Introduction

• Mining History of Resurrection Creek

• Planning Process

• Analysis Approach
  ▶ Existing Conditions of Project area
  ▶ Reference Conditions

• Restoration Goals, Objectives
Introduction

- 2005 Restoration Construction Techniques
- 2005 Project Accomplishments
- Project Monitoring
- Project Goals for 2006
**History**

- Home to one of Alaska’s Early Gold Rushes in 1896

- Hydraulic mining – 1902-1940
Hydraulic mining provided the power needed to process large volumes of alluvial gravels for gold.

High pressure water was used for earth moving.
• Piles up to 25 feet in elevation
• Poor growing medium
• Steep, Constrained Channel
• Mostly riffle habitat
Steps in the Planning Process

- Resurrection Creek Watershed Association Hydrologic Condition Assessment (Kalli and Blanchet, 2001)

- Resurrection Creek Landscape Assessment (USDA-FS, 2001)

- Resurrection Creek Stream Channel and Riparian Restoration Analysis (Bair, Powers and Olegario, 2002)

Steps in the Planning Process

- Public Scoping
  - February 2003
  - June 2003
  - October 2003
Steps in the Planning Process

- Final Environmental Impact Statement
- Project Permitting
- Contractor Selection

Analysis Approach

Disturbed Reference Sites...
Relic Reference Reach

Riparian Conditions:
- Flood Prone Width & Entrainment
- Bar Slope
- Bankfull Width
- Mean Radius of Curvature
- Meander Length
- Riffle Slope

Channel Geometry Equations:

\[ W = 2.37Q^{0.50} \]
\[ L_m = 7.5W_{bnk}^{1.12} \]
\[ R_c = 1.5W_{1.2}^{1.12} \]
\[ BD_m = 2.07 - 0.19 \log (R_c/W-2)^*(XD_v) \]
### Project Area
- **Valley Width / Historic Flood Plain**
- **Existing Stream Channel**
- **Mine Tailings**
- **Palmer Creek**
- **Disturbed Reference**

### Existing Ground

### Disturbed Reference

### CHANNEL MORPHOMETRY

**RESURRECTION REFERENCE REACH**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valley Length</td>
<td>814 feet</td>
</tr>
<tr>
<td>Valley Slope</td>
<td>0.02 (2%)</td>
</tr>
<tr>
<td>Valley Width</td>
<td>705 feet</td>
</tr>
<tr>
<td>Channel Length</td>
<td>1404 feet</td>
</tr>
<tr>
<td>Elevation Drop</td>
<td>16 feet</td>
</tr>
<tr>
<td>THALWEG SLOPE</td>
<td>0.0117 (1.17%)</td>
</tr>
<tr>
<td>Riffle Slope</td>
<td>0.015 (1.5%)</td>
</tr>
<tr>
<td>Rosgen Channel Type</td>
<td>C3-4</td>
</tr>
<tr>
<td>Bankfull Width</td>
<td>55.0 feet</td>
</tr>
<tr>
<td>Bankfull Ave. Depth</td>
<td>1.8 ft</td>
</tr>
<tr>
<td>SINUOSITY</td>
<td>1.7</td>
</tr>
<tr>
<td>LARGE IN-STREAM WOOD/MILE</td>
<td>346 PIECES (&gt;12 IN. IN DIAMETER)</td>
</tr>
<tr>
<td>ENTRENCHMENT RATIO</td>
<td>7.9</td>
</tr>
<tr>
<td>POOLS/MILE</td>
<td>19</td>
</tr>
<tr>
<td>D50</td>
<td>98mm</td>
</tr>
<tr>
<td>Length of Meander</td>
<td>371-551 feet</td>
</tr>
<tr>
<td>Belt Width</td>
<td>197-295 feet</td>
</tr>
<tr>
<td>AVE. BED SHEAR STRESS</td>
<td>6.3-8.3 Kg/m²</td>
</tr>
</tbody>
</table>
Comparison of Reference and Project

Project / Reference Reaches

RESURRECTION CREEK

Project Reach

Reference Reach
Reference Reach
Floodplain and
Side Channels

Entrenchment ratio =
Flood-prone Width / Bankfull Width = 8:1
Side Channels Carry 20% of Perennial Flow

Project Reach
Floodplain and
Side Channels

Entrenchment ratio = 1.1 : 1
Side Channels Carry <1% Flow
Instream Large Wood

Reference Reach
330 pieces/river mile

Project Reach
8 pieces/river mile

Spawning Gravel

Reference Reach
• 1,840 yd² of spawning gravel per river mile

Project Reach
260 yds² / river mile