

## DOUGLAS CITY REHABILITATION SITE

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Hoop Valley Design Group

This document provides the project area title, a brief description of actions and purpose for each action.

### R-1 HIGH FLOW CHANNEL

Actions Include:

- Construct 1,500 to 2,000 cfs high flow scour channel avoiding large trees (excavation of approximately 2,200 yd<sup>3</sup> of material 1-3 ft deep)
- Plant with wetland and riparian patch types and willow clumps
- Place large wood throughout constructed surfaces.

Purpose:

- Increase groundwater elevations from backside of floodplain
- Improve riparian natural regeneration and planting success
- Increase floodplain complexity
- Provide off channel juvenile rearing opportunities for flows greater than 1,500 cfs

### R-2 SIDE CHANNEL ENHANCEMENT: BANK LOWERING & SHAPING

Actions Include:

- Lower surfaces adjacent to existing and proposed side channel (Excavate approximately 1,500 yd<sup>3</sup> of material varying bench inundation from 450 cfs to 2,000 cfs)
- Plant with wetland and riparian patch types and willow clumps
- Place large wood throughout constructed surfaces.
- Avoid areas of existing vegetation

Purpose:

- Promote off-channel juvenile rearing areas that meet depth, velocity, and cover criteria during winter and spring flows (flow > 450 cfs)
- Provide areas for natural riparian recruitment
- Promote development of patchy riparian vegetation
- Increase floodplain and side channel complexity
- Increase large wood storage

### R-3 SIDE CHANNEL ENHANCEMENT: BANK LOWERING & SHAPING

Actions Include:

- Lower surfaces adjacent to existing and proposed side channel (Excavate approximately 2,000 yd<sup>3</sup> of material varying bench inundation from 450 cfs to 2,000 cfs)
- Plant with wetland and riparian patch types and willow clumps
- Place large wood throughout constructed surfaces.
- Avoid areas of existing vegetation

Purpose:

- Promote off-channel juvenile rearing areas that meet depth, velocity, and cover criteria during winter and spring flows (flow > 450 cfs)
- Provide areas for natural riparian recruitment
- Promote development of patchy riparian vegetation
- Increase floodplain and side channel complexity

- Increase large wood storage

#### R-4 REMNANT INFRASTRUCTURE DEBRIS REMOVAL AND DISPOSAL

Actions Include:

- Remove abandoned and remnant infrastructure (i.e., pipe, concrete, bridge piles)
- Dispose of off site

Purpose:

- Reduce bank and bed armoring
- Enhance / Maintain dynamic alluvial properties within Weaver Creek delta

#### R-5 BANK REVETMENT INFRASTRUCTURE PROTECTION

Actions Include:

- Design and construction of a 'fish friendly' bank revetment incorporating wood and large boulders between HWY 299 bridge piers/abutment and the Weaverville CSD infiltration gallery.

Purpose:

- Protect existing and proposed infrastructure
- Promote pool scour on lower Weaver Creek
- Provide juvenile rearing and adult holding habitat in lower Weaver Creek

#### R-6 INFILTRATION GALLERY FOOTPRINT

Weaverville Community Service District (CSD)

Actions Include:

- Provide permit to allow Weaverville CSD to repair infiltration gallery/water source

Purpose:

- Support Weaverville CSD infrastructure repair

#### IC-1 LEFT BANK SKELETAL BAR, ALCOVE, & LARGE WOOD HABITAT STRUCTURES

Actions Include:

- Place approximately 5,000 yd<sup>3</sup> coarse sediment (3 in to 12 in diameter)
- Incorporate alcove and scour channel along right bank
- Incorporate large wood (1-2 ft diameter in high flow scour channel and head of skeletal bar)

Purpose:

- Promote right bank scour and mainstem flow into side channel
- Increase sinuosity and channel complexity
- Promote pool development on outside of meander
- Provide juvenile rearing areas that meet depth, velocity, and cover criteria for targeted flows (300 to 2,000 cfs)
- Increase large wood storage and retention
- Increase sediment storage and retention

#### IC-2 SIDE CHANNEL ENHANCEMENT: BANK LOWERING & SHAPING OR SIDE CHANNEL EXPANSION

Actions Include:

- Lower surfaces adjacent to existing and proposed side channel (Excavate approximately 2,000 yd<sup>3</sup> of material varying bench inundation from 450 cfs to 2,000 cfs) or lower surface to construct new mainstem channel (Excavate approximately 12,000 yd<sup>3</sup> of material 1/2 meander wavelength, thalweg 2-6 ft deeper than existing mainstem channel)

- Plant with wetland and riparian patch types and willow clumps
- Place large wood along right bank of constructed surfaces
- Avoid existing vegetation or incorporate into design feature
- Remove portions of existing islands to promote mainstem capture

Purpose:

- Increase mainstem channel complexity and sinuosity
- Increase fry and juvenile rearing habitat that meets cover, depth, and velocity criteria for targeted flows (300 to 2,000 cfs)
- Provide areas for natural riparian recruitment
- Promote mainstem deposition
- Increase yellow legged frog habitat
- Increase bed and bank scour
- Increase adult holding habitat

### IC-3 RIGHT BANK SKELETAL BAR, ALCOVE, & LARGE WOOD HABITAT STRUCTURES

Actions Include:

- Place approximately 1,750 yd<sup>3</sup> coarse sediment (3 in to 12 in diameter)
- Incorporate alcove and scour channel along right bank
- Incorporate large wood (1-2 ft diameter in high flow scour channel and head of skeletal bar)

Purpose:

- Promote left bank scour into bedrock to deepen existing adult holding
- Increase sinuosity and channel complexity
- Provide juvenile rearing areas that meet depth, velocity, and cover criteria for targeted flows (300 to 2,000 cfs)
- Increase large wood storage

### IC-4 SIDE CHANNEL ENHANCEMENT: LARGE WOOD PLACEMENT & BAR BUILDING

Actions Include

- Placement of large wood (root balls facing upstream) within existing side channel (wood 0.5-2 ft diameter and >10 ft in length)
- Placement of coarse sediment in existing side channel (approximately 3,000 yd<sup>3</sup>)

Purpose:

- Promote off-channel juvenile rearing areas that meet depth, velocity, and cover criteria for targeted flows (300 to 2,000 cfs)
- Increase channel and floodplain complexity by promoting local bank and bed scour and deposition
- Increase large wood storage
- Increase channel complexity and sinuosity
- Increase coarse sediment storage

### IC-5 MID-CHANNEL BAR AND LARGE WOOD PLACEMENT

Actions Include:

- Place 2-3 large logs with root ball facing upstream (3 ft diameter, 40 ft in length, branches intact, and 8 ft root ball)

Purpose:

- Promote left bank/medial bar deposition and growth
- Increase channel complexity and sinuosity
- Increase right bank and Weaver Creek delta scour

- Increase large wood storage and retention

#### IC-6 MID CHANNEL BAR AND LARGE WOOD PLACEMENT

##### Actions Include:

- Place 2-3 large logs with root ball facing upstream (3 ft diameter, 40 ft in length, branches intact, and 8 ft root ball)
- Place 2,100 yrd<sup>3</sup> coarse sediment (4 to 12 inches diameter) burying log stems and branches leaving root ball exposed

##### Purpose:

- Promote transverse bar development and right bank scour
- Increase channel complexity and sinuosity
- Increase large wood storage and retention

#### IC-7 BANK EXCAVATION (CHANNEL EXPANSION)

##### Actions Include:

- Excavate approximately 3,200 yd<sup>3</sup> of material from right bank to current channel thalweg depth (or deeper) approximately 250 ft long and 20 ft wide at apex
- Place large wood pieces, root balls facing upstream at downstream end of excavation (1-2 ft diameter and >15 ft long)
- Excavate pool at apex of expansion area 40 ft long by 6 ft wide and 6 ft deep)

##### Purpose:

- Promote transverse bar development
- Right bank scour
- Pool formation and scour
- Increase channel complexity and sinuosity
- Increase adult holding habitat

#### IC-8 BOULDER HABITAT PLACEMENT

##### Actions Include:

- Placement of large boulders (4-8 ft in diameter) along the left bank

##### Purpose:

- Promote small pool development through local bed scour and deposition
- Improve existing adult holding along left bank
- Increase channel complexity

#### U-1 UPLAND

##### Actions Include:

- Provide area to place up to 20,000 yd<sup>3</sup> of material excavated from R and IC project areas
- Plate with upland vegetation

##### Purpose:

- Enhance upland vegetation
- Provide future gravel source