strategies

HAT + 3.3 ft ~ 100 yr storm event



The IPCC notes:

- more incr
- lower cost



START

TA DA!

Receive magic powers for implementation.

Move ahead **3**

Your magic powers lead to…

- More pa egies
- More -making
- Easier t ns
- Improved natu urces
- Increased cooperation

START

100-year storm hits Maine coast.

Go back **1**

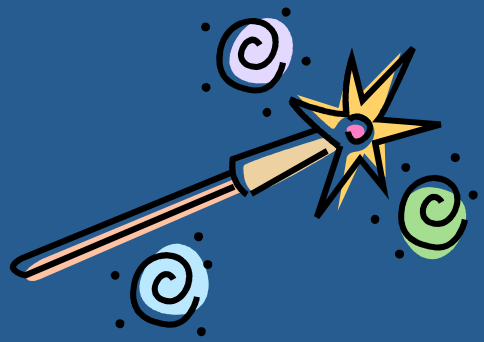
OH NO!

START

Unpack your magic powers!

M S F N

If you do not choose to use your magic powers…



You assess the intensity of the storm event.

Move ahead 3

START

M S F N

START

s limit failure

nino effects”!

TA DA!

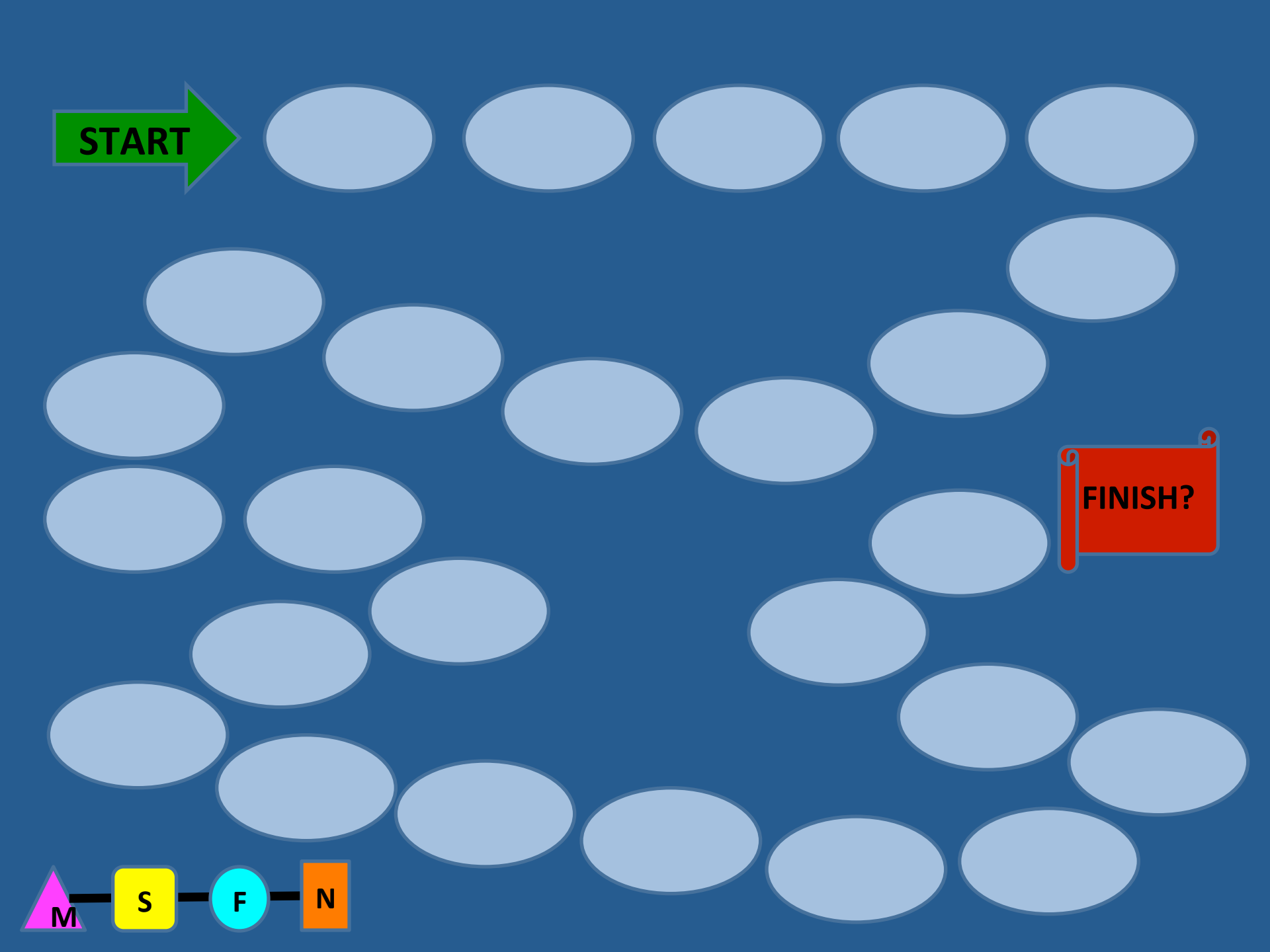
M S F N

START

Recalculate priorities with partners following 100-year event.

TO DO!

One last time…


START
FINISH?
M
S
F
N

NEVER!

But you can still celebrate…

You've built a **robust partnership**, building on each others' strengths, that supports **resiliency** under **unpredictable circumstances**.

Back to our friend Albert…

You can’t solve a problem at the same level of consciousness that created it.

Albert Einstein

Primary Grant Partners

MaineDOT Environmental Office

- Charlie Hebson, Manager, Surface Water Division

MaineDOT Bureau of Planning

- Chip Getchell, Director of Asset Services
- Ben Condon, Asset Management

MaineDOT Results & Information Office

- Nate Kane, Director of GIS Services

MaineDOT Bureau of Maintenance & Operations

- Cliff Curtis, Assistant Highway Maintenance Engineer

Maine Department of Agriculture, Conservation and Forestry

- Liz Hertz, Director, Municipal Planning Assistance Division

Maine Geologic Survey

- Pete Slovinsky, Marine Geologist

Catalysis Adaptation Partners

- Sam Merrill, President
- JT Lockman, Vice-president

TAG,
YOU'RE IT!!!