Elwha nearshore ecosystem restoration: dam removal and shoreline armor removal

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Elwha Nearshore Ecosystem Restoration: Dam Removal and Shoreline Armor Removal

Jamie Michel and Anne Shaffer, Coastal Watershed Institute; Chris Byrnes, Washington Department of Fish and Wildlife; Dave Parks, Washington Department of Natural Resources

Salish Sea Ecosystem Conference 2018
Dams Alter Sediment Supply

Former 210’ tall Glines Canyon Dam
Removal Completed August 2014

Former 105’ tall Elwha Dam
Removal Completed August 2012
Pre Dam Elwha River Delta

1908

Historical Changes to Estuaries, Spits, and Associated Tidal Wetland Habitats in the Hood Canal and Strait of Juan de Fuca Regions of Washington State. PNPTC, 2006
Sediment Starvation Exacerbates Erosion and Results in \( \frac{3}{4} \) Mile of Armor

1956
Continued Erosion Despite Armor

2011

Photo: USDA Farm Service Agency
Approximately 20,000,000 cubic meters of material behind dams*- approximately 60% is sand/silt, 40% is gravel/cobble.

Photos by John Gussman

Lake Mills  August 2012

*80% from Lake Mills
A. Ritchie, ONP, J. Bountry and T. Randle, BoR
River Delta Expansion
Derelict Armor Inhibits Beach Formation Process
Elwha Nearshore Restoration

Chronic Sediment Starvation Results in Loss of ~20 acre Estuarine Lagoon

Shoreline transition from sand/gravel to cobble/boulder substrate

Derelict armor adversely impacts estuarine/nearshore dependent species
- Spawning
- Foraging
- Migrating

Photo by Tavish Campbell

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Freshwater Bay Deposition

*Freshwater Bay November 2010*

*Freshwater Bay January 2013*
Beach Lake Erosion

1950

2015

(Photo: US National Archives)
Multiple Mobilizations to remove exposed abandoned shoreline armor from 3 acres of tidelands along ¾ mile of beach in front of Conservation Property, Tribal Reservation and Private Landowner.
Beach Lake Acquisition and Restoration Project

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Phase I Armor Removal Demobilization
8/19/2016
Beach Lake Acquisition and Restoration Project

Increase of LWD Recruitment and Retention
1/4/2017 (+4’ MLLW Tide) Material Exposed After Winter Erosion. Note the armor and concrete panels on beach, but also the armor extending out to -2’ MLLW. Project is permitted and funded for multiple phases of armor removal to continue to mobilize as armor emerges.
Sand Engine Technique in Holland

1970’s

Traditional beach and dune nourishment

1990’s

Shoreface nourishment

2011

Localized mega nourishment

Completion of 20 M cubic meter Sand Engine in 2011

Beach Lake Acquisition and Restoration Project

Monitoring Metrics
- Newly Emerged Armor
- Beach Topography
- Beach Sediment Size
- Forage Fish Spawning
- Beach Wrack
- Invertebrates
- Fish Use
- LWD

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Questions/What’s Next?