

Goat Rock State Beach Jetty Study



Russian river jetty—August 9, 1930. Looking south from county road, showing entire jetty, railroad and quarry.

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What is the Goat Rock State Beach Jetty?



- Constructed 1924-1948
- Maintain open passageway into estuary
 - Facilitate transport of mined gravel
- 1,600 lineal feet

Why Study the Jetty?

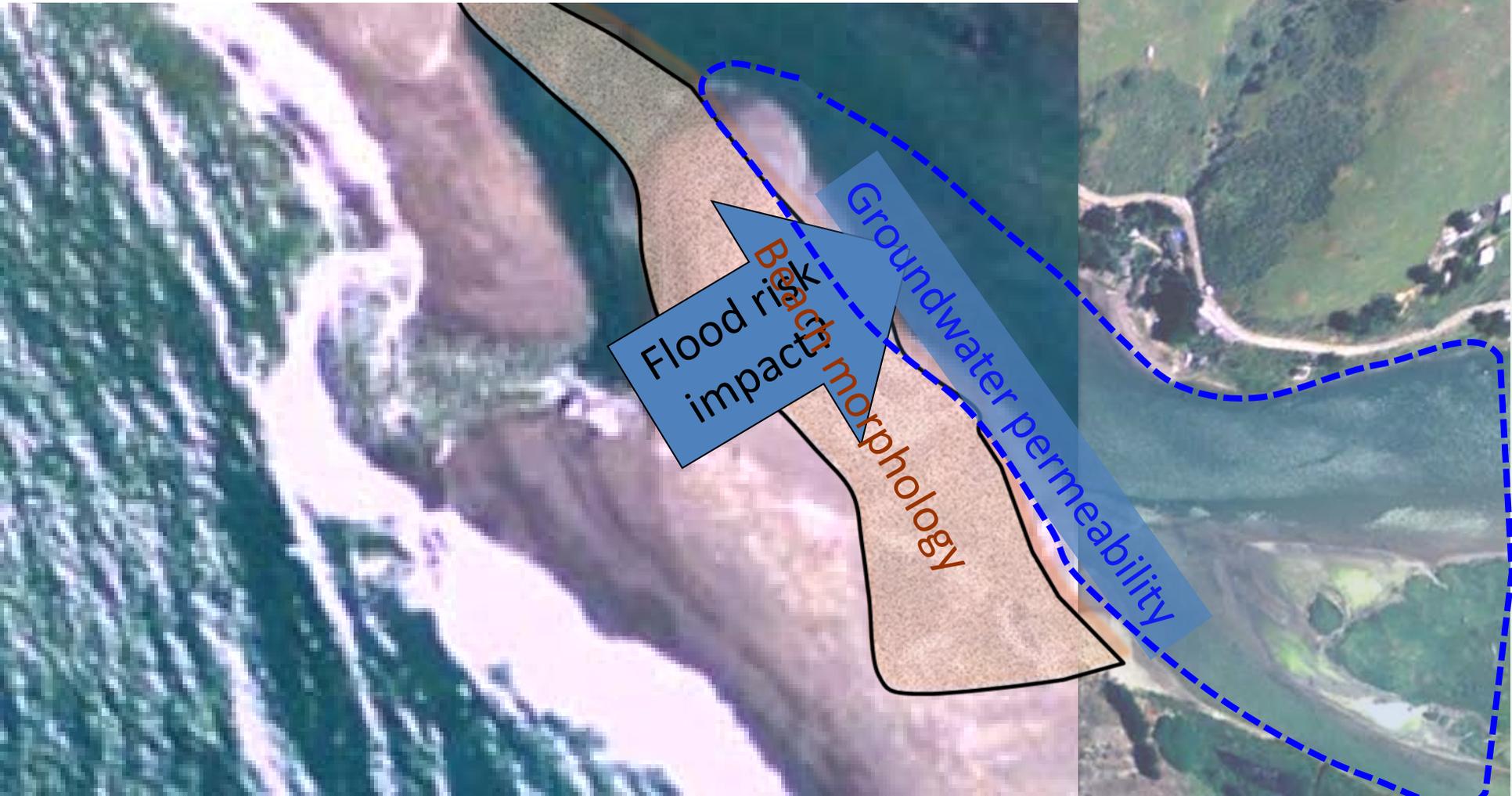


- 2008 Biological Opinion
 - Requirement of Reasonable Prudent Alternative
 - Manage estuary for steelhead rearing habitat while minimizing flood risk
 - May 15 - October 15 lagoon management season
 - No funding source identified for project implementation

Why Study the Jetty?

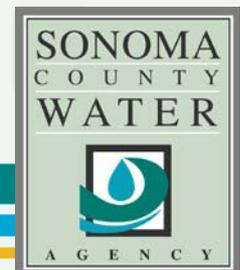
Freshwater lagoon habitat May 15 – Oct 15

Inlet morphology



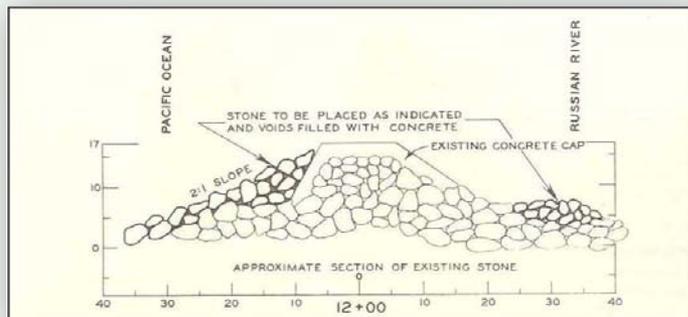
Study Components

- Jetty Structure
 - Historic Assessment
 - Site Assessment
 - Geophysical Analysis
- Groundwater Permeability
 - Groundwater monitoring wells
 - Geophysical Analysis
 - System Water Balance Study
- Ocean Waves Assessment
- Inlet and Beach Morphology Assessment
- Flood Risk Assessment
- Alternatives Development and Assessment
- Final Report

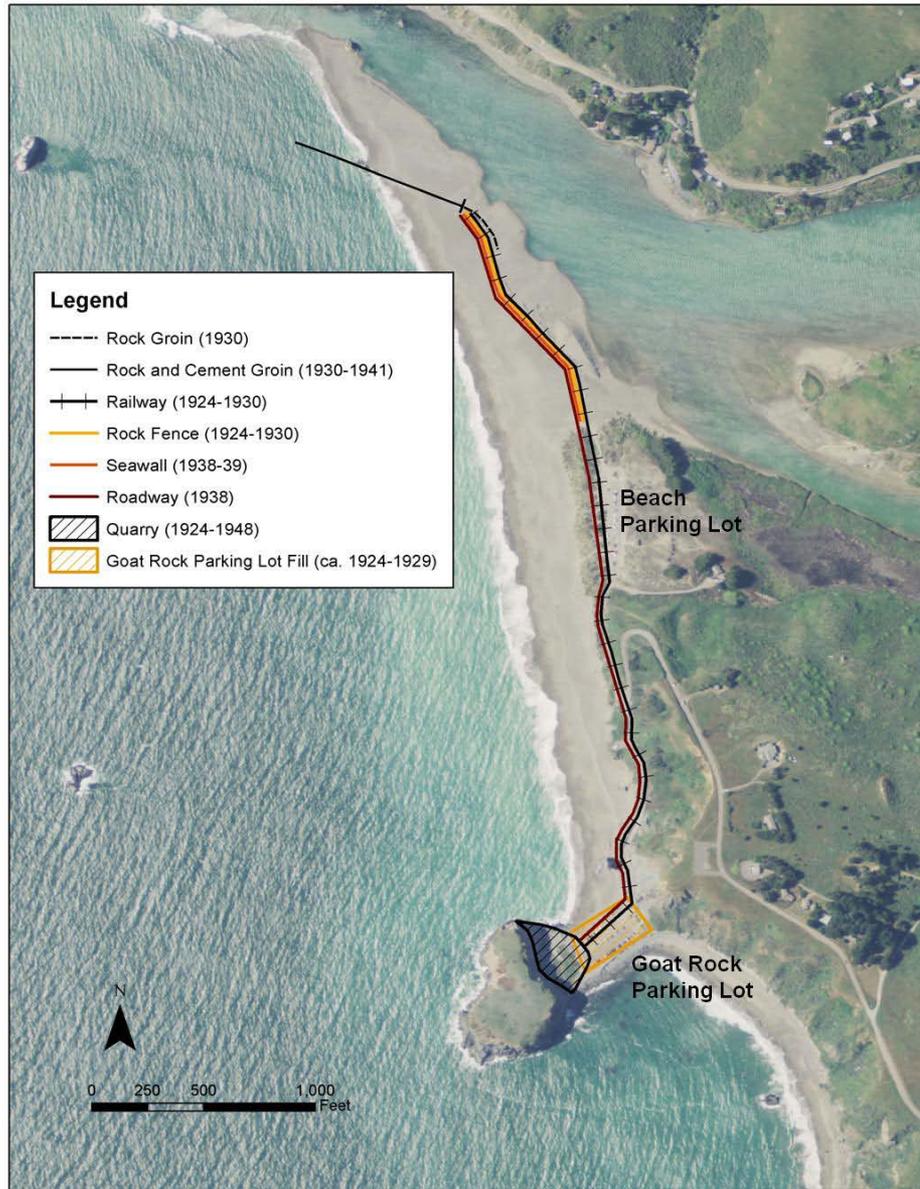


Jetty Structure - Historic Assessment

- Limited information on composition
 - Reports
 - Plans
 - Photographs and Aerials
- Two phases of construction
 - 1st Phase: 1924 to 1934
 - 2nd Phase: 1938 to 1948



Jetty Structure - Historic Assessment



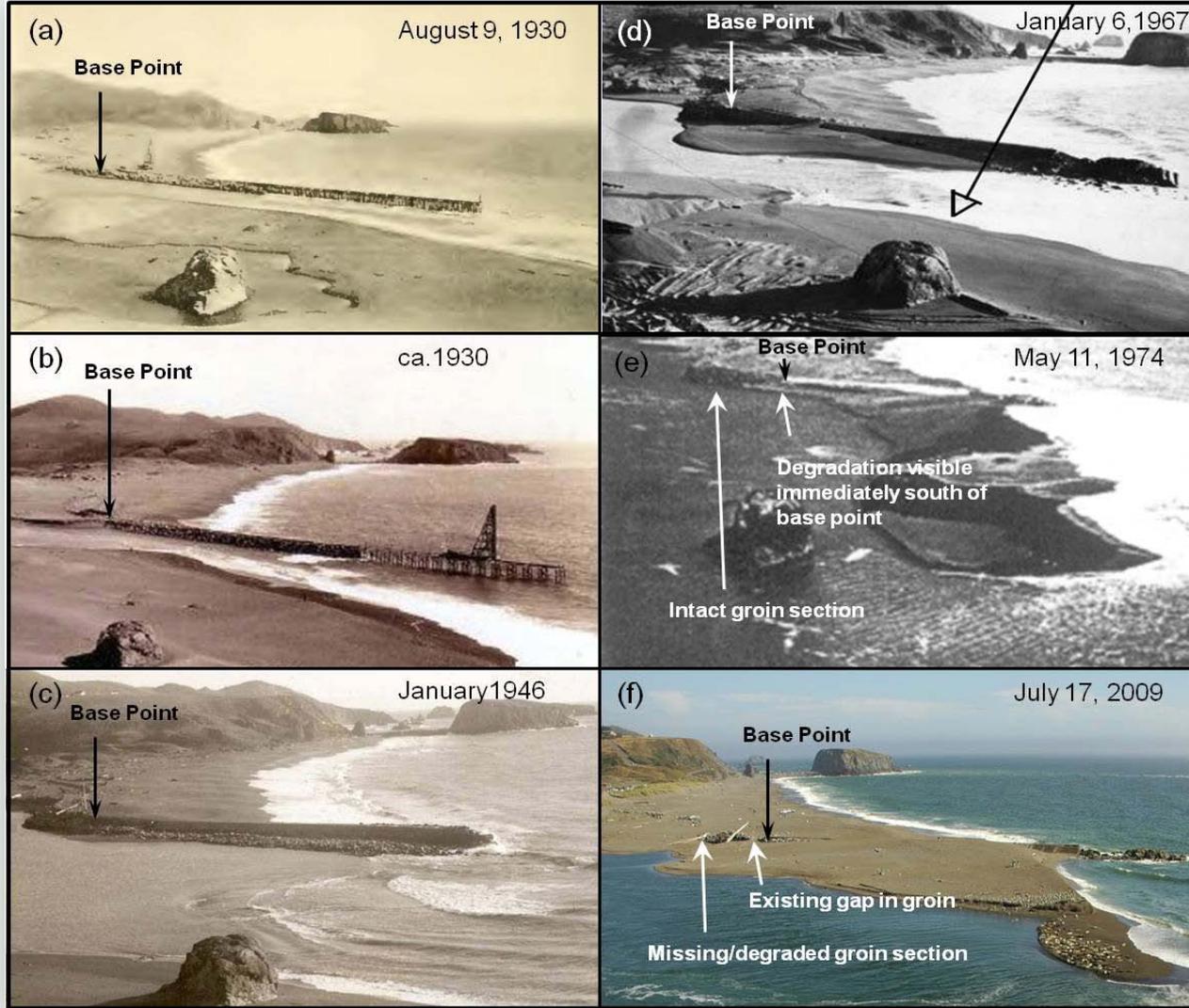
First Phase of Construction

- **1924-1929:** Quarry, railway constructed. Rock fence constructed to protect railway
- **1930:** Groin constructed
- **1930-1934:** Groin repairs

Second Phase of Construction

- **1938-1939:** Seawall and rock fence constructed
- **1940-1941:** Concrete cap placed on groin
- **1948:** Stone armoring added to groin

Jetty Structure - Historic Assessment

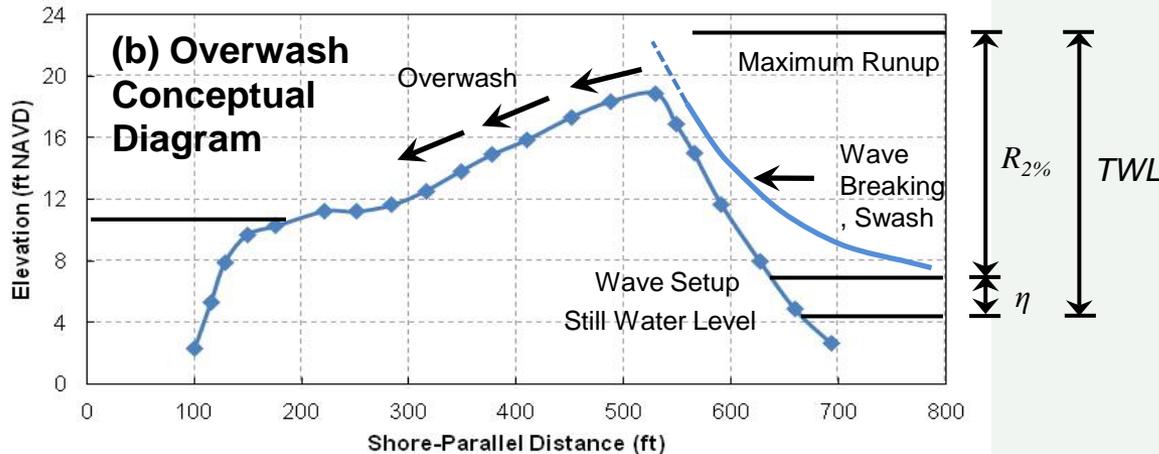


Ocean Waves Assessment

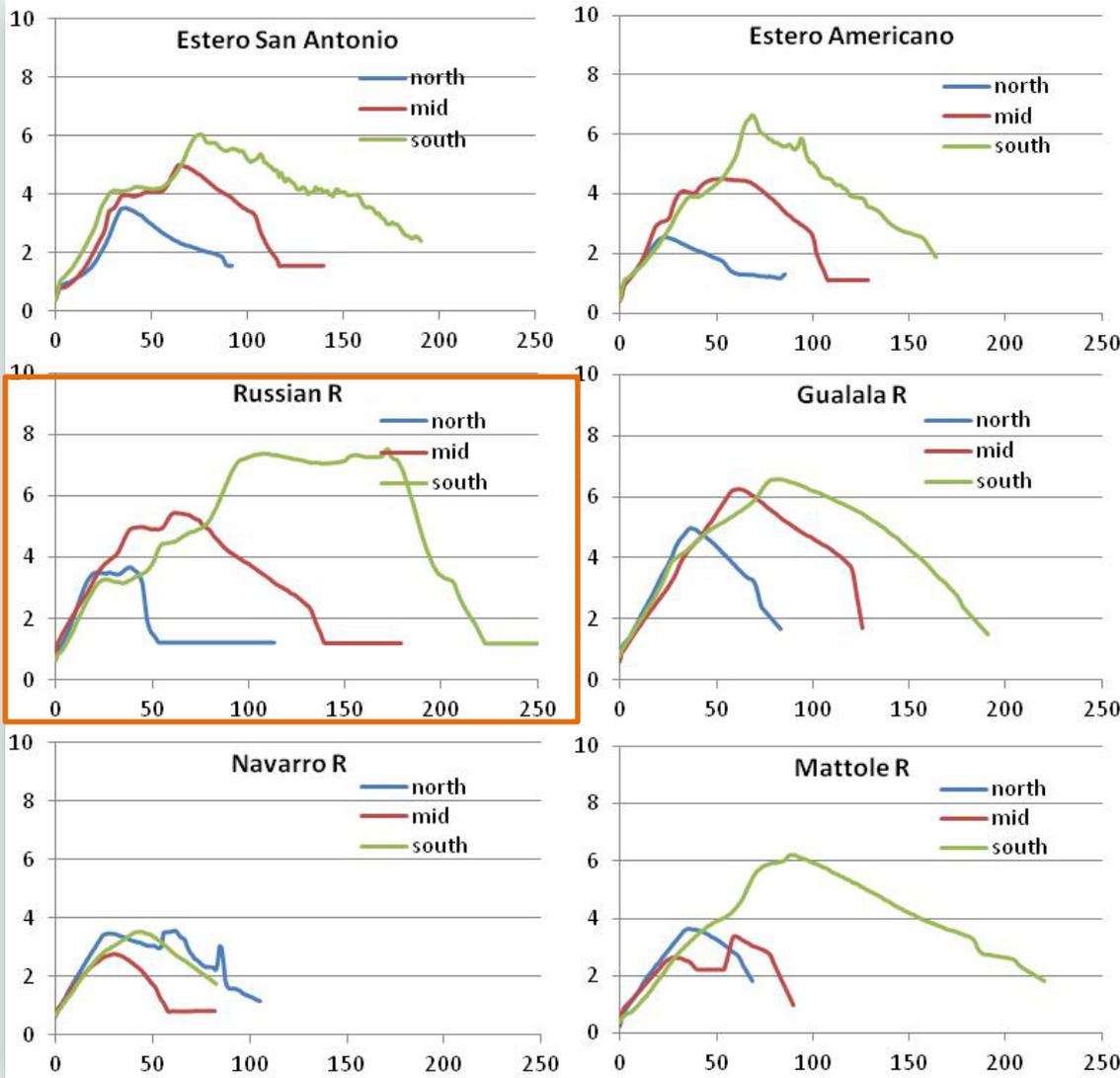
(a) Beach Overwash on December 9, 2009



- How waves affect lagoon conditions
 - Wave overwash = saltwater increase
- Comparison to estuary beaches w/o jetty
 - Gualala River Estuary
 - Navarro River Estuary
- Increase in overwash
 - May to October
 - Steelhead rearing season

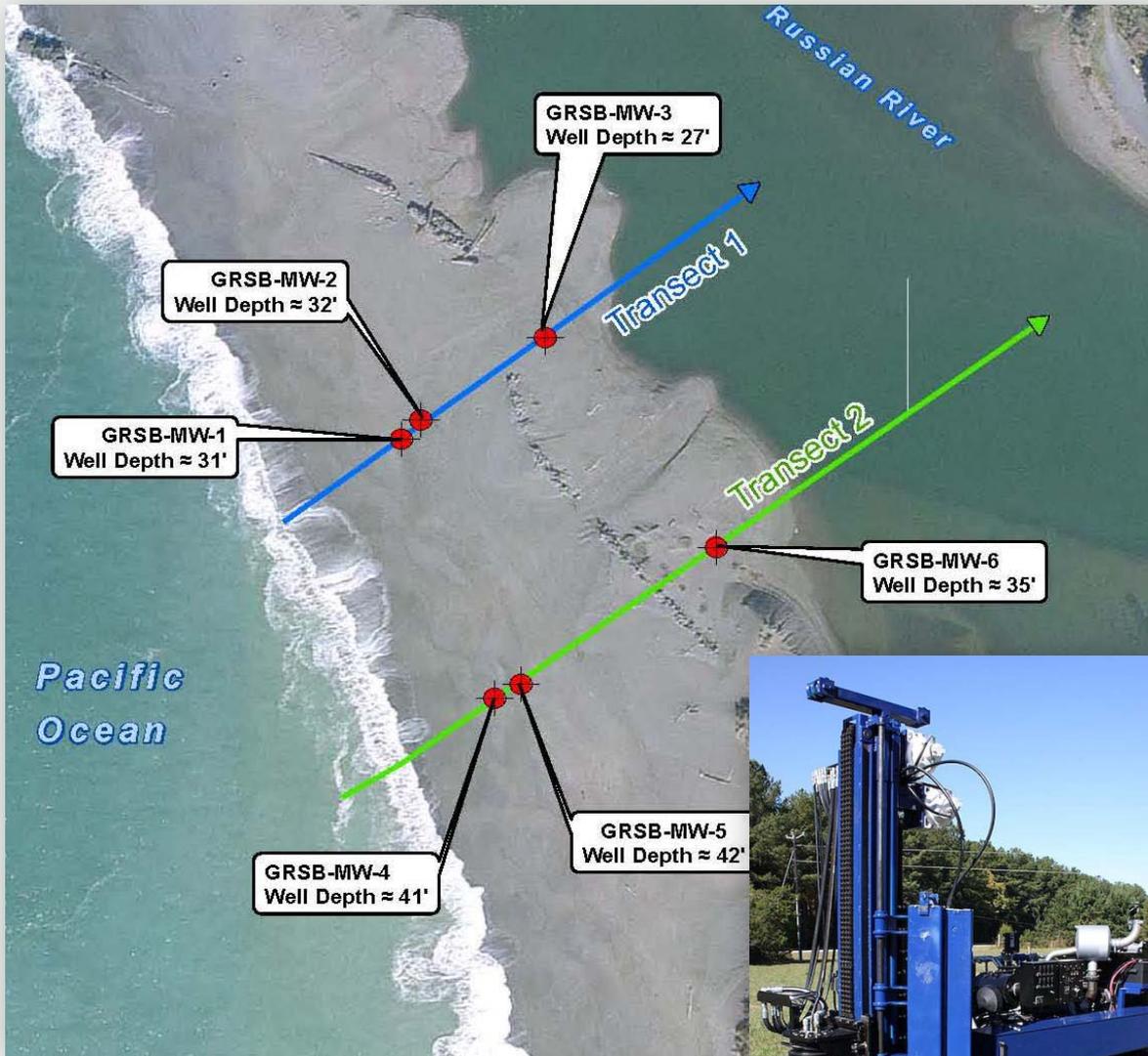


Beach Morphology



- Findings
 - South of groin, beach is wider and higher than other beaches in area
- Possible Implications
 - Decreased groundwater flow south of groin
 - Reduced wave overtopping south of groin

Future Work – Monitoring Wells



- Why?: Better understand groundwater flow through beach
- How?:
 - Up to 6 monitoring wells
 - 2" well casing
 - Top of well buried in sand
 - Wells to be instrumented
 - Monitored/maintained once per month
 - Public will have access to beach during construction
 - Restricted access in immediate vicinity of well construction
 - 2 to 4 days



Future Work – Geophysical Surveys

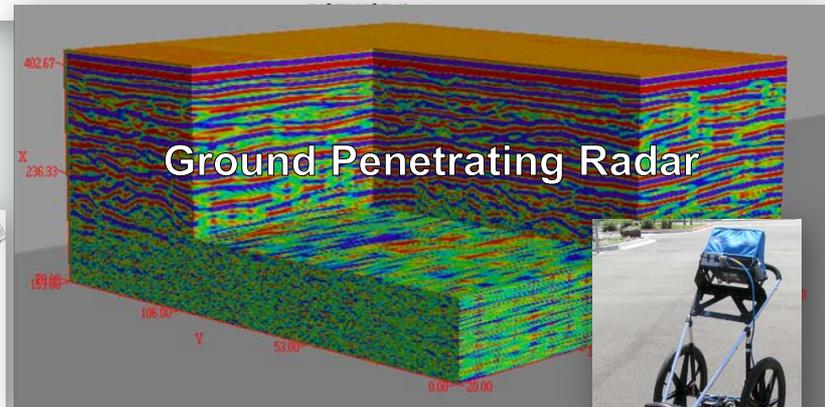
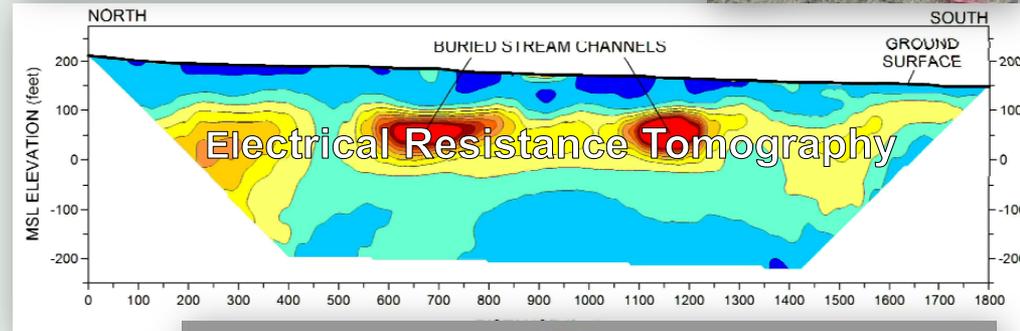
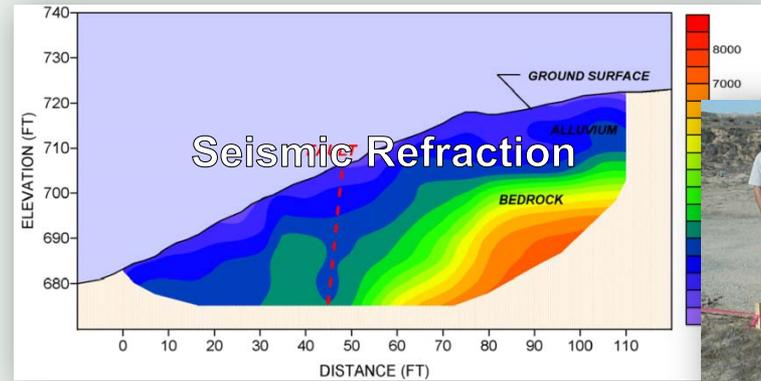


- Why?:
 - Geometry and composition of buried rock jetty
 - Thickness of sand and bedrock
 - Groundwater flow through beach berm

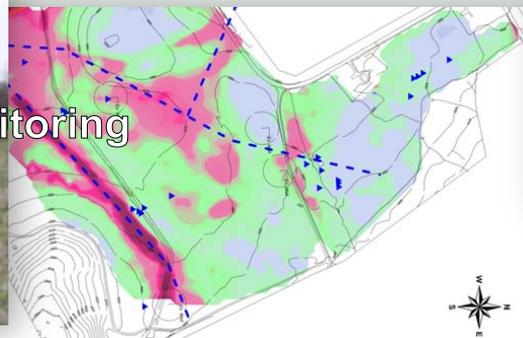
Future Work – Geophysical Surveys

How?:

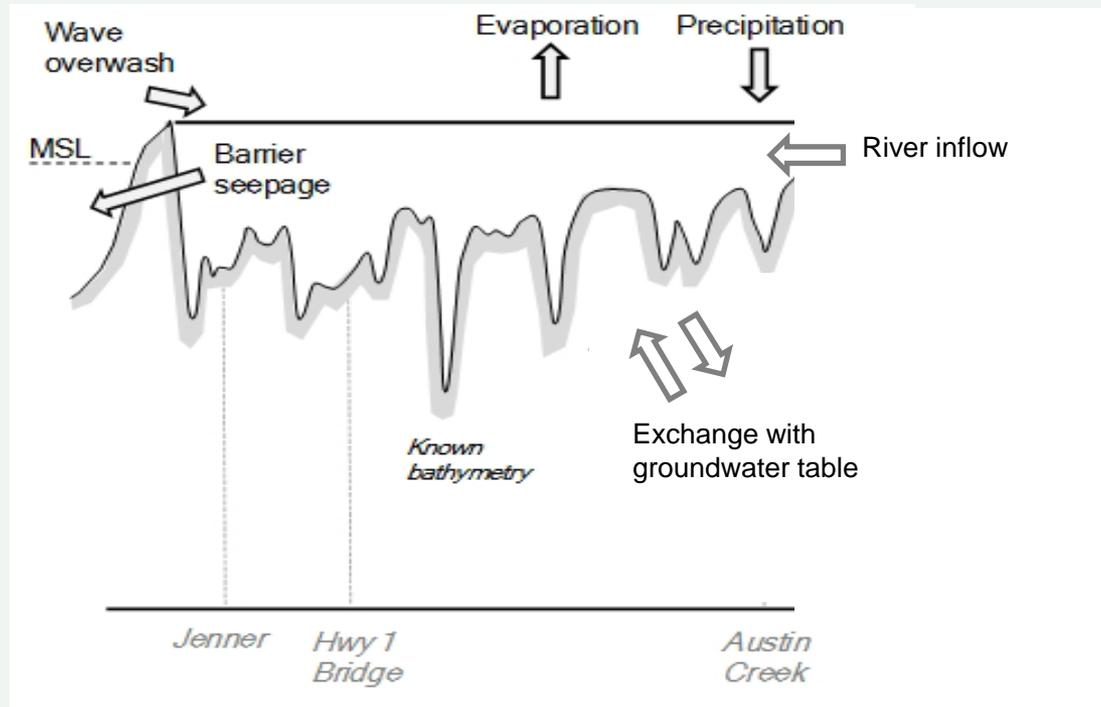
- Seismic Refraction – up to twice
- Electrical Resistance Tomography - once
- Ground Penetrating Radar - once
- Electromagnetic Monitoring – up to 10
- No permanent installation of equipment
- Public will have access to beach
- Restricted access in immediate vicinity of survey activity
- 1 to 2 days per survey
- Researchers:
 - Lawrence Berkeley National Lab
 - NorCal Geophysical



Electromagnetic Monitoring



Future Work - Alternatives

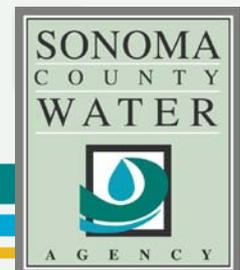


- Synthesis of data to develop conceptual model
- Development of jetty modification or removal alternatives
- Final Report

Study Schedule



- Spring 2013: Obtain permit to conduct field investigations
- October 2013: Complete field investigations
- December 2013: Final Report
- Final Report to be available on Water Agency website:
www.sonomacountywater.org



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Lawrence Berkely
National Laboratory

NorCal Geophysical



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