# Introduction

## Headland Research Motivations
- Can a rocky headland impact alongshore sediment flux?
- Gaps in headland transport research
- Geographical approach infers transport
- Theoretical modeling studies not field validated

## Coastal Management Implications
- Littoral Cell Delineation
  - Headlands frequently used as littoral cell boundaries
- Beach Nourishment
  - Better use of resources for climate change adaptation
- Conservation Zones (e.g., Marine Protected Areas)
  - Management plans for sediment, biology, water quality

# Study Objectives
1. Examine potential sediment transport at a rocky headland under different oceanographic and meteorological conditions
2. Contrast conditions and resultant transport on opposite sides of the headland
3. Assess the likelihood of the headland to be a barrier to transport

# Test Case Headland: Pt. Dume, Malibu, California

## Selection Criteria
- Symmetrical
- Suspected high transport
- Sandy system

Pt. Dume – largest headland in Santa Monica Bay, questioned as a barrier within Santa Monica Littoral Cell

## Field Program
74-day measurement of currents & waves (ADCPs/AWACs), turbidity (OBSs); bed sediment grabs

## Findings
- Wave power contained in southwest quadrant and larger on exposed side of headland
- Alongshore and cross-shore currents show flow toward apex from either side and fastest velocities across apex but shear stresses dominated by waves
- Turbidity highest at inshore off-apex stations

## Conclusions
1. A. Flow and flux from both sides toward the apex; exposed side coarser and more energetic
2. Wave-driven \( \tau_w \) stresses dominate over currents-driven \( \tau_{\text{curt}} \); largest \( \tau_{\text{total}} \) on exposed side
3. Turbidity always lowest at apex
4. Resuspension on exposed side vs. advection on protected → headland a combination of flow scenarios
5. Partial barrier to sediment; grain size dependent as finer sand more mobile

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