Developing a reliable method to estimate recreation demand at San Clemente's beaches

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May 2026

Need

Information is required to understand the town’s beach and surfing resources

Visitation Numbers

Beachgoing
Surfing

Visitor’s Origins

Census Tracts
CalEnviroScreen

Economic Impact

Spending

Previous Research

Banzhaf (1996) examined periodic counts as a statistical sampling problem

Wallmo (2003) estimated beach attendance in Delaware using three methods:

King and McGregor (2012) Compare human counts to lifeguard counts

Nate Merrill and others using cell data.

Approach

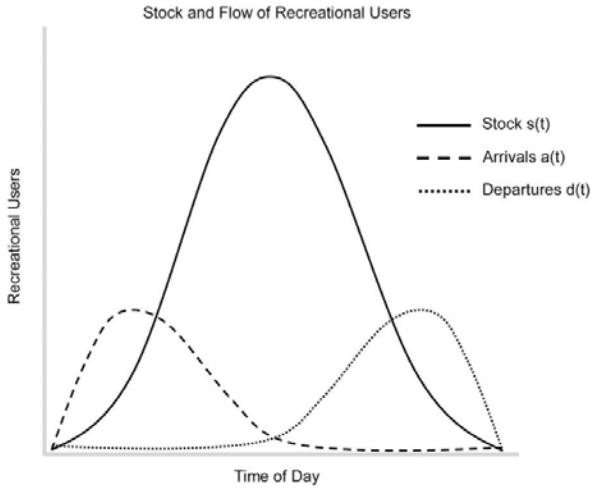
Robust methods and combined modern technologies

Mobile Device Location Data

Placer.ai

Video Counts

Surfline
Coastal Intelligence



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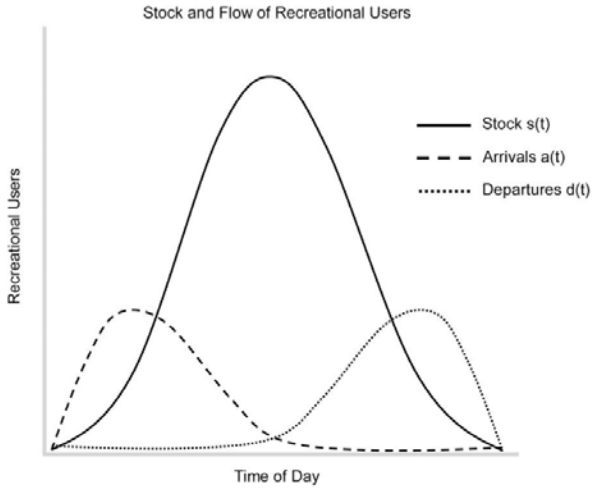

- Visitation over time (hour and days)
- Visitor home origins (CalEnviroScreen %s)
- Economic impact

Approach

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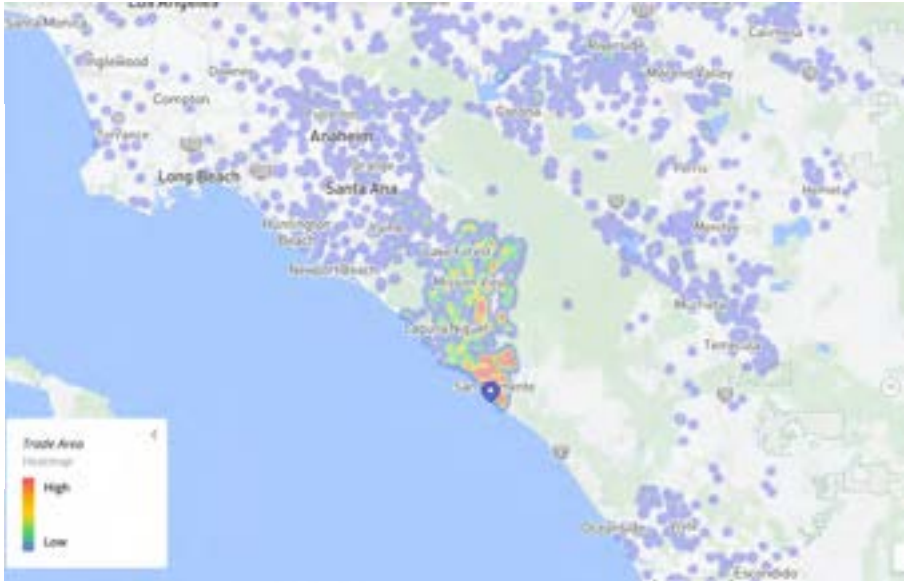
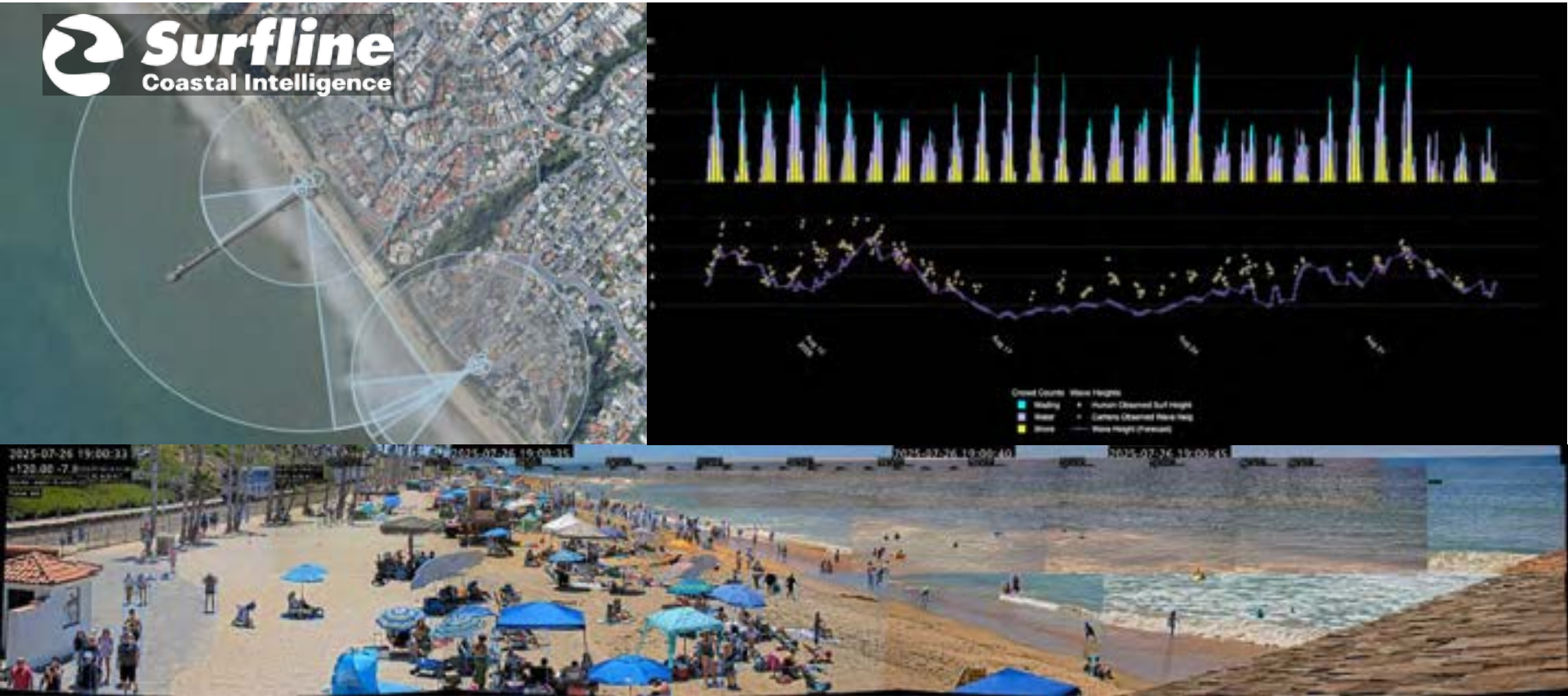


San Clemente South of Pier F...

Visits	124.2K	Panel Visits	7.6K
Visitors	88.5K	Visits YoY	-7.4%
Visit Frequency	1.4	Visits Yo2Y	+1.3%
Avg. Dwell Time	95 min	Visits Yo3Y	-9.4%

Approach

Robust methods and combined modern technologies

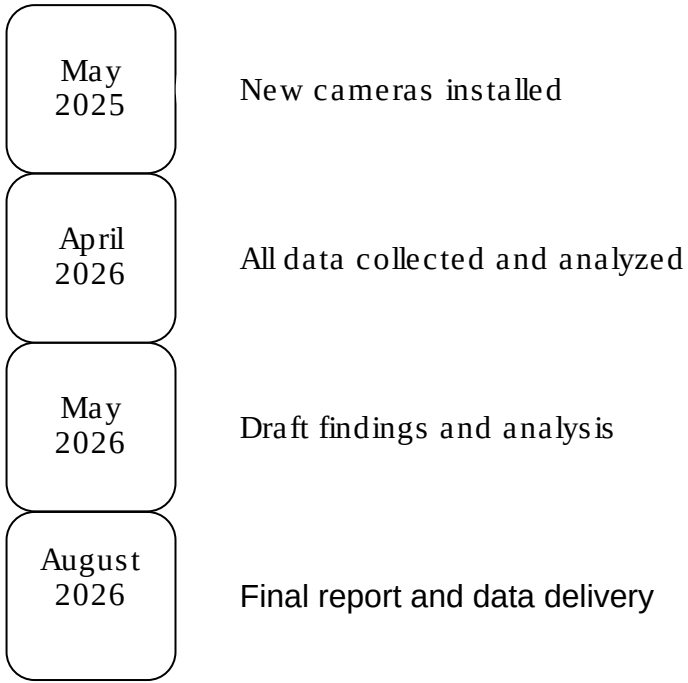


Outcomes

Methods, data and insights

- Visitation estimation methods for using permanently installed cameras
- Multi-method datasets on visitors, visitor origins and recreational behavior for San Clemente’s beaches
- Spending totals and economic impact

Timeline

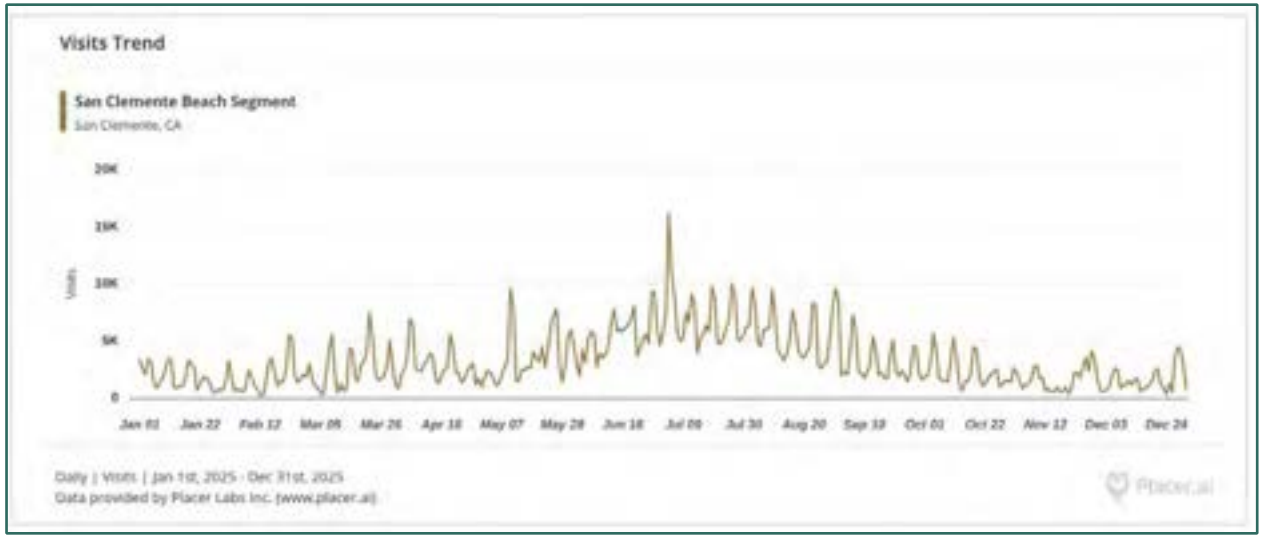

May 2025
New cameras installed
April 2026
All data collected and analyzed
May 2026
Draft findings and analysis
August 2026
Final report and data delivery

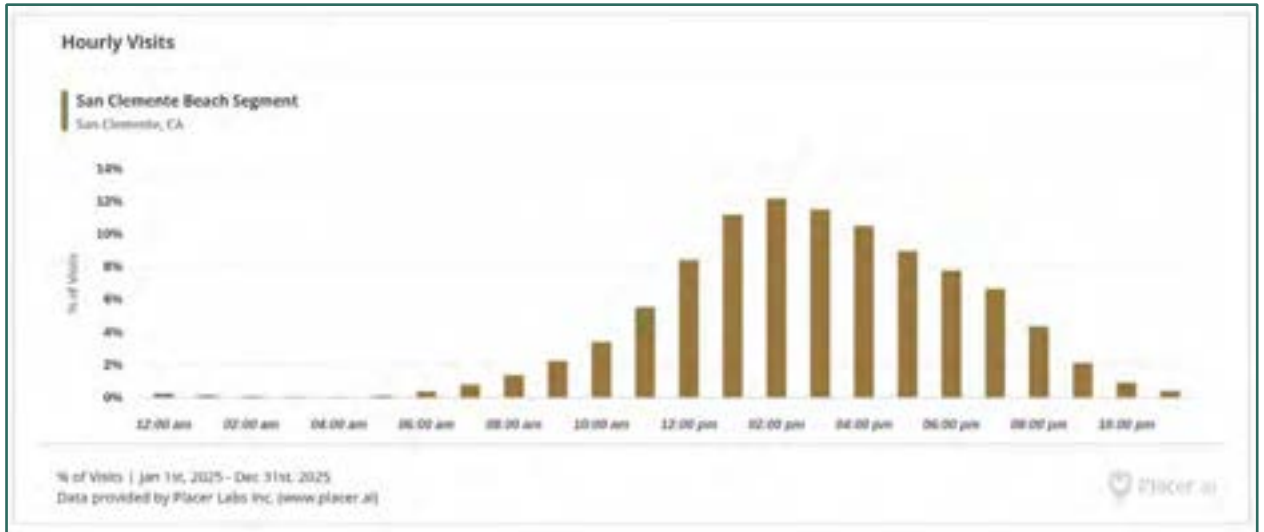
Results

- **High Visitation:** San Clemente recorded approximately 1.2 million beach visits in 2025, with visitors staying an average of 84 minutes.
- **Significant Economic Contribution:** Annual visitor spending totaled approximately $82.1 million, generating $3.3 million in combined local sales and transient occupancy tax revenue.
- **Equity and Access:** The analysis indicates that 12.5% of all beach visits originated from SB 535-designated Disadvantaged Communities (DACs), highlighting the role of San Clemente’s beaches in supporting regional coastal access.

Results

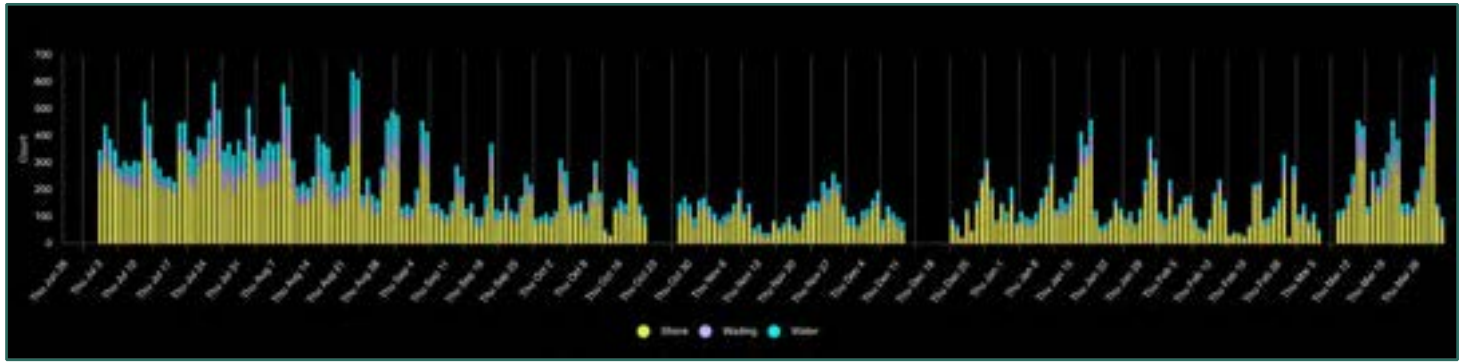
Placer.ai data

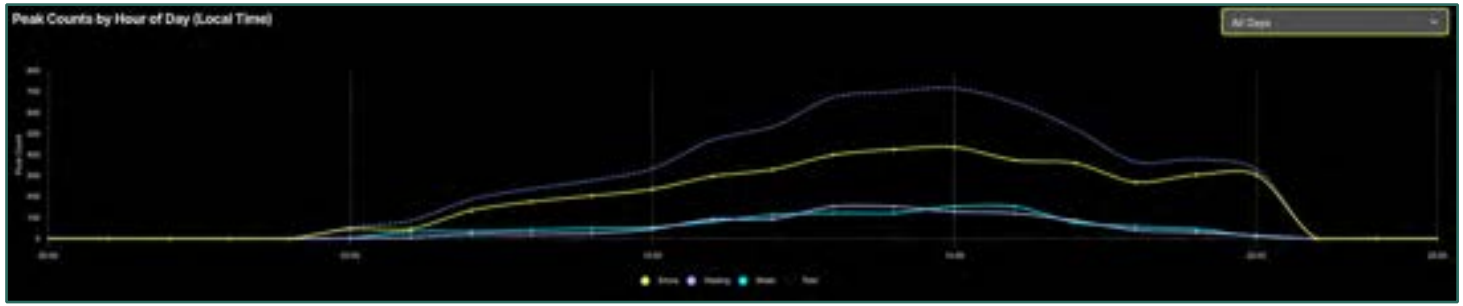




Results

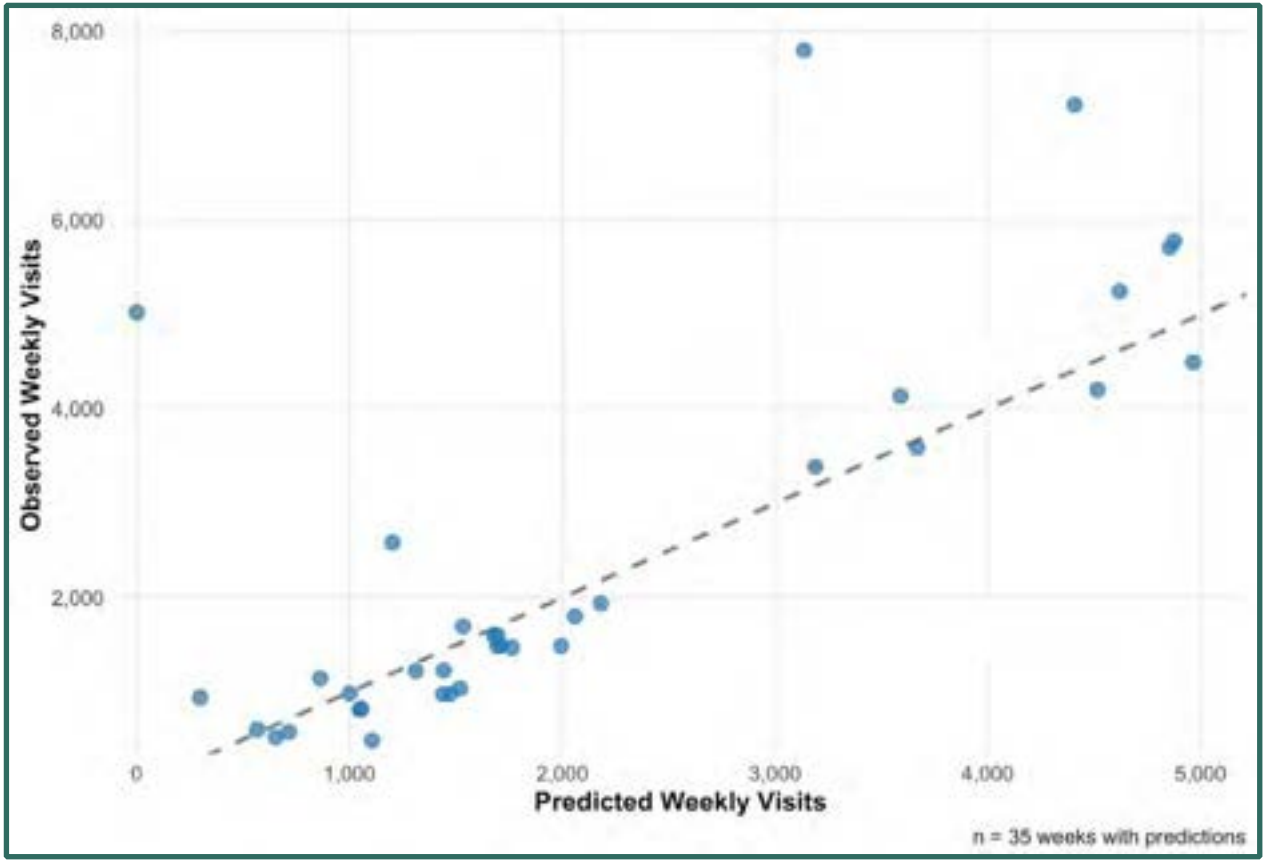
SCI data





Results

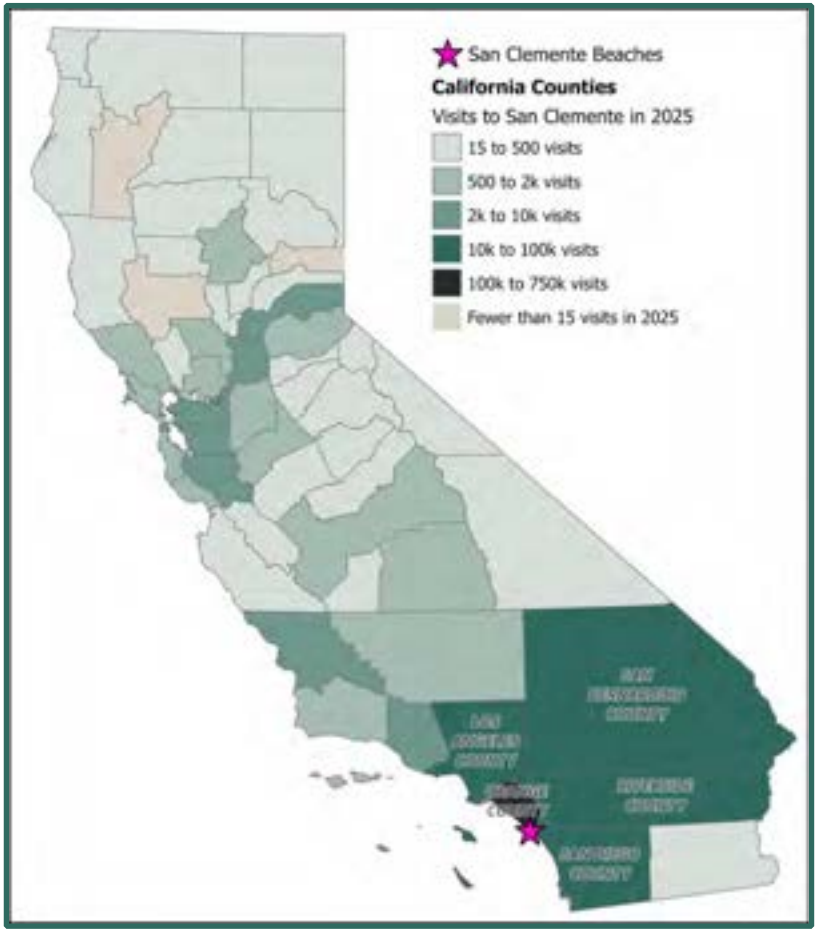
Data combination



Predicted versus observed mobile device–derived weekly visitation estimates for the SCI Mosaic camera view. The dashed line indicates a 1:1 relationship.

Results

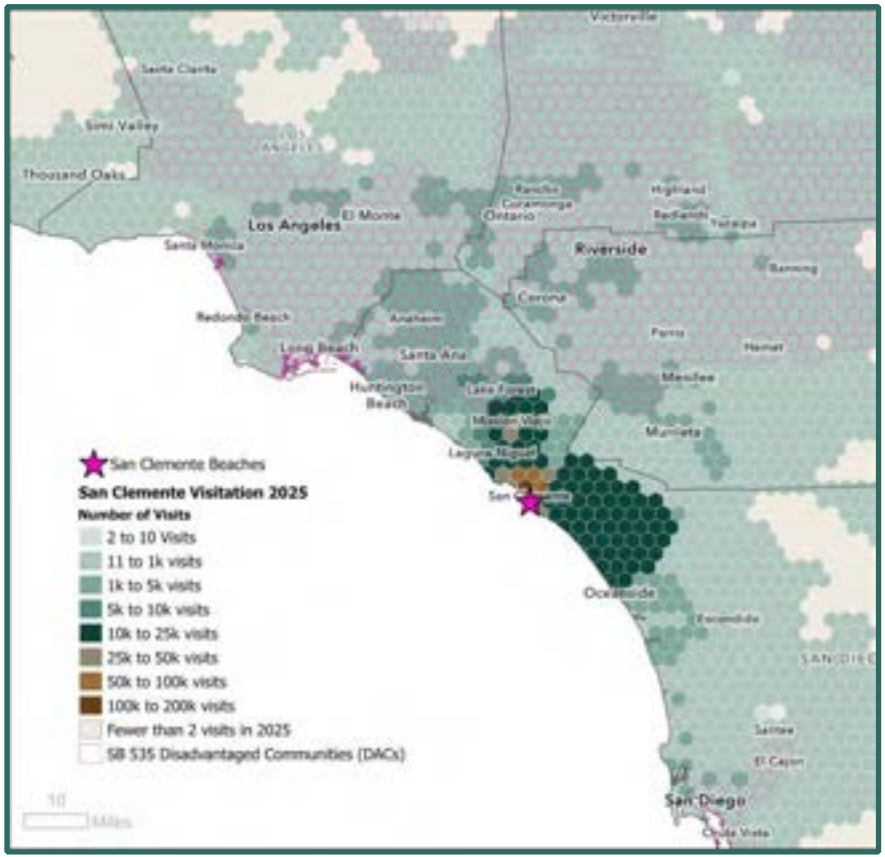
Visitor Origins



Estimated visitation to San Clemente beaches in 2025 derived from anonymized mobile device data (Placer.ai), summarized by county of origin. Values represent aggregated visits originating from each California county.

Results

Visitor Origins



Estimated visitation to San Clemente beaches in 2025 derived from anonymized mobile device data (Placer.ai), aggregated to a hexagonal grid with 5-mile spacing (distance-based). Visit estimates were spatially joined from census block–level origin data to hexagons. Disadvantaged Communities (DACs), as defined under SB 535 using CalEnviroScreen, were joined from census tract–level designations and reaggregated to the hex grid for comparison. Values represent total visits rather than per capita visitation.

Results

Economics

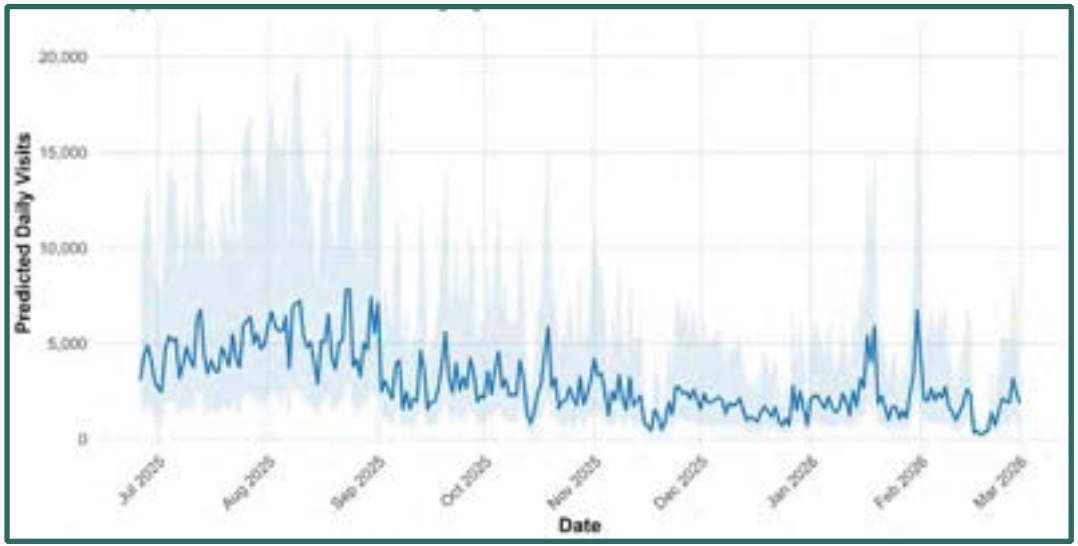
- Visitation broken down into day trips and overnights (>150 miles)
- Visitor spending data from GSA
  - Day - $64.50
  - Overnight- $173.00 (food and lodging)
- Orange County's share of sales tax (1.75%)
- Transient occupancy tax (ToT) (10%)

	Annual Visitation	Annual Spending	ToT Revenue	Orange County Sales Tax Revenue
Day	975,000	$62,905,000	Not applicable	$1,101,000
Overnight	220,000	$19,169,000	$1,917,000	$332,000
Total	**1,196,000**	**$82,075,000**	**$1,917,000**	**$1,433,000**

San Clemente coastal visitors spending and tax revenue.

Discussion

- SCI video count data correlated well with cell data to build visitation models
  - Cameras' fields of views were limited for on-sand recreation (covering ≈12% of useable beach area in San Clemente)
- SCI video counts needed to be converted to visitor days for economics connections
- Combined hybrid data approaches strengthened outcome
  - How best to monitor moving forward?



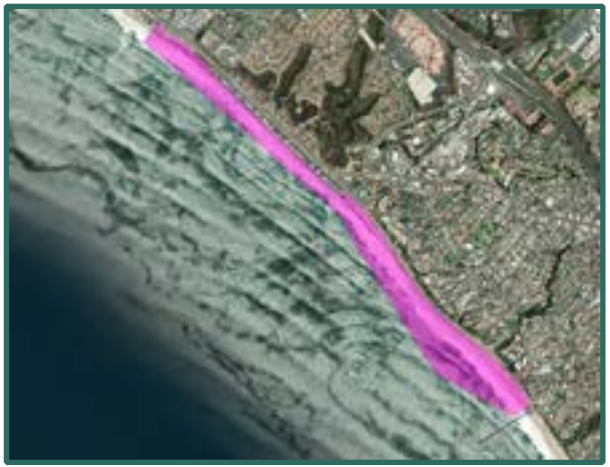
Predicted daily visits for the San Clemente Beach Segment based on the calibrated model using SCI video-derived counts. The shaded band represents the 95% confidence interval.

Extras

SCI camera fields of view. Short name of individual SCI cameras labeled.

San Clemente Beach Segment - covering all of San Clemente's coastal area including the pier.

San Clemente South of the Pier to City Boundary



San Clemente North of the Pier to City Boundary

San Clemente Pier

SCI Camera View	Date Range
Pier North	3/24/2023-Today
T-Street Left	3/24/2023-Today
T-Street Overview	2/28/2023-Today
T-Street	3/24/2023-Today
Mosaic	6/26/2025-Today

Table 1: Date ranges of available SCI video-derived count data by camera view

Pier North

T-Street Left

T-Street Overview

T-Street

General field of view of the SCI Mosaic camera, showing coverage of the beach area south of the San Clemente Pier.

SCI Mosaic camera view used for video-derived estimation of beach attendance.