Cardiff Beach Living Shoreline Project

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About me...
San Diego Coastline
West vs. East Coast Differences

- Beach nourishment less frequent, smaller volumes
- Storm surge is small, wave runup is large
- Seawall projects are generally contentious
- Dunes not included in nourishment design

<table>
<thead>
<tr>
<th>Factors Affecting Water Level</th>
<th>Typical Range for CA Coast (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tides</td>
<td>3 – 10</td>
</tr>
<tr>
<td>Low pressure</td>
<td>1.5</td>
</tr>
<tr>
<td>Storm Surge</td>
<td>2 – 3</td>
</tr>
<tr>
<td>Storm Waves</td>
<td>3 – 15</td>
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</tbody>
</table>
Coastal Storm Damage - Erosion
Coastal Storm Damage – Wave Runup & Flooding
Planning for change...

California Coastal Commission
Sea Level Rise Policy Guidance

Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits

Original Guidance unanimously adopted – August 12, 2015
Science Update unanimously adopted – November 7, 2018
Southern California Sea Level Rise Projections

*NRC 2012 vs. OPC-SAT 2017*

*OPC-SAT (2017) projections assume emission scenario RCP 4.5. Worst Case scenario (Red Circle) developed by DeConto and Pollard (2016).*
Common Concern - “Coastal Squeeze”

Oceanside, CA
Cardiff Beach Living Shoreline Project

Construction underway!

Existing

With Project

(Source: M&N 2016)
Project Location – Cardiff State Beach, Encinitas, CA
HWY 101 Vulnerabilities
Wave Overtopping & Undermining
An ever changing system...

2017

(Source: M&N 2016)

1998
Cardiff Beach Width Change (1981 to present)

(Source: M&N 2016)
Green/Grey Hybrid Solution

1. Decrease vulnerability of HWY 101
2. Restore dune habitat
3. Beneficially reuse sand
4. Improve public access
5. Share lessons with others

(Source https://www.nap.edu/read/18811/chapter/5#70)
Project Elements

1. Buried Revetment
2. Cobble Berm
3. Sand Dune
4. Dune Habitat Area
5. Public Access
Project Element – Buried Revetment

(Source: M&N 2018)
Project Element – Cobble Berm

(Source: M&N 2018)
Project Element – Sand Dune

(Source: M&N 2018)
Project Element – Dune Habitat Creation
Project Element – Public Access Improvements
Project Element – Monitoring

- Dune performance (UCLA & SIO)
- Vegetation Establishment (SELC)

(Source: Sergededina.com)
Project Element – Maintenance & Adaptation

Up to 10,000 CY / YR
Project Challenges

- Dunes vs. Traditional Armoring
- Trade-offs (e.g. view sheds vs. protection)
- Winter Construction
- Sensitive species
Nourished Beach - San Elijo Lagoon Restoration Project

330,000 CY
Sensitive Species

Western Snowy Plover

Grunion
Project Funding

~ $3.5M for Planning though Construction

- State Coastal Conservancy
- Ocean Protection Council – Prop 1
- City of Encinitas
- California Coastal Commission
- SANDAG
- USFWS

Construction Schedule

- Estimated completion (April 2019)
- 5 Year Monitoring & Reporting (2019 – 2024)