Project Goals
• Manage risks associated with climate change
• Identify most vulnerable Port assets
• Identify adaptation strategies to protect the Port

Project Benefits
• A more resilient Port able to continue operations under changed conditions
• A Port prepared and ready to adapt
• More future-looking risk assessment process
• Long-term sustainable development
• Continued Green Port goals

Least Extreme: 16" Sea Level Rise

Most Extreme: 55" Sea Level Rise + 100-year Storm Surge
Steps to Developing the CRP

1. Reviewed climate science to determine primary stressors and impacts

   **Primary Stressors**
   - Extreme Heat
   - Sea Level Rise (SLR)
   - Storm Surge

   **Potential Impacts**
   - Asset Damage
   - Cargo Damage
   - Operational Disruptions

2. Completed inventory of Port assets and vulnerability assessment

   - Exposure
   - Sensitivity
   - Adaptive Capacity

3. Completed inundation mapping for six scenarios

   The 16" and 36" scenarios are most appropriate for planning purposes based on the Port’s lifespan of assets. (The 36" scenario is the high-end projection for 2070 and most likely projection for 2100).

<table>
<thead>
<tr>
<th>Year</th>
<th>Six Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050</td>
<td>16&quot; SLR</td>
</tr>
<tr>
<td>2070</td>
<td>36&quot; SLR</td>
</tr>
<tr>
<td>2100+</td>
<td>55&quot; SLR</td>
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</tbody>
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4. Developed vulnerability profiles

   **Pier Infrastructure**
   Areas of Piers S and D are first inundated under the 16" SLR scenario.

   **Transportation**
   Rail speeds are reduced as soon as temperatures reach 90 degrees Fahrenheit. Rail movement stops as soon as there is direct, or indirect inundation. Vehicle movement stops after a few inches of inundation. Sections of rail and roadways on Piers S and D are inundated with 16" SLR.

   **Critical Facilities**
   Buildings, in general, are located at higher elevations and are not vulnerable to inundation. However, access could be compromised, such as for the Fire Station #24 (Terminal Island). Extreme heat may cause electrical outages/brownouts and HVAC systems could be disrupted impacting employee comfort, health, and productivity.

   **Utilities**
   The most vulnerable utilities are stormwater and electrical systems. The least vulnerable utilities include freshwater, sewer, and communications systems.

   **Breakwater**
   The ‘Long Beach’ section of the breakwater is the most vulnerable based on historical storm conditions. However, this could change with different wind and wave directions, as was the case during Hurricane Marie.

5. Identified adaptation strategies

   **Process**
   - Developed 50+ strategies based on field experts and best management practices
   - Held workshop with several Port Divisions to prioritize strategies
   - Identified 5 strategies that would be further developed into detailed studies or concept designs

   **Strategy Types**
   All strategies fall into one of the following categories: governance, initiative, physical infrastructure.

6. Completed five detailed adaptation strategies

   **Governance**
   - Addressing climate change impacts through Port policies, plans, and guidelines
   - Adding sea level rise analysis to the Harbor Development Permit (HDP) process

   **Initiative**
   - Piers A & B Study - Combined Impacts of Riverine and Coastal Flooding

   **Physical Infrastructure**
   - Terminal Island SCE electrical substation protection
   - Terminal Island shoreline protection