GAME OF FLOODS
PRESERVATION EDITION

Advisory assistance provided by:

National Trust for Historic Preservation
Save the past. Enrich the future.

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
- Public Well
- Post Office
- Historic Church
- Boat Launch
- Beach
- Home
- Ranch
- Mammal Habitat
- Marina
- Evacuation Route
- Agriculture
- Seabird Colony
- Gas Station
- Storm Shelter
- Sheriff
- Aquaculture
- Sewage Lift Station
- Electrical Sub-Station
INTERVENTION OPTIONS

ACCOMMODATE
future sea level + extreme tide/storm
existing sea level

PROTECT | ENGINEERED
future sea level + extreme tide/storm
existing sea level

PROTECT | NATURAL
future sea level + extreme tide/storm
existing sea level

RETREAT
future sea level + extreme tide/storm
existing sea level
1. PROTECT

Hard (Traditional) Engineering

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

Costs: High
Environmental Impacts: High
Effectiveness: Medium to Long Term
Seawall

Costs: High
Environmental Impacts: High
Effectiveness: Medium to Long Term

St. Augustine, FL
Jones Point, Washington D.C.

Images: Ann Horowitz
Tidal gate

Costs: Extreme
Environmental Impacts: High
Effectiveness: Long Term
Pump station

Costs: High
Environmental Impacts: High
Effectiveness: Medium Term
1. PROTECT

Soft (Nature-based) Engineering

Horizontal levee

Dune restoration & Beach maintenance

Wetland/ shoreline vegetation

Offshore structure
Horizontal levee

Costs: High
Environmental Impacts: Positive
Effectiveness: Long Term (waves and sea level rise)
Wetland/ Living Shorelines

Costs: Medium
Environmental Impacts: Positive
Effectiveness: Medium Term (Wave Attenuation)

Giacomini Wetland Restoration, 2008
Beach Maintenance

Costs: Medium to High
Environmental Impacts: Negative to Positive
Effectiveness: Medium Term (Wave Attenuation)
Offshore structures

San Clemente artificial reef experiment

Costs: Medium to High
Environmental Impacts: Positive
Effectiveness: Medium Term (Wave Attenuation)
2. ACCOMMODATE

- Elevate buildings
- Floodable Development
- Elevate/New Road
Elevate buildings

Costs: Medium
Environmental Impacts: Neutral
Effectiveness: Medium Term
FLOODABLE DEVELOPMENT

Costs: Medium
Environmental Impacts: Medium
Effectiveness: Medium Term
New/elevate road

Costs: High
Environmental Impacts: High
Effectiveness: Long Term
RETREAT

Retreat

Post-storm prohibitions

Rebuild here

Stricter land use zoning
MANAGED RETREAT

Costs: High
Environmental Impacts: Low to Medium
Effectiveness: Long Term
POST STORM RESTRICTIONS AND STRIC TER LAND USE ZONING

• No or restricted rebuilding after storms?
• Rolling easements
• Extra technical studies
• Use of stricter codes (FEMA V)
Hybrid Strategies

Communities of North Bay Island

- Downtown Norbay
- Eroding Cliff Heights
- Mudflat Manors
- Desolation Court
- Shoreline Marina
- Twig Cove
- Seaspray Homes
Downtown Norbay

- Commercial hub of the island
- Protected by undersize levees and vulnerable to both riverine and tidal flooding
Eroding Cliff Heights

- Residential community threatened by cliff erosion
- Zoning and shoreline protection challenges
Mudflat Manor

- Large residential community threatened by SLR
- Vocal community of property owners demanding protection
Desolation Court

- Small poor isolated community threatened by SLR
- In danger of being cut-off from services
Shoreline Marina

- Water-based commercial business and associated businesses threatened by SLR
- In danger of being cut-off from road access at high tides
Curvey Cove

- Historic Ag based community with access and crops threatened by SLR
- In danger of being cut-off from road access at high tides
Seaspray Estates

- Large vacation and second home community with access and homes threatened by SLR
- In danger of being cut-off from road access at high tides
Costs $$$

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

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

• Start with one community: what’s at risk and what infrastructure is essential?
• What must be protected to allow the community to function. What other options exist?
• Adaptation options: discuss pros and cons of measures alone and combined - phasing
• Consider: mitigation, permits, and funding; options that span more than one community
• Add up the costs and stick your group’s measures on the board
Game over?

1) Who in your organization is planning/strategizing around sea level rise?
2) What other organizations are also planning/strategizing that you may need to coordinate with?
3) What are the benefits or drawbacks of interagency discussion/planning/strategizing?
4) Any improvements or suggestions?
THANK YOU!

Sea Level Rise
marinslr.org