AGENDA

9:00  Introductions
9:15  Presentation
9:35  Play Game
11:05 Report Back (large group)
11:30 Game Feedback (large group)
11:50 Evaluation
THE GAME OF FLOODS

Marin Island

Legend:
- Vertical Structure $555
- Beach Maintenance $55
- Bush Fire Safety $44
- Soft Engineering $55
- Roadway $55
- Building $55
- Hatch $55
- Elevate/New Road $55
- Tidal Gate $55
- Lowland Levee $55
- Elevate Buildings $55
- Floodable Buildings $55
- Water $55
- Pumphouse $55
- Gas Station $55
- Ocean Lift Station $55
- Highrise $55
- Safari $55
- Police Station $55
- School $55
- Restaurant $55
- Pub $55
- Golf Course $55
- Marina $55
- Hospital $55
- Post Office $55
- Police $55
- Fireplace $55
- Table $55
- Chair $55
- Bed $55
- Table Lamps $55
- Bed Lamps $55
- Fireplace Lamps $55

Game Pieces:
- Retire $55
- Post-storm Prohibitions $55
- Move Here $55
- Managed Retreat $55
- Accommodate Water $55
- Hard Engineering $55

Game Instructions:
1. Place streets and roads. Decide on the infrastructure layout.
2. Place buildings and businesses. Consider the impact on flood risk.
3. Establish zoning and land use regulations. Ensure sustainable planning.
5. Monitor and adapt to changing conditions. Stay informed of climate changes.

Start here: Base the board on your own ideas and creative vision.
GAME OF FLOODS: PT. REYES STATION
HIGH SCHOOLS
Advisory assistance provided by:

Changes:
• More urban look and feel
• Increased assets of historical/cultural significance
• Integrity impacts
• Documentation

Developed for:

KEEPING HISTORY ABOVE WATER
APRIL 10-13, 2016 | NEWPORT, RI

CALIFORNIA PRESERVATION FOUNDATION
Asset Mapping & Inventory

Mapping people; livelihoods; infrastructure, environmental, and economic, social, & cultural assets

- Hospital
- Parking
- School Site
- Water
- Grocery
- Fire Station
- Library
- Restaurant
- Roadway
- Revetment
- Post Office
- Historic Church
- Boat Launch
- Beach
- Historic Seawall
- Home
- Mammal Habitat
- Marina
- Landmark
- Agriculture
- Seabird Colony
- Archaeological Site
- Lighthouse
- Sheriff
- Public Open Space
- Industrial
- Historic Cemetery
ADAPTATION MEASURES

PROTECT

Hard Engineering
- Revetment/Seawall
- Traditional Levee
- Tide Gate
- Wall & Pump Station

Soft Engineering
- Horizontal Levee
- Offshore Structure
- Wetland Restoration
- Beach Maintenance

ACCOMMODATE
- Elevate Buildings
- Floodproof (Dry or Wet)
- Elevate/New Road
- Amphibiate Buildings
- Accommodate Water

RETREAT
- Abandonment
- Relocation
- Managed Retreat

INVENTORY
- HABS
- Area Survey
- Documentation
1. PROTECT

Hard (Traditional) Engineering

- Traditional levee
- Seawall/Revetment
- Tidal gate
- Wall & Pump Station
Seawall

St. Augustine, FL

Jones Point, Washington D.C.

Images: Ann Horowitz
Tidal gate
Flood wall & Pump station

[Images of flood wall and pump station]
1. PROTECT

Soft (Nature-based) Engineering

- Horizontal levee
- Wetland/shoreline vegetation
- Offshore structure
- Dune restoration & Beach maintenance
Horizontal levee

Safesfbay.org
Wetland/ shoreline vegetation

Giacomini Wetland Restoration, 2008
Beach Maintenance

Wikipedia

Ross Clark

Venetian Court Apartments. Capitola, CA
Offshore structures

San Clemente artificial reef experiment

Concrete

Quarry rock
2. ACCOMMODATE

- Elevate buildings
- Elevate/New Road
- Floodproof Buildings
- Amphibiate Buildings
Elevate Buildings

Images: Mississippi Development Authority

Historic Homes in the Mississippi Gulf Coast Region
Floodproof Buildings (Dry/Wet)

Retrofitted buildings in Darlington, Wisconsin

Images: Federal Emergency Management Agency
New/elevate road
Amphibiate Buildings

Amphibiation Candidate. Galveston, Texas

Images: Elizabeth English
3. RETREAT

Relocation

Abandonment
Managed Retreat

Current

Coastal Erosion & Hazard Zone
Local scour reduced beach width

Post

Coastal Erosion & Hazard Zone
Natural dune
Restore active shore
Natural beach

Eroded

Coastal Erosion & Hazard Zone

Existing Development / Landuse
Sand

Existing Development / Landuse
Sand

Existing Development / Landuse
Relocation

National Park Service

National Geographic

Dennis A. Mook

Cape Hatteras Lighthouse, North Carolina
Abandonment
4. DOCUMENTATION

Historic American Building Survey

Cultural Resource Inventory
## Inventory

<table>
<thead>
<tr>
<th>Name and Address of Asset Subject to Hazard (same as previous page)</th>
<th>Level of Property Vulnerability (High, Medium, Low)</th>
<th>Loss to Structure ($)</th>
<th>Loss to Contents ($)</th>
<th>Loss of Function or Use ($)</th>
<th>Displacement Cost</th>
<th>Total Loss for Hazard Event</th>
<th>Level of Community Value for Ranking Purposes (High, Medium, Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madisonville Opera House 50 Main Street</td>
<td>Medium</td>
<td>$300 K</td>
<td>$150 K</td>
<td>$30 K</td>
<td>$100 K</td>
<td>$670 K</td>
<td>Medium</td>
</tr>
<tr>
<td>Lebanon Gardens Corner of Main and North</td>
<td>High</td>
<td>N/A</td>
<td>$20 K</td>
<td>N/A</td>
<td>N/A</td>
<td>$20 K</td>
<td>High</td>
</tr>
</tbody>
</table>

FEMA
National Park Service

LOGGERHEAD KEY LIGHT STATION
BOATHOUSE

The Boathouse at Loggerhead Key Light Station is a small, single-story structure that serves as a storage and maintenance building for the lighthouse. It is located on Loggerhead Key, a small island off the coast of Florida. The building was constructed in 1940 and is part of the National Park Service's Loggerhead Key Light Station. The Boathouse is used to store the lighthouse equipment and is also a place for maintenance work. The building is a simple structure with a gabled roof and a large window on one side. Inside, there is a small room with a workbench and several shelves for storage. The Boathouse is an important part of the Loggerhead Key Light Station and is a valuable resource for maintaining the operation of the lighthouse.
Hybrid Strategies

COSTS $$$

*Real World* – costs are messy and depend on many factors
+ planning & engineering
+ permitting
+ maintenance & repair

*Game World* – costs are simpler one-time costs and given to you per unit (i.e. mile or # of buildings)
OBJECTIVE

Collaboratively develop a vision for 2050 to adapt to rising seas with minimal economic, environmental, and integrity impacts.
ROLES

• Preservationist
• FEMA Officer
• Sustainability Coordinator
• Park Service Staff
• Entrepreneur
• Ecologist
<table>
<thead>
<tr>
<th>Strategy</th>
<th>E = Environmental (Leaves)</th>
<th>I = Integrity (Diamonds)</th>
<th>$ = Economic (dollar Signs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Proof</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Horizontal levee</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Sea wall</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>HABS</td>
<td>N/A</td>
<td>-2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>3</td>
<td>Total Above 6 = 3</td>
</tr>
</tbody>
</table>

**Grand Total** = Total E + Total I + $>6 = **12**
GAME ON!
THANK YOU!

Sea Level Rise
marinslr.org