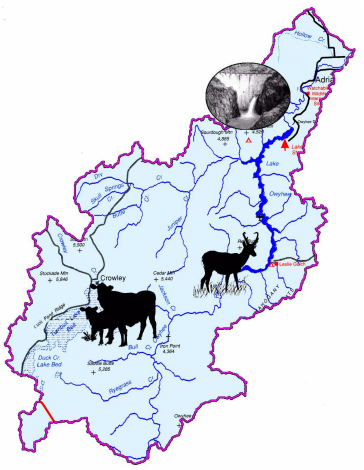

Lower Owyhee Watershed Assessment

Appendix H. Descriptions of channel habitat types in the lower Owyhee subbasin

(From Watershed Professionals Network. 1999. Appendix III-A: descriptions of channel habitat types. *Oregon Watershed Assessment Manual*. Prepared for the Governor's Watershed Enhancement Board, Salem, Oregon)

A. Low Gradient Confined Channel (LC)

LC channels are incised or contained within adjacent, gentle landforms or incised in volcanic flows or uplifted coastal landforms. Lateral channel migration is controlled by frequent bedrock outcrops, high terraces, or hill slopes along stream banks. They may be bound on one bank by hill slopes and lowlands on the other, and may have a narrow floodplain in places, particularly on the inside of meander bends. Stream-bank terraces are often present, but they are generally above the current floodplain. The channels are often stable, with those confined by hill slopes or bedrock less likely to display bank erosion or scour than those confined by alluvial terraces.

High-flow events are well-contained by the upper banks. High flows in these well-contained channels tend to move all but the most stable wood accumulations downstream or push debris to the channel margins. Stream banks can be susceptible to landslides in areas where steep hill slopes of weathered bedrock, glacial till, or volcanic-ash parent materials abut the channel.

1 Channel attributes

Stream gradient: <2%
Valley shape: Low- to moderate-gradient hill slopes with limited floodplain
Channel pattern: Single channel, variable sinuosity
Channel confinement: Confined by hill slopes or high terraces
Oregon stream size: Variable, usually medium to large
Position in drainage: Variable, generally mid to lower in the larger drainage basin
Dominant substrate: Boulder, cobble, bedrock with pockets of sand / gravel / cobble

2 Channel responsiveness

The presence of confining terraces or hill slopes and control elements such as bedrock limit the type and magnitude of channel response to changes in input factors. Adjustment of channel features is usually localized and of a modest magnitude.

a. Large woody debris: low to moderate

In larger forested basins, wood numbers are often low in this channel type. This may be in part due to land management activities, but these channels usually display sufficient energy to route wood downstream. Also, limited lateral movement of the channel reduces the recruitment of wood from bank erosion. Wood is often present in jams or as large single pieces capable of withstanding high energy flows. Even in streams of this channel type that are smaller and display less energy, wood may be routed or retained above the elevation of the bankfull channel, where it has limited impact on aquatic habitat.

b. Fine sediment: low

The confining nature of the landforms that define this channel type tends to focus enough stream energy to route most introduced fine sediment downstream. In basins with high background sediment levels, such as sand and siltstone-bedded channels in the Coast Range, supply may approach or surpass transport capacity, resulting in pool filling and **bed fining**.

c. Coarse sediment: moderate

These channels can be depositional areas for coarse sediment. When the supply of coarse sediment surpasses the transport capabilities of the stream, pools are filled, and the influence of large boulders, wood, and bedrock control structures is lessened. If significant amounts of large sediment are added, the channel is particularly vulnerable to widening, lateral movement, sidechannel development, or scour.

d. Peak flows: low to moderate

These channels have limited floodplain, and are capable of passing most high flows without adjustments to the overall dimensions of the channel. Development of point or medial bars is likely in basins with high sediment loads. Localized bed or bank scour is possible on bends in the main channel.

3 Riparian enhancement opportunities

These channels are not highly responsive, and in channel enhancements may not yield intended results. In basins where water-temperature problems exist, the confined nature of these channels lends itself to establishment of riparian vegetation. In nonforested land, these channels may be deeply incised and prone to bank erosion from livestock. As such, these channels may benefit from livestock access control measures.

B. Low Gradient Moderately Confined Channel (LM)

These channels consist of low-gradient reaches that display variable confinement by low terraces or hill slopes. A narrow floodplain approximately two to four times the width of the active channel is common, although it may not run continuously along the channel. Often low terraces accessible by flood flows occupy one or both sides of the channel. The channels tend to be of medium to large size, with substrate varying from bedrock to gravel and sand. They tend to be slightly to moderately sinuous, and will occasionally possess islands and side-channels. Because of the difficulty in assessing the degree of confinement and the height of stream-bank terraces from maps or air photos, these channels are often misidentified as LC channels unless field-checked.

1 Channel attributes

Stream gradient: <2%
Valley shape: Broad, generally much wider than channel
Channel pattern: Single with occasional multiple channels
Channel confinement: Variable
Oregon stream size: Variable, usually medium to large
Position in drainage: Variable, often main-stem and lower end of main tributaries
Dominant substrate: Fine gravel to bedrock

2 Channel responsiveness

The unique combination of an active floodplain and hillslope or terrace controls acts to produce channels that can be among the most responsive in the basin. Multiple roughness elements are common, with bedrock, large boulders, or wood generating a variety of aquatic habitat within the stream network.

a. Large woody debris: moderate to high

In forested basins, wood alone or in combination with other elements is associated with pool formation and maintenance, bar formation, and, occasionally, side-channel development. These channels may have relatively low wood numbers due to past management activities.

b. Fine sediment: moderate to high

The location of these channels often dictates a high sediment input to the stream. These channels can be sediment deposition zones for larger particles, although a significant portion of the fine sediment may be transported, particularly in bedrock channels. Increases in fine-sediment supply will likely result in filling of margin pool and bed-fining of side-channels and low-velocity areas. Decreases in sediment supply may induce scour in nonbedrock channels or localized bank erosion.

c. Coarse sediment: moderate to high

These channels are depositional areas for coarse sediment. When the supply of coarse sediment surpasses the transport capabilities of the stream, pools are filled, and the influence of large boulders, wood, and bedrock control structures is lessened. If

significant amounts of large sediment are added, the channel is particularly vulnerable to widening, lateral movement, side-channel development, and localized scour.

d. Peak flows: moderate

These channels are capable of passing most high flows without adjustments to the overall dimensions of the channel. Development of point or **medial bars** is likely in basins with high sediment loads, as is side-channel development. Localized bed or bank scour is possible on bends in the main channel.

3 Riparian enhancement opportunities

Like floodplain channels, these channels can be among the most responsive of channel types. Unlike floodplain channels, however, the presence of confining landform features often improves the accuracy of predicting channel response to activities that may affect channel form. Additionally, these controls help limit the destruction of enhancement efforts common to floodplain channels. Because of this, LM channels are often good candidates for enhancement efforts.

In forested basins, habitat diversity can often be enhanced by the addition of roughness elements such as wood or boulders. Pool frequency and depth may increase, and side-channel development may result from these efforts. Channels of this type in nonforested basins are often responsive to bank stabilization efforts such as riparian planting and fencing. Beavers are often present in the smaller streams of this channel type, and fish habitat in some channels may benefit from beaver introduction through side-channel and scour pool development. Introduction of beavers, however, may have significant implications for overall channel form and function, and should be thoroughly evaluated by land managers as well as biologists as a possible enhancement activity.

C. Low Gradient Large Floodplain Channel (FP1)

FP1 channels are lowland and valley bottom channels of large watersheds. They may also occupy uplifted estuaries along the coast. Normally, these channels have extensive valley floodplains and river terraces. Sloughs, **oxbows**, wetlands, and abandoned channels are common in large river corridors. Smaller tributary streams may flow through channels abandoned by the main river. Numerous overflow **side-channels**, extensive gravel bars, avulsions, and log jams in forested basins are characteristic. They may be bordered on one bank by steep bluffs, marine terraces, or gentle slopes.

These channels function as sediment deposition systems, with short-term storage of fine sediment. Fines are typically mobilized during most high-flow events. Small side-channels dissecting the floodplain are common. In-channel wood accumulations are less stable than in smaller floodplain channels due to higher flood flows and greater channel width. Historically, many of these channels that drained forested areas contained significantly more wood than observed today.

1 Channel attributes

Stream gradient: ≤1%

Valley shape: Broad valley, floodplain
Channel pattern: Sinuous, single to multiple channels
Channel confinement: Unconstrained
Oregon stream size: Large
Position in drainage: Bottom, low in drainage
Dominant substrate: Sand to cobble

2 Channel responsiveness

Floodplain channels can be among the most responsive in the basin. The limited influence of confining terrain features and fine substrate allows the stream to move both laterally and vertically. Although often considered low energy systems, these larger channels can mobilize large amounts of sediment during high flows. This often results in channel migration and new channel formation.

a. Large woody debris: moderate to high

Because of the great stream power, only large pieces or accumulations of pieces are likely to impact overall channel conditions. The role of wood and the amount and distribution of pieces is highly variable over time, as high flows regularly change conditions. Single pieces are likely to be associated with pools in sidechannels and localized sediment depositions. Accumulations of wood are often responsible for the creation of midchannel bars and sidechannel development.

b. Fine sediment: moderate

Fine sediment is easily mobilized by most of these channels. Increases in the supply of fines may cause temporary storage and pool filling, but moderate to high flows will mobilize the majority of the sediment. Deposition may be more permanent in smaller side-channels, and pool filling and minor shifts in side-channel location could occur.

c. Coarse sediment: high

Floodplain channels are generally depositional areas for coarse sediment. When the supply of coarse sediment surpasses the transport capabilities of the stream, the channel is particularly vulnerable to widening, lateral movement, side-channel development, and **braiding**. Overall aquatic habitat complexity is reduced as pools are filled and obstructions such as large boulders or bedrock outcrops are buried.

d. Peak flows: low to moderate

Large floodplain channels are usually capable of transporting high flows with a minimum of alteration to the primary physical characteristics of the channel. Flows tend to spread out across the valley rather than cause streambed scour. Localized bank erosion is expected as new channels are developed.

3 Riparian enhancement opportunities

Due to the unstable nature of these channels, the success of many enhancement efforts is questionable. Opportunities for enhancement do occur, however, especially in channels where lateral movement is slow. Lateral channel migration is common, and efforts to restrict this natural pattern will often result in undesirable alteration of channel

conditions downstream. Smaller sidechannels may be candidates for efforts that improve shade and bank stability, but it is likely that these efforts may be more beneficial and longer-lived elsewhere in the basin.

D. Moderately Steep Narrow Valley Channel (MV)

MV channels are moderately steep and confined by adjacent moderate to steep hill slopes. High flows are generally contained within the channel banks. A narrow floodplain, one channel width or narrower, may develop locally. MV channels efficiently transport both coarse bedload and fine sediment. Bedrock steps, boulder cascades, and chutes may be common features. The large amount of bedrock and boulders create stable streambanks; however, steep side slopes may be unstable. Large woody debris is found commonly in jams that trap sediment in locally low-gradient steps.

1 Channel attributes

Stream gradient: 4-8%, may vary between 3 to 10%
Valley shape: Narrow, V-shaped valley
Channel pattern: Single channel, relatively straight similar to valley
Channel confinement: Confined
Oregon stream size: Small to medium
Position in drainage: Mid to upper
Dominant substrate: Small cobble to bedrock

2 Channel responsiveness

The gradient and presence of confining terraces or hill slopes and control elements such as bedrock substrates limit the type and magnitude of channel response to changes in input factors. Adjustment of channel features is localized and of a minor magnitude.

a. Large woody debris: moderate

In larger forested basins, wood numbers are often high in this channel type. Wood is present in jams or as single pieces capable of withstanding high-energy flows. Large woody debris may be the primary element responsible for pool formation and development. In bedrock systems, wood has less influence, and is often transported downstream.

b. Fine sediment: low

The confining nature of the landforms and the higher gradients combine to produce enough stream energy to route most introduced fine sediment downstream. Filling of lateral pools and lower energy areas may result from increases in the sediment supply.

c. Coarse sediment: moderate

These channels are usually transport reaches for coarse sediment, although lower-energy sections can retain sediment and adjust channel dimensions. When the supply of coarse sediment surpasses the transport capabilities of the stream, pools are

filled, and the influence of large boulders, wood, and bedrock control structures is lessened.

d. Peak Flows: Moderate

These channels have limited floodplain, and are capable of passing most high flows without adjustments to the overall dimensions of the channel. Development of point or medial bars is likely in basins with high sediment loads. Localized bed or bank scour is possible on bends in the main channel.

3 Riparian enhancement opportunities

These channels are not highly responsive, and in channel enhancements may not yield intended results. Although channels are subject to relatively high energy, they are often stable. In basins where water-temperature problems exist, the stable banks generally found in these channels lend themselves to establishment of riparian vegetation. In nonforested land, these channels may be deeply incised and prone to bank erosion from livestock. As such, these channels may benefit from livestock access control measures.