IPCC WGI Fourth Assessment Report (2007) suggests a sea-level rise overwash at barrier islands undergoes SLAMM process:

- **Inundation:** Calculated based on the minimum elevation and slope of the cell.
- **Erosion:** Triggered given a maximum fetch threshold and proximity of the marsh to estuarine water or open ocean.
- **Overwash:** Barrier islands undergo overwash at a fixed storm interval. Beach migration and transport of sediments are calculated. (N/A)
- **Saturation:** Migration of coastal swamps and fresh marshes onto adjacent uplands – response of the water table to rising sea level.
- **Accretion:** Vertical rise of marsh due to buildup of organic and inorganic matter on the marsh surface. Rate differs by marsh-type.

**SLAMM process overview**

- **Sea Level Rise Scenarios**
  - Funding for this model application was provided through a grant from the San Diego Foundation *Global Climate Change: Sea-Level Rise, Critical Coastal Habitats, and Coastal Water Quality in the San Diego Region.*
  - San Diego State University also provided extensive GIS processing in support of this analysis and the conversion of LiDAR data for the entire spatial domain of the city of San Diego into a high resolution digital elevation model.
  - Sea Level Rise Affects Marshes Modeling (SLAMM) done by Jonathan Clough of Warren Pinnacle Consultants
    - http://warrenpinnacle.com/prof/SLAMM/

- **Detailed SLAMM Land Categories**
  - 23 Categories derived from NWI (National Wetlands Inventory)
  - May be specified as “protected by dikes or seawalls”
  - Dry Land: Developed and Undeveloped
  - Swamp: General, Cypress, & Tidal
  - Transitional Marsh: Occasionally Inundated, Scrub Shrub
  - Marsh: Salt, Brackish, Tidal Fresh, Inland Fresh, Tall Spartina
  - Mangrove: Tropical Settings Only
  - Beach: Estuarine, Marine, Rocky Intertidal
  - Flats: Tidal Flats & Ocean Flats
  - Open Water: Ocean, Inland, Riverine, Estuarine, Tidal Creek

- **SLAMM background & methodology**
  - SLAMM 5 was run using scenario A1B from the Special Report on Emissions Scenarios (SRES)
    - Rapid economic growth & global population that peaks mid-century and declines thereafter & rapid introduction of new & efficient technologies
    - IPCC WGI Fourth Assessment Report (IPCC, 2007) suggests a likely range of 0.21 to 0.48 meters of SLR by 2090-2099 “excluding rapid dynamical changes in ice flow”
    - A1B-mean scenario predicts 0.40 meters SLR by 2100; A1B Max is 0.7 M SLR
Overall regional results

<table>
<thead>
<tr>
<th>Area</th>
<th>Initial Condition</th>
<th>A1B Max Year 2100</th>
<th>Percent Change</th>
<th>Min. Elevation Change</th>
<th>Max. Elevation Change</th>
<th>Total Elevation Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level</td>
<td>10,453</td>
<td>18,950</td>
<td>81.0%</td>
<td>23.0%</td>
<td>12.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Desert</td>
<td>10,453</td>
<td>18,950</td>
<td>81.0%</td>
<td>23.0%</td>
<td>12.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Wetlands</td>
<td>10,453</td>
<td>18,950</td>
<td>81.0%</td>
<td>23.0%</td>
<td>12.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Tijuana Delta</td>
<td>10,453</td>
<td>18,950</td>
<td>81.0%</td>
<td>23.0%</td>
<td>12.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Total</td>
<td>5,686</td>
<td>9,475</td>
<td>67.0%</td>
<td>38.0%</td>
<td>13.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Ocean Beach</td>
<td>10,453</td>
<td>18,950</td>
<td>81.0%</td>
<td>23.0%</td>
<td>12.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Tijuana Estuary</td>
<td>10,453</td>
<td>18,950</td>
<td>81.0%</td>
<td>23.0%</td>
<td>12.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>31</td>
<td>67.0%</td>
<td>38.0%</td>
<td>13.0%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Using SDCK Watershed wiki to engage the public in understanding the implications of climate change:

- www.sdwatersheds.org
**Mission Bay**

**San Elijo Lagoon**

---

**Policy recommendations and considerations**

- Impacts to wetland functioning as a consequence of SLR and Climate Change
  - Lower flows from watersheds may result in fewer coastal exceedances (because of drought) and more concentrated urban run-off (because of water conservation)
  - Need for increased buffers to protect areas impacted by Sea Level Rise
  - Need to protect threatened coastal habitat, especially high-value habitat and allow for better wetland functioning through invasive species removal

---

**Incorporating SLAMM data into planning efforts**

- IRWMP
  - Prioritize invasive removal for areas identified as having priority habitat
  - Climate Change Adaptation strategies

- Urban Water Management Plans
  - Seawater intrusion into groundwater basins (existing and potential)
  - Climate-responsible water supplies (mitigation)

---

**Thanks**

- Karen Franz
- Watershed Program Director, San Diego Coastkeeper
- (619) 758-7743 x 113
- karen@sdcoastkeeper.org