A Review of the San Clemente Dam Removal & Carmel River Reroute Project

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http://www.sanclementedamremoval.org/
Lead Agencies & Staff

• California American Water [Cal-Am], J. Aman Gonzalez, P.E.

• NMFS, Joyce Ambrosius & Jacqueline Pearson-Meyer

• State Coastal Conservancy, Trish Chapman

L to R - Joyce A. & Trish C.
Design Build Team

• Design Build Team
  – Granite Construction – Construction Lead
  – Kleinfelder – Design Lead
  – Tetratech – Design Lead, Channel Restoration

• Owner’s Team
  – Water Systems Consulting – Construction Management
  – AECOM – Owner’s Engineer
see sample slides
tchapman, 2/10/2016
$83 Million Total Cost

- California American Water, $49,000,000
- Federal Funds, $2,500,000
- State Funds, $28,200,000
- Settlement Funds, $2,000,000
- Resources Legacy Fund, $433,000
- The Nature Conservancy, $1,000,000
Factors Driving Dam Removal

• Seismic Safety
  – Earthquake + Probable Maximum Flood = loss of life & damage ~1500 properties for 3+ miles downstream.
  – DWR-DSOD rated as the most unsafe dam left in CA

• Create Volitional Fish Passage
  – Removing the steepest fish ladder in western North America
  – Faster & better access to ~60% of the watershed’s steelhead habitat

• Stream Function
  – Restore natural sediment transport & habitat connectivity
Original Impediments to Dam Removal

• CAW required by CPUC to select least cost alternative
• CAW required by DWR-DSOD to pick fastest alternative
• No feasible dam removal option was originally identified in first 2008 EIR
• CAW not familiar with restoration projects
• Long term liability for any removal project
Factors Driving the Reroute Option

• Reinforcement least expensive & “feasible”, but still subject to earthquake risk & unstable rock face on north abutment. Required harsh annual sluicing of accumulated sediment to maintain fish passage

• Community opposition to trucking sediment precluded dredging & recovery of ~1,200+ AF of storage or natural channel restoration
  – ~250,000 dump/~125,000 double trailer trucks required
    ~8-10 years, 6-12 m/yr, every 5-10 min, 24/7 or 9-4, weekdays

• Gradual dam removal & resuspension of ~1300 cubic yards of sediment created downstream flood liability for Cal-Am, may have affected habitat quality for up to 40+ years, & required interim trap and truck

• Minimize long term project liability final landowner
Negative Impacts of SCD and the Reservoir’s Sediment Field

- Steep ladder may have delayed adult immigration & blocked smaller fish
- Annual draw-down for seismic safety from 2003-2014 curtailed late season adult immigration, & reduced downstream water quality
- Bare sediment field of inundation zone & minimum pool heated river water, created severe algal blooms, impaired downstream juvenile redistribution + fall pre-smolt emigration, & enhanced avian predation
Design Objectives

• Eliminate dam safety issue.
• Bank accumulated sediment on site, resistant to P.M.F. = 81,200 CFS & M.C. Earthquake = 6.7 Richter Scale
  – + Avoid trucking/sluicing impacts
• Restore volitional upstream passage for adults, and larger juveniles
  – + Enhance downstream passage & survival of juveniles
• Restore natural sediment transport for spawning gravel & beach replenishment
  – + restore habitat connectivity
• Create an aesthetic solution & convert to public land (BLM) linked to regional park & potential full river trail
Project Timeline

- **1992**: Dam Declared Seismically Unsafe
- **1999**: Dam Safety Order
- **2007**: Draft EIS/EIR
- **2008**: Final EIR/EIS Certified
- **2008**: Geotech Investigation
- **2010**: Reroute Concept Defined
- **2011**: Concept Refinement
- **2012**: Preliminary Design Completed
- **2013**: 75% of funding secured
- **2013**: Access Road Change
- **2013**: Final Permits
- **2013**: Granite Construction Selected as contractor
- **June 2012 - CPUC approves Dam Removal**
- **Begin Construction!**
History of San Clemente Dam

- Constructed in 1921 by Del Monte Properties, later sold to California Water and Telephone Company; Purchased by CAW in the 1960’s
- 106 feet tall concrete arch dam - Reservoir storage of 1,425/2,136 AF
- Spillway crest elevation of 525 feet - Spillway capacity of 20,800 CFS
- Declared seismically unsafe in 1992
- Ceased being used as a water supply in 2001 due to sedimentation & ESA
Stop Logs = + 711 AF of Storage
Flood Photo – 3/10/1995 @ 16,000 CFS

Failure Risk = Peak discharge of 76,700 CFS 5 minutes after dam breach
Sediment Field Intrusion

- Storage Reduced From 1425 to <90 AF
Pre-Project Site Video
Reroute and Removal Project

- Reroute Channel
- Diversion Dike
- Sediment Stockpile
- Reconstructed Combined Flow Reach
- Stabilized Sediment Slope
- Remove Dam
Recent Post Project Photos After Initial 1250+ CFS Peak Flow
Up to 5 Years of Post Project Evaluations

- NMFS-SWFSC: BACI study
- USGS: TSS monitoring
- CSUMB-WMI: Morphological Channel Monitoring & LWD Surveys
- MPWMD: Redd surveys
- Granite & MPWMD: Habitat Typing & BMI
- MPWMD & Cal-Am: SH counts above & below project - LPD T&T @ RM 25, & DIDSON @ RM3
- Potential cooperative PIT tagging & arrays w. MPWMD/NMFS-SWFSC/CSUMB-WMI
Lessons Learned

• Extensive outreach and site tours sustained community support
• On-line presence and live site cameras sustained transparency and community interest
• Be prepared for larger than expected effects of bypass flow losses & construction dewatering/treatment on downstream flow in dryer years
• Be prepared to modify permits to take advantage of water year types to enhance project efficiency & extend work window when feasible
• Feasible construction bypass flow pipes may not be optimal fish passage devices
• Secure Access to large rock and spawning gravel for channel construction far in advance
• Plan to recover or remobilize spawning gravel, if feasible
• Take advantage of the opportunity to do simultaneous river projects, yet avoid compounded risks by planning to manage cumulative impacts
• Design-build requires an extensive team of engaged expert advisors and regulators, with decision-making authority, readily available to make real-time management decisions on necessary project adjustments
What We’re All Striving For

A Steelhead's Journey
by Ben Lovejoy
Old Carmel River Dam
Sluice Gate High & Low Flow Access