**Ashok responses in bold**

1. Purpose:
   1. This data frame outlines the probability of levee failures for leveed areas in the RAND model
   2. Each island contains combinations of various scenarios to determine the levee failure probabilities
      1. I am not too sure on these exact scenarios from the code but it appears to be a function of:
         1. Climate change scenarios:
            1. Affects water level, represented by SR\_Curve (I believe); ***This stands for Stage Recurrence Curve.*** ***In the tool, we have considered stage-recurrence curves for current conditions (year 2012), nominal and high sea level rise conditions for 2030, and nominal and high sea level rise conditions for 2050.***
         2. Investment strategies:
            1. Affects levee fragility curve
            2. Others?
   3. Data columns
      1. islandID: index value of each island in the RAND model
      2. Island.or.Tract: name of the leveed area
      3. Year: no clue, can only take on 3 values, 2012, 2030, and 2050; ***It represents the years we have analyzed. 2012 would represent current conditions or baseline, and 2030 and 2050 represent future conditions.*** 
         1. 2012 is likely baseline scenario, conditions for that year as baseline
         2. 2030 and 2050 are likely simulated time points
      4. GF\_Year: no clue; ***Relates Year to years available in database (e.g., Year = 2012 uses 2010 population, so GF\_Year = 2010 if Year = 2012)***
      5. SR\_Curve: stage-recurrence curve. Probability curve of a specific water level occurring to gauge flood risk. ***SR\_Curve of 0 indicates 2012 average estimate; 1 – sea level rise (SLR) 2030 average estimate; 2 – SLR 2050 average estimate; 3 – SLR 2030 High estimate; and 4 – SLR 2050 High estimate.***
      6. PGAR\_Curve: Peak Ground Acceleration (PGA) recurrence curve. Used to estimate probability of seismic events
      7. LF\_Curve: levee fragility curve. Relationship between levee probability of failure and other risks, such as flood risk or seismic risk. Appears to have 4 scenarios, 4, 5, 6

| **Scenarios** | | |
| --- | --- | --- |
| **strTable** | **lngScenario** | **strDescription** |
| FragilityCurveHydro | 4 | DLIS 2015 |
| FragilityCurveHydro | 5 | DLIS 2015 + PL84-99 |
| FragilityCurveHydro | 6 | DLIS 2015 with 10 improved |

* + 1. SF\_Curve: seismic fragility curve. Relationship between levee failure and seismic events. This is constant across RAND scenarios.
    2. DD\_Curve: no clue. Doesn’t change across RAND scenarios though. ***This is short for Depth-Damage Curve (sometimes referred to as a Depth-Damage Scenario). Yes, only one type of Depth-damage curve is considered in this analysis which is Scenario 0, but there should be a template setup for future scenarios. The Depth\_Damage table supports two types of depth-damage curves: inundation depth vs. percent damage and inundation depth vs. dollar damage. Percent Damage Curves: Set Damage\_Type to 0 and enter a value between 0 and 1 in PercentDamage. Dollar Damage Curves: Set Damage\_Type to 1 and enter the dollar value of the damages in DamagePerUnit. Only one depth-damage curve should be entered for each scenario and asset type.***
    3. SLR\_Condition: Sea-level rise scenarios: 5 scenarios

| **Scenarios** | | |
| --- | --- | --- |
| **strTable** | **lngScenario** | **strDescription** |
| Stage\_Recurrence | 0 | 2012 Average |
| Stage\_Recurrence | 1 | SLR 2030 Average |
| Stage\_Recurrence | 2 | SLR 2050 Average |
| Stage\_Recurrence | 3 | SLR 2030 High |
| Stage\_Recurrence | 4 | SLR 2050 High |

* + 1. Discount\_rate: no clue, economic metric. Likely have to deal with the various investment scenarios; ***Discount rate (or asset discount rate) to be applied to the asset valuation. It is used to estimate asset values and thus EAD, for future scenarios; the emphasis here is on the “future’ as opposed to current. For baseline (or current scenario), the discount rate is 0%.***
    2. C4CCA\_Percentile: no clue, it’s NA for all; ***Currently, this column is marked as NA for all entries, indicating California’s 4th Climate Change Assessment. This column is informational and can be deleted if not needed. For example, if you create a Scenario 29 representing the 99.9th percentile with an RCP 8.5 from the C4CCA for 2050, you would fill out the C4CCA\_Percentile, C4CCA\_RCP, and C4CCA\_SLR columns accordingly.***
    3. Levee\_Fragility\_Description: no clue, it’s NA for all; ***I have entered levee fragility description in a spreadsheet that Chris Kwan provided. Basically, Code 4: Represents maintaining the levees at current conditions (DLIS-2015). Code 5: Indicates DLIS 2015 plus levee improvements at certain islands to the PL84-99 standard, reflecting strengthened levees. Code 6: Represents DLIS 2015 plus improvements to urban levees.***
    4. C4CCA\_SLR: no clue NA for all; ***please see the response for C4CCA\_Percentile.***
    5. hydrologicFailure: levee failure probability based on water conditions
    6. seismicFailure: levee failure probability based on seismic conditions
    7. leveeFailure: summation of the hydrologicFailure and seismicFailure excluding the probability that both occurs. See “doc/RANDExploration.docx” for a more detailed description.

Additional Information:

|  |  |  |
| --- | --- | --- |
| ***Field*** | ***Field Type*** | ***Description*** |
| ***Scenario*** | ***Integer*** | ***Master scenario ID*** |
| ***Year*** | ***Integer*** | ***Year of scenario*** |
| ***GF\_Year*** | ***Integer*** | ***Relates Year to years available in database (e.g., Year = 2012 uses 2010 population, so GF\_Year = 2010 if Year = 2012)*** |
| ***SLR\_Condition*** | ***String*** | ***Description of sea level rise used in stage recurrence*** |
| ***SR\_Curve*** | ***Integer*** | ***Stage recurrence curve scenario*** |
| ***PGAR\_Curve*** | ***Integer*** | ***PGA recurrence scenario*** |
| ***LF\_Curve*** | ***Integer*** | ***Levee fragility scenario*** |
| ***SF\_Curve*** | ***Integer*** | ***Seismic fragility scenario*** |
| ***DD\_Curve*** | ***Integer*** | ***Depth-Damage scenario*** |
| ***Discount\_Rate*** | ***Real*** | ***Discount Rate to be applied to assets (e.g., 7% is entered as 0.07)*** |