Pudding Creek IMW – Accomplishment Report

Pudding Creek Intensively Monitored Watershed Overview

Focal Species: Coho Salmon and steelhead
Limiting factors: Lack of slow water winter habitat (over winter survival); lack of high volume summer habitat (low summer growth); hydrologic connectivity.
Restoration strategy: Treat 80% of Pudding creek with large wood (LWD) to improve habitat.

Experimental Design

Before-After-Control-Impact (BACI) design. BACI assumes treatment and reference.

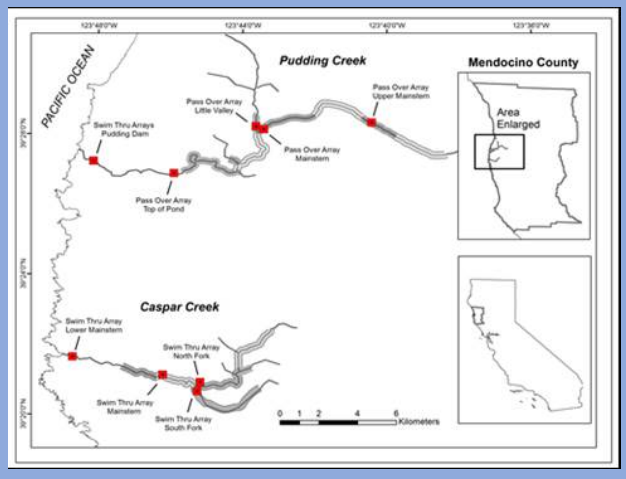
Reference stream with no restoration:

Caspar Creek

Treatment stream:

Pudding Creek

Conditions are dynamic but correlated. Biological pre-treatment monitoring ongoing since 2006, physical habitat monitoring since 2011, restoration treatment summer 2015, post-treatment monitoring to continue trough 2019.



Monitoring Approach

Salmon:

Redd surveys covering known spawning distribution bi-weekly in both watersheds. Annual summer and fall Coho parr and spring smolt abundance estimates via mark-recapture. Coho and steelhead marked with PIT tags which are recaptured or detected at arrays located throughout the watersheds. Marine and freshwater growth and survival. Returning adults captured at Pudding Creek weir December- March and identified (species, sex, tag) before release upstream.

Habitat variables:

Habitat data pertinent to reach-scale change collected by census of the entire watershed annually each winter and summer. Data include unit volume, depth, fish cover, percent slow and fast water, abundance and volume of instream LWD, pool frequency, and mean wetted width.

Restoration Approach

- Process-based, approach with focus on habitat formation and maintenance, ecosystem function
- Restoring watershed resiliency along with quantity and quality of habitat likely to produce measurable response in salmon populations.
- Restore floodplain connectivity and increase amount slow water habitats.
- Increase complexity: restore stream roughness elements (LWD) and processes that will lead to future wood recruitment (riparian restoration and protection).

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Restoration Accomplishments

Pudding Creek:

Biological metrics adult escapement, redd counts, smolt abundance, parr abundance, growth and survival 2006 to 2017. Habitat metrics unit volume, substrate, fish cover, large wood, and CHaMP metrics 2012-2016.

7.5 miles of stream treated with over 425 LWD pieces using accelerated recruitment methods in summer 2015.

Fish Population Responses

Monitoring is ongoing. 2016-17 adult returns were above average.

Habitat/Riparian Responses

- To date, no consistent, directional change in habitat measured at the watershed scale.
- Patterns of annual variability similar among streams
- 2015 wood predicted to produce measurable habitat response over time.

Future Direction

- Answer the question: “Will the addition of large wood generate a measurable increase in smolt production in Pudding Creek?”
- Continued biological and physical habitat post-treatment monitoring through at least 2019
- Better understanding of how large wood addition induce habitat change and how restoration treatments interact with salmonid growth, survival, and production.
- Significant restoration in Pudding Creek, including LWD installation and floodplain reconnection, was completed in 2015; significant physical response expected in the coming years, especially once floodplain reaches new equilibrium.
- Linking project findings from Pudding Creek to other streams in coastal California through improved monitoring.