groundwater table, reduces the riparian area and destabilizes streambanks. If downcutting isn't blocked by resistant geologic formations or man's intervention, it could migrate upstream and potentially disrupt the hydrologic function of the entire watershed.

Where streams with gravel or rock bottoms resist downcutting, laterally unstable stream channels can result from activities that degrade riparian vegetation and otherwise destabilize streambanks. Weakened streambanks are more vulnerable to erosion. The stream channel becomes progressively wider and shallower at the expense of the riparian area and water quality.

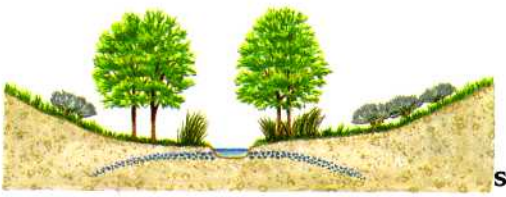
STRUCTURES *treat symptoms of the problem. If used as a substitute for changes in grazing necessary to improve riparian and upland conditions, investments in structures may be wasted.*

PROPER *management of riparian and upland grazing usually is the best, most cost-effective treatment for stream channel instability and watershed deterioration caused by improper grazing. In some cases, instream structures such as weirs, rip rap and gabions can help reduce streambank erosion, stabilize the stream channel, reduce downcutting of the streambed and lowering of the water table, and trap sediment to rebuild streambanks.*

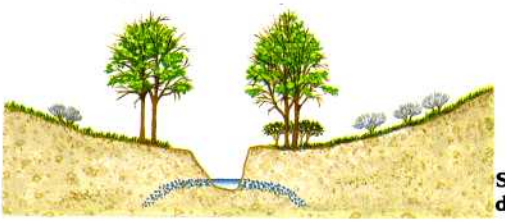
Structures treat symptoms of the problem. If used as a substitute for changes in grazing necessary to improve riparian and upland conditions, investments in structures may be wasted. If improperly designed or deployed, instream structures may accelerate stream channel and riparian damage.

In streams prone to downcutting, instream structures have the greatest payoff when used during Stage 1 conditions to prevent downcutting and keep it from migrating upstream. Instream structures used to combat Stage 2, 3 and 4 conditions can be very expensive to build and maintain and have high risk and rate of failure.

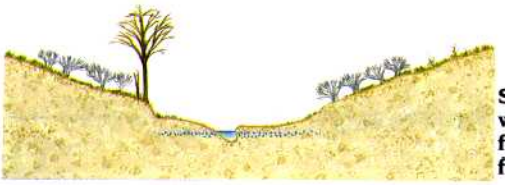
In streams prone to lateral or sideways channel movement, instream structures generally can be justified as a first resort only when there is not enough soil left to support adequate riparian vegetation. Or when the stream channel is so unstable it prevents recovery of the riparian zone within an acceptable period of time.



Stage 1: Unincised

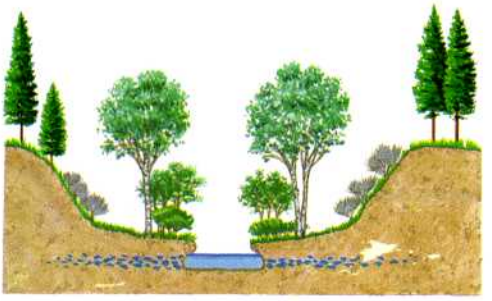


Stage 2: Rapid downcutting

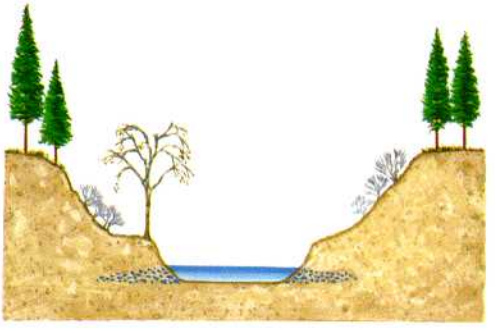


Stage 3: Channel widening and forming new floodplain

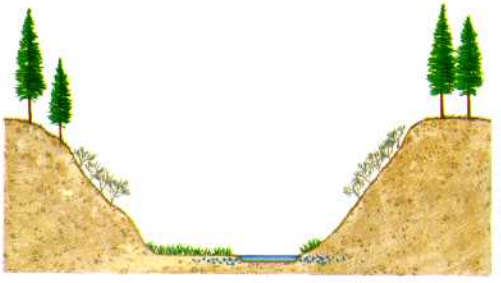
Stage 4: Channel widened enough to form a new stable channel and floodplain



Streambanks and channel in good condition



Stream channel widens and shallows in response to deteriorating upland and/or riparian conditions



Stream channel very wide and shallow; stream moves back and forth in channel until stabilized by vegetation