Gravel Augmentation

Current Specifications and Plans

Daily Mean Flow, Trinity River at Lewiston

Gravel Transport at Lewiston Dam
Channel Narrowing and Habitat Deterioration

Lack of gravel supply leads to +Ds
“Restore Fluvial Processes”

Increase sediment storage (TRFE)

Increase coarse sediment transport rates (SAB)

Decrease surface particle sizes (governs the transport rate)
Coarse Sediment Management Plan

Broad-scale planning document, finalized in April, 2007.
Describes potential placement methods.
Identifies placement locations and associated volumes that can be placed.
Inventories potential coarse sediment sources (tailings piles).

Transport Criterion 1

Empirical (sort of) Estimate

\[ y = 0.0003x^{0.245} \]
\[ R^2 = 0.7393 \]

Annual gravel load, best guess: ~ 9,000 tons
Range: 3,000 – 30,000 tons
Transport Criterion 2
Parker Dimensionless Hydraulic Geometry

\[ \bar{Q} = \frac{Q}{(gD_{s50})^{0.5} D_{s50}^2} \quad Q^* = \frac{Q_s}{(gD_{s50})^{0.5} D_{s50}^2} \]

\[ S = 1370 Q^{*1.062} \bar{Q}^{-1.062} \]

\[ Q^* = \frac{S^{0.9416}}{7855} \bar{Q} \]

Annual bedload \( \sim 17,000 \) tons
How much is gravel?
7,000 - 12,000 tons?

Lack of gravel supply leads to \(+D_s\)

Restore gravel supply to restore or maintain a mobile bed surface
Surface Grain Size Criterion
dimensionless hydraulic geometry again...

\[
B^* = 3090000 Q_0^{1.296} \bar{Q}^{-0.296} \\
Q^* = \frac{B_0^{0.7716} \bar{Q}^{0.2284}}{101785}
\]

Channel width (m)

Median surface grain size (mm)
**Recommended Volume/Gradation**

- Coarse sediment additions below Lewiston Dam should average 10,000 – 15,000 tons/yr.

- Eliminating the coarsest fractions (material caught on a 4” sieve) is effective for reducing surface grain sizes.

- 1”-minus material provides fisheries (as opposed to geomorphic) benefits. Inclusion of 3/8”-1/2” material has been suggested (CSMP).
Augmentations:
When and Where?

Short-term: Get gravel in the river NOW at multiple injections points -- dispersion takes time.

Long-term: Maintain target transport rates and surface grain sizes into the future.

Potential long- and short-term sites

- Hatchery job
- Sven Obertson placements
- Deadwood placement
- Cableway placements
- Potential Sawmill processing and long-term placement
- Hoadley Gulch placements
- Potential Lowden processing and long-term placement

Not Shown: Indian Creek processing
This year: Process 10,000 tons at Indian Creek

Finish Hatchery job,
~ 6000 tons

4000 tons split between weir hole and Sawmill outcrop