

**Culvert Monitoring  
 Skinner Creek Culvert  
 Culvert #1237, Road 3462  
 Skinner Creek, Tributary to Canal Creek  
 South Zone (Waldport Ranger District), Siuslaw National Forest  
 June 17, 2004**

**Comparison of Culvert and Stream Dimensions before and after retrofit**

	Prior to Replacement	After Retrofit	July 25, 2005
Stream bankful width	25 feet	25 feet	
Stream gradient	1.99%	1.99%	
Culvert width	192 inches (16 feet)	192 inches (16 feet)	
Culvert length	61.5 feet	61.5 feet	
Culvert type	Pipe arch	Pipe arch	
Culvert slope	0.536%	0.536%	
Drop from culvert outlet to residual pool	1.1 feet	0	
*Distance from streambed to top of inlet:			8.64
*Distance from streambed to top of outlet:			9.05

**Previous Condition**

The width of the existing culvert is 64% of the stream’s bankful width. However, the culvert is in good shape, and the future of this road segment is uncertain. It may be closed at a later date. There was a drop of one foot at the culvert outlet, and the stream was downcut and scoured to bedrock between the outlet and the confluence of the stream with Canal Creek, a distance of 140 feet. The upstream channel was in good shape, and has a pool-riffle morphology (Figure 1).

**Reference Reach Stream Condition**

The stream gradient is 2% with a pool-riffle morphology. The confluence of West Creek and Skinner Creek is approximately 80 feet upstream from the culvert inlet. The Rosgen stream classification between the inlet and confluence is F3. The Rosgen stream classification above the confluence of the two streams is B3.

**New Culvert Design Objectives**

- To improve fish passage
- To eliminate the 1’ jump at the culvert outlet.
- To create a stable streambed downstream from the culvert.

**Design Constraints**

Work with the existing culvert.

**The “Retrofitted” Culvert**

“Retrofitting” the culvert was done in August-September, 2003. The streambed was built up downstream from the culvert outlet for a distance of approximately 100 feet using pit-run angular basalt rock from a quarry (3-6 inches in diameter), and randomly placed boulders. The result was a streambed that looked like a lag deposit from a debris torrent. After one winter, the streambed was still in place, and sediment was being deposited in the lee of the boulders. The streambed aggraded 0.5 feet through the culvert. The streambed below the culvert remained at the same gradient of 1.18% (Figures 2-4).

## **RESULTS**

### **Stream Channel in Culvert**

No material was added to the streambed inside the culvert. After the streambed was built up downstream of the culvert, sands and gravels were deposited inside the culvert to a depth of at least 0.5 feet. (Figure 3, Figure 5).

### **Stream Adjustment Above and Below Culvert**

After one winter, the streambed downstream from the culvert appears stable. No erosion from winter flows was noticed. There was no change upstream from the culvert (Figures 5 and 6).

### **Miles of Fish Habitat Accessible Behind Culvert**

Coho habitat (<4% stream gradient): 2.53 miles  
Steelhead trout habitat (<8% gradient): 3.37 miles  
Cutthroat habitat (<20% gradient): 4.74 miles

### **Fish Response**

No data at this time.



Figure 1. Outlet in Summer 2000 before retrofit

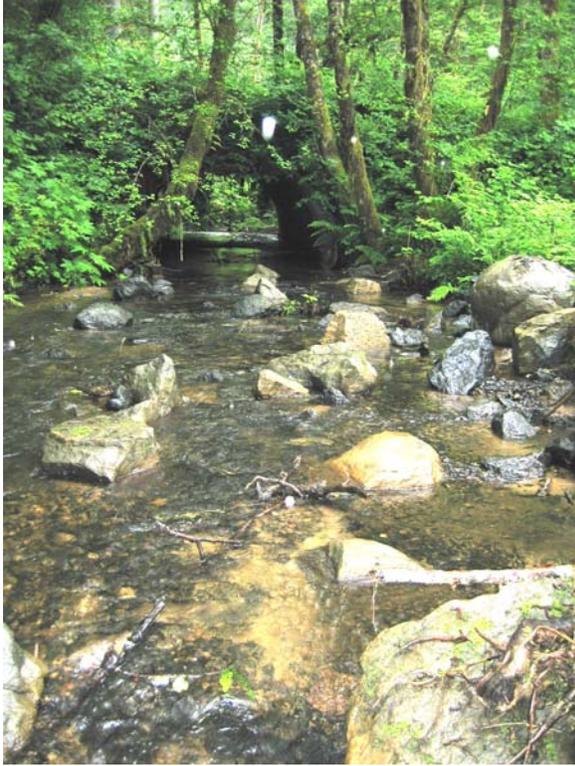


Figure 2. Looking upstream at the culvert outlet after the streambed was built up with angular basalt cobbles and boulders.



Figure 3. Looking downstream through the

culvert at the outlet. Note the sediment that is aggrading on the left side of the photo.



Figure 4. Closer view of the built-up streambed below the culvert outlet. Note the lighter colored fine-grained sediment that is accumulating downstream of the boulders.

**Skinner Creek Longitudinal Profile before and after adding streambed material**

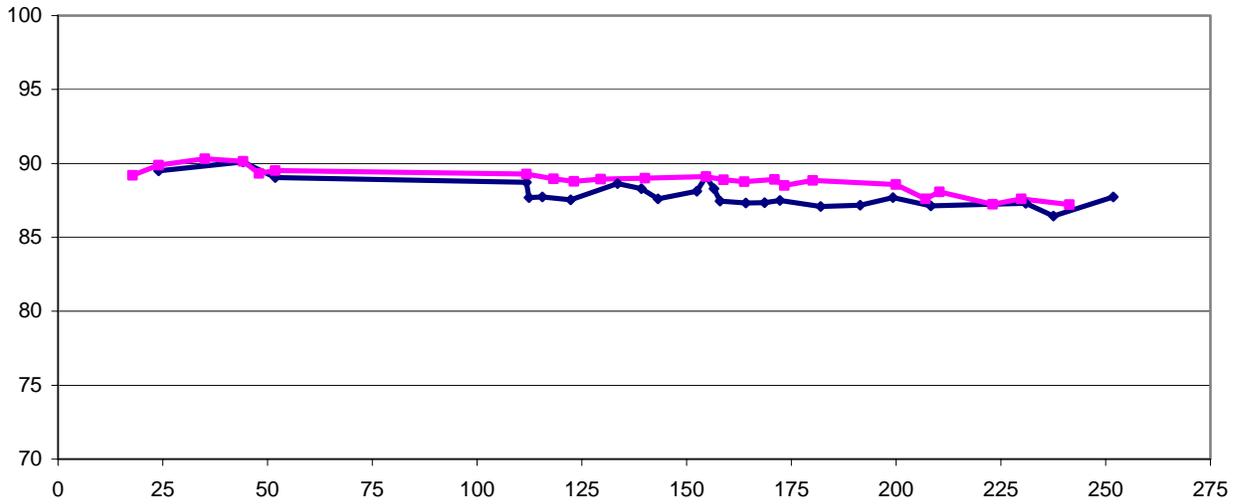


Figure 5. Longitudinal profile of the stream thalweg before the streambed was built up (lower blue line) and the profile after the coarse sediment and boulders were added (higher pink line). Streamflow is from left to right. Scale is in feet.

**Skinner Creek Culvert Cross-Section below Culvert, across added sediment**

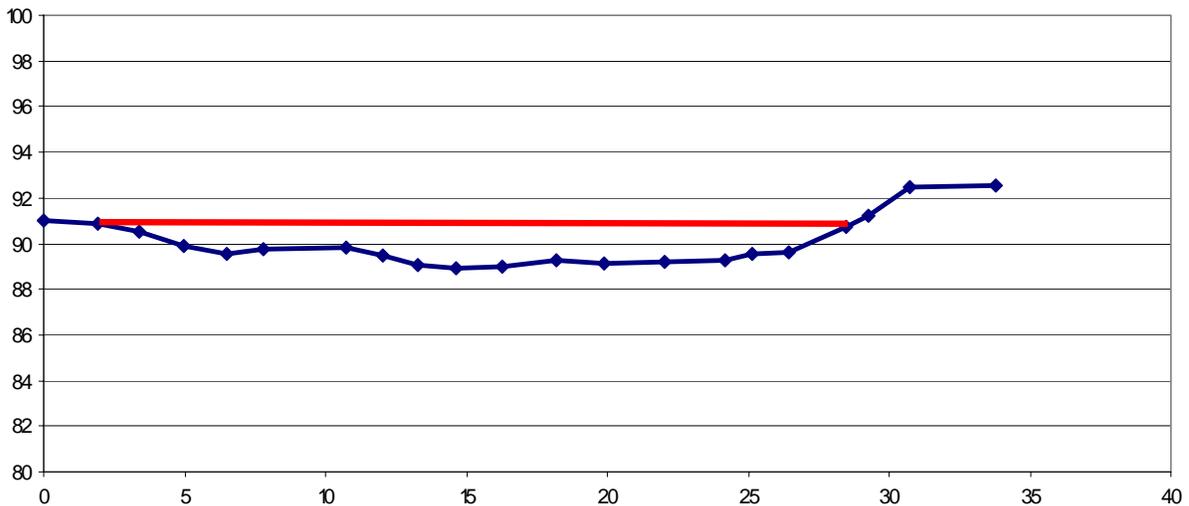


Figure 6. Cross-section across the added sediment in the streambed below the culvert. The red line represents the bankful height and width of the channel.

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