

# Del Mar Sediment Management Study

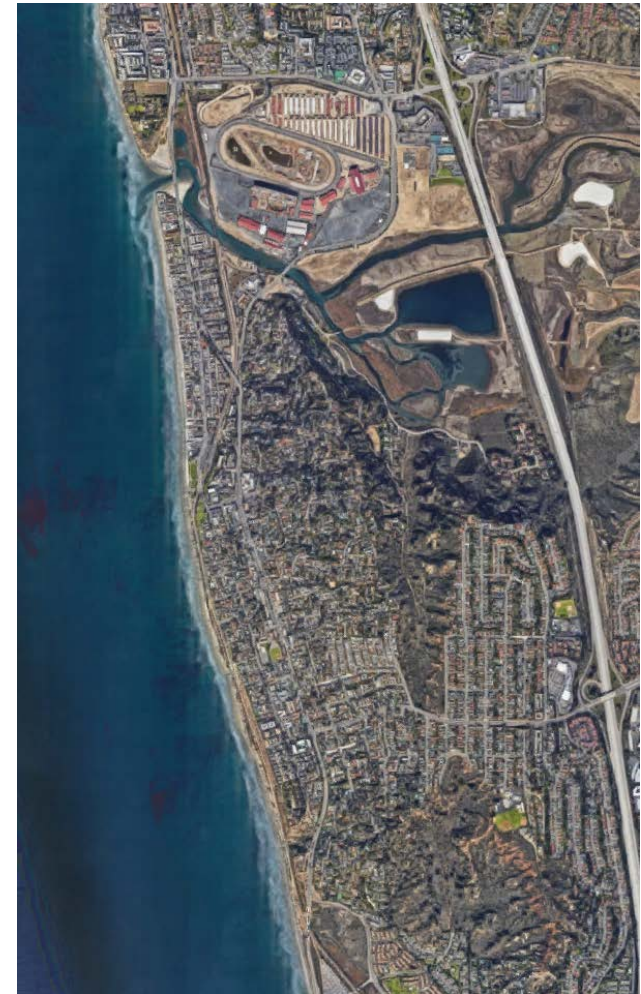


Shoreline Preservation Working Group, June 7, 2018

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# Current work in Del Mar

- 2016 Sea-Level Rise Vulnerability Assessment
- 2018 Adaptation Plan
- 2018 Sediment Management Plan
- 2018 Lagoon Habitat Evolution Assessment
- LCP Amendment



# Sediment Management Plan

- Why develop this plan?
  - Vulnerability Assessment identified risks with sea-level rise
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  - Understand sediment dynamics to inform dredging and nourishment to reduce risks
  - Companion document to Adaptation Plan and LCP Amendment

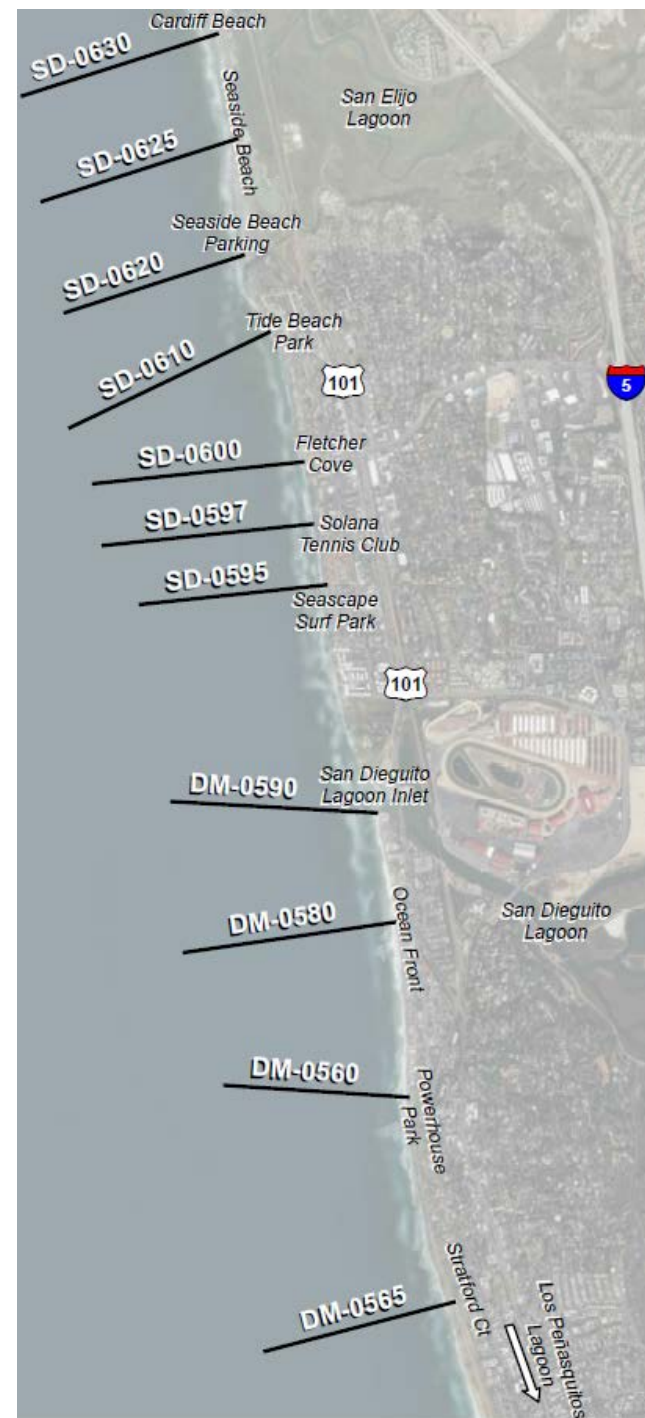
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  - Companion document to Adaptation Plan and LCP Amendment
- **How was the plan developed?**
  - Gathered data to develop long-term sediment budget
    - Developed existing conditions budget
    - Considered how each process will change with sea-level rise
  - →Developed Channel Dredging Plan
  - →Developed Beach Nourishment Plan
  - →Developed planning-level cost estimates with assumptions



# How Has the Beach Changed Over Time?

- SANDAG Beach Transects
  - Fall and spring surveys
  - 1997 to present
  - 7 transects between San Elijo & San Dieguito
  - 4 transects between San Dieguito & Los Peñasquitos
- Scripps transects

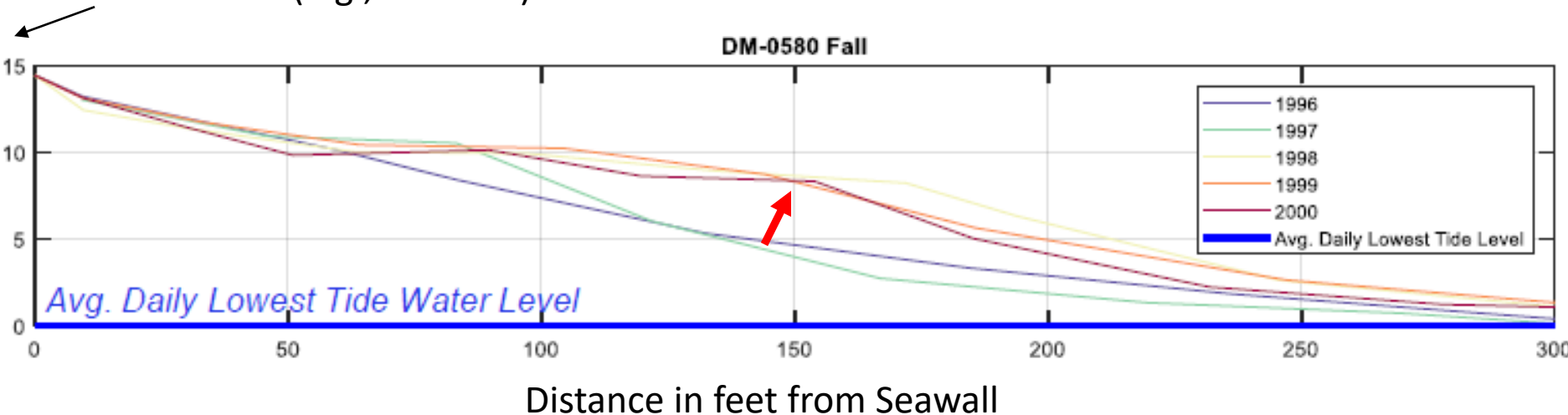


# SANDAG Beach Transects

- In 1997, US Navy Homeporting project added 170,000 cy of sand



Feet Above Average Daily Lowest Tide Water Level (e.g., ft MLLW)

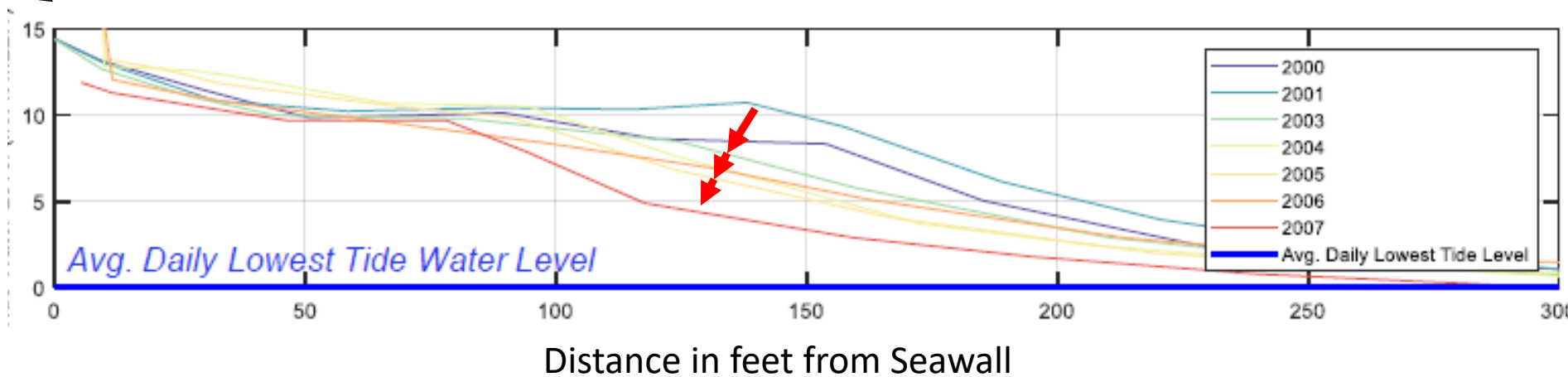


# SANDAG Beach Transects

- RBSP I (2001) eroded away in the following years



Feet Above Average Daily Lowest Tide Water Level (e.g., ft MLLW)



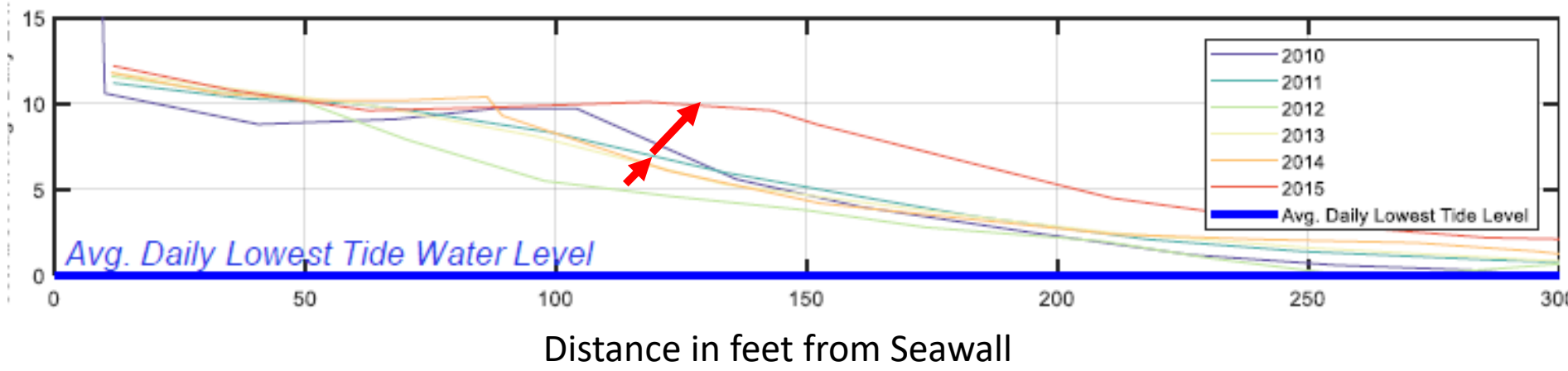


# SANDAG Beach Transects

- RBSP II (2012) transported to 25<sup>th</sup> St by 2015



Feet Above Average Daily Lowest Tide Water Level (e.g., ft MLLW)

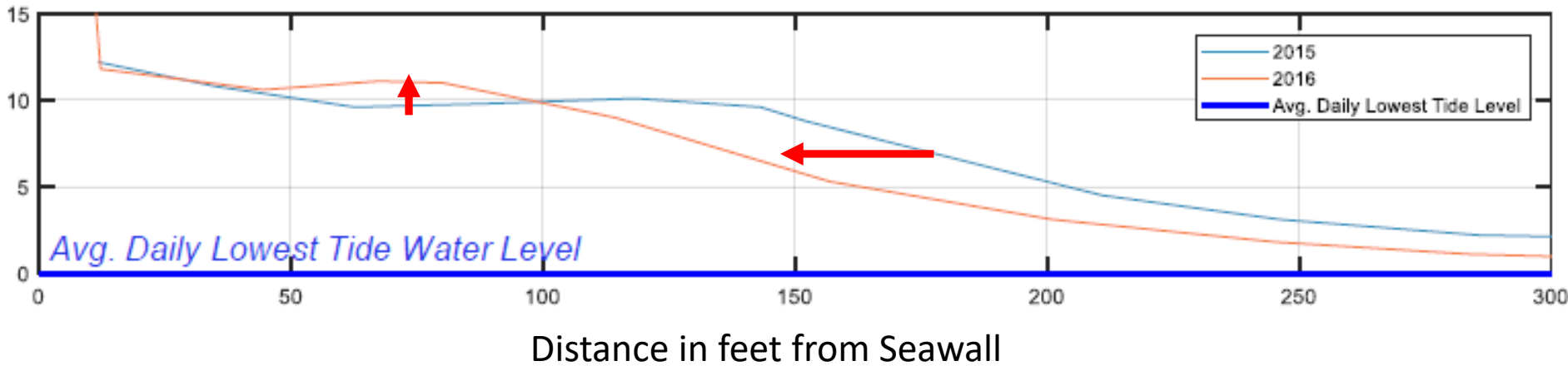


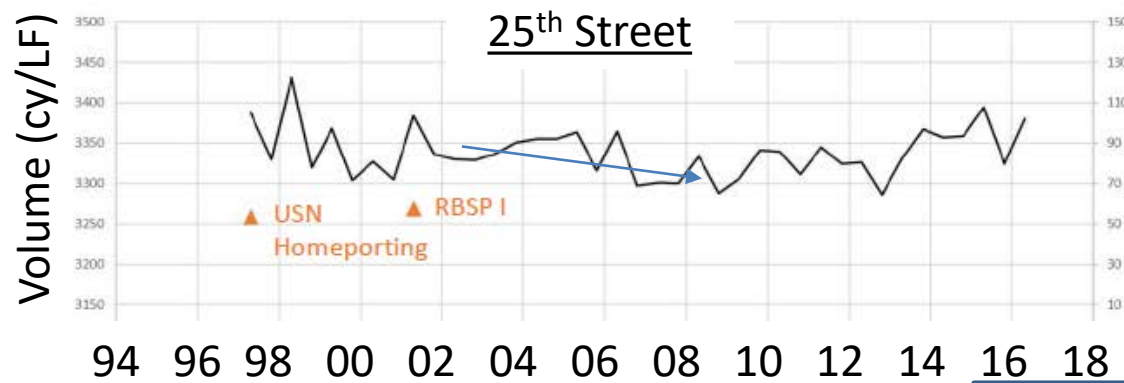
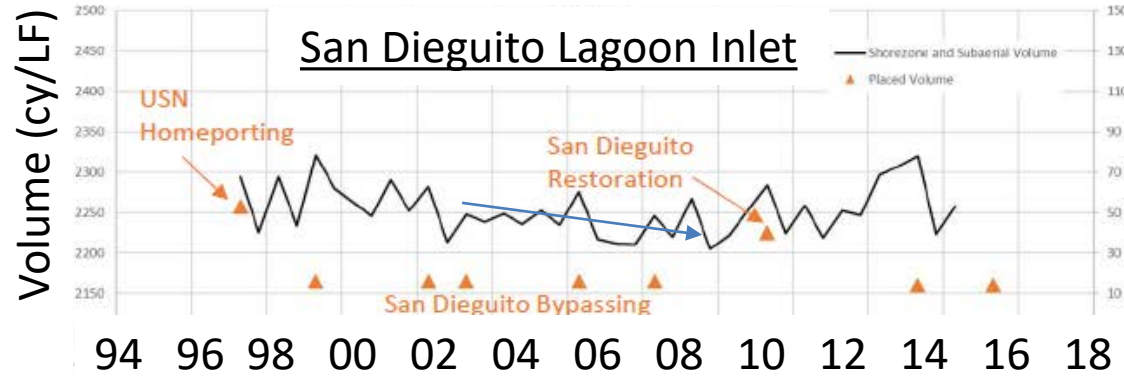
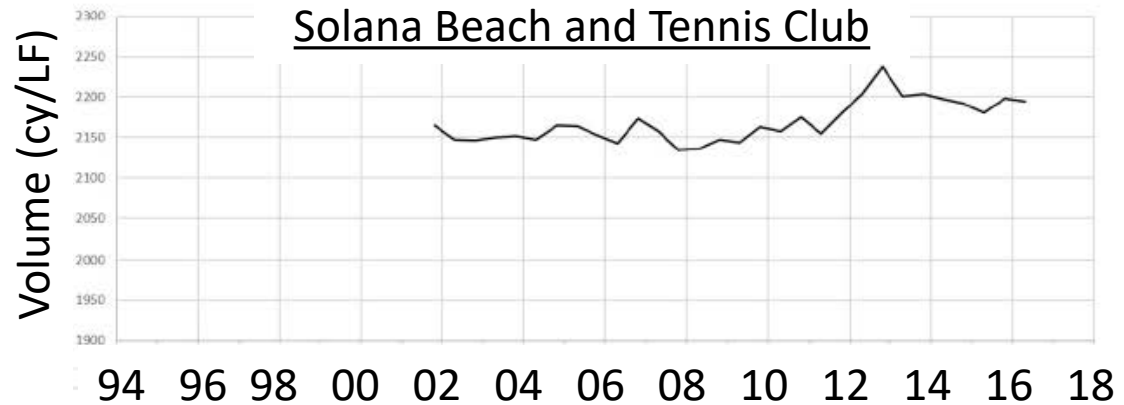
# SANDAG Beach Transects

- Before and after 2015-2016 El Niño



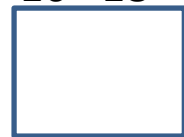
Feet Above Average Daily Lowest Tide Water Level (e.g., ft MLLW)





Placed Volume (cy/LF)

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# Existing Conditions Beach Dynamics - Findings

- During 2002-2012 time period Del Mar Beach eroded, even with bypassing from San Dieguito Lagoon
  - Losing 7,900 cy/yr from beach
  - Already nourishing with 9,500 cy/yr from San Dieguito dredging/bypassing
  - Beach needed 17,400 cy/yr to remain stable

# Beach Nourishment – In the future

- With future sea-level rise, additional nourishment need:

	1 ft of SLR	2 ft of SLR	5.5 ft of SLR
Current need	17,400 cy/yr	17,400 cy/yr	17,400 cy/yr
Additional need with SLR	34,000 – 35,600 cy/yr	50,900 – 53,200 cy/yr	76,400 – 80,200 cy/yr
Total nourishment	51,400 – 53,000 cy/yr	68,300 – 70,600 cy/yr	93,800 – 97,600 cy/yr



# Sediment Budget Findings, compared to RBSP

	RBSP I	RBSP II	Average
	2001	2012	~Every 11 years
Del Mar	183,000	-	n/a
Solana Beach	146,000	142,000	144,000
Cardiff Beach	101,000	89,000	95,000
Oceanside Littoral Cell	1,833,000	1,082,000	1,457,500
Total for SANDAG RSBP	2,104,000	1,532,000	1,818,000

	Current	1 ft of SLR	2 ft of SLR	5.5 ft of SLR
Nourishment needed every 11 years	191,400 cy	374,000 – 391,000 cy	559,000 – 585,000 cy	840,000 – 882,000 cy

# Data Gap

- Need more monitoring upstream of mouth
- Dredging during restoration likely acting as sediment sink since



# Conclusions & Recommendations

- Current San Dieguito Lagoon mouth dredging program not expected to maintain walkable beach with sea-level rise
- To keep up with sea-level rise, would need to place ~1M cy of sand every ~10 yrs (at 5 ft of sea-level rise)
  - Cost \$21M - \$22M per nourishment event
  - Feasibility uncertain at higher sea-level rise amounts (e.g., > 2 - 3ft)
    - Estimates assume neighboring cities nourish at a similar scale, otherwise sand would be lost to neighbors
    - Sand retention structures would be needed if neighbors don't nourish at same level to make nourishment effective
    - At this scale, might not be feasible due to availability of and competition for sand sources
  - Would still require higher sea walls

## Conclusions & Recommendations

- Coordinated regional sediment management with beach targets is recommended
  - Sand placed directly on beach has better potential to maintain walkable beach than relying on up-coast nourishment
  - Consider participating in future SANDAG program with some optimization for Del Mar beaches
- There are approaches for strategic placements (timing, grain size, etc.) that could improve effectiveness
- Sand placement may have some negative impacts
  - Beach ecology, sand mining impacts, increase lagoon mouth deposition and maintenance
- Sand retention structures could increase effectiveness
  - Artificial reefs are recommend for consideration as a potential multi-benefit approach and potential effectiveness in trapping sand due to high rates of both north and south transport
- Continued monitoring will help improve beach nourishment efforts

# Questions?



*Photo courtesy of Coastal Environments, 2017*