The Formation and Growth of Gravel Bars in Response to Increased Sediment Supply Following the Marmot Dam Removal

Chuck Podolak
Peter Wilcock

Department of Geography & Environmental Engineering
The Johns Hopkins University

The Geological Society of America
2009 Annual Meeting
Figure 13b. Thickness of gravel deposition following removal of Marmot Dam (Alternative B - Run 1: Average hydrology and grain size)

<table>
<thead>
<tr>
<th>Distance From Marmot Dam (km)</th>
<th>Thickness of Gravel Deposition (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10 days</td>
</tr>
<tr>
<td>15</td>
<td>30 days</td>
</tr>
<tr>
<td>25</td>
<td>60 days</td>
</tr>
<tr>
<td>35</td>
<td>90 days</td>
</tr>
<tr>
<td>45</td>
<td>Initial</td>
</tr>
</tbody>
</table>

- Initial
- 5 days
- 10 days
- 30 days
- 60 days
- 90 days
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- 6 years
- 7 years
- 8 years
- 9 years
- 10 years

Height distribution of downstream bars

- Dam Bar, 80 m downstream
- Slaughter Hole (Rt), 650 m downstream
- Slaughter Hole (Lt), 690 m downstream
- Beaver Slaughter, 920 m downstream
- Gordon’s Bar, 1520 m downstream
- Boulder Garden, 1720 m downstream
- Log Jam, 1950 m downstream

Year
- 2007
- 2008
Long Profile

Distance downstream from dam (km)

Elevation (m)

- 2006 (LIDAR)
- Nov 07 (USGS)
- Jan 08 (USGS)
- Jan 09 (USGS)
- Jul 09 (JHU)

Background Photo: Fall 2008 (490 cfs)
• Height as primary response
• Smaller width & length response
• Bar immediately downstream - different response / different regime?
• Locations match pre-input bars
• Filling in of large clasts
  – Same scale as height deltas
• Some migration
Credits

- Smokey Pittman, Keith Barnard, Logan Cornelius, Cort Pryor, Mike Walkinshaw, Brooke Connell, Kary Danielson – Graham Matthews & Associates
- Rose Wallick, Jon Major, Mackenzie Keith, Charlie Cannon, Rachael Peavler, Rebecca Collins – USGS
- Gordon Grant – OSU/USFS
- Connie Athman – USFS
- Russ Plaeger – Sandy River Basin Watershed Council
- Dave Heintzman, John Esler, Tony Dentel, Tim Keller - PGE
- Bill Doran – Metro Parks
- Greg Stewart, Barbara Burkholder

Funding
- National Center for Earth Surface Dynamics
- US Forest Service
- Oregon Watershed Enhancement Board

Questions / For More.....

www.jhu.edu/marmot
charles.podolak@jhu.edu