

# Coos Bay Lowland Assessment and Restoration Plan

## Chapter 3: Willanch Sub-basin Restoration Opportunities



Willanch Creek riparian restoration. Photo CoosWA, 2004.

### Table of Contents

Restoration Opportunities .....	2
Prioritization of Potential Actions.....	6

# *Restoration Opportunities*

This section discusses the need for restoration in particular reaches (aquatic habitat survey reaches) within the sub-basin based on survey data analysis, and then introduces restoration priorities within each of four larger regions based on the prioritization scoring system.

Our analysis indicates that the quality of salmon habitat meets some benchmarks but fails others. There is not a definite, predictable pattern across the sub-basin. As demonstrated by the Limiting Factors analysis in Chapter 2, the primary habitat issue in this sub-basin is quality of winter and summer rearing habitats. Key features of winter rearing habitat are off-channel areas where juvenile coho can find refuge from high winter flows. Key features of summer rearing habitat, where temperature is not a priority issue, as in Willanch, are deep residual pools, and channel sinuosity. It will be important to consider how landowners are affected by these habitat issues, and to find ways in which they can each benefit or improve.

## **Temperature and Shade**

Stream temperatures in Willanch creek, although above current standards in the lower reaches, are still within marginal to optimal habitat ranges for salmonids. However, as the quality of other habitat features declines, high temperatures become more stressful to fish.

Long-term data suggest that using planting projects to restore stream-side vegetation in the mid and upper sections of a stream is effective in lowering overall stream temperatures. Taking yearly temperature fluctuations into account, the stream temperatures in Willanch creek have steadily cooled since the planting project in the lower valley reach in 1997.

Riparian shade is lacking on the upper half of the Upper Valley reach, on the lower segments and a couple tributaries to Johnson Creek, the entire Tidal reach as well as a tributary entering the mainstem at the top of the Tidal reach, and the lower section of the Lower Valley reach to the confluence with Johnson Creek. These areas should be planted, especially on the southern banks, to avoid excess solar heating. The areas needing the most riparian planting are largely in agricultural use, especially along the Tidal reach. Therefore, riparian restoration planning will need to consider ways in which agricultural land managers can best integrate riparian management into their operations. Examples of such management practices to consider include the use of appropriate fencing, off-stream livestock watering, noxious weed control, and planning

for the nearby use of heavy farm equipment. Existing should also be protected and managed to continue providing shade in the future.

Riparian planting projects will not only contribute to keeping water cool, but also stabilize banks, catch and filter sediment in run-off, and increase future large wood recruitment.

## **Sediment**

The Willanch sub-basin has high natural sediment production that is accelerated by road-related erosion, improperly functioning culverts, and other land use practices that are adversely affecting drainage of the area. Slope stability is relatively good, with only 13.38% of the sub-basin in the medium to extremely high risk range for naturally occurring landslides. The most unstable banks, 20% unstable, are in the Tidal and Lower Valley reaches and on the Right Fork. Unstable banks contribute sediment to the stream system and may undermine riparian plantings. Bank stability surveys were not done on three tributary reaches and should be sought in the future.

The Willanch sub-basin has a relatively moderate amount of fill at high to very high risk of failure - 1536 yds<sup>3</sup> during a 50-year event. However, the larger problem may be that 18% of the sub-basin's culverts cannot drain more than 25% of their flow during a 50-year event. This means that during rain or storms smaller than 50-year events, culverts are becoming at least partially overwhelmed and causing both sediment build-up and erosion to occur around them.

Confounding the problems caused by high sediment production is the fact that the tide gate at the lower end of the slough interrupts the natural sediment transport mechanisms and therefore, very little sediment is flushed out of the system.

While sand-silt dominated channels are generally expected in lower, low-gradient reaches, the Willanch sub-basin has undesirable high levels of fine sediment in almost all of the reaches. Most of the mainstem reaches, including the headwaters, have more fine sediment in the riffles than gravel. Sediment loading may also be contributing to low residual pool depths.

All reaches meet or exceed benchmark levels of riffle gravel however, the gravel is highly embedded with fine sediment. Four of the reaches, including areas in the upper sub-basin, have more fine sediment in the riffles than gravel. The mainstem reaches with the most riffle sediment also have the lowest pool depths.

Road and landing treatment recommendations (see Table W-11) are site-specific fixes that bring road drainage problems up to date with current, 2003 Oregon Department of Forestry Best Management Practices (BMP). “New structures needed” are based on Oregon Department of Forestry, 2003, Best Management Practices addressing ditch lengths. “Replacement structures needed” address all road drainage features, and are based on the Pacific Watershed Associates Road and Landing Survey Protocol adapted by the Coos WA. Based on the road and landing surveys, Willanch sub-basin needs 52 ditch relief culverts (cross drain pipes) to reduce road related sediment and 24 existing stream crossing culverts need to be replaced. Locations of treatment sites are shown Figure W-19.

Site Type	New Structures Needed To Meet BMP	Replacement Structures Needed
Stream Crossing	46 Cross Drain Pipes	24 Culverts (16 Erosion) (8 Fish Passage)
Ditch Relief	6 Cross Drain Pipes	6 Cross Drain Pipes
Abandoned Road	12 Water Bars	
Totals	64	30

Table W-11 Road & Landing Treatment Recommendations

Of the culverts that need replacing, 16 are rusted out and eroding the road fill under the pipe. The 8 culverts that are listed as fish passage barriers, are either badly undersized or have perched outlets. Five of the fish passage culverts are high priority based upon the potential amount of habitat above the site.

The Willanch sub-basin is one of the sub-basins where surveyed stream crossing upgrades have already begun. Over the last few instream working seasons several undersized culverts have been replaced with

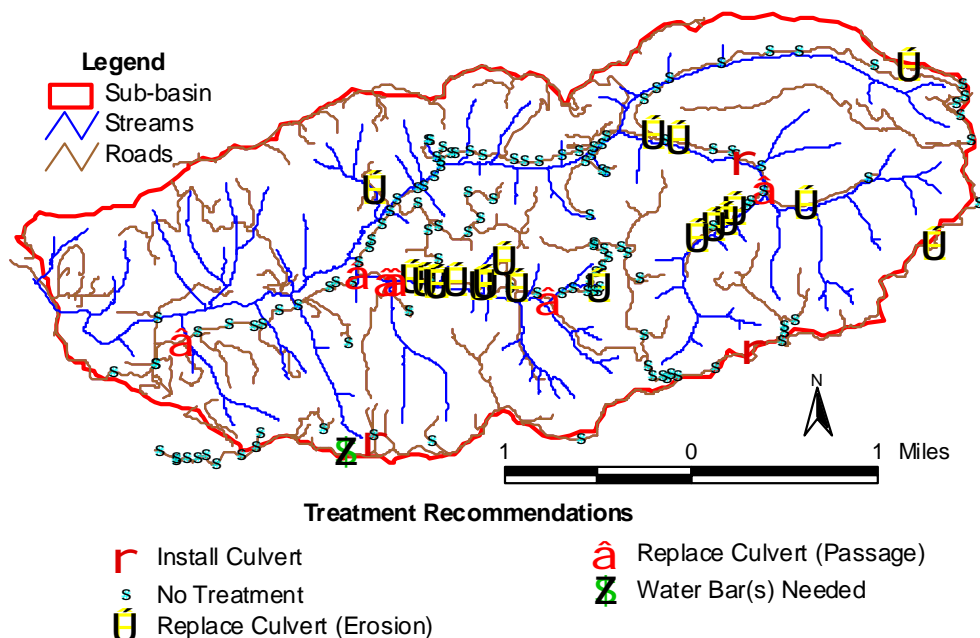


Figure W-19 Road & Landing Treatment Recommendation Locations

bridges. There have been four bridges replaced on Willanch Creek, three of which were replaced in the summer of 2004 and one several years prior. These bridges helped to allow year-round access to spawning and rearing areas for both juvenile and adult salmon. Another of the at-risk stream crossing culverts is a 72 inch culvert up stream from the main forks on Willanch Creek. This culvert drains only 80% of the area above it, and has 650 yds<sup>3</sup> of associated fill. Replacement of the culvert with a bridge would be most beneficial to the stream system however, steep hill slopes at the site necessitate a particularly long-spanning bridge.

### **Large Wood**

Large wood is missing completely in some lower areas of Willanch, gains some in the mid sections of the sub-basin, although still far below benchmark levels, and in some of the smaller, upper tributary reaches there is ample large wood yet almost no key pieces. Large wood and boulders should be placed in the Tidal, Lower Valley, and Right Fork 4 reaches where there is no current large wood.

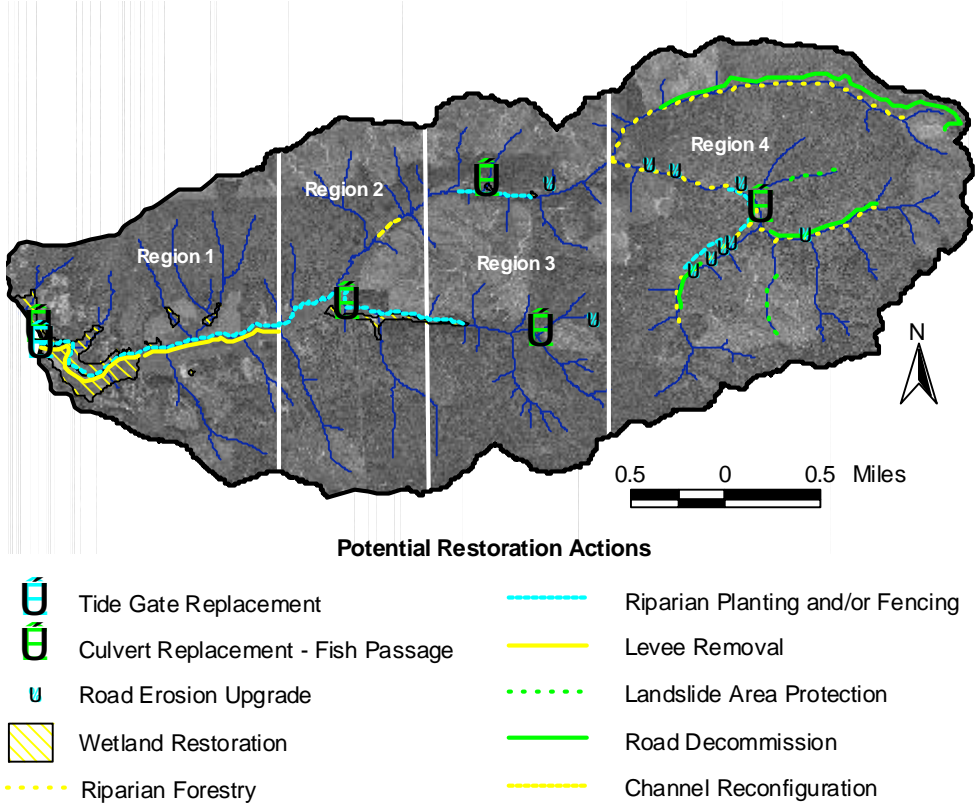
Placement of large wood and boulders will improve summer rearing habitat by creating pools, increasing pool depth by scour action, adding habitat complexity, and enhancing channel sinuosity. Residual pool depths are also below desirable levels in all reaches, and would be benefited by large wood placement. Large wood and boulder placement will improve winter rearing habitat for juveniles by creating secondary or side channel areas, such as alcoves, backwaters, and isolated pools, for fish to find relief from high, fast winter flows. However, large wood placement may not be practical in the Tidal and Lower Valley reaches until banks are stabilized there. Other reaches needing large wood should also be surveyed and treated for bank stability before large wood can be installed.

### **Conclusions**

The results of the watershed health analysis and the concerns expressed by landowners make it necessary to establish positive working relationships in order to develop and implement successful restoration strategies. Effective habitat restoration efforts in this sub-basin will focus on improving summer and winter rearing habitat while addressing sediment loading, stream complexity and concerns of landowners regarding drainage issues. An additional key to successful restoration may be educating landowners about watershed functions such as the relationship between sediment transport and drainage issues. While many actions may influence winter and summer rearing habitats, actions that address both biological criteria, i.e. watershed processes, and socio-economic criteria, i.e. landowner concerns should be considered first.

# Prioritization of Potential Actions

Results of the prioritization process are mapped below in Figure W-20. The colors indicate how the action scored in relation to a threshold of two. Descriptions of the score categories and action types are provided in Chapter 3 – Restoration Strategy.



**Figure W-20  
Potential  
Restoration  
Opportunities**

Potential actions within each region are listed in Tables W-11 and W-12. The color next to each action corresponds to the colors on the map in Figure W-20, and to the prioritization score categories.

## Region 1

Potential actions within Region 1 are listed in Table W-11 and shown in Figure W-20. As the score-derived color coding indicates, replacement of culverts for fish passage is the highest priority potential action in Region 1. Yellow priority level potential actions include levee removal and wetlands restoration. The potential actions of riparian planting and fencing, tide gate replacements, and implementation of farm plans re-

ceived lower scores for biological returns and higher scores for socio-economics. Implementation of farm plans generally applies to agricultural land, and is not displayed on the map in Figure W-20. Red priority level potential actions in Region 1 scored low in both the biological and socio-economic criteria and are not included on the restoration potentials map.

### Region 2

Potential actions within Region 2 are listed in Table W-11 and shown in Figure W-20. The top priority action in this region is culvert replacement for fish passage. Yellow priority level potential actions include wetlands restoration, reshaping the channel, and beaver encouragement. The CoosWA would seek to develop partnerships and education or demonstration opportunities for these potential actions.

Blue priority level potential actions, in which the CoosWA may provide design assistance but not take a lead in funding development, include riparian fencing and planting, willow wall construction, and implementation of farm plans. Implementation of farm plans generally applies to agricultural land, and is not displayed on the map in Figure W-20. The red priority level actions all received low scores for both biological and socio-economic criteria and are highly unlikely to be implemented.

### Region 3

Potential actions within Region 3 are listed in Table W-12 and shown in Figure W-20. Road decommissioning and road upgrades received the highest priority level in this region. These actions are assumed to have both high biological returns and socio-economic favorability and would be generally easier to implement in this region. The yellow priority level actions, beaver encouragement, riparian forestry practices and channel reshaping, are cases in which the CoosWA may seek partnerships and funding development if interest from landowners is shown. Blue priority level actions include culvert replacements for fish passage, large wood placement, riparian fencing and riparian planting. These ac

Region	Potential Actions
1	Culvert replacements (passage)
	Levee removal
	Wetlands restoration
	Riparian planting
	Riparian fencing
	Tide gate replacements
	Implement farm plans
	Ditch maintenance
	Large wood placement
	Tide gate removal
	Levee setback
	Water Conservation
	2
Wetlands restoration	
Reshape channel	
Beaver encouragement	
Riparian fencing	
Riparian planting	
Willow wall	
Implement farm plans	
Large wood placement	
Ditch maintenance	
Bank resloping (no plant)	
Off-channel features	
Water Conservation	

**Table W-11  
Willanch  
Regions 1  
and 2  
Potential  
Actions**

tions scored higher in the socio-economic criteria and lower for biological returns. CoosWA would not take a leading role in developing funding for these projects.

**Region 4**

Potential actions within Region 4 are listed in Table W-12 and shown in Figure W-20. The highest level priority actions in this region are culvert replacement for fish passage, landslide area protection, and road decommissioning. The yellow level potential action is riparian forestry practices. Actions in which the CoosWA would not take a lead role, those that scored lower biologically and higher for socio-economics, include riparian planting and culvert replacements for erosion control.

Region	Potential Action
3	Road decommission
	Road upgrades
	Beaver encouragement
	Riparian forestry practices
	Reshape channel
	Culvert replacement (passage)
	Large wood placement
	Riparian fencing
	Riparian planting
4	Culvert replacement (passage)
	Landslide area protection
	Road decommission
	Riparian forestry practices
	Riparian planting
	Culvert replacements (erosion)

**Table W-12  
Willanch  
Regions 3  
and 4  
Potential  
Actions**