

# Logan River at Rendezvous Park, Channel and Floodplain Restoration: Crack Willow (*Salix fragilis*) Issues and Management Strategies

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## Issues

Crack willow is a deciduous multi-stem tree that grows 50 to 80 feet tall and 1 to 3 feet in diameter. Its name comes from the audible 'crack' that occurs when branches break and fall. Easily propagated from broken twigs, this species was brought to North America from Eurasia during Colonial times, and now is invading riverine habitats in Logan, Utah. It escaped cultivation (intended plantings) and spreads easily from twigs and root suckers. Crack willow is considered invasive in 9 States, including Utah.

Originally grown as individual trees in parks for fast growing shade and firewood, crack willow has spread along Cache Valley waterways into monoculture thickets. Crack willow expansion is effectively replacing many native riparian species, dominating the form and function of river channels, and impacting floodplain functions in all Cache Valley rivers. Crack willow thickets appear naturalized because the trees look old and half dead, however most trees are only 30 to 50 years old.

Top ten reasons why crack willow thickets are a problem along the Logan River:

- Grows rapidly and consumes large quantities of water
- Creates dense closed canopy monoculture thickets
- Eliminates protective grasses, sedges, rushes, and forbs from growing on streambanks
- Replaces smaller more functional native shrubs, including species such as coyote willow, yellow willow, peachleaf willow, dogwood, woods rose, and water birch
- Outcompetes and replaces more functional native trees, including narrow leaf and Fremont cottonwoods
- Negatively impacts fish and wildlife habitats
- Prevents natural meander migration and bar development processes
- Causes accelerated bank erosion, downstream sedimentation, and water quality problems
- Grows in channel and reduces flood conveyance capacity, and
- Diminishes floodplain functions

Crack willows are often mistaken as native cottonwood trees, but are not native to this area and functionally are very different. Cottonwood trees more often coexist with other native shrubs, grasses and forbs, whereas crack willows create monoculture thickets. Multiple layers of riparian vegetation associated with cottonwood trees provide habitats for a wide range of native wildlife species; including birds, mammals, reptiles and amphibians. Native riparian vegetation also provides better bank stabilization and filtering functions, which reduces sediment and nutrient loads to downstream reaches of the Logan River and Cutler Reservoir.



Crack willow thicket along the Logan River at Rendezvous Park. Notice a lack of native grasses, shrubs and trees along the streambanks, and many areas of active bank erosion.



In contrast, this bank along the lower Logan River retains diverse riparian vegetation layers. Near water overhanging shrubs improve instream habitat, protect streambanks, and trap sediments while not causing excessive woody debris accumulation in the channel. Multiple canopy layers provide higher quality wildlife habitat.

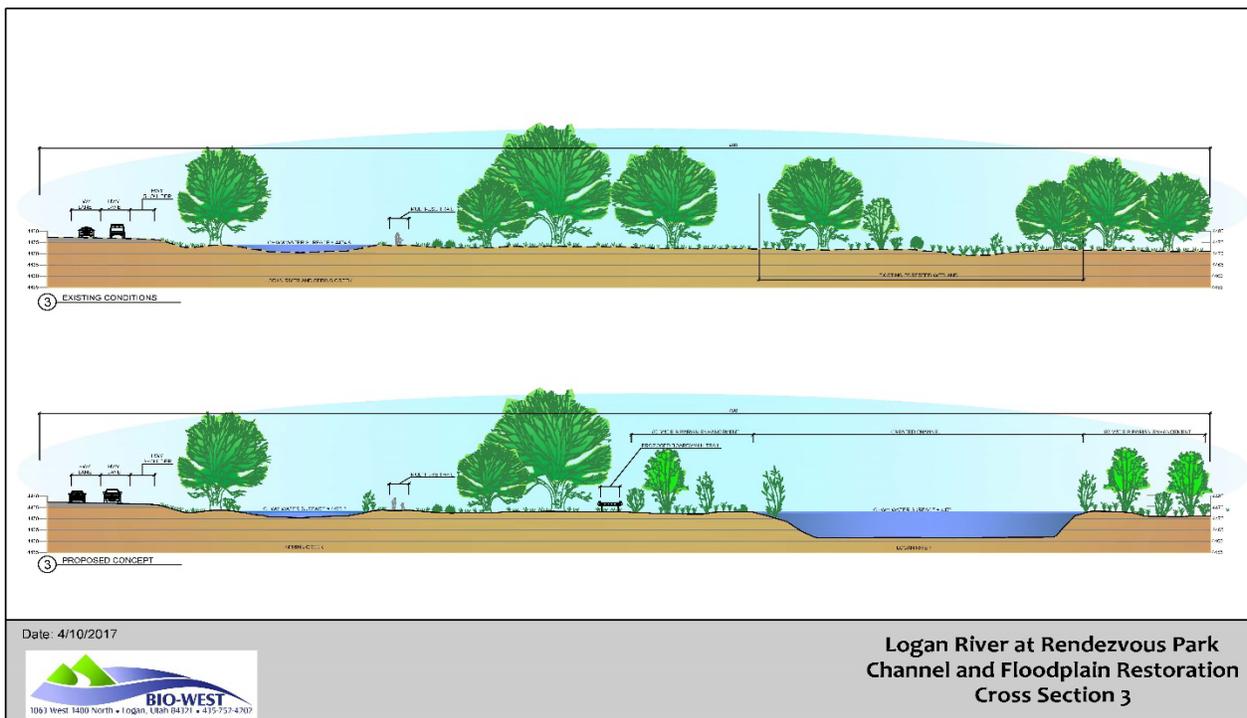
Furthermore, mature cottonwood trees are generally positioned above the bankfull channel on older floodplain surfaces, whereas crack willows occupy a lower position on the streambank, sometimes in the active channel. Streambanks under crack willow trees are usually void of a protective ground cover and exhibit high erosion rates. Undesirable concrete revetment is common near crack willows. The dense root structures and large trunks often cause flow blockages, and increase the potential for full channel avulsions to occur. An example of a full channel avulsion happened during the recent 25-year flood event in 2011 when the river suddenly changed its course across the golf course toward Park Avenue. Play at the golf course was impacted for several months from standing water and sediment deposits.



Crack willow trees are often positioned low in the active channel along the Logan River. The massive trunks cause accelerated bank erosion, and serious flood and safety hazards.

## Management Strategies to Improve Riparian Vegetation Conditions

Logan River Restoration in this reach involves practices to restore channel and floodplain processes to support aquatic, wetland, and riparian habitats within the constraints of the project site (railroad, highway, pedestrian bridges, and golf course). The project will also improve water quality in Logan River and Spring Creek. Additional trails and recreational opportunities are also associated with the project.



The Logan River Restoration at Rendezvous Park project consists of the following construction activities:

- Excavating a new meander cut-off channel between the golf cart bridge and the railroad bridge that provides instream pool and riffle habitat, hydrologic connection to the floodplain (cut-off channel restoration area), and an accessible location to remove sediment accumulations
- Installing an earthen berm in the existing Logan River channel to block flow from entering the re-routed channel
- Creating additional pool habitat at the confluence of Logan River and Blacksmith Fork River (lower channel restoration area) downstream of the existing pedestrian bridge and dog park, and an accessible location to remove sediment accumulations
- Installing instream buried rock field to provide grade control and prevent headcutting and incision at critical points
- Restoring 1000 feet of Spring Creek within the abandoned Logan River channel reach (Spring Creek restoration area) between the present confluence with Logan River and the railroad bridge
- Restoring wetlands along the restored Spring Creek channel (wetland restoration area)
- Enhancing wetland and riparian vegetation conditions in a 50-foot wide corridor along both sides of the new channel alignment
- Removing crack willow deadfall and litter, trash, and bank-hardening material including riprap, old cars, and rebar, within the project area
- Removing nonnative and invasive plant species and replacing and vegetating with native riparian, wetland, and upland seed mixes, and shrubs and trees
- Using best management practices to prevent discharges of construction-generated sediment

To implement the restoration project, all existing standing and downed crack willow trees will be removed within the new channel alignment and within a 50-foot buffer adjacent to the streambanks as shown on the proposed concept map and cross section. This is necessary to re-establish native shrubs along the restored stream channel.

The revegetation plan for the project area will include:

- Pre-project herbicide treatment of undesirable vegetation
- Tree and debris removal (preserving trees along existing trails)
- Project channel and floodplain construction, soil placement, and preparations for revegetation
- Post-project seeding, mulching, and plantings (including community planting workshop)
- Post-project monitoring of indicator condition assessments at the reach scale, and revegetation success at the project area scale, providing on-going management recommendations, and
- Long-term weed control measures to prevent future invasions of crack willow, phragmites, Siberian elm, English elm, Russian olive, thistle, and other invasive weeds

The revegetation plan also includes a long-term cottonwood tree replacement strategy for remaining crack willows, starting with priority trees causing flood conveyance problems and raising safety concerns for trail users. Many of the remaining crack willows within this project area will be removed in future years after replacement cottonwood trees have become established and grown to a height of at least 15 feet. Also, crack willow replacement strategies should occur in the upstream residential and urban reaches to reduce the source of twigs that may cause future floodway invasions.