

### Fleshman Creek – Voyich Reach Stream Restoration & Fish Passage Enhancement



**Location:** Livingston, Montana

**Client:** Private Client and NRCS

**Key Project Elements:**

- ❖ Hydraulic Analysis & Hydrologic Assessment
- ❖ Natural Channel Design
- ❖ Streambed Simulation Culvert Design
- ❖ Bioengineered Bank Stabilization
- ❖ Instream and Riparian Habitat Enhancement
- ❖ Floodplain Restoration



**Project Description:**

This project was a community effort with multiple funding partners including the NRCS, Montana Future Fisheries Program, Park County, the Joe Brooks Chapter of Trout Unlimited and the Livingston School District. Restoration Engineering's principals provided design and construction oversight services for the restoration of the 2,500 foot reach of the Fleshman Creek Channel on the Voyich Ranch property. The project area had historically been used intensively as winter pasture for cattle which resulted in the elimination of riparian vegetation and loss of aquatic habitat complexity. Additionally, the stream channel had been mechanically channelized and entrenched at some point prior to the 1930's.



This Priority I restoration established a new channel alignment at a historic floodplain elevation, reestablishing floodplain connectivity. Due to the lack of vegetation and quality native sod, channel construction methods relied heavily on the use of coir erosion control fabric to create channel banks. An innovative strategy was employed to provide both fish habitat, naturalized vertical bank profiles and bank toe stabilization in channel bends. This treatment involved a stacked log / brush and soil bank toe placed in compacted lifts.



Two undersized culverts that were partial fish barriers were replaced with open bottom arch culverts using streambed simulation designs. As a result, fish passage is now unimpeded throughout the project reach for all life stages at all flows, and the new crossings allow for the stream to function naturally without inhibiting sediment transport and woody debris conveyance.