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Climate Collaboration

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Sediment-by-rail logistics project

Master of Engineering Program

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UC Irvine

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Synopsis

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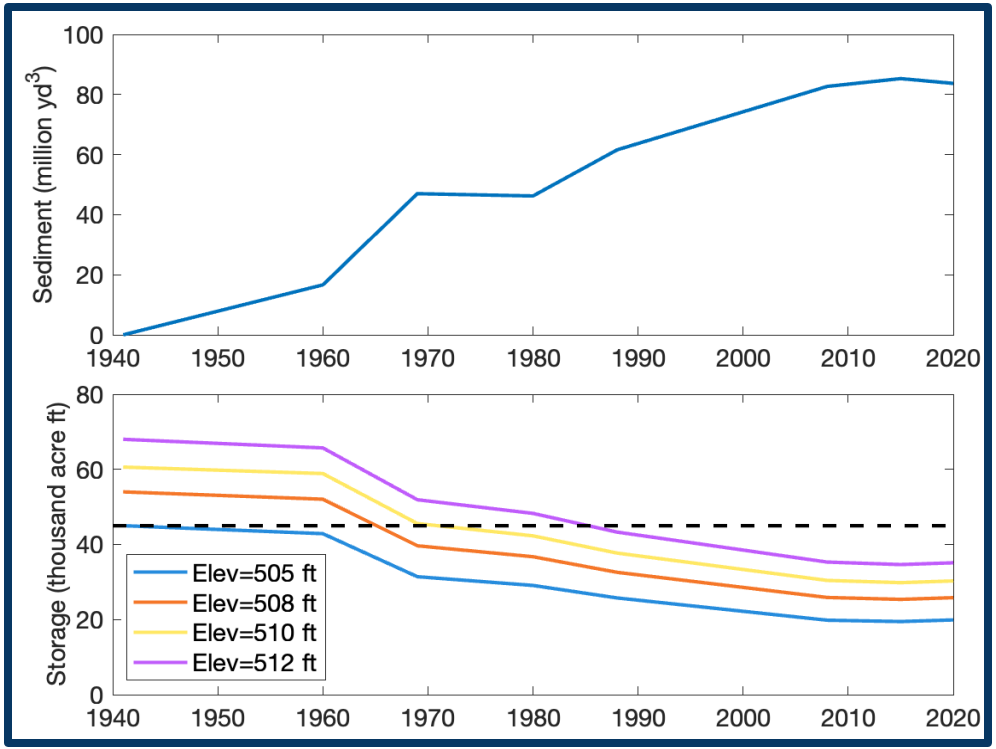
- Five-month project (May-Jun 2026)
- Capstone design experience for 3 Master of Engineering students
- OCWD Leadership: Weekly meetings with Lisa Haney, *Executive Director of Planning and Natural Resources*
- Two faculty advisors
    - Professor Brett Sanders (Environmental)
    - Professor Mike Hyland (Transportation)
- Broad collaboration
    - OCPW, OC Parks, Supervisor Katrina Foley, OCTA, USACE, USFWS, rail experts, permitting experts
- Timely and valuable results

The project will result in preliminary plans for the loading locations, offloading locations, transfer locations, the necessary rail spurs and an estimate of capital construction costs, operating costs and delivery costs.

Sediment Accumulation in Prado Basin



High demand for sediment on South Coast beaches

NEWS › TRANSPORTATION • News

Sand trucked in from desert to help protect rail line, address beach erosion in San Clemente

Crews bring in truckloads of sand at North Beach in San Clemente, CA as part of its ongoing emergency response to help protect the coastal

By LAYLAN CONNELLY | lconnelly@scng.com |
PUBLISHED: September 5, 2025 at 3:20 PM PDT

THE ORANGE COUNTY REGISTER

Constraints have made "cost effective" transport-by-rail elusive

- Disturbances to habitat and sensitive species
- Restrictions on placement in the coastal zone
- Rail spurs for loading/unloading
- Minimum volume constraints
- Rail congestion constraints

Prado Basin plays a big role in Southern California

Journal of Coastal Research	SI 36	662-674	(ICS 2002 Proceedings)	Northern Ireland	ISSN 0749-0208

Retention of Beach Sands by Dams and Debris Basins in Southern California

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ABSTRACT

The sediment budgets of most beaches in southern California are dominated by sand contributions from coastal streams. Extensive alteration of fluvial systems by the construction of dams and debris basins has reduced substantially the volume of sand reaching the shore. This is one factor in the chronic erosion of these beaches. The purpose of this research is to assess the magnitude of the impacts of coastal dams and debris basins on sand delivery using direct measurements of sediment impoundment rates within eight watersheds.

Sediment impoundment data were obtained for 28 dams and more than 150 debris basins in the watersheds of eight rivers: the Santa Ynez, Ventura, Santa Clara, Los Angeles, San Gabriel, Santa Ana, San Dieguito, and San Diego. The cumulative effect of these structures is the impoundment of more than 4,000,000 $m^3\ yr^{-1}$ of sediment. This is equivalent to a potential deprivation of beach sand of roughly 3 $m^3\ yr^{-1}$ per m of shoreline in the five southern California coastal counties.

The sedimentation records for individual watersheds are interpreted in the context of wet and dry climate episodes in the last century. The data are compared to estimates of sediment delivery derived from stream gauge records. In most watersheds, the majority of sedimentation occurs behind one dam, and the contributions of debris basin impoundment are secondary. The net effect is a substantial reduction of potential sand supply to the coast.

ADDITIONALINDEXWORDS: *sediment budget, watershed sedimentation, human impacts, coastal streams*

- Santa Ana River watershed accounts for **25% of all captured sediment** in Southern California
- 1 million m^3/year vs a total of 4 million m^3/yr

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2026 Project Execution (Jan – May)

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- **Discovery - January & February**
  - Panel Consultation with experts organized in collaboration with the County of Orange. Including sites visit.
  - Examine all logistical factors influencing solution
- **Preliminary solutions – March & April**
  - Source locations, staging, rail spurs, placement
  - Costs and benefits
- **Engagement Symposium – April**
  - Presentation from students and discussion with broad community
  - Feedback for improvements
- **Revised solutions – May**
  - Presentations/reports

Last year MEng Symposium at the Ole Hanson Beach Club

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Thank you!

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