



## San Luis Rey Longshore Sand Transport Investigation

### Description

The San Luis Rey River (SLRR) Flood Risk Management Project (FRMP) is located in southern California in the city of Oceanside. As part of the larger sediment and vegetation management plan to attain and maintain authorized flow conveyance in the channel, sediment removal activities have to be undertaken. The sediment removal and mitigation plan for the SLRR FRMP requires the investigation of the sources and sinks of the sandy sediment that has historically blocked the SLRR mouth. This investigation will be performed using a coupling of the Adaptive Hydraulics (AdH) and StWave models. This effort will allow for the design of mitigation options and reduction or elimination of future sediment removal activities, as well as frequency of sand plug removal located at the mouth of the river.

The San Luis Rey River Flood Control Project was approved in 1970 pursuant to the Flood Control Act of 1965. The original Project design, identified as the “modified single-levee plan,” with subsequent modifications, was approved in March 1988 in the Supplemental Phase II GDM, and authorized by Congress in 1990. The first construction contracts were awarded in 1988, with construction beginning in 1989 and continuing in phases designed to convey 89,000 cubic feet per second (cfs) for a Standard Project Flood event. Physical construction of the levee system of the flood control channel was completed in January 2000. Unfortunately, due to the growth of vegetation within the river channel, increase in the population of endangered species, and the designation of critical habitat under the Endangered Species Act (ESA), the original plan for vegetation and sediment management Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) plan could not be implemented without receiving a jeopardy opinion pursuant to the ESA. As a result the authorized capacity at the time of construction was never achieved. Alternatives were analyzed in the Post Authorization Decision Document/Supplemental Environmental Impact Statement/Environmental Impact Report (PADD). The vegetation and sediment removal plan was estimated to take eight or more years to complete if fully funded each year. The remaining work involves: (1) removal of vegetation from the levee structure for levee inspection and compliance with EP 1110-2-18; (2) levee inspection and repairs to the levee; (3) sediment removal from the channel; (4) project environmental commitments to fulfill on-going resource agency terms and conditions; and (5) any additional associated environmental compliance.



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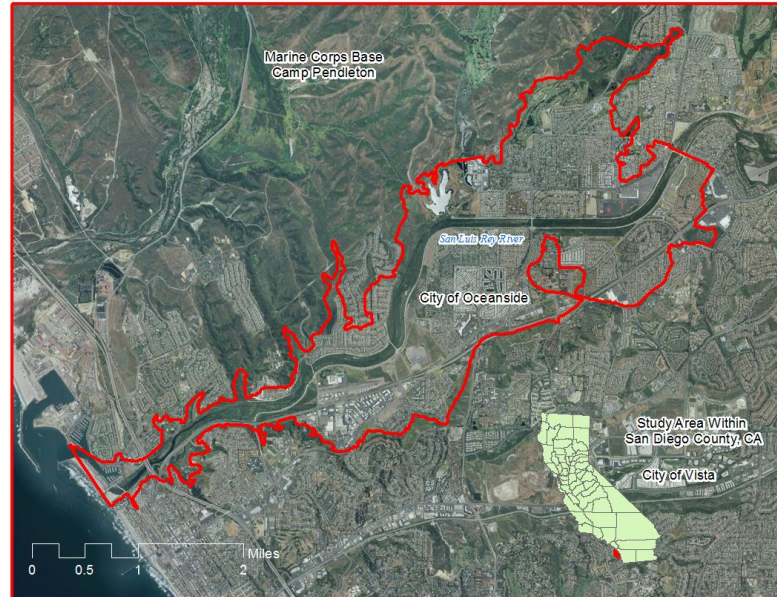


Figure 1. Location of RSM region or initiative(s).

**Issue/Challenge  
To Address**

The proposed RSM project is truly regional in scope. The location lies at the intersection of mutually dependent inland and coastal processes. The flood control in the inland is dependent upon the longshore transport at the mouth of the river, and the shoaling at the mouth is dependent upon the flow in the river. Countermeasures for shoaling will have consequences for longshore transport downwind on the coast.

**Successes  
Lessons Learned**

- The work in progress for this project offers a unique opportunity to study sediment transport at mouth of a river /estuary sand plug formations. The first phase of the simulation run results shows AdH is capable of capturing river physics form hydraulic stand points. The next step that is adding oceanic boundary condition will potentially bridges the gap between river engineering and ocean engineering, while simultaneously treating a challenging environmental problem more properly.

**Expected Products**

- 8 simulation AdH model corresponding to 8 hydrological flood frequencies were run over the whole computational domain. This area corresponds to the required area for design flood inundation.
- The AdH model for sediment transport will be set-up. Sediment data for river has been identifies are being prepared to be plugged into AdH Sed\_Lib module.San
- StWave values are being collected. StWave results represents Oceanic Boundary condition
- Evaluation of variability of sand-plug at the mouth of San Luis Rey River in response to longshore sediment transport
- Comparison of existing sand plug data to AdH/SEDLIB+StWave model results for further validation of the product
- Report and presentation



US Army Corps  
of Engineers.  
Engineer Research and  
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## National Regional Sediment Management Program Los Angeles District (SPL) & ERDC:



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#### Stakeholders/Users

The stakeholders for this project are the City of Oceanside, the Fish and Wildlife Services and the USACE. The non-Federal stakeholders will be able to use the information generated through this RSM project for compliance with FEMA regulations.

#### Projected Benefits Value Added

This RSM project straddles a unique environment where inland and coastal processes interact. Flood control measures for the inland are directly dependent upon the understanding of the causes of the SLRR mouth blockage by sand, and the magnitude of the sand transport through wave driven longshore transport. The engineering knowledge gained through this RSM project will be invaluable in understanding the interplay between the inland and the coastal environment, and develop strategies for longshore shoaling counter-measures.

#### Leveraging Opportunities

The work in progress for this project offers a unique opportunity to study sediment transport at mouth of a river /estuary sand plug formations. This effort potentially bridges the gap between river engineering and ocean engineering, while simultaneously treating the challenging environmental problem more properly. From engineering practice point of view, SLRR is a natural field scale physical laboratory experiment that tests our engineering advancement. This RSM project will leverage other SLRR projects that the L.A. District is undertaking thereby reducing costs for both the RSM program and the district project.

#### Points of Contact

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#### Participating Partners

This project is a collaborative sediment study between SPL and ERDC.