

Bioengineering Techniques

For Future Site Mitigation

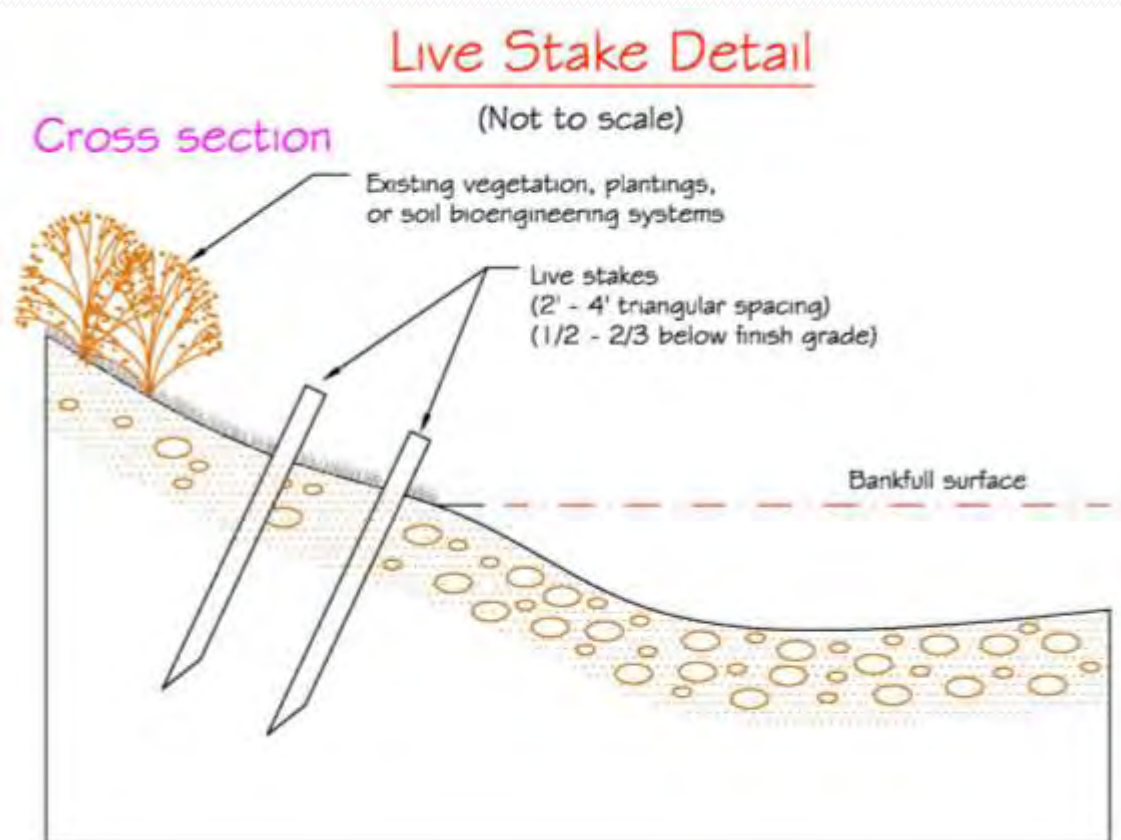
List of Bioengineering Techniques

- Live Willow Stake
- Rip-rap Joint Planting
- Coconut Fiber Roll
- Live Fascine
- Brush Mattress
- Brush Layering
- Vegetated Geogrid
- Live Cribwall

Multiple techniques are often used together to produce a final solution.

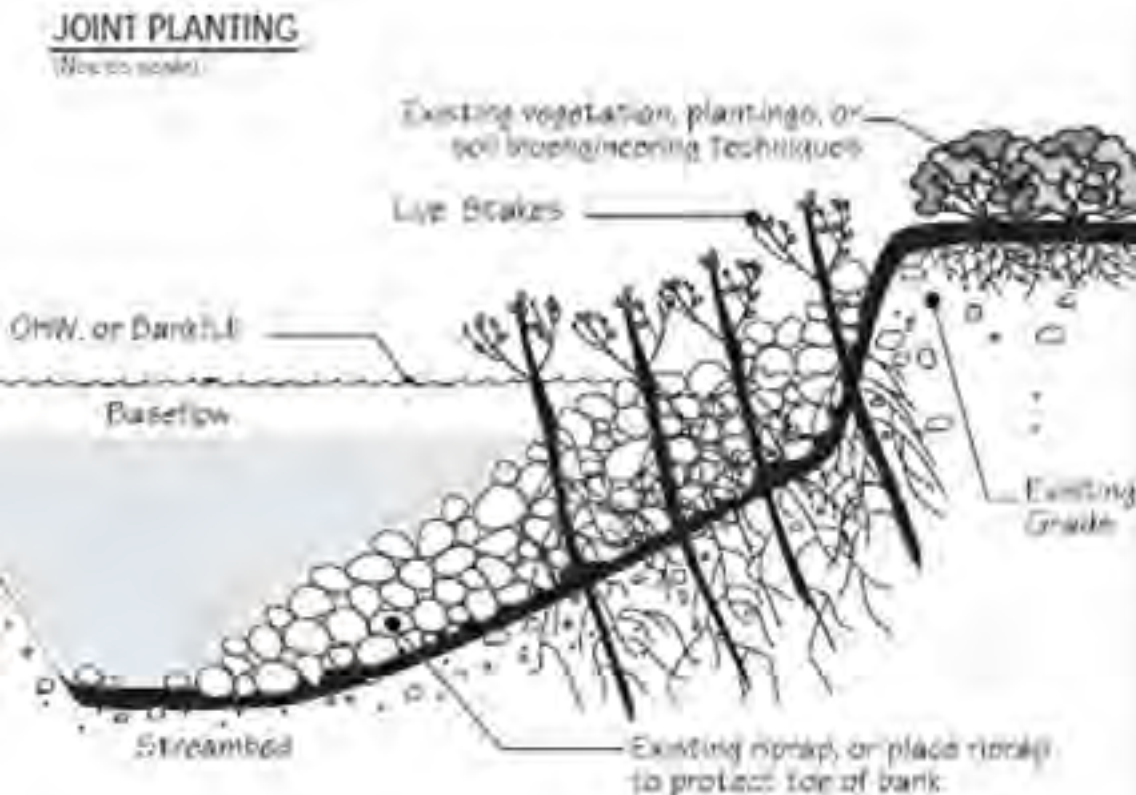
Live Willow Stakes

The placement of dormant woody plant cuttings into the bank as a method of stabilization by the root and above ground growth.



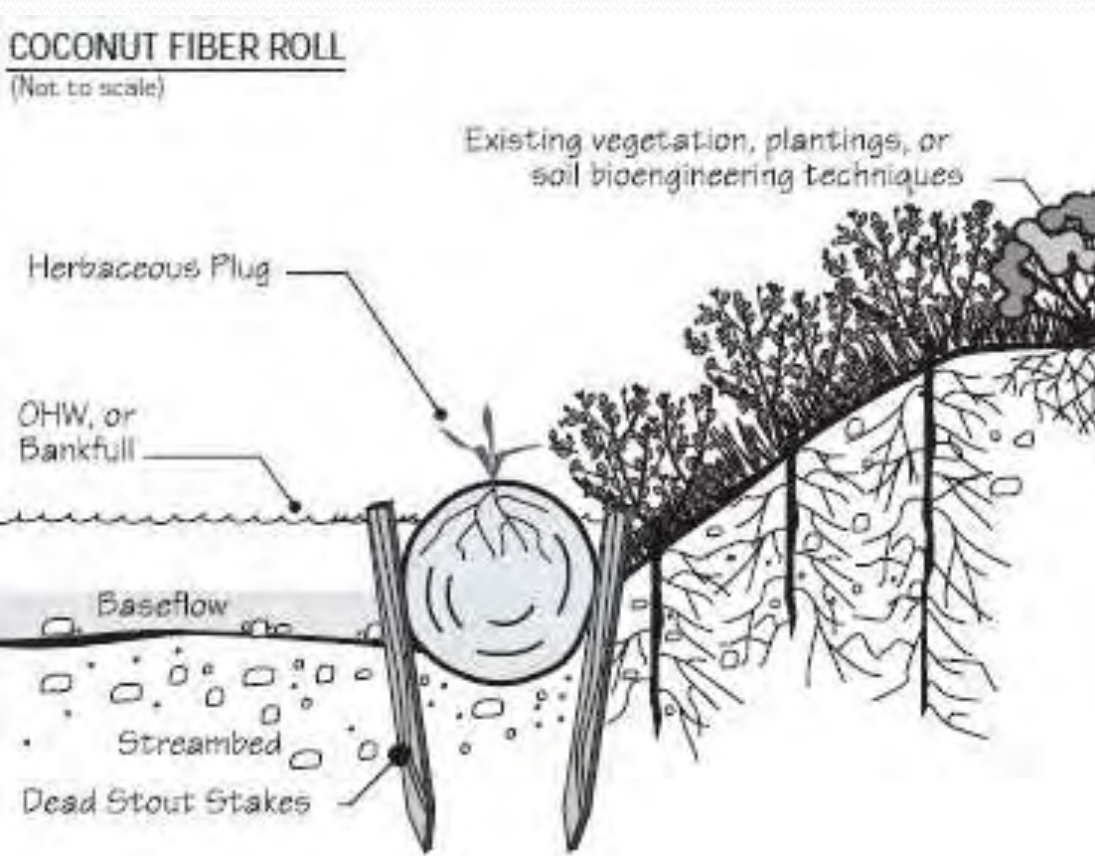
Rip-rap Joint Planting

Disguises and shades riprap, provides habitat and adds additional stabilization to streambank. Can be installed in open spaces between existing rocks or when rock is being placed. Material should be 1.5 inches or larger in diameter.



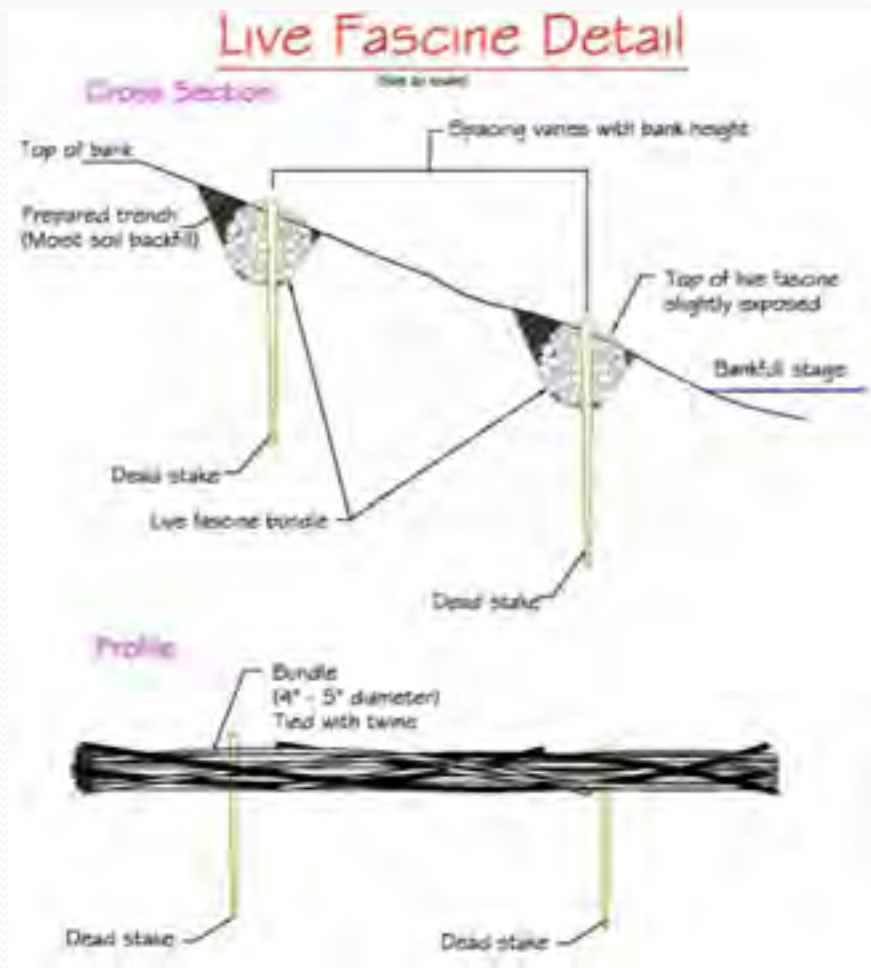
Coconut Fiber (Coir) Roll

Used on hillsides and low-gradient streams and waterbodies to protect the slope and toe. Can conform to bank contour and allows plants to grow in it.



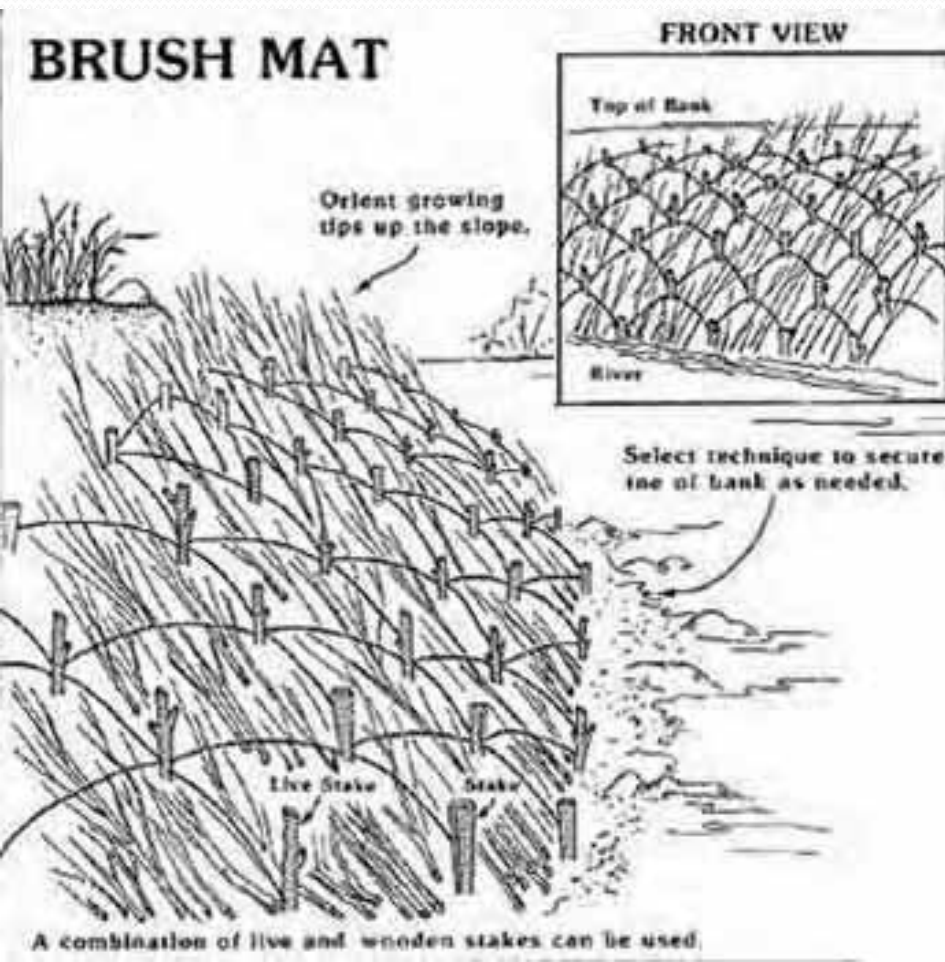
Live Fascine Placement

Bundles of live branches placed in trenches on the streambank to protect the toe of streambank, trap sediment, reduce slope steepness, and slow surface erosion.



Brush Mattress

A layer of dormant branches laid on and secured to a bank surface offering an immediate bank coverage. Typically, it is combined with a toe stabilizing technique such as rock, root wads, live siltation, fascines, coconut fiber logs, or tree revetments.

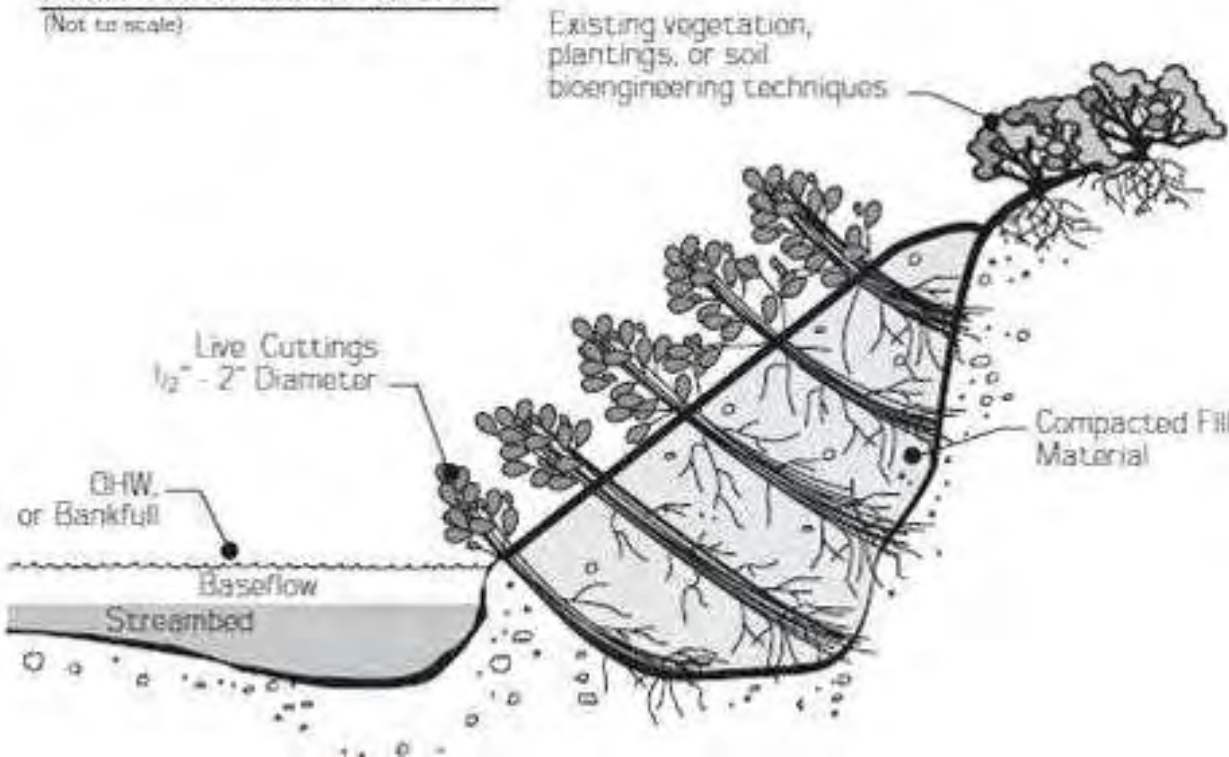


Brush Layering

Laying vegetative cuttings on horizontal benches that follow the contour of either an existing or filled bank (slope).

BRUSH LAYERING: FILL METHOD

(Not to scale)



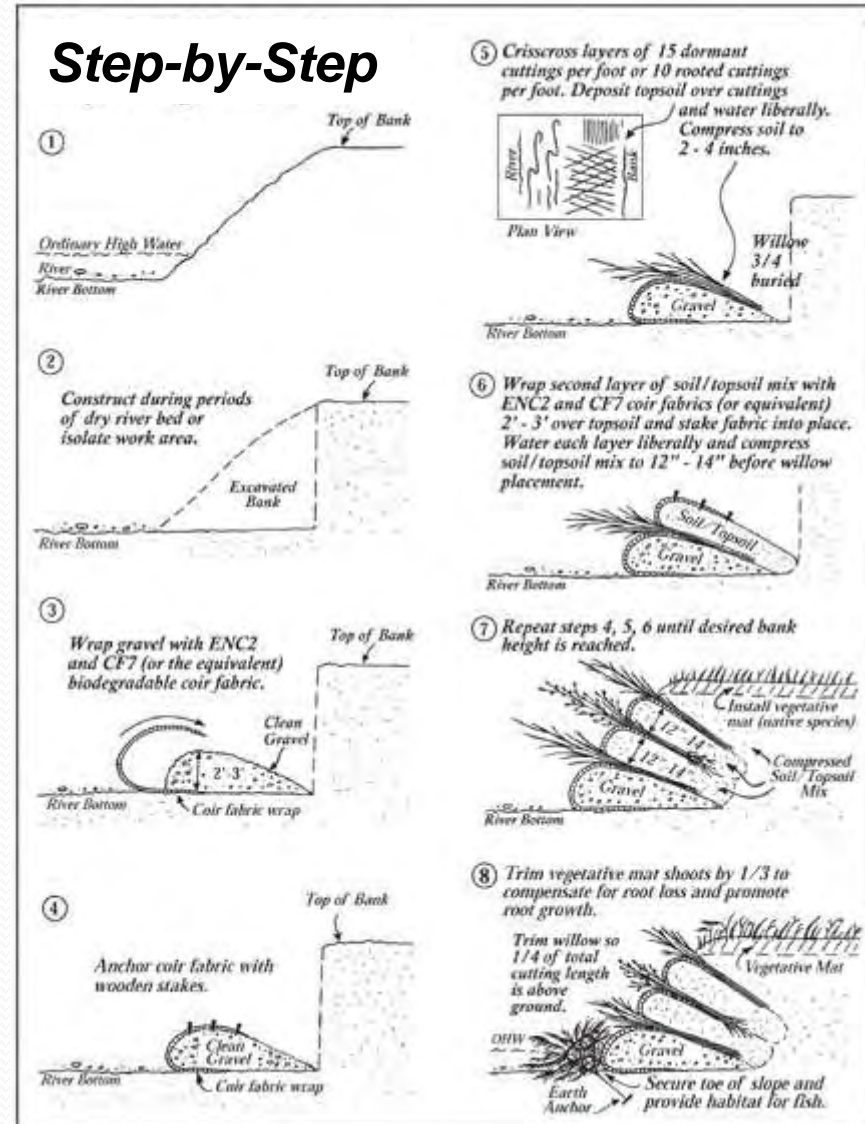
Brush layering with coconut logs.

Vegetated Geogrid

Similar to Brush Layering plus erosion control fabric to wrap the soil between the layers. Live cuttings are placed between the geogrids, and a root structure is established to bind the soil within the geogrid. Can be used on severely eroded slopes up to 8 feet in height where the bank cannot be pulled back to a gentle slope.



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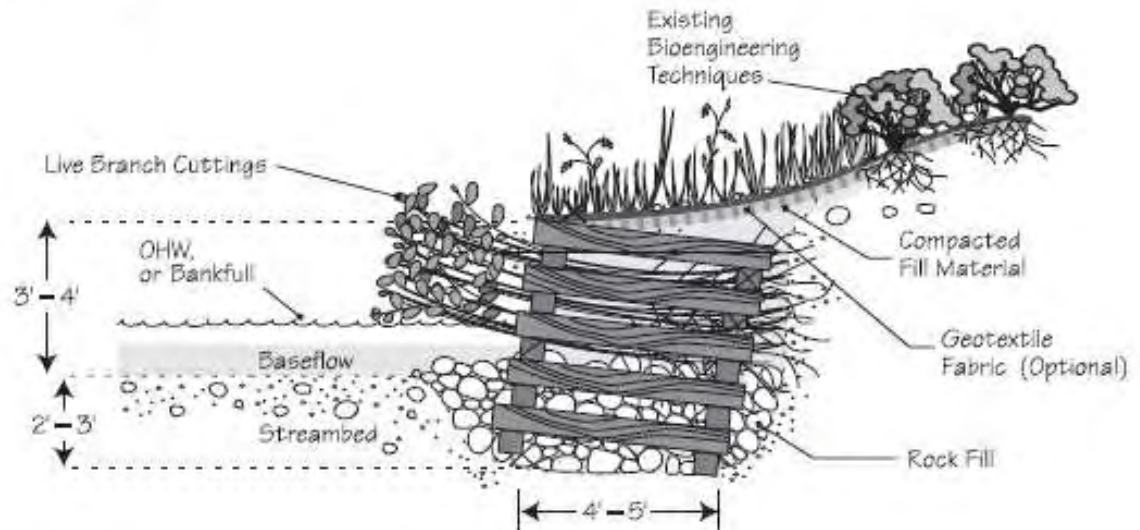
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Crib Wall

A live crib wall is used to rebuild a bank in a nearly vertical setting, but can also be tiered to create a less steep slope. It consists of a boxlike interlocking arrangement of untreated log or timber members. The structure is filled with rock at the bottom and soil beginning at the ordinary high-water mark or bankfull level. Layers of live branch cuttings root inside the crib structure and extend into the slope. Layers of live branch cuttings root inside the crib structure and extend into the slope.



LIVE CRIBWALL
(Not to scale)



Hydraulic Structures

For Future Site Mitigation

- These structures are made of rocks or logs
 - Cross vanes
 - Straight vanes
 - J-hooks
 - Step-pools
 - Hardened Riffles
- If you think you need to install one or more of these contact your local SWCD or NYSDEC office for assistance

Cross Vane



Straight Vane



J-Hook



Step-pool



Hardened Riffle



07-05-11

Hardened Riffle



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Questions?