City of Seal Beach
Local Coastal Program

Vulnerability Assessment
Workshop 2
July 17, 2019
What is a Local Coastal Program?

• Consists of Land Use Plan (LUP) and Local Implementation Plan (LIP)
• Guides development in Coastal Zone once LCP is certified by the Coastal Commission
• City was awarded grant funding by the Coastal Commission to address sea level rise
LCP History in Seal Beach

• 2003: Initiated LCP Preparation
• 2008: Re-initiated LCP Preparation
• 2017: Coastal Commission provided grant funding to prepare and certify an LCP
• 2018: Initiated LCP Preparation in coordination with the
Benefits of a Certified LCP

• Development applications and permit issuance within the Coastal Zone is delegated to the City

• Coastal Development Permit processing is streamlined through the City instead of Coastal Commission

• City controls local decision making

• A Certified LCP does not
LCP Process and Scope

PHASE I (Current Scope)
• Project Kick-Off
• Consultation with Coastal Commission
• Community Outreach
• Sea Level Rise Vulnerability Assessment
• Prepare Administrative Draft Land Use Plan and Maps

PHASE II (Future Efforts)
• Final Land Use Program
• Administrative Draft and Final Local Implementation Plan
• Study Session with Planning Commission and City Council
• Local Adoption
• Coastal Commission Application and Certification
Components of an LCP

• **Land Use Plan (LUP)**
  - Similar to General Plan
  - Goal: A general statement describing a desired future condition
  - Policy: A statement of commitment designated to guide future decisions in such a way that the LCP goals can be achieved

• **Local Implementation Plan (LIP)**
  - Incorporated as part of the Zoning Ordinance
  - Implementation Program: A program to identify systems, procedures, or techniques that implement
Community Outreach Efforts

- Pop-Up Booth Workshop: Vision, Issues and Opportunities
  - May 27th at the Seal Beach Car Show
- SLR Vulnerability Assessment and Adaptation
  - July 17th at the Marina Center
- LCP Policy Development
  - August 21st at the Marina Center
# Stakeholder Meeting Summary

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Date</th>
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<tr>
<td>Lions Club</td>
<td>April 10</td>
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<td>Friends of Seal Beach Naval Wildlife Refuge</td>
<td>April 10</td>
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<tr>
<td>Boeing</td>
<td>April 17</td>
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<td>Surfside Colony Board</td>
<td>April 17</td>
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<td>Chamber of Commerce</td>
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<td>Naval Weapons Station Seal Beach</td>
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<td>Gold Coast Architectural Committee</td>
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<tr>
<td>Save our Beach</td>
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<td>City Council – District 1 and 3 Representatives</td>
<td>April 25</td>
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Vision/Aspirations
• Small-town feel, with connection to the past
• Service, volunteerism and community involvement

Concerns
• Coastal flooding and wave run ups
• Trash brought to the beach during heavy storms
• Protection of critical facilities
• Local control of the Coastal Zone
Approximately 200 participants

Primary modes of transportation:
- Walking, Driving, Biking

Concerns about:
- Pollution/Trash
- Crowds/Congestion
- Beach Access/Parking
How Will Input be Used?

• Participants will be informed about the process of developing an LCP consistent with Coastal Commission regulations

• City is gathering information and public feedback that will help inform LCP policy development
City of Seal Beach Sea Level Rise Vulnerability Assessment

Workshop 2
July 17, 2019
Key Questions

- What are the hazards associated with sea level rise for Seal Beach?
- What magnitudes of sea level rise matter for Seal Beach?
- What resources are at risk?
- When could these scenarios happen and how do we plan for them?
Coastal Setting
Water Levels

- Typical tidal range of MLLW to MHHW
- Spring tides 2x a month
- King tides
  - Largest spring tides of the year
  - Can cause dry-weather flooding
- Sea level anomalies
  - El Nino
  - Storm surge

Water Levels

- Extreme Water Levels
  - once every 100 yrs
  - once every 10 yrs
  - once every 2 yrs
  - once every 1 yr

High Tides
- Spring Tides
- Mean Higher High Water
- Mean High Water

Low Tides
- Mean Lower Low Water

7/17/2019
Wave Climate

• Wave exposure typical of region
  • South swells in summer
  • West swells in winter

• Unique winter wave hazard
  • Swell reflected off of Anaheim Bay west jetty
  • Wave energy amplified
  • Increased wave heights along east beach
Littoral Processes

- Influenced by jetties, pier, concrete groin
- Jetties create a pocket beach
  - Isolated from regional sand transport
  - Shoreline impacts at Surfside
- Reflected waves transport sand upcoast
  - Localized erosion ~13th St
  - Pier groin constructed to offset...
City Sediment Management

- Sand backpassing
  - West to east beach
  - Offset sand transport
- Winter dike
  - Wave/flood protection
- Nourishment
  - Opportunistic at east beach
  - Cycle of nourishment at Surfside
Sediment Management

Berm construction

Surfside nourishment
What is Sea Level Rise?
Historic Trends

Variation over geologic time scales

Observations in CA show increase over last century
Projections and Probability

- H+ Scenario - Extreme Risk Aversion
- 0.5% Probability, Medium-High Risk Aversion
- Top range of 66% Probability - Low Risk Aversion

Sea Level Rise (ft)

- 1.6 ft, 50 cm
- 3.3 ft, 100 cm
- 4.9 ft, 150 cm
- 6.6 ft, 200 cm

- High Emissions
- Low Emissions
Vulnerability Assessment

• Resources
  • Coastal development
  • Utilities infrastructure
  • Public safety facilities
  • Transportation infrastructure
  • Coastal access and recreation
  • Municipal pier
  • Environmental resources

• Hazard analysis
  • Spring tide flood hazards
  • 100-year storm flood hazards
Sea Level Rise Adaptation

- Wide variety of adaptation measures
- 3 main categories
  - Protection
  - Accommodation
  - Retreat
- Adaptation often takes hybrid approach
  - Combine elements of multiple categories
  - Account for different vulnerabilities over space and time

### Diagram

- **Protect:**
  - Hard protection
  - Soft protection/living shorelines
  - Protect agricultural barriers for flood protection

- **Accommodate:**
  - Siting and design standards
  - Retrofit existing structures
  - Stormwater management

- **Hybrid:**
  - Accommodate over short-term, relocate over long-term
  - Update land use designations and zoning ordinances
  - Redevelopment restrictions
  - Permit conditions

- **Retreat:**
  - Limit new development in hazardous areas and areas adjacent to wetlands, ESHA, other habitats
  - Removal of vulnerable development
  - Promote preservation and conservation of open space
Conceptual Examples: Protection
Conceptual Examples: Accommodation

Service equipment (such as utilities and electrical circuits) moved above flood level.

Openings on each wall ensure entry of water to equalize hydrostatic pressure.

Lightweight or mobile items (such as a car) can be stored under the home and moved prior to flooding.
Conceptual Examples: Retreat
THANK YOU!

moffattnichol.com
Selected Sea Level Rise Scenarios

- **1.6ft**
  - Extreme: 2040
  - Medium-high (0.5%): 2050
  - Low (17%): 2070
- **3.3ft**
  - Extreme: 2060
  - Medium-high (0.5%): 2070
  - Low (17%): 2100
- **4.9ft**
  - Extreme: 2070
  - Medium-high (0.5%): 2080-2090
- **6.6ft**
  - Extreme: 2080-2090
  - Medium-high (0.5%): 2100
## Selected Sea Level Rise Scenarios

|                     | Probabilistic Projections (in feet) (based on Kopp et al. 2014) |  |  |  
|---------------------|---------------------------------------------------------------|---|---|---|
|                     | MEDIAN                                             | LIKELY RANGE               | 1-IN-20 CHANCE | 1-IN-200 CHANCE | H+ scenario (Sweet et al. 2017) <br> *Single scenario* |
|                     | 50% probability sea-level rise meets or exceeds... | 66% probability sea-level rise is between... | 5% probability sea-level rise meets or exceeds... | 0.5% probability sea-level rise meets or exceeds... |
| High emissions      | 2030                                               | 0.3                        | 0.2 - 0.5      | 0.6            | 0.7                          | 1.0                          |
|                     | 2040                                               | 0.5                        | 0.4 - 0.7      | 0.9            | 1.2                          | 1.7                          |
|                     | 2050                                               | 0.7                        | 0.5 - 1.0      | 1.2            | 1.8                          | 2.6                          |
| Low emissions       | 2060                                               | 0.8                        | 0.5 - 1.1      | 1.4            | 2.2                          | 2.2                          |
| High emissions      | 2060                                               | 1.0                        | 0.7 - 1.3      | 1.7            | 2.5                          | 3.7                          |
| Low emissions       | 2070                                               | 0.9                        | 0.6 - 1.3      | 1.8            | 2.9                          | 2.9                          |
| High emissions      | 2070                                               | 1.2                        | 0.8 - 1.7      | 2.2            | 3.3                          | 5.0                          |
| Low emissions       | 2080                                               | 1.0                        | 0.6 - 1.6      | 2.1            | 3.6                          | 3.6                          |
| High emissions      | 2080                                               | 1.5                        | 1.0 - 2.2      | 2.8            | 4.3                          | 6.4                          |
| Low emissions       | 2090                                               | 1.2                        | 0.7 - 1.8      | 2.5            | 4.5                          | 4.5                          |
| High emissions      | 2090                                               | 1.8                        | 1.2 - 2.7      | 3.4            | 5.3                          | 8.0                          |
| Low emissions       | 2100                                               | 1.3                        | 0.7 - 2.1      | 3.0            | 5.4                          | 5.4                          |
| High emissions      | 2100                                               | 2.2                        | 1.3 - 3.2      | 4.1            | 6.7                          | 9.9                          |