

## Sea Level Rise Adaptation Role-Play Game Design:

*Objective:* Players work together to develop strategic sea level rise adaptation plans for their community under economic, political, and time constraints.

*Goals:* (1) For the researchers: To introduce participants to the common (and uncommon) sea level rise adaptation strategies and opportunities, and discover their preferences in order to assess participants see their community adapting to sea level rise.

(2) For participants: To gain an understanding of the vast undertaking that planning for sea level rise will be with the coordination of different stakeholders and adaptation strategies given the reality of economic limitations; to become familiar with the different strategies available for sea level rise adaptation.

*Duration:* 30 minutes of game play, plus 10 minutes for pre and post-evaluations.

*Players:* 5 players plus 1 supervisor per group

### *Scenario – Planning for the next 20 years*

The effects of coastal dynamics are becoming increasingly apparent in your community. You have noticed more frequent beach erosion and more severe storm flooding than you can remember from years past. On the maps, you can see the areas of your community that are predicted to be vulnerable to habitat changes with 3 feet of sea level rise. In less than a century, this area will look drastically different. Such dramatic changes require equally dramatic responses, and implementing these responses should begin as soon as possible.

All of you come to this table representing the interests of larger groups: local residents, developers, government officials, business owners, and scientists. You have been nominated by your groups to manage the funds they have raised and allocate them towards appropriate adaptation strategies. As a community, you have **\$800 million** to put towards sea level rise adaptation efforts. Given what you know about the future, but keeping in mind your economic limitations, what is the best way to adapt to the upcoming changes? Develop a strategic sea level rise adaptation plan for the next 20 years, keeping in mind changes likely to occur over the next century.

### *Rules for Play:*

1. Take a seat and turn over your stakeholder persona card.
2. Review the strategy cards on the table, as well as the map. Think about which strategies your stakeholder persona would advocate and develop arguments in favor of these strategies.
3. Take 5 minutes and fill out the individual pre-game worksheets.
4. Begin with the “Local Resident” player and proceed going clockwise. The “Local Resident” explains their preferred strategy or set of strategies to the group, noting which benefits the strategy offers.
5. Going clockwise, each subsequent player advocates for a strategy or set of strategies.

6. When the game supervisor announces that 10 minutes remain, the rounds of advocating for different strategies comes to an end. Groups should start making concrete decisions on a set of strategies they would like to implement for their community based on the economic limitations.
7. The game ends after 30 minutes of playing time. The goal is to have a strategy, or set of strategies that everyone can agree on but are also affordable by the end of the game.
8. After the timer goes off, fill out the post-evaluation sheet as a group and then fill out the post-game worksheets individually.
9. Elect one representative from each group to briefly share the decisions their group came to and briefly describe the decision-making and collaboration process. To wrap up, the game leader will provide feedback to the groups.

*Materials:*

- Stakeholder persona cards (5 cards; 1 for each player in the group)
- Strategy cards with benefits (7 cards, plus 1 blank card)
- Map: Vulnerable areas with 3 foot SLR
- Timer (cellphone)
- Pens & small notepads
- Small calculators
- Individual pre/post-evaluations
- Group post-evaluation

*Stakeholder personas (total funds = \$800 million):*

- Local resident (\$100 million)
  - You have been selected to represent your community on this issue.
  - Your community is a beach community.
  - Members of your community enjoy living where they do because they enjoy seeing wildlife in their backyards, watching dolphins swim into the sunset, and going to the beach.
  - Your houses are near the water and your neighborhood floods during heavy storms.
- Government official (\$350 million)
  - As an elected official, you work in a position of power within your local government.
  - You have lived in the area for many years and plan to continue living here because you are an amateur fisherman and you love the area.
  - You have heard recent reports about the potential impact of sea level rise in your community but you find it difficult to dedicate the necessary resources towards this issue because more immediate issues weigh you down.
- Ecotourism business owner (\$100 million)
  - You are a born and raised resident of the area that owns a kayaking tour company.
  - Recent storms have caused some damage to your business and you are beginning to worry about the intensification of coastal dynamics in the near future.

- You also notice increasing development pressures threatening marsh areas that you like to take some of your tours through.
- Inland developer (\$150 million)
  - You are not a full time local resident but you own large areas of land inland from the present communities.
  - You anticipate that as people begin to worry about sea level rise they will be looking to move further inland and you would like to build a community to accommodate this anticipated demand.
- Environmental scientist (\$100 million)
  - You are not a Florida native but you came to this area and continue living here because you recognize the uniqueness of the ecosystem and biodiversity of the area.
  - You worry about the wellbeing of the local ecosystem, especially threatened species, with the pressures of development and now the threat of sea level rise.
  - You are particularly interested in sea turtles and manatees.

*Strategy cards* include a brief summary of the strategy, the key benefits, the estimated costs, and a small illustration:

- Seawalls
  - Installing physical barriers between the sea and land to prevent flooding of developed areas.
  - \$4.24 million/mile
  - *Key benefits:* Protect existing infrastructure
- Elevating structures
  - Elevating existing and future structures on stilts to protect them from storm surge and flooding.
  - \$150,000 for 2300 sq. ft. building
  - *Key benefits:* Protect existing infrastructure
- Beach nourishment
  - Replacing sand lost through erosion to re-widen a beach.
  - Lifespan: 5 years
  - \$3-15/cubic meter, depending on dredge site; \$100 million for a large beach
  - *Key benefits:* Protect existing infrastructure, protect recreation and tourism

- Habitat migration corridors
  - Acquiring tracts of land connecting different wildlife habitats to allow for the safe migration of species, via purchases and conservation easements.
  - \$50,000/acre
  - *Key benefits:* Allow migration of wetlands and threatened species
- Living shoreline
  - Reintroducing wetlands to areas that have lost them or are suitable for wetland habitat. Wetlands help absorb the impact of coastal dynamics by providing a place for the water to go, acting as a buffer between the sea and development. Also using organic and structural materials like wetland plants, sand, aquatic vegetation, oyster reefs and stone to create a protective shoreline and maintain valuable habitat.
  - \$25,000/acre
  - *Key benefits:* Allow migration of habitats and threatened species, protect recreation and tourism, protect fisheries and rookeries, improve water quality via filtration of upland runoff
- Ecosystem conservation
  - Government purchases relatively undeveloped land from coastal property owners to put into conservation. This conservation land will act as a buffer for retreating shorelines, protect habitats, and increase resiliency along the shoreline by preventing development in high-risk areas.
  - \$50,000/acre
  - *Key benefits:* Protect private property rights, allow migration of wetlands and threatened species
- Planned relocation
  - Gradually moving infrastructure away from high-risk areas, primarily through the use of rolling conservation easements. Land will be acquired inland to allow for infrastructure to be rebuilt outside of highly vulnerable areas.
  - \$700 million over the next 20 years
  - *Key benefits:* Protect future infrastructure, allow migration of wetlands and threatened species
- Conceptual strategy: Water storage easement
  - Conservation easements of at least 10 acres on private lands to provide ecosystem services, mainly water storage. As sea levels rise, freshwater is susceptible to saltwater contamination. Water storage easements will help protect the community's freshwater supply, while supporting ecosystem health and allowing for habitat migration.
  - \$50,000/acre; *Key benefits:* Support ecosystem services, protect freshwater supply