Monitoring and adaptation management of revegetation in the former Elwha Reservoirs

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Elwha River Revegetation Project

Monitoring and adaptive management of revegetation in the former Elwha Reservoirs

Joshua Chenoweth

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Surface 1: Fine sediments
- Up to 14 m deep
- 0.3 - 2 meters

Surface 2: Coarse, delta sediments
- 2 - 10 m
- Up to 14 m deep

Floodplain
Terraces
Valley Wall
Forest
Surface 1: Fine sediments
- Up to 14 m deep
- 2-10 m

Surface 2: Coarse, delta sediments
- 0.3 - 2 meters

High density and diversity of seed rain
- 150 feet

Density and diversity of seed declines with distance
- 1,300 ft (0.25 miles)

Floodplain
- Valley Wall
- Terraces

Forest
Revegetation Project Overview

- Project goals:
  - Minimize invasive species populations
  - Restore ecosystem processes
  - Accelerate forest development
Revegetation Project Overview

- Adaptively manage the project.
  - Planting phased over 7 years
  - Allow natural regeneration wherever possible!
    - Plant lightly during dam removal
  - Permanent plots to monitor revegetation
Mean bare ground: 75%

Mean bare ground: 83%

Fine Sediment Plot (unplanted): 2012

Coarse Sediment Plot (planted): 2012
Mean bare ground: 29%

Fine Sediment Plot (unplanted): 2013

Mean bare ground: 90%

Coarse Sediment Plot (planted): 2013
Mean bare ground: 6%

3.67 stems per meter square
36,700 per hectare
(14,854 per acre)

Mean bare ground: 83%

0.32 stems per meter square
3,200 per hectare
(1,294 per acre)

Fine Sediment Plot (unplanted): 2014

Coarse Sediment Plot (planted): 2014
Fine Sediment Plots

Mean bare ground: 6%

Unplanted Plot

2014

Planted Plot

Coarse Sediment Plots

Unseeded mean bare ground: 88%

Seeded mean bare ground: 80%

Seeded Plot
Unplanted Plot

Mean bare ground: 1.5%

Unseeded mean bare ground: 81%

Seeded mean bare ground: 58%

Fine Sediment Plots

Coarse Sediment Plots

2015

Planted Plot

Seeded Plot
**Fine Sediment Plots**

- Mean bare ground: 0.6%

**Coarse Sediment Plots**

- Unseeded mean bare ground: 69%
- Seeded mean bare ground: 40%

2016

- Unplanted Plot
- Planted Plot
- Seeded Plot
Fine Sediment Plots
Mean bare ground: 0.6%

Coarse Sediment Plots
Unseeded mean bare ground: 69%
Seeded mean bare ground: 40%

Unplanted Plot

2017

Planted Plot

Seeded Plot
The primary message after 6 years...

- **Sediment texture effects:**
  - Rate of vegetation development
  - Species composition
  - Woody species richness and abundance
The impacts of planting and seeding...

- **Seeding affected:**
  - Bare ground reduction in the coarse sediments
  - Species composition

- **Planting affected:**
  - Woody species composition and richness in both textures
  - Stem densities in the coarse sediment
Questions?